The Archaeological Foodscape of Roman Kent and Essex

by

Neal Payne

B.A. (Dist., Archaeology and English), Simon Fraser University, 2018

Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts

in the
Department of Archaeology
Faculty of Environment

SIMON FRASER UNIVERSITY
Summer 2020

Declaration of Committee

Name:	**Neal Payne**
Degree:	**Master of Arts**
Thesis title:	**The Archaeological Foodscape of Roman Kent and Essex**
Committee:	**Chair: Mark Collard** Professor, Archaeology
	Sabrina Higgins Supervisor Assistant Professor, Hellenic Studies
	Catherine D'Andrea Committee Member Professor, Archaeology
	Matthew McCarty Examiner Assistant Professor, Roman Archaeology Department of Classical, Near Eastern, and Religious Studies University of British Columbia

Abstract

The material manifestations of the colonial encounters occurring in Roman Britain has been subjective to diverse – and divisive – theoretical and methodological considerations. Situated within this ongoing discourse, this thesis employs occurrence and network analysis to investigate the impact of these colonial encounters in the foodscape of Early Roman Britain. Archaeobotanical and zooarchaeological data were collected from reports of Roman excavations throughout the counties of Kent and Essex. Occurrence analysis was conducted using a site-type approach to reveal differences in plant and animal-based food occurrence. The imported plant foods data were visualized utilizing network analysis. This project reveals that while all site-types had some access to new foodstuffs following conquest, nucleated settlements and villas exhibited more frequent occurrence and greater diversity than the rural sites. The site-type differences in food availability/usage are interpreted as distinct forms of entanglement resulting from the colonial encounters, restructuring the British foodscape.

Keywords: Archaeology of Food; Colonial Encounters; Foodscape; Network Analysis; Roman Britain; Romanization

Acknowledgements

First and foremost, I would like to thank Dr. Sabrina Higgins for her advice, encouragement, and invaluable feedback throughout the development and completion of this thesis. Thank you to Dr. Catherine D'Andrea for her thoughtful advice and guidance. I would also like to thank Dr. Matthew McCarty, from the University of British Columbia's department of Classical, Near Eastern and Religious Studies, for providing valuable feedback that has enhanced this thesis.

This project could not have been completed without generous travel funding provided by the Stavros Niarchos Foundation Centre for Hellenic Studies at Simon Fraser University, enabling data to be collected at the British Museum's Anthropology Library and Research Centre, the British Library, and the University of Oxford's Sackler Library. Additionally, thank you to all of the SNF Centre's members, graduate students, professors, and staff, for welcoming me into their community and providing an enriching experience.

Funding for this project was also provided by Simon Fraser University's Department of Archaeology through a Graduate Fellowship, and the Social Sciences and Humanities Research Council of Canada's Graduate Scholarships-Master's Program.

Table of Contents

List of Tables

List of Figures

List of Acronyms

BCE	Before Common Era (Dating)
Cato, *Agr.*	Cato, *De agricultura*; (Trans.) Hooper and Ash 1934
CE	Common Era (Dating)
Columella, *Rust*	Columella, *De re rustica;* (Trans.) Anon 1745
Gal. *De al. fac.*	Galen, *De alimentorum facultatibus*; (Trans.) Powell and Wilkins 2003
MNI	Minimum number of Individuals (Zooarchaeology)
NISP	Number of Identified Specimens (Zooarchaeology)
Plin. *HN*	Pliny the Elder, *Naturalis historia*; (Trans.) Rackham 1938
RSRB	Rural Settlement of Roman Britain (Database)
Tac. *Agr.*	Tacticus, *Agricola*; (Trans.) Bryant 1942
Varro, *Rust.*	Marcus Terentius Varro, *De re rustica*; (Trans.) Millar 1745

Glossary

Allec	A boneless Roman fish paste created as the by-product of *Liquamen.*
Affiliation Network	A type of two-mode network where nodes of one type can only connect to nodes of the other type. Nodes only relate to each via their affiliation through nodes of the other type. Edges in affiliation networks are most often directed, flowing from one type of nodes to the other type. Typically, these networks are unweighted.
Arborator	Latin name for a Roman worker specialised in the care of fruit trees.
Archaeological Affiliation Network	A type of affiliation network based on archaeological data. Typically, sites constitute one set of nodes, with some form of material culture constituting the other.
Belgic	The classification of Pre-Roman groups from northern Gaul (modern-day Belgium). This cultural grouping evidences strong material cultural similarities to the Pre-Roman tribal peoples of Britain.
Bipartite Network	Alternative name for a two-mode network.
Camulodunum	An iron-age *oppidum* / Roman fort / *colonia* situated within the boundaries of the modern-day city of Colchester. This *colonia* was the original capital of the province, before ceding this position to Londinium.
Colonia	Latin name for large Roman outposts established in conquered territory. Also, a high-status Roman city.
Durovernum Cantiacorum	An iron-age *oppidum* / Roman town situated within the boundaries of modern-day Canterbury.
Edge	A connection between nodes in a network graph. Edges can be directed, showing flow between nodes in only a single direction, or undirect, where the flow between nodes is bidirectional. Edges can be weighted.
Foodscape	Theoretical framework used in this study. Employs multiple levels (micro-, social, physical, and macro-) of interlink influence to discuss food availability in a given location, Roman Kent and Essex for this usage.
Garum	A Roman fermented fish sauce that was used as a table condiment.
Gephi	An opensource software designed for network analysis and visualization.
Holitor	Latin name for a Roman worker specialized in the care of garden vegetables.
Horti	Plural form of *Hortus*.
Hortulli	Latin name for Roman market gardens.

Hortus	Latin name for a Roman garden.
Liquamen	A Roman fish sauce similar to *garum,* used in the cooking process. Could be made of many different types of fish, often concurrently.
Londinium	A Roman settlement along the Thames river, situated within the boundaries of modern-day London. The settlement became the largest in Roman Britain, serving as a major trading hub, and took over from Camulodunum as the capital of the province.
Network	A type of graph that constitutes nodes connected by edges.
Node	The base unit of a network graph. Nodes are connected via edges to form a network.
Roman Britain	The temporally variable geographic area of the British Isles under Roman occupation during the chronological division of the Early, Middle, and Late Roman Periods.
Romanization	A long-standing theoretical approach developed by Sir Francis Haverfield that centralizes the notion of the Romans making non-Romans more Roman. While now widely dispute, Romanization served as British Roman archaeology's major framework for over a century, and its critiques gave rise to the range of subsequent frameworks researchers would employ.
Olitor	Alternative form of *Holitor.*
One-Mode Network	A network that possesses nodes of only a single type.
Oppidum	Fortified Nucleated Settlements from the Iron Age, associated with the La Tiene Culture.
Projection (Network)	A one-mode network that is extracted out of an affiliation network. As there are two types of nodes in an affiliation network, two projections, one for each type of nodes, is formable. Affiliation networks that possess directed and unweighted edges produce projections that possess undirected and weighted edges. The edge weight is determined by the number of shared affiliations between two nodes, or by employing some form of similarity/dissimilarity metric.
QGIS	An opensource geographic information system (GIS) software.
Two-Mode Network	A network that possesses nodes of two different types.
Visualization (Network)	The process of converting a data matrix into a network graph. Additionally, visualization concerns the varying decisions made by the network analyst as part of the visualization process (e.g., what does node size/colour signify within the network).

Chapter 1. Introduction

The island of Britain resides at the periphery of northwestern Europe. While isolated geographically by the English Channel, Britain is visible from the closest shores of the continent (Tac. *Agr*. 10). As the Roman armies progressively conquered the majority of continental Europe, this isolated, yet visible, island became a target of Roman expansionism. After Julius Caesar's failed invasions in the latter half of the first century BCE (Bédoyère 2013:20), the forces of Emperor Claudius completed the undertaking of his dynastic forbearer, achieving their initial foothold on Britain in 43 CE. In the following decades, Roman territory in Britain continually expanded beyond its initial core in the island's southeast, subsuming ever more of Britain's pre-existing tribal populations into the Roman world. This expansion was accomplished through both military and political conquest, the latter of which involved securing client kingdoms of loyal non-Roman tribal groups on the periphery of Roman territory. Through this expansion, Britain became the northwestern-most frontier of the Roman Empire.

The conquest and occupation of Britain established diverse interactions between the Roman's colonizing force and the non-Roman tribal population(s) of Britain. The observation and interpretation of these interactions have been the central theme of British Roman Archaeology for over a century. Historically, this interaction was framed through the lens of Romanization, a model of top-down homogeneous cultural change occurring in Britain during the immediate post-conquest period (e.g., Millett 1990). However, scholars of the late 1990s and early 2000s began to increasingly recognize the inadequacy of this framework for relating the complexities of interactions occurring in Britain (e.g., Woolf 1997; Grahame 1998; Webster 2001; Mattingly 2004). Since Romanization's initial deconstruction, the scholarship of British Roman archaeology has witnessed a growing acknowledgement that contextual research frameworks would be the most beneficial for furthering the disciplinary discourse of Roman colonialism (e.g., Stek 2014; Woolf 2014; Van Oyen and Pitts 2017). Rather than utilizing a predetermined research framework, such as Romanization, these scholars argue that different theories are needed to address different questions, using varying forms of archaeological evidence (Stek 2014:33). Although studies of material culture – particularly ceramics (e.g., Van Oyen 2016) – have been at the forefront of the call for contextual approaches, opportunities exist for other datasets to develop their own theoretical foundations.

The archaeological interest in food is imbedded in the notion that food choice presents a salient reflection of cultural identity (Twiss 2007:3; van der Veen 2014:802; Twiss 2015a:189) with a high degree of archaeological visibility (Beaudry 2013:295). Food choice is imbued with a paradoxical conservatism and adaptability (e.g., Guptial et al. 2013:37; Stockhammer et al. 2018:XIII) that provides archaeologists with the opportunity to scrutinize the perpetuation and exclusion of potential foods as tastes change. As such, scholars are increasingly framing food as a distinctive, and interpretively valuable, form of “embodied material culture” (Dietler 2007:222). The foods which people choose to consume reflect their culturally negotiated identity, manifested through the cultural construction of edibility.

This thesis weaves together the colonial encounters of Roman Britain and the archaeological evidence for food negotiated in this colonized space. Two datasets, archaeobotanical and zooarchaeological foods, were collected from Roman excavation reports in the British counties of Kent and Essex. These food data were examined via a site-type occurrence analysis in an attempt to differentiate patterns in food consumption. A network analysis of the imported plant foods was utilized to analyze the relational interaction occurring in these foods in Roman Kent and Essex as a whole. A visual inspection of this network was then used to substantiate and build-upon the patterns evidenced in the occurrence analysis. The overarching goal of this thesis is to evaluate the Roman impact on the British foodscape. This analysis will contribute to ongoing discussions of colonial encounters in the classical world, archaeological network analysis, and the archaeology of food more broadly.

1.1. Thesis Structure

This thesis is structured into seven chapters. Chapter 2 traces the history of colonialism in British Roman archaeology from the development and proliferation of Romanization to its eventual deconstruction, and the resulting theoretical diversification. Additionally, Chapter 2 also reviews the archaeology of food, exploring two of its major datasets – archaeobotany and zooarchaeology – and its major theoretical shifts. This chapter concludes with an introduction to the concepts of ‘entanglement’ and ‘foodscape’, as each is central to the interpretive framework utilized in this thesis.

Chapter 3 discusses the types of data and methods employed in this thesis; particularly, how the study area and data were chosen, the process – and decisions involved in – data collection, and the occurrence analysis. Additionally, this chapter presents a discussion on the often-divisive usage of historical texts in archaeology, incorporating how critical usage of Roman sources can beneficially provide evidence for taste, differentiating between foods and non-foods. Finally, Chapter 3 concludes with an introduction to the basics of network analysis, the archaeological application of affiliation networks, and a review of the network methods used in Chapter 6 to construct and discuss a network of imported plant foods.

Chapter 4 presents the archaeobotanical food occurrence data. These data have been categorized into five distinct groups, (1) cereals, (2) pulses, (3) wild and locally established plant foods, (4) imported plant foods, and (5) potentially imported plant foods. These plants are both classified and interpreted utilizing historical sources on Roman agriculture and food, as well as the pre-existing archaeobotanical literature. The major site-types are compared for each plant food, with the goal of identifying differences in the archaeobotanical representation of these plants. This chapter concludes with a discussion of Roman horticulture, and its potential role in the dissemination of Roman cuisine, and related cultural practices, into Britain.

Chapter 5 presents the zooarchaeological food occurrence data. These data have also been sorted into five categories, (1) major domesticates, (2) mammalian foods, (3) avian foods, (4) marine and freshwater foods (excluding molluscs), and (5) marine and freshwater molluscs. Historical sources and pre-existing zooarchaeological publications are utilized to contextualize which animals were considered edible foods, and what their presence may reflect about Roman influences on the regional foodscape. This chapter concludes with a discussion of Roman aquaculture, and its potential role in the British foodscape.

Chapter 6 presents the regional insights garnered through the network analysis of the imported plant foods. This network, presented in varying forms, does not employee the zooarchaeological material presented in Chapter 6. Potential interpretive issues and the current limitations of the chosen network software necessitated the choice of a particular subset of data for the network to be explored in the previous chapters of this project (for a detailed explanation see, Chapter 3, sec. 3.4.3). The imported plant foods data was chosen for the network of this study due to the site-type variance that emerged as potentially meaningful during occurrence analysis. This chapter discusses three versions of this network and how each of these versions provide different insights into the underlying dataset. The differing strength of connections evidenced in these networks is framed through the conceptual differences established in the preceding chapters, concerning how foods were incorporated differently at each type of site. This chapter concludes with a discussion of absent network connections, the potential impact of this bias, and possible solutions for future research.

The final chapter of this thesis ties together the theoretical framework and data interpretation presented throughout the study. This chapter reviews the contents of this thesis from a site-type perspective and through three major categories of food: staples, imported foods, and wild foods. The metaphor of entanglement is explored to aid in the interpretation of the diversity evidenced in this study. This chapter, and thus the thesis, concludes with suggestions for how to expand this project in the future.

Chapter 2. Background

2.1. Roman Colonialism and British Archaeology

2.1.1. The Origins of Romanization

Romanization was the driving theoretical force within the discourse of British Roman archaeology for over a century. While numerous researchers have contributed to the deconstruction of this problematic paradigm (e.g., Webster 1996; Woolf 1997; Grahame 1998), subsequent theoretical approaches (e.g. Webster 2001) have been criticized as merely Romanization rephrased (Laurence 2001). Additionally, calls for the reinvigoration of the Romanization debate, and by extension its terminological validity, continue (Versluys 2014; Knappett 2017). Similarly, some scholars intentionally employ Romanization while acknowledging its problematic history and criticisms (e.g., Terrenato 1998; Redfern and DeWitte 2011; Stek 2014); while others persistently argue for the need to redefine the term (e.g., Revell 2010; Dzino 2018). As such, a review of the archaeology of Roman Britain would be incomplete without due consideration given to the development, impact, and lingering influence of Romanization.

Romanization is not a Roman concept (Mattingly 2011:205). Building upon German historian Theodor Mommsen's *Romanisierung* (Hingley 2008:436), Sir Francis Haverfield developed and propagated the concept of Romanization (Van Oyen 2015:207). Haverfield's Romanization was a process of unidirectional (Van Oyen 2015:209) acculturation (Mattingly 2004:7), involving the transmission of civilization from the Romans onto conquered populations. In the archaeological record, this process was embedded in observations of material culture change (Jones 1997:33), with Roman material culture replacing that of non-Roman peoples due to a supposed inherent superiority (Hingley 2016:13). "Haverfield saw the Roman Empire as a benevolent force" (Dmitriev 2009:134), one that beneficially imparted its ideas, identity, and material culture onto other peoples.

Haverfield first invoked these ideas in a 1911 lecture titled, 'The Romanization of Roman Britain' (Hingley 1996:38). Haverfield's lecture presented Romanization as a "model for the process of progressive change", which entwined his vision of Roman Britain with late-nineteenth and early twentieth century notions of progress and development (Hingley 1996:39). Haverfield's moralizing of Roman conquests equated to the European colonial justification of a "moral obligation" to bring civilization to the colonized non-European peoples (Hingley 1993:23-24). By portraying the Romans and their empire positively, the actions of Britain's own empire were both justified and portrayed as beneficial (Hingley 1993:24). The nineteenth and early twentieth century saw the creation of increasing parallels between the British and Roman imperial experiences, parallels which the British used to define their own imperial purpose (Hingley 1999:138).

Alternatively, Sviatoslav Dmitriev (2009:128) sees Romanization's origins not with Haverfield building upon Mommsen, but with Haverfield echoing John R. Seeley's 1869 concept of 'ancient imperialism'. Seeley adapted his view on ancient imperialism from European politics and periodical publications of the mid-nineteenth century (Dmitriev 2009:128), forging a parallel between the British and the Romans. Similarly, Francis Grew (2001:15) draws a number of parallels between the nineteenth-century 'Scramble for Africa' by European powers and the Roman conquest of Britain in 43 CE. While Dmitriev (2009) raises a relevant alternative origin for Haverfield's views, it seems most probable that these potential influences are not mutually exclusive. Rather, I suggest that all of these different influences contributed, though perhaps not equally, to Haverfield's development of Romanization.

Beyond external theorists, Haverfield was also influenced by his time studying Classics at the University of Oxford (Van Oyen 2015:207). Classics had become a powerful vessel through which the indoctrinating rhetoric of British imperialism was instilled into Britain's upper class. Officers of both the East India Company and British military studying at Oxford were required to read Classical texts (Dmitriev 2009:132; Van Oyen 2015:208). The intentional dissemination of colonial rhetoric in the academic world can be directly evidenced by an 1851 Royal Commission which instituted a number of structural changes to both Oxford and Cambridge. This commission is now viewed as a "reassertion of governmental intervention in university curricula" (Van Oyen 2015:207). The Roman Empire was used by the British Empire "not simply as precedent and justification for their own activities, but… as a reference point for the measurement of achievement" (Mattingly 1996:53). Similarly, a focus on Greek colonization also developed in Classical studies during the nineteenth century (van Dommelen 2012:393).

For colonial British officers, the Romans, and to a lesser extent the Greeks, provided a model for their colonial enterprises around the globe.

Drawing together, rather than delineating between, these influences is essential to understanding the origins and historical context of Romanization. Haverfield's Romanization drew from both the work of his predecessors, John R. Seeley and Theodor Mommsen, while reflecting Early Modern colonial policy. Attempting to delineate which of these influences had the greatest impact on Haverfield's Romanization (as has been attempted by Dmitriev 2009) seems to ignore the obvious consideration that there were multiple instigating influences, both social and scholarly, that shaped his theory. As the historiographical works of Richard Hingley (1996;1999;2000) and the occasionally conflicting works of others (e.g., Dmitriev 2009; Van Oyen 2015) have demonstrated, Haverfield's notion of Romanization was as much a reflection of British imperialism as it was of Roman colonial encounters.

2.1.2. The Romanization of Britain

The origin of contemporary perspectives on Romanization are found within Martin Millett's (1990) seminal work, *The Romanization of Britain: An Essay in Archaeological Interpretation*. In this foundational study, Millett (1990) describes the process of Romanization as the purposeful adoption of Roman cultural practices and materials by non-Roman Iron Age peoples, with their elites serving as active agents of material culture dispersal. When compared to Haverfield's Romanization, Millet's approach has been subsequently, and externally, redefined as self-Romanization. This reframing as self-Romanization reflects the notion that these non-Roman elites exercised agency and chose to be Romanized (Mattingly 2004:6). As such, Millett's (1990) Romanization is differentiated from Haverfield's framework on account of the implication of a supposed non-interventionist policy enacted by Romans (Grahame 1998:1), relying on the non-Roman elites themselves to propagate ideas of 'Romanness'. Millett's inspiration from Marxist cultural anthropology, primarily world-systems theory and dependency theory, manifests in agency afforded to the Pre-Roman Iron Age class structure throughout the process of Romanization (Woolf 1997:340). As with Haverfield, Millett's approach was rooted in the material culture of Roman Britain, with an emphasis on the architectural and ceramic evidence (Woolf 1997:340).

Despite terminological similarities to Haverfield's notion of Romanization, Millett (1990:2) frames Romanization as "a two-way process of acculturation", whereby the agency of non-Roman peoples impacted the process of cultural change. In the critiques of Millett's Romanization (e.g., Webster 2001), this mutual exchange is rarely acknowledged. Typically, Millett's (1990) Romanization is framed as retaining the unidirectionality of Haverfield, with different (non-Roman) agents enacting the process of acculturation for different reasons. By acknowledging the bidirectionality of Millet's Romanization, Millet's original publication can be identified as one of the first incorporations of post-colonial theory into British Roman archaeology. However, not all scholars agree with this interpretation; Peter van Dommelen (2014:42) rejects the suggestions that Millett's (1990) Romanization is in anyway post-colonial, given the lack of explicit references to previously published post-colonial works. While it may be incorrect to label Millett's work as truly post-colonial, his identification of provincial differences and deconstructing of homogeneity primed the discourse for the emergence of the post-colonial approaches.

The increased recognition of the mutual exchange present in Millet's (1990) Romanization fundamentally altered the discourse of British Roman archaeology. Respondents to Millet redoubled his emphasis on bidirectionality, while simultaneously questioning the terminological validity of Romanization itself. Some scholars continued to employ the term despite its persistent problems (e.g. Meadows 1995), while others called for a full rejection of Romanization and all of its associated implications (e.g. Webster 1996; Mattingly 1999). Increasingly, scholars (e.g. Webster 1996; Mattingly 1999) recognized the plurality of the archaeological record. Cultural change cannot be deconstructed into a singular pattern of archaeological material, but multiple patterns that were expressed from different instances of change resulting from different interactions (Woolf 1997). The post-Millett critique of Romanization has been termed the 'Romanization debate' for its fractious splintering of discourse into pro- and anti-Romanization positions (Ghisleni 2018:139).

Throughout its history of use, Romanization incurred increasing explanatory power for the changes that occurred in Britain following Roman conquest. Greg Woolf (2014:47) succinctly notes that Romanization problematically provided archaeologists with homogeneous explanations for the change in material culture of conquered territories, linkage between cultural change and imperialism, the foundation of provincial identities, and value-based ideological portrayals of the Roman's power over their subjects (Ghisleni 2018, provides similar categories of criticism for Romanization). For Woolf (2014:47-49), no single explanatory framework can un-problematically encapsulate these diverse usages without becoming reductionist. Notably, Woolf (2014:47-49) is among the scholars who have since rejected the suggested need for a new paradigm to replace Romanization, instead advocating for a contextual approach that has different questions guided by different theoretical frameworks (cf. Versluys 2014). Additionally, these criticisms, while specific to Romanization, resonate with the general deconstruction of culture history and acculturation-based approaches from a vast range of varied archaeological contexts (Ghisleni 2018:139). Romanization did not provide permanent unifying answers to questions of cultural change, and so new theoretical approaches arose.

2.1.3. The Post-Colonial Critique

The demise of culture-history as archaeology's disciplinary paradigm – as a result of the development of processualism and later post-processualism – had little impact on British Roman archaeology beyond increasing concerns with socio-economic and political aspects of change (Van Oyen 2015:213). Even when compared to other the other prominent classical archaeology – that of Greece, Roman archaeology has demonstrated a remarkable insularity and is less reflective of disciplinary trends than its Hellenic counterpart (Woolf 2004:418-419). As post-processualism overtook processualism as archaeology's central framework for many scholars, theoretical approaches in British Roman archaeology remained stagnant and rooted in Romanization. British Roman archaeology began its first major transition since the development of Romanization in the mid-to-late 1990s. This transformative period saw the rise of a diverse body of theoretical approaches that would be presented under the banner of post-colonialism. These reactionary approaches employed post-colonial discourse in order to engage with the limitations and overgeneralizations of Romanization.

From a political perspective, post-colonialism is "defined as the end of formal domination" (Dmitriev 2009:149). Post-colonial theory is centered around the "representation and discourse" (van Dommelen 2011:2) of formerly colonized peoples. As such, post-colonial Roman archaeology sought to give representation to the underrepresented – that is, non-Roman – perspectives and provide a critical deconstruction of Roman colonial discourse. This emphasis on representation is also highlighted by David Mattingly (2004:22), who states, "[d]ifferent groups in Britain lived different lives, and many of them lived in rather different worlds from that conventionally emphasized by historians and archaeologists". The post-colonial approaches commonly sought to bring these ignored groups and perspectives to the foreground of archaeological research. Further, the archaeological application of the post-colonial ideal is important because the non-Roman peoples subsumed within the Roman Empire are exceedingly absent from the literary sources, and those who did publish texts most likely benefited from the empire the most (Hingley 1996:42-43). Thus, post-colonial theory provided Roman archaeologists with the opportunity to re-orient their discourse and explore the plurality of identities that existed in the Roman world.

A diverse range of theoretical approaches have been subsumed by the broad categorization of post-colonial Roman archaeology. British Roman archaeologists applied concepts and developed research projects that overtly challenged the traditional Romano-centric history of Roman Britain, bringing the 'other' into the foreground of discussions (Gardner 2013:4). Andrew Gardner (2013:4) divides the post-colonial approaches that are applied to the Roman world into three broad categories: representation, colonial discourse analysis, and studies of identity. Representation approaches centralize what is termed 'Nativist' reinterpretations, which are active attempts to foreground the non-Roman perspective and resistance to Roman occupation (Gardner 2013). Colonial discourse analysis, on the other hand, examines the ways in which colonial power is enacted through language, and in archaeology, through material culture (Webster 1996:6). Much of the colonial discourse analysis was conducted through post-colonial readings of Roman period texts (Garnder 2013:4). Unlike Gardner (2013), Webster (1996:6) does not create a division between the representation and colonial discourse analyses. Instead, Webster (1996:6) notes that 'Nativist' reinterpretations emerged out of colonial discourse analysis to bring alternative voices to this historical narrative. These interpretations were based on the scholarship being produced in the newly independent former colonies of the European empires, where the overt influence of colonialism was clearly evident in everyday life.

The scholarly works focused on representation and colonial discourse approaches have engendered an element of resistance, or counter-acculturation, when attempting to decolonize the past (Jiménez 2008:15). While potentially beneficial, a disproportionate focus on resistance leads to framing any lack of Roman material culture as an explicit act of resistance by non-Roman peoples (Jiménez 2008:16). This approach perpetuates a simplistic reversal of Romanization and reaffirms the notion that the adoption of Roman cultural material equates to the adoption of Roman identity (Laurence 2001:97), a central narrative of Romanization. Archaeologists must acknowledge that the changes evidenced in the archaeological record demonstrates neither “Roman 'domination' nor native 'resistance', but rather expose the [complex negotiations of] social politics… [in]… Roman Britain” (Grahame 1998:8). As such, the need for greater nuance in correlating archaeological material to specific groups has led to an enduring emphasis on identity in British Roman archaeology.

Identity, the third approach identified by Gardner (2003), has seen the greatest proliferation throughout the archaeological scholarship on Roman Britain. Scholars stymied by the normative approach of Romanization began looking for more complex ways to explain the colonial encounters occurring in Britain (Gardner 2013:4). The first major theoretical framework for discussions of identity came from Greg Woolf (1997) who focused on unity and disunity in Roman culture. Woolf (1997) proposed that conquered societies were drawn into a complex Roman cultural dynamic, whereby both groups acted as vessels of persistent bidirectional change. Unlike the Romanization framework, the impact of Woolf’s (1997:347) proposed interaction was felt not only by the conquered population, but also by Rome. For Woolf (1997), colonial encounters were as impactful on the colonial culture as they were on the colonized culture and population.

The second major post-colonial framework proposed to replace Romanization and centralize identity came from Jane Webster (2001), who brought the notion of creolization to British discourse on the Roman Period. Webster’s (2001) creolization was drawn from linguistic applications in the New World and blended the process of acculturation and interculturation (Hawkes 1999:90); wherein a distinct new provincial culture is produced through the interaction between colonial (Roman) and non-Roman groups (Webster 2001:218). Although it is in many ways similar, Webster’s (2001) creolization is differentiated from Woolf’s (1997) approach given her explicit focus on provincial culture and a lack of engagement with how these colonial encounters may resonate within the culture of Rome itself.

The third major post-colonial theoretical framework to emerge was David Mattingly's (2004) 'discrepant identity'. First published in his article "Being Roman: Expressing Identity in a Provincial Setting" in the *Journal of Roman Archaeology,* Mattingly (2004) has made several explicit attempts to promote the concept in subsequent publications, including *An Imperial Possession. Britain in the Roman Empire* (2007) and *Imperialism, Power, and Identity: Experiencing the Roman Empire* (2011). Discrepant identity diverges from Romanization's perpetual focus on patterns of similarity, by centering patterns of regional differences in the archaeological record to extrapolate diverse experiences of Roman colonialism (Mattingly 2004:9). This approach "recognizes the essential dynamism of cultural process", that "cultural effects varied over time and space and across society" (Mattingly 2011:273), allowing researchers to avoid the previously strict dichotomy of Romans versus non-Roman peoples (Goldberg 2009:191). Through discrepant identity, Mattingly foregrounded the need to recognize the diverse identities that coexisted in Roman Britain, forcing a re-evaluation of "being Roman" from a highly specific to highly contextual description (Taylor 2013:172). Mattingly was not operating in isolation, his approach is firmly situated alongside other post-colonial perspectives emerging in the late 1990s and early 2000s (e.g., Woolf 1997; Grahame 1998; Webster 2001). In particular, discrepant identity reflects aspects of Woolf's (1997:341) earlier call for an emphasis on the "system of differences" for the study of identity that could reveal the "cultural logic of empire".

Beyond Mattingly's own usage of the concept, discrepant identity has been used to explore several topics in Roman archaeology, such as, the unique manifestation of temples with both Celtic and Roman features in Roman Britain (Goldberg 2009). Despite limited usage by other scholars, many have been eager to highlight the issues with this framework (e.g., Fulford 2007; Versluys 2014). Mattingly's (2004) discrepant identity, like Webster's (2001) creolization, is often categorized as a linguistic-based approach to the archaeological record (see, Ghisleni 2018:142). These linguistic approaches are criticized for disengaging their theoretical underpinnings from the fundamental political and historical contexts to which that they were developed to explain (Palmié 2006:435,447). Discrepant identity, like creolization, it is entwined with a specific discourse – that is, Early Modern/Modern colonialism.

Moreover, Mattingly's application of discrepant identity is also criticized for merely replicating Romanization's binary division of 'Roman' and 'other' (Fulford

2007:368) and, by-extension, its conformation to the historical record (Pitts 2007:709). Interestingly, Mattingly (2011:203-204) is weary of Webster's (2004) creolization approach for a similar reason, suggesting it could lead to a simple reversal of Romanization's top-down elite focus to a bottom-up lower class focus. In his second work focusing on discrepant identity, *An Imperial Possession: Britain in the Roman Empire,* Mattingly (2007) presents a more direct focus on aggregate group identities, such as: military, rural, and urban. This broad grouping is potentially problematic because it perpetuates a simplistic categorization of peoples in Roman Britain; however, it aligns with a broad swath of archaeological studies of Roman Britain (e.g., van der Veen et al. 2007, uses this categorization as the basis of dividing society in Roman Britain in her study of changing plant food usage over time). Even though he is critical of Mattingly's lack of an explicit methodology and choice in terminology, Michael Fulford (2007:268) acknowledges that discrepant identity – and its focus on diverse regional identities – holds the potential to express the often-ignored diversity of the Roman world.

The post-colonial approaches to British Roman archaeology have been met with a number of common criticisms, most recently criticizing these frameworks for their anti-colonialism (Versluys 2014; and to a lesser extent, Breeze 2018). This anti-colonial reframing implies a bias to misrepresent, or evade, important – and potentially unsavory – aspects of the Roman world, such as, military conquest, slavery, and violence (Gardner 2013:6). While this criticism has been levelled against the wider body of post-colonial approaches, Mattingly (2011) has responded to similar accusations of an anti-Roman bias by stating that his "view is critically analytical, not negatively prejudiced". Further, he states that such a suggestion, "grossly distorts my position, but, more seriously, the implication appears to be that pro-Roman bias, however subconsciously hidden in our academic discourse, is not something to be concerned about" (Mattingly 2011:274-275). Webster (1996:6) also noted that the post-colonial approach was "not anti-colonialism", but a "critique of processes by which 'knowledge' about the colonial Other was produced". In part, this criticism is linked with the discourse's broader shift from research focusing on the military and urbanism, towards the rural and previously underrepresented populations (see, Breeze 2018, who is concerned with the discourse's shift away from the military). While both the military and urban dwellers played essential roles in colonial encounters, the rural population is similarly worthy of consideration. In the western Roman provinces, including Britain, the rural population is believed to have constituted at least 80-90 percent of the total population (Taylor 2013:173). Previous research in Roman Britain has had a "tendency to overemphasize the military nature of rural sites" (Mattingly 1996:54). As such, the scholarship of Roman Britain could benefit from a focus on the rural majority.

Despite a proliferation of different theoretical approaches, no single post-colonial approach has gained widespread acceptance by scholars (Pitts and Versluys 2015:6). Rather, these theoretical frameworks have a paradoxical history of competition and cross pollination, evidenced in the intricate cross-references between many of these works (e.g., Mattingly 2004, citing Webster 2001). And while this diversity has allowed various new perspectives to flourish, some scholars (e.g., Versluys 2014) seem to struggle with this disunity and the lack of a guiding paradigm in British Roman archaeology.

The lack of a singular unifying theoretical framework in British archaeology reflects a similar trend in the theoretical approaches found in the broader discipline of archaeology. The previous dominant paradigms of archaeology, processualism and post-processualism, have eroded, diversified, and amalgamated into new approaches. The deconstructing and merging of processual and post-processual frameworks have been framed differently by different authors; for example, it has been termed, hybridity (Hodder 2002:322), anthropological archaeology (O'Brien et al. 2005:249-250), cognitive processualism (Bintliff 1993:100; Hodder 2005:211), and processual-plus archaeology (Hegemon 2003:229; Trigger 2006:497-498). The previous strict adherence to specific theoretical factions only served to isolate "like-minded archaeologists" by masking the "major similarities between the approaches and obscures the promise that both hold" (O'Brien et al. 2005:252). While division certainly still remains in the minds of many (e.g., Fleming 2006), there has been a gradual movement away from firmly bounded delineations in archaeological theory based on specific theoretical paradigms. In his discussion of the search for a new grand narrative in historical archaeology, Matthew Johnson (1999:34-35) states that "historical archaeology is not going to come up with any grand new global synthesis because no new synthesis is to be had". Similarly, the quest for a new paradigm in Roman archaeology seems inherently flawed (Stek 2014:32). Roman archaeologists do not need a new grand theory; rather they need to embrace the contextual approaches that have emerged in recent decades. Different questions require different theories, methods, and data. There is no reason to limit oneself to a predetermined path in the exploration of archaeological material (also suggested by, Stek 2014:33). Similarly, Woolf (2014) argues that Versluys' (2014) call for a renewal of the Romanization debate is unnecessary because it limits the interpretive potential of Roman archaeologists and that the contextual approach beneficially allows for understandings of cultural change that are not dependent on any predetermined overgeneralizations.

2.1.4. Globalizing the Roman World

While no true paradigm has emerged to replace Romanization, Globalization theory has been prominently interwoven into the current discourse of Roman archaeology. Globalization theory is actually a diverse body of theory that is most broadly defined as "the compression of the world and the intensification of consciousness of the world as a whole" (Pitts 2008:494, citing Robertson 1992). Through globalization, the world becomes more interconnected and peoples become increasingly aware of this interconnection. Additionally, scholars have advocated for the application of globalization theory to better understand the interconnection of the Roman world and its material culture (e.g., Pitts and Versluys 2015:3). This focus on the global is not new for Roman archaeologists; Romanization has centralized notions of connectivity throughout the history of the discipline. Beyond Romanization, many post-colonial approaches have also engaged with this notion. For example, Ray Laurence (2001:98) stressed that archaeologists needed to conduct an archaeology of place that is both local and global. Similarly, Webster's (2001) creolization is often connected to notions of interconnection and change that are similarly rooted in globalization theory.

The concept of globalization builds on world-systems theory, one of Millett's (1990) influences in his reframing of Romanization (Woolf 1997). World-systems theory is "a neo-Marxist analysis of the origins of modern capitalism", that suggests "Roman conquest was… state driven and top-down, in order to guarantee the effective exploitation of new territories" (Pitts and Versluys 2015:8-9). As with Romanization, world-systems theory presents acculturation-based change, whereby "cultural homogenisation occurs overtime" (Pitts and Versluys 2015:10). World-systems theory has been criticized for its basis in a modern capitalist understanding of trade and its ascription onto diverse regional instances of "interaction and accumulation" that have occurred "over the last 5,000 years" (Gosden 2004:7). As such, the application of world-systems theory to the Roman world has been portrayed as anachronistic (for more on world-systems in Roman archaeology see, Woolf 1990).

Although the aforementioned definition of globalization is not inherently based on economics (see also, Pitts 2008:494), economics has been central to many globalization studies of the Roman world (Olstein 2015). Economic historian Bruce R. Hitchner (2008:34) identifies two of the main features of globalization as increased military intervention and economic integration (see also, Geraghty 2007). Perhaps it should come as no surprise that the first case study in Martin Pitts and Miguel John Versluys' (2015) co-edited volume devoted to globalization theory in Roman archaeology focuses on the Roman economy (see Morely 2015). Furthermore, Gardner (2013:9) identifies this renewed focus on the economic aspect of empire as a specific benefit of globalization. The prominence of economics in globalizations reiterates the anachronism that problematized world-systems theory. Hingley (2011:110) argues that an explicit acknowledgement of this anachronism can ultimately "promote a critical reflection on the role of classical knowledge". For Hingley (2011), archaeological interpretation may benefit from the use of a flawed concept which has had its imperfections identified; for if archaeologists know these flaws, they can be accounted for.

The concept of glocalization has emerged out of scholarly discourse on the local impacts of globalization (Pitts 2008:494). Glocalization provides an explicit attempt to explain how local populations uniquely negotiated the time-space compression of globalization (Witcher 2017:13); the development of previously isolated locals in highly connected social and economic networks. Glocalization proponents argue that this process is not related to cultural homogenization (e.g., Pitts 2008:494); instead, they argue that it attempts to operate with bi-directional influences (Gardner 2013:7). As such, glocalization represents "the paradox of growing integration of different local contexts around the same world at the same time as the deliberate creation of subcultures" (Johnson 1999:31). Given this description, it is clear why Philipp W. Stockhammer (2012:46) links glocalization with Webster's (2001) use of creolization (see also, Gardner 2013:7). Glocalization is directly involved in identity formation, as this increased connectivity resulted in "countless identities being constructed between local and global patterns" (Dzino 2018:373), echoing Mattingly's (2004;2007;2011) discrepant identity.

Beyond the role of economics, the other major issue that globalization proponents have encountered is whether globalization – and by extension glocalization – provide an explanatory framework or merely a descriptive metaphor of the cultural interactions and changes occurring. Robert Witcher (2017:6) argues that globalization holds important explanatory potential for the increasing connectivity of Rome and its provinces. Conversely, Martin Pitts (2008:494) presents a version of globalization that is not intended as an explanatory framework, but as a descriptive metaphor for "the effects of time-space compression fostered by intensifying networks of connectivity". For Pitts (2018), globalization can elucidate the changes that have occurred, but it cannot explain the underlying processes that have led to these changes (see, Woolf 2014, for a similar interpretation of globalization). Following these perspectives, globalization serves two similar, but conflicting, roles in the archaeological discourse of the Roman world. While globalization is not unproblematic in its conflicting applications, the concept beneficially foregrounds the importance of connectivity, a concept with particular relevance to discussions of Roman colonial encounters.

2.2. The Archaeology of Food

The archaeology of food is a broad subfield of archaeology that strives to provide insights into past food consumption, harvesting/collecting/herding, and processing. Rather than being based on a particular interpretive framework or datatype, the archaeology of food utilizes diverse data, methods, and theories to explain how, why, and what foods people ate.

2.2.1. Archaeobotany

Archaeobotany, also referred to as paleoethnobotany in many North American institutions, is the study of plant remains in archaeological contexts. The archaeological evidence of plants can be obtained from both macroscopic and microscopic botanical remains. Macroscopic archaeobotanical remains (macroremains) are those plant tissues large enough to be seen with the naked eye (Pearsall 2019:5) and identified through low-power magnification (Ford 1979:301; Wright 2015:294). Macrobotanical remains include wood, seeds, fruits, tubers, nutshells, and woven fibers (Wright 2014:38). Macrobotanical seeds are one of the primary forms of environmental evidence recovered through flotation, a process whereby sediment is removed from environmental samples using water separation. Flotation, either machine assisted or the basic bucket method, is an imperfect form of macrobotanical recovery, as it possesses the potential to incur fragmentation of the macroremains we are attempting to recover (Vanderwarker et al. 2016:129). Despite these potential issues, flotation remains the most prominent, and reliable, approach for collecting macroremains from sediments. Macroremains recovered through flotation are analyzed via a range of morphological criteria and identified in comparison against modern seed reference collections (Wright 2015:294).

As with all organic material, plant remains are subject to decomposition. However, the decomposition of macrobotanical remains can be halted in four distinct preservation contexts: charring, waterlogging, mineralization, and desiccation. Different taxa preserve differently in these distinct contexts (Miller 1988:72; see, van der Veen 2008:85, for how these preservation methods result in differential plant representation in Roman Britain). As such, an understanding of the types of preservation that we may encounter, and their biases, is essential to interpreting the plants that are evidenced in the archaeobotanical record.

The most common form of macroremains recovered from archaeological contexts are preserved through charring. Charring, or carbonization, occurs primarily through exposure to fire in oxygen-poor environments (Moffett 2011a:41). These charred macroremains linger in the archaeological record after natural weathering processes degrade non-preserved organics (Pearsall 2019:32). Charred macroremains are often the remnant refuse of crop production, processing, and/or consumption (Diehl 2017:197). As such, plants requiring processing prior to consumption are commonly represented in charred assemblages (Day 2013:5806). In most contexts, food waste is deposited in the archaeological record through unintended accidents that result in charring (Diehl 2017:197). A seed's robustness and density, moreover, impact the probability of charred preservation (Moffett 2011a:42). As such, cereal grains, chaff, arable weed seeds, and, to a lesser extent, legume seeds and nut shells, are the most abundant charred macroremains encountered in the archaeological record (van der Veen et al. 2007:193). Although the abundance of cereals in charred assemblages demonstrates the ubiquity of their use, their abundance also reflects how preservation bias can impact the visibility of past plant use. Rather than a lack of use, the absence of specific taxa in charred assemblages may merely indicate that certain seeds are more sensitive to, and thus likely to be destroyed through, exposure to fire (Wright 2003:577).

The second form of macrobotanical preservation encountered in the archaeological record is waterlogged remains. Waterlogged preservation occurs in areas where "the water table is high, when wells or deep pits are present within the excavated area, or when deep stratigraphy is recovered" (van der Veen et al. 2007:193). Peat bogs serve as an alternative source for waterlogged remains, which also beneficially possess high acidity levels (Miksicek 1987:213). Despite their potential utility for preservation, peat bogs were rarely sites of past habitation (Gallagher 2014:24). Waterlogged assemblages are valuable on account of the concentration of remains and the range of plant tissue types and species that can be preserved in these contexts (Wright 2014:45; Gallagher 2014:24). Additionally, while fruits and vegetables are often near absent in assemblages of charred remains (Vaz et al. 2015:87), they are commonly preserved in waterlogged contexts (van der Veen et al. 2007:185 and 193). Although, waterlogged macroremains often simplify identification due to their visual similarity to modern unpreserved macroremains, these remains are often extremely fragile when allowed to dry (Gallagher 2014:25); requiring increased care to ensure preservation. Although delicate and less frequently encountered at archaeological sites than their charred counterparts, waterlogged macroremains provide vital insights into the diversity of past plant use.

The third major form of macrobotanical preservation is mineralization, or calcium phosphate replacement. Mineralized remains form when minerals from the surrounding environment infiltrate and replace a plant's anatomical structure (Day 2013:5806; Gallagher 2014:25). When the encased or infiltrated organic remains decompose, these mineralized formations are preserved in the archaeological record (Gallagher 2014:25). While calcium phosphate is the most common mineral to form around these remains, mineralization can also occur when corroding bronze, copper, and iron are present in archaeological contexts (Gallagher 2014:25). As with waterlogged preservation, fruits, vegetables, and herbs are often preserved through mineralization (van der Veen et al. 2007:193). Caves, cesspits, and, in particular, Roman latrines are all rich sources of mineralized remains (van der Veen et al. 2007:193; Day 2013:5806). Despite their interpretive value, these remains are exceedingly rare in the archaeobotanical record of Roman Britain.

The final preservation method for archaeobotanical macroremains is desiccation. The desiccation of macroremains occurs in arid environments, which prevents the decomposition of organic material (Gallagher 2014:21). Caves in arid environments present the ideal conditions for desiccation, given the lack of rainfall and low humidity of these contexts. However, desiccation can occur in areas of high rainfall, provided the depositional context affords the macroremains sufficient protection from the elements (Gallagher 2014:21-22). As with waterlogged assemblages, desiccated assemblages are often dense and species rich (Gallagher 2014:21), containing a high percentage of wild plants. These wild plants are valuable because they can evidence weeds associated with processed cereal crops, fuel use, and animal fodder (van der Veen 2007:969-970). Beyond weeds, high percentages of chaff and straw have been identified in desiccated assemblages from Roman sites in Britain (van der Veen 2007:970). Additionally, desiccation can preserve fruits, flowers, leaves, and membranes that are usually absent – or exceedingly rare – from other preservation contexts (Day 2013:5806). As with the other non-charred assemblages, desiccated remains can beneficially aid in diversifying past plant use.

2.2.2. Zooarchaeology

Zooarchaeology, also referred to as faunal analysis, is the study of animal remains recovered in archaeological contexts. Scholars began to recognize the interpretive potential of archaeologically situated animal bones as early as the 1700s (Steele 2015:168). However, it was not until the 1960s when zooarchaeology emerged as a widely recognized archaeological approach, developing into a prominent sub-discipline of archaeology (Crabtree 1990:155). Zooarchaeologists use animal remains recovered from archaeological excavations to explore past relationships between people and their environment (Peres 2014:15). Zooarchaeologists contribute to wider archaeological narratives on the origins of agriculture and domestication (Evin et al. 2013), reconstructing human demographics (Steele 2015:171), and the emergence of anatomically modern Homo sapiens sapiens (Gifford-Gonzalez 2018:26-30). Although not all of the relationships explored by zooarchaeologists address issues related to subsistence practices, this has remained a primary area of research. For example, zooarchaeologists can use the animal remains recovered from archaeological contexts to study the movement of animal products as part of both local, producer to consumer, and long-distance trade relationships (Crabtree 1990:158).

The hard tissues of animals – including bones, shells, and teeth – commonly preserve in archaeological contexts while softer tissues, such as muscles, fat, skin, and other organs, decompose through natural taphonomic processes (Landon 2015:559). The process of zooarchaeological identification process begins with determination of the species and the body parts of that species present. This initial identification is, where possible, followed by a determination of the age-at-death, sex, and whether there is evidence of cultural modification, such as butchery and charring (Twiss 2019:22-23). The study and quantification of these skeletal features and modification are central method(s) by which zooarchaeologists contribute to archaeological scholarship, using the results obtained through these analyses to interpret the relationship between people and their environment through animal intermediaries.

2.2.3. Theorizing Food

Archaeologists have long engaged with food in a variety of ways, as food provides insights into the larger socio-cultural world of the peoples being studied (Hastorf 2017:19). The archaeological discourse on food can be linked to historic trends in the wider discipline, and archaeologists, of all theoretical persuasions, have been concerned with the study of food (Graff 2018: 306). Culture-historians perceived food as a part of the domestic economy (Graff 2018:306), the functionalist processual perspective sought to understand subsistence through nutritional requirements and caloric intake (Twiss 2007:4; Stockhammer 2016:91), and the semiotics perspective of the early post-processualists sought to reveal food's underlying symbolic meaning (Twiss 2007:5-6; Stockhammer et al. 2018:IX). While food has persisted as a vital aspect within a remarkable plurality of archaeological inquiries and discourses, recent archaeological discussions of food have diverged from the aforementioned research emphases to focus on contextual frameworks that shift to suit the particular research questions under investigation. One such approach that has gained influence is the archaeology of cooking.

The archaeology of cooking is a theoretical framework that addresses social questions through holistic research, weaving together distinct sets of data and methods

(Graff 2018). Beyond the artificially imposed "tripartite cycle of production, distribution, and consumption" (Morrison 2012:232), cooking delineates the transformative process — often ignored in archaeological research (Stockhammer 2016:91)— whereby potentially edible flora and fauna become food (Morrison 2012:231; Graff 2015:32). The archaeology of cooking is dominated by three distinct theoretical trends: practice, agency, and gender (Graff 2018:308-311). While I do not directly employ a cooking-based approach in this study, I draw on its social focus to contend with the complexity of colonial encounters through an emphasis on the integration of multiple lines of data and methodologies.

2.2.4. Colonial Encounters, Entanglement, and Food

The intercultural engagement between colonial Roman forces and non-Roman inhabitants have been termed colonial encounters (e.g., Dietler 1998:288-291); foregrounding the complex and imbalanced power dynamics occurring throughout periods of contact. These encounters involve the relationships that manifest during, and subsequent to, conquest and colonization. These relationships are frequently framed through notions of hybridity (e.g., Beaudry 2013; Hanscam 2019), wherein each group fundamentally changes, to varying degrees, through interaction with the other. However, some scholars have disputed the utility of this terminology, identifying hybridity as a problematic biological metaphor transposed onto cultural applications (e.g., Stockhammer 2012:46-47; Silliman 2016). Rather than hybridity, these scholars propose using the term entanglement to encapsulate the range of possibilities that can occur in colonial situations.

Colonialism is defined archaeologically as the material cultural reflection of the dynamic relationships, the hybridizations/entanglements, that are preserved from past colonial encounters (Gosden 2004:3). Problematically, postcolonial theory has often reductively framed these relationships as resistance and acceptance to colonial culture and its influence (Rowlands 1998:318-319; Given 2004:10-11). In Roman archaeology, colonial encounters have been one of, if not the, central focuses of Romanization and its dissenting respondents. Many of these respondent theories are criticized for their reductive rephrasing of the apparent lack of Roman material culture as the exclusive manifestation of non-Roman resistance to colonial oppression, circumventing the complexity that lies below these superficial interpretations. Rather than solely focusing on resistance, archaeologists who wish to explore identity must focus upon both the possibilities of cultural persistence (Ghisleni 2018:141), and the opportunities for transformation (Voss 2015:666). Philipp Stockhammer (2012) identifies two types of entanglement that can be observed in the archaeological record as a result of colonial encounters, the entanglement of objects (relational entanglement) and the entanglement of social practices (material entanglement). In relational entanglement, newly introduced objects are incorporated into pre-existing local social practices and ascribed predetermined values. While, material entanglement involves external social practices are integrated alongside the introduced objects.

Food and its associated cultural practices present an explicit expression of identity (Campana 2010:129), allowing scholars to discern the impact of colonial encounters on identity through corresponding shifts in food consumption and practices. New dietary inclusions and exclusions evidenced in the archaeological record, along with new agricultural and culinary practices, provide an archaeological visible manifestation of colonial encounters. Utilizing Stockhammer's (2012) terminology of relational and material entanglement, the incorporation of Roman foods into pre-existing Iron Age culinary practices would equate to relational entanglement. Conversely, the incorporation of Roman culinary and agricultural practices alongside the Roman foods would represent material entanglement. Understanding how different places (sites and regions) entangled Roman food provides a way to observe the impact of the Roman conquest on Britain's Pre-Roman tribal population.

2.2.5. Establishing the Foodscape

The theoretical framework employed in this study, however, applies the concept of foodscapes. Foodscapes, sometimes referred to as food environments (e.g., Story et al. 2008; Lake et al. 2010; Caspi et al. 2012), are holistic conceptual frameworks employed by anthropologists (e.g. Pollock 2017), food nutritionists (e.g. Burgoine et al. 2009; Lake et al. 2012), historians (e.g. Mosby and Castairs 2015) and sociologists (e.g. Mackendrick 2014). Foodscapes provide scholars with a research perspective that attempts to encapsulate everything from individual preferences, physical environments, socio-cultural norms, and economics to food policy influences concerning food in a specific region or of a specific group of people (Lake et al. 2010; Adema 2007). As such, a foodscape emphasizes the dynamic interconnectedness of food, places, and people

(Becuţ and Puerto 2017:1) and how these different factors interact in a given space through both material and immaterial means (Pollock 2017:263).

While several recent archaeological studies have employed the term foodscapes (e.g., Sunseri 2015; Blewitt 2016; Livarda 2016; Svyatko et a. 2017:71; Reifschneider 2018), these prior applications do not provide context, citations, or definitions alongside their usage of the term (c.f., Hurley 2018, for the most relevant usage I have thus far encountered in the archaeological literature). However, these preexisting usages do imply some amount of regionality. To extract the full potential out of this terminology, and to avoid the definitional deficiencies of previous usages, we require a clear definition of foodscape for archaeological applications. Therefore, a 'foodscape' is herein defined as the interconnected linkage between food, people, and space. Foodscapes, in their contemporary applications, are not restricted to a particular scale, ranging from the study of an individual household to a highly interconnected empire. Given the popularity of the foodscape approach in other disciplines, there is an opportunity to introduce this increasingly prominent terminology more concretely into the archaeological lexicon (Stockhammer 2016:91, suggests a similar potential of cross-pollination between archaeology and other aspects of the fledgling discipline of food studies).

Colonial encounters and entanglements (sec. 2.2.4) provide terminology that offer further definitional refinement for the concept of foodscapes. Colonial encounters occurring in the past resulted in the entanglement of food in different ways in different places, representing the discrepant experiences of Roman colonialism. These discrepant experiences invoke Mattingly's (2004;2007;2011) 'discrepant identity' and the regionally distinct experiences of Roman colonialism. This regionality also corresponds with Karen Meadows' proposed approach to studying Roman colonialism through regional differences in food consumption (1995). Increased globalization – that is, intensified interaction instigated by the Roman Empire – facilitated these colonial encounters and their material manifestation. Drawing on these different pre-existing threads of theoretical research, foodscapes can be tied directly into the current discourse on the Roman conquest of Britain and its changes can be explicated through the pre-existing terminology of entanglement.

2.3. Chapter Summary

This chapter has reviewed the history of the theoretical frameworks used in British Roman Archaeology, with an emphasis on Romanization and the respondent theories that emerged to counter its problematic uniformity. The multiple, and conflicting, roles of globalization in contemporary British Roman archaeology have also been discussed. Following this focus on British Roman archaeology, the archaeology of food was discussed, with an emphasis on this study's two major datatypes, archaeobotany and zooarchaeology. The history of theoretical approaches in the archaeology of food was also addressed, laying the foundation for this chapter's concluding sections on colonial encounters and the concept of a foodscape. Together these final points of emphasis are utilized, alongside the concept of entanglement, as the primary theoretical framework throughout the remainder of this study.

Chapter 3. Data and Methods

In this chapter, I discuss the data that were collected and methods that were employed throughout this study to analyze these data. As such, the chapter is subdivided into four sections: data collection and entry (sec. 3.1), the limitations and potential of occurrence data (sec. 3.2), occurrence analysis methods (sec. 3.3), and network analysis (sec. 3.4).

3.1. Data Collection and Entry

3.1.1. Defining the Study Area

Data collection began by defining the geographic boundary of the study area. This boundary was selected to ensure that a sufficient dataset was available and geographic biases were minimized, while also imposing limitations that would facilitate the completion of the project. A number of prominent approaches have been used by scholars to impose geographic delineations onto the post-conquest landscape of Britain. This tradition began with the scholarship of Sir Francis Haverfield (1912), who designated the area with the greatest extent of Roman material culture, Britain's south and east, as the Romanized civil district (Hingley 2016:13-14). This 'civil district' was juxtaposed against the military district of the north and west, where Roman material culture was more limited. This division also reflected the positioning of the Roman frontier in 47 CE, where the island was split between the conquered and yet to be conquered territories (Bédoyère 2013:25). Recent archaeological research has continued to replicate this model despite its simplicity (e.g., Sargent 2002), as it remains linked to the lingering notions of Romanization in British Roman Archaeology.

Subsequent researchers sought alternative ways to delineate the landscape of Roman Britain, however, many of these approaches are rooted in the construction of similar, or repeated, dichotomies. For example, both Cyril Fox's (1932) upland/lowland division of Britain and the – problematic – villa/native landscape divide proposed by Ken Dark and Petra Dark (1997) conform near perfectly with Haverfield's initial division. While the terminology and reasoning may change between these approaches, the underlying dichotomy between 'Roman' and 'other' is maintained. These dichotomizing approaches are limited by their oversimplification of the archaeological record and have been continually problematized since the demise of Romanization (see, Chapter 2, sec. 2.1.3).

Stephon Rippon (et al. 2015:47) presents an alternative to these dichotomizing approaches that utilizes “regional variation in landscape character”. Rippon’s ‘Fields of Britannia Project’ constructed geographic divisions based on the landscape character of a region. This landscape character was determined by looking at the predominant elevation, surface geology, pre-existing palynological profiles, and historic agricultural land classification. Following these criteria, Rippon (et al. 2015:47) divides Britain into nine distinct settlement zones. Although these zones possess internal variation, they are cohesive when compared to the other zones.

I have selected two British counties for data collection that are located within Rippon’s (et al. 2015:47) southeast zone, Kent and Essex. Utilizing Rippon’s (et al. 2015) division has allowed me to minimize the potential influence of geology and climate on observable patterns that emerge from the analysis. Additionally, British excavation reports are often reported by county, which provides a means of quickly identifying relevant studies. Rather than adhering to modern county divisions, historic county division were utilized, as these divisions were common in several of the older published monographs that were found during data collection (e.g., Philip 1973). Consequently, several of the sites, particularly form the historic county of Kent, actually correspond to the modern county of Greater London. Rather than arbitrarily defining the study area based on the historical narrative or material remains, selecting two counties from a singular zone – based on Rippon’s (et al. 2015) landscape division – provides a way to efficiently search and identify relevant reports, while also minimizing any potential geographic biases.

3.1.2. Defining a ‘Site’ and the Unit of Analysis

The concept of a ‘site’ in archaeology has a diverse and divisive history of usage. Initially, the term was directly adopted from its use in English, equating to the location of where something occurred (Dunnell 1992:22). Many archaeologists of the 1960s, 70s, and 80s, attempted to refine the archaeological definition of ‘site’. One such attempt was made by Lewis Binford (1964:431) who, as part of his wider attempt to give new structure to disciplinary practices, defined a site as, “a spatial cluster of cultural features or items, or both”. Binford’s (1964) definition re-oriented the term ‘site’ from a specific place with artifacts, to a spatial relationship inherent in the artifacts themselves (Dunnell 1992:24). Alternatively, Thomas R. Hester’s (et al. 2016:42) recent textbook on archaeological field methods defines a site as, “any discrete, bounded location where humans lived, worked, or carried out a task—and where physical evidence of their behavior can be recovered by the archaeologist”. Compared to Binford’s (1964) definition which relies on the spatial relationship of material, Hester (et al. 2016) returns the focus to space.

A third definition of site can be seen in many inter-site surveys seeking to explicate regional trends in material culture, including ecofacts (e.g. Rowan 2019). These inter-site surveys typically do not provide a specific definition of what they mean by ‘site’, often resulting in the conflation of sites and past places. For example, A.J. Parker’s study of bird remains in Roman Britain summarizes multiple excavation locations in past places while employing the term site. These definitional variances and shifts have resulted in some scholars attempting to dismiss the term from the archaeological lexicon all together (e.g. Dunnell 1992). Despite these calls for its dismissal, the term ‘site’ retains significant terminological presence in archaeology. However, the majority of current archaeological publications do not take the time to define what they actually mean by the term; relying on their readership to differentiate between the meaning of excavation location and historic place.

In this project, I define a ‘site’ as the location of a specific excavation, rather than as a specific place, such as a town or village. This approach to sites treats each excavation report, and its associated specialist reports, as a distinct unit – a record – of analysis. Following this approach, large urban centres, such as Camulodunum (modern day Colchester), possessed multiple excavation sites and are, therefore, represented by multiple records in the analysis. Equating my unit of analysis to a report allows the collected reports to be utilized in their current state, rather than requiring significant manipulation following data collection. Additionally, the lack of context often associated with unpublished excavation reports makes assigning ‘spaces’ to many of these excavations problematic. Often these excavations only constitute a fragment of the space that would have been occupied, focusing specifically on the areas that will be destroyed or otherwise impacted by planned construction. Following these practices of limited and incomplete excavation, it is impossible to assign many of these sites to a space beyond the geographic coordinates of their excavation. Therefore, while some sites could have been translated into spaces – summarizing multiple reports from the same village/town/*colonia*, I would have been required to exclude those sites that could not undergo this translation. As such, the excavation reports – the 'sites' – were left in this comparable state to avoid issues related to partial report/space representation, and to avoid excluding the most abundant category of reports available (see, Chapter 3, sec. 3.1.3). Multiple preceding studies from Britain that have utilized a large amount of unpublished (grey) literature have employed a similar data collection process, including archaeobotanical (e.g., van der Veen et al. 2007; Livarda and van der Veen 2008; Lodwick 2017) and zooarchaeological (e.g., Locker 2007) research.

3.1.3. Report Sources and Types

The data for this thesis were retrieved from digital and physical excavation reports, which were sourced from a number of online databases and physical libraries (see, Appendix B for full list of sources with their associated URLs). Simon Fraser University's Library was combed for monographs from the study area, and monographs were brought to Simon Fraser University's library from institutions across North America using interlibrary loans. Additionally, I undertook a research trip to Britain in Fall 2019 to gather reports from The British Library, the British Museum's Anthropology Library and Research Centre in London, and The University of Oxford's Sackler library.

The reports collected can be divided into four primary types: (1) unpublished reports from developer-funded excavations, (2) published monographs, (3) articles from regional journals, and (4) published articles from peer-reviewed journals. The majority of the excavation sources, 90 of 178 reports acquired, came from the unpublished reports of developer-funded archaeological excavations, the so-called grey literature (see, Figure 1). Of the unpublished reports, 46 came from sites in Kent and 34 from sites in Essex (see, Figure 2). Since the 1990s, there has been a proliferation of archaeological fieldwork in Britain (Fulford and Holbrook 2018:1), with developer-led archaeology now constituting ninety percent of the fieldwork undertaken (Holbrook and Morton 2008:6). After the unpublished reports, published monographs were the next most frequent report-type, followed by regional journals, and lastly, published articles.

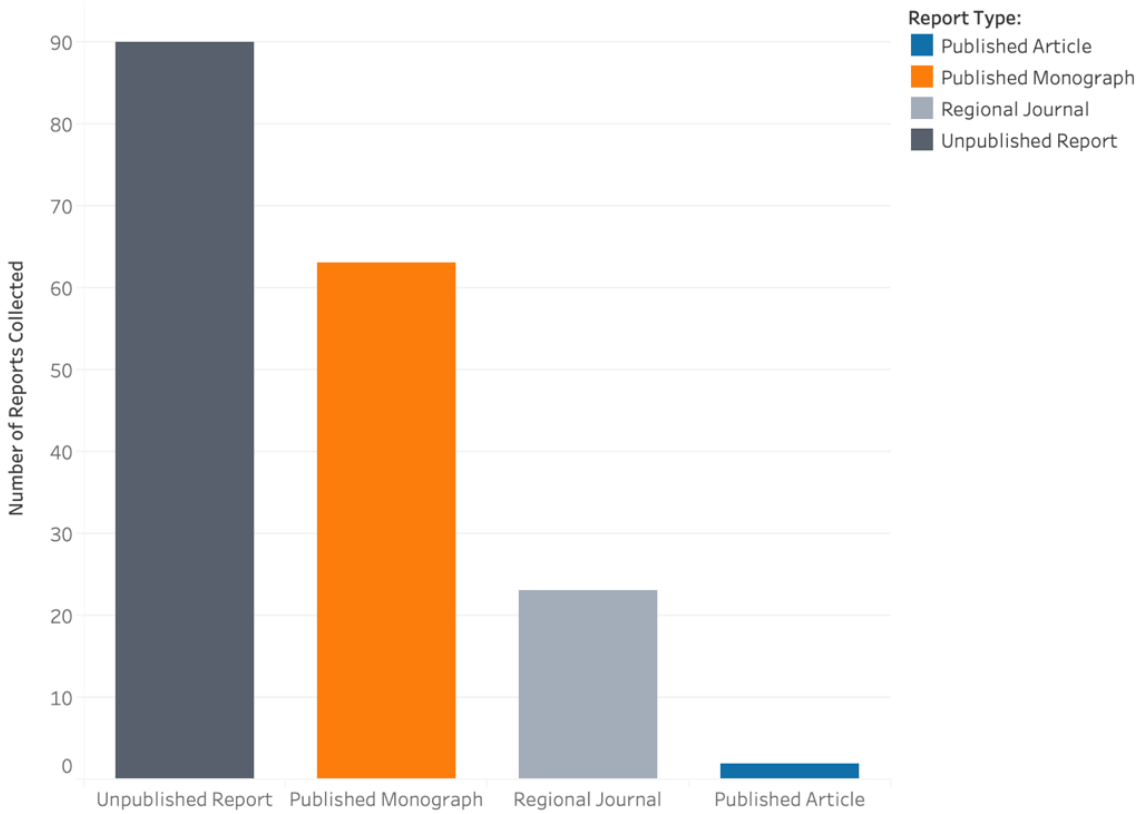


Figure 1: Report Types Collected

Of these report types, only the published monographs were accessed as physical copies; all unpublished reports, regional journals, and published articles were downloaded as PDF files from the online databases. The major benefit of monographs was the completeness of data available, compared to the more abundant, but less detailed, unpublished reports. Published monographs were more likely to include multi-year excavations, rather than the short rescue-based excavations that dominated the unpublished reports. This regional bias exhibited in the unpublished reports was reversed when examining the 63 published monographs, 33 of which come from Essex and 30 from Kent.

One regional journal was identified for each region, *Essex Archaeology and History* published by the Essex Society for Archaeology and History, and The *Archaeologia Cantiana* published by and The Kent Archaeological Society. While not as comprehensive as the published monographs or peer-reviewed articles, these regional journals were valuable sources of information for rural sites that were excavated in each region. Of the 23 reports from regional journals, fourteen came from Kent and nine from Essex. The two published articles that were utilized in this study both came from sites in

Kent. There are subtle regional biases within the report-types of the sites collected for this study, with sites from Essex more likely to be published in monographs and sites from Kent more likely to be produced as unpublished reports and published in regional journals.

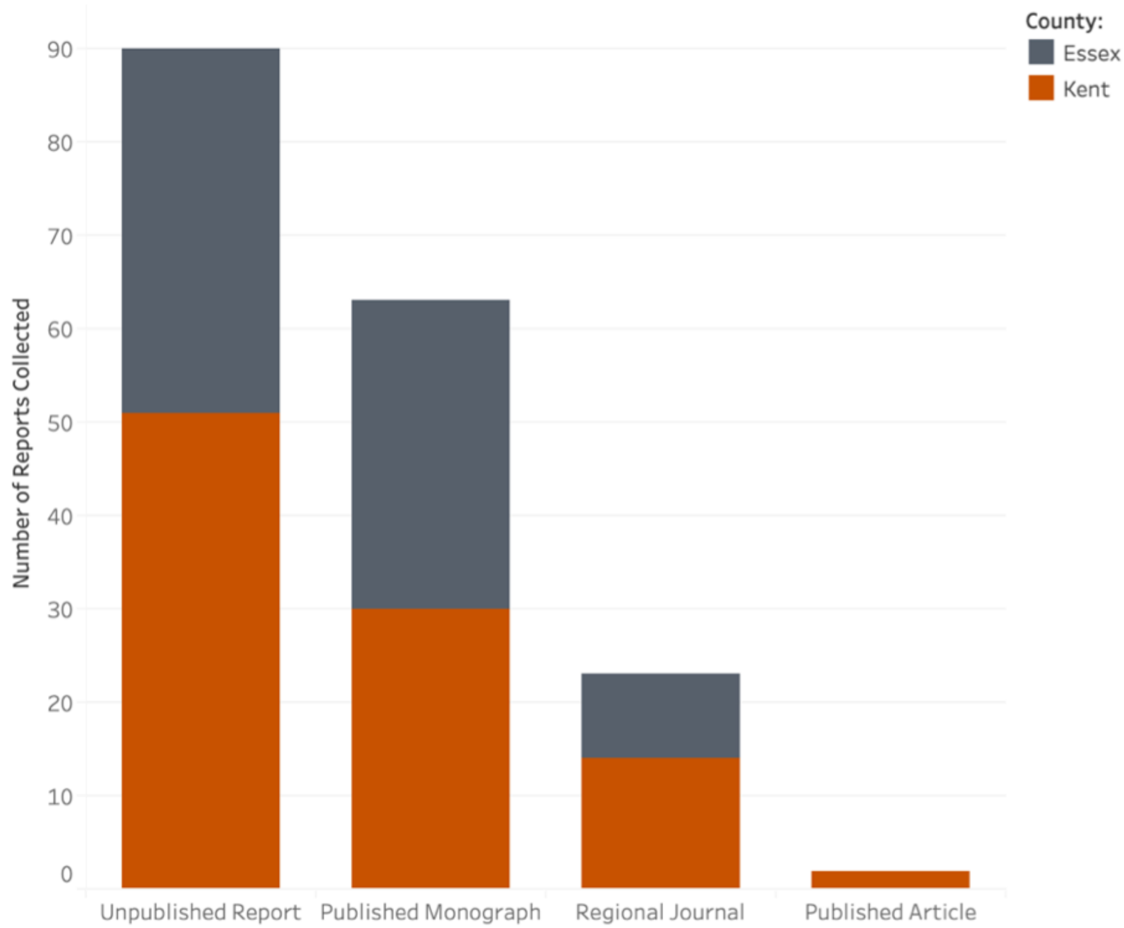


Figure 2: Reports by Publication-Type and Region

3.1.4. Site Coordinates

I recorded each sites' geographic coordinates using the United Kingdom's National Grid Reference (NGR) code system. The standardized use of these codes resulted in their presence within the majority of the excavation reports collected. For those sites that lacked any explicitly stated NGR code, a range of alternatives were identified in order to convert them into this system, including easting/northing, latitude/longitude, postal-codes, and street addresses. Following conversion into an NGR, these locations were recorded, along with the NGR's specific latitude and longitude coordinates, which were required for the development of georeferenced maps of the study area using the data visualization software Tableau (see, Figure 3) and in the georeferenced network (see, Chapter 3, sec. 3.4).

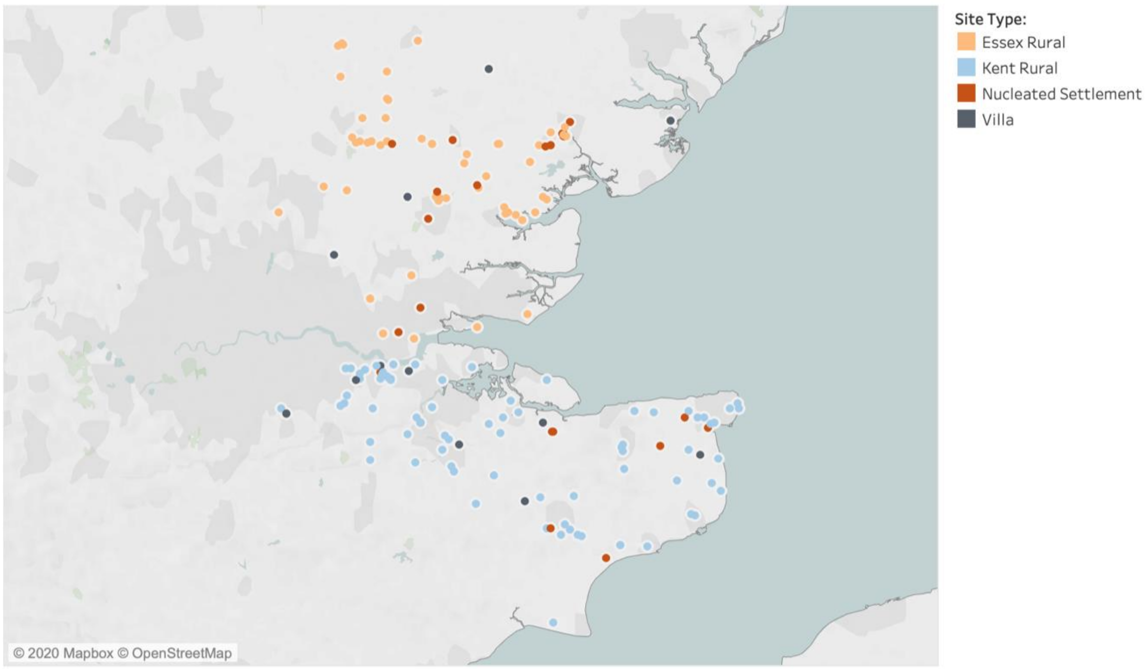


Figure 3: Map of Roman Excavations Identified in Kent and Essex

3.1.5. Chronology

Site date ranges were also recorded for this study. A limited number of sites collected any radiocarbon dating, with even fewer radiocarbon dates actually coming from the Roman layers of those sites. Therefore, ceramic typology remains the standard chronological indicator for Roman excavations in Britain, with the majority of reports using the recovered ceramic assemblage to assign generalized dates to individual sites related to the established ceramic-based culture-history sequence (see, Figure 4). Typically, the Roman period is identified as between 43 CE and 450 CE. It is further subdivided into Early, Middle, and Late Roman periods and bookend by the Pre-Roman Late Iron Age and Post-Roman periods. Rather than representing real divisions, the archaeological periods of culture-history are artificial boundaries that are employed to provide structure to the complexities of the archaeological record (Monnier 2006:709). The simplification of periodization, while often problematically reductive of the true diversity of these periods (Monnier 2006:709), is necessary to facilitate communication in archaeological discourse.

The goal of this study was to focus on the Early Roman period, enabling an evaluation of the immediate post-conquest impact of the Romans on the British foodscape. However, the chronological reporting strategy implemented by the vast majority of unpublished reports from developer-funded archaeological excavations, and even many monographs, introduces a degree of uncertainty into the classification of many sites. First, several sites were not ascribed a specific date range, and were solely identified as ‘Roman’. As such, the pre-existing culture history framework would ascribe the dates of 43 to 450 CE, far exceeding the Early Roman period. Second, when reports did identify more specific periods (e.g., Early Roman or Middle Roman), multiple periods were often grouped together. For example, the Late Iron Age/Early Roman Periods were listed as a single category, as were the Early Roman/Middle Roman Periods and the Middle Roman/Late Roman Periods. This period merging was by-far the most common chronological indictor provided in the ‘grey literature’. As such, all special reports with archaeobotanical and zooarchaeological data credited to ‘Late Iron Age/Early Roman’, ‘Early Roman’, and “Early Roman/Middle Roman’ were included in data collection. Excluding these merged period sites would have significantly reduced the dataset.

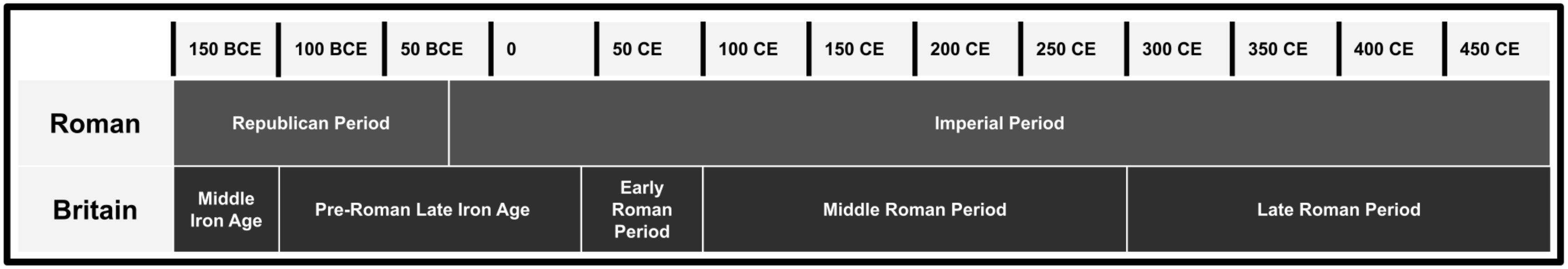


Figure 4: Chronology of Roman Britain

3.1.6. Site Typology

One key aspect of this study was the development and implementation of a site typology for classifying the collected sites. As with chronological (see, sec. 3.1.5) and geographical (see, sec, 3.1.1) divisions, site typologies are inherently artificial distinctions imposed on the archaeological record. However, these distinctions are paradoxically structured on observable evidence (Boozer 2015:93-94). The archaeological discourse's current emphasis on 'the tyranny of typology' is a manifestation of the increasing recognition that the many longstanding typological distinctions are overly rigid, and problematically restrict scholars' interpretive approaches to predefined categorizes (for a full deconstruction of typology see, Boozer 2015). From the classification of social hierarchy (e.g., Barreto 2014) to artifacts (e.g., Fowler 2017), typological issues are entwined into fundamental aspects of archaeological interpretation.

Previous research on Roman Britain has undertaken two distinct approaches to site type: highly detailed typologies with many divisions and simplistic typologies with minimal divisions. An example of the more detailed approach is found in van der Veen's (et al. 2008) archaeobotanical survey of Roman Britain, which utilizes five major site types and more than twelve minor site types. This highly segmented approach was also utilized in other publications that evolved out of this project, including an article by Alexandra Livarda (2011), who presented an archaeobotanical survey of Northwestern Europe during the Roman and Early Medieval Periods. While highly detailed, many of the distinctions are not fully explicated. For example, villa sites are grouped with other types of rural sites, while nucleated rural sites are differentiated, with minimal explanation, from small urban towns. While van der Veen (et al. 2008:13) does acknowledge the fine distinction between these site-types, that is the extent of the typological discussion in the studies produced by this research project. Conversely, Rippon (et al. 2015:72) utilized five site-types: rural settlements, villas, major towns, small towns, and elite sites; however, this final category was only discussed for the medieval period. Furthering the trend of generalized site typology, Anthony King's (1999:168) proposed usage of 'settlement zones', provides a highly generalized approach that attempts to circumvent the typological issues of multi-purpose sites in rural Britain. As such, King prefers to avoid this historical typological issue, rather than engage with assessing its relevance.

This study seeks to establish a middle ground between the two extremes presented above, allowing for complexity while also minimizing typological issues. As such, five general site types were utilized, (1) ‘nucleated settlements’, (2) ‘rural’, (3) ‘villas’, (4) ‘industrial’, and (5) ‘ritual/funerary’ sites. The reports’ abstracts, introductions, titles, and discussions were all checked for an explicit, or implied, reference to a site-type. Those reports which lacked an explicit classification were referenced against the Rural Roman Settlement of Roman Britain (RSRB) database for a primary type (Martyn et al. 2018). Nucleated settlements ranged from small clusters of buildings that may be problematically labelled as villages (see, Millett 2016:708) to large urban centres (see, Wacher 1997), such as Camulodunum (modern day Colchester) and Durovernum Cantiacorum (Canterbury). Rural sites, on the other hand, presented as the least definable site-type due to their sheer generality, as they could constitute anything from isolated finds with little to no associated contextual material to a small enclosed farms or multi-building rural settlements (Millett 2016:706). Furthermore, rural was used as the default type for unassigned sites who’s reports provided no distinctive description or identifying features. The term ‘rural’ encapsulates a diverse range of past lifeways.

Archaeologists and historians have long debated the precise definition of a villa, a debate that echoes the plurality of definitions present in Roman historical texts (Greene 1990:88-89). In the Mediterranean, multiple types of villas are found, from the *villae suburbanae* located around settlements, to *villae rusticae* situated further into the rural hinterland, and *villae maritimae* along the coast of lakes and the Mediterranean Sea (Marzano 2014: 7639). Modern scholars of Roman Italy define villas through both spatial requirements and decorative distinctions (Marzano 2014:7645). However, Varro (*Rust.* III.II) notes that villas were differentiated from farms based specifically on their financial income in Italy during the Roman period. Alternatively, archaeologists studying the northern provinces have defined villas through architectural features that demonstrate Romanization, and many of these sites would have been referred to as farms in Italy (Harding 2017:200), as they lacked both the size and elaborate décor required for an Italian villa (Marzano 2014:7645). Mattingly (2004:14) suggests that only 20-30 of the 2,500 proposed villas of Roman Britain, should actually qualify as villas.

Britain demonstrates dramatic variation in the range of sites that have been historically classified as villas (McGowen 2014:7801).

Villas, despite their definitional issues, have historically been the focal point of the discourse on Roman Britain, with scholars centralizing issues of their creation and social role in the Romanization of Britain. For example, E.W. Black (1994) suggests that villa*s* were, at least until the end of the second century CE, the residences of former military officers of the Roman army. In Britain, villas*,* as with nucleated settlements, have been more likely – historically – to undergo intensive excavation due to their perceived historical value (Millett 2016:699; Booth 2017:56). Despite this, Mattingly (2004:14) suggests that only 3-4% of the rural sites of Roman Britain are represented by villas, highlighting a discrepancy between research focus and the majority of the evidence. This emphasis reflects their perceived status as important fixtures of the Roman landscape that – along with the development of roads and cities (Grahame 1998:4) – encapsulate the intersection of “agriculture, imperialism, and [Roman] citizenship” (Spencer 2010:62). In this study, I have retained the differentiation between villas and rural sites to provide a means of evaluating the validity of division between these site-types. For this study, I have only identified sites as villas that already held this status in their reports, and I acknowledge that this terminology is inherently problematic.

The final two types used in this study’s site typology are ‘industrial’, and ‘ritual/funerary’ sites. Industrial sites are those sites focused on resource extraction and processing. The ritual/funerary type is a broad group of sites ranging from graveyards to temples and other centres of ritual. While these types have been included in the typology to reflect their presence in the study area, these sites were not included in the occurrence (Chapters 4 and 5) or network analysis (Chapter 6) that constitute this study. These exclusions were rooted in highly specialized contexts provided by these sites, contexts that are less pertinent to the everyday consumption of food. Future research questions may be formatted to include these types in the analysis, such as investigating the role of foods in the cult/ritual activity occurring in Roman Britain.

These site-type divisions are artificially imposed boundaries, resulting in several sites not fitting comfortably within these typological categories. For example, some of the sites classified as ‘rural’ also included burials, highlighting the artificial division between ‘rural’ and ‘ritual/funerary’ sites. Similarly, sites could be assigned to different typological categories depending on the exact timeframe under consideration. For example, the sites recorded from the Roman fort/*colonia* Camulodunum could be assigned to the category of 'military' during the first half of the Early Roman Period, while classified as a 'nucleated settlement' throughout the latter half of the Early Roman and Middle Roman periods. This transition highlights the fluidity of the real-world situations encapsulated in rigid typological divisions.

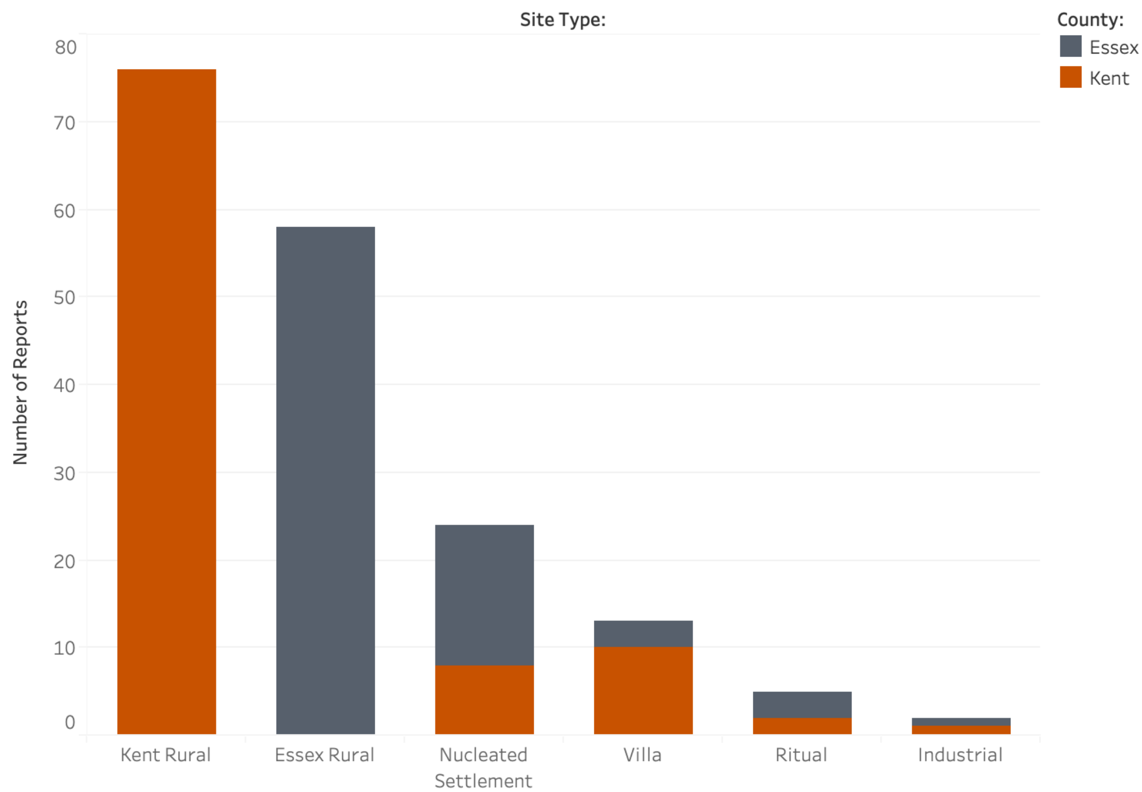


Figure 5: Site-type Division of Excavation Reports Collected
Note: Reports in red are from excavations in Kent and reports in dark gray are from excavations in Essex.

The site-types are not spread evenly between the two counties that constitute the study area. An analysis of the site-type divisions revealed that the majority of the collected excavation reports referenced 'rural' sites, with 77 excavation reports collected from rural sites in Kent and 60 from rural sites in Essex (see, Figure 5). Nucleated settlements were twice as frequent in Essex, sixteen to the eight identified in Kent. Conversely, villas were more frequently encountered in Kent, ten to the four from Essex. The minimal number of funerary/ritual and industrial sites in each region was relatively equivalent.

From a joint site-type and report-type perspective, rural sites in each region are dominated by the unpublished reports, followed by published monographs and regional journal articles (see, Figure 6). Nucleated settlements and villas, on the other hand, are dominated by published monographs, followed by unpublished reports, and minimal amounts of both regional journals and published articles. Following this division, there is a clear difference in the reporting strategy for rural sites when compared to nucleated settlements. The aforementioned historical bias towards nucleated settlements and villas may explain their publication in a more prominent format. Conversely, rural sites are often relegated to unpublished reports, reflecting their historic insignificance in the discourse. Despite this clear trend, there is evidence for rural occupation, outside of villas, gaining greater emphasis in contemporary archaeological discourse. For example, the RSRB, and its resulting publications, have focused specifically on incorporating rural sites into the wider narrative of Roman Britain.

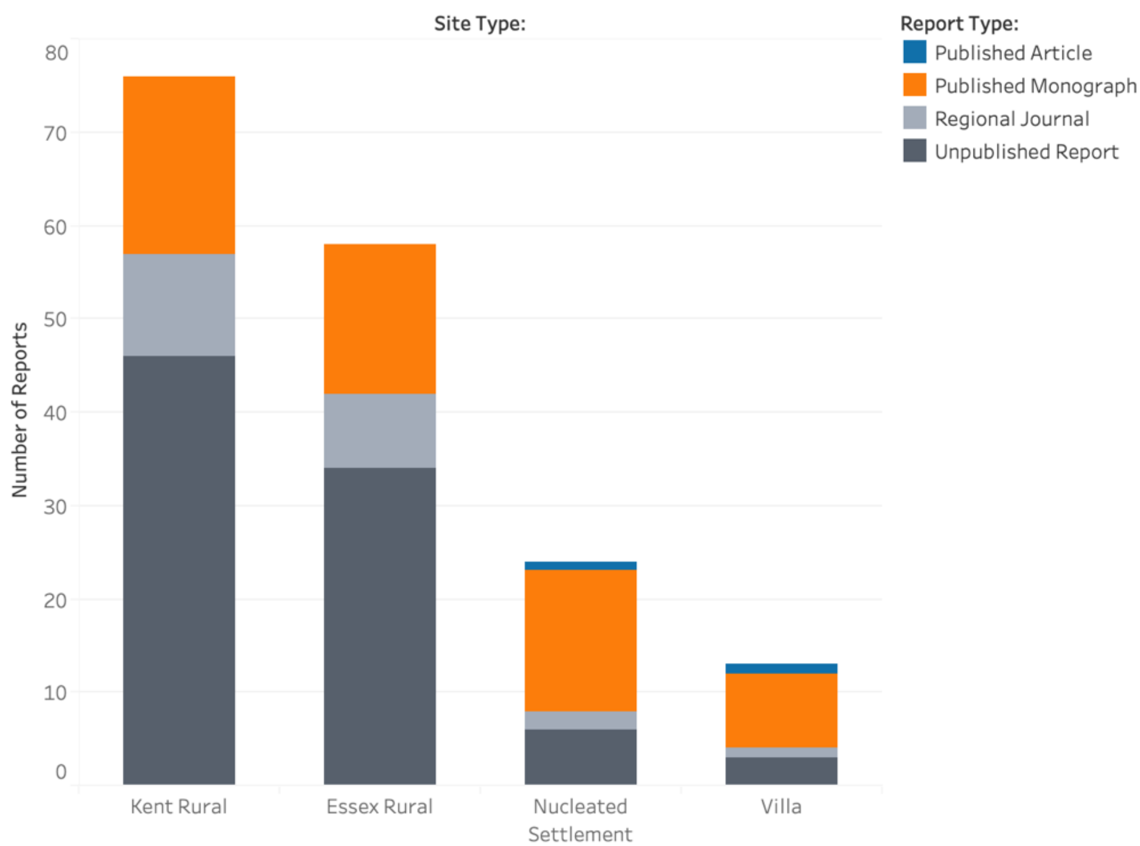


Figure 6: **Reports by Site and Publication Types**

3.1.7. The Archaeobotanical and Zooarchaeological Data

Archaeobotanical and zooarchaeological data were collected from each excavation's specialist report. From these reports, the foods identified were entered into regionally organized (Kent and Essex) excel workbooks which housed different worksheets for plant foods, animal domesticates, and other animal foods (see, Appendix C, for examples of both the site-data and food-data sheets). For each site examined, a "1" was entered to indicate the presence of a taxa, a "0" was entered to indicate absence of a taxa. The data were collected on a site-by-site, region-by-region basis.

In this study, I only collected presence/absence occurrence data as a means of coping with the complexities of standardizing a vast range of reporting strategies, ranging from fully quantified counts and weights to mere sentences listing the major species identified. Further, the utilization of multiple datasets required that the data were collected in a means that was conducive to both datasets – that is, the archaeobotanical and zooarchaeological data (Vanderwarker and Peres 2014:6). Beyond the external inconsistencies, many of the reports – particularly the monographs – used different specialists for their general zooarchaeological reports, fish remains, and marine molluscs reports. Therefore, data collection requires navigating both internal and external inconsistences in reporting strategies. These issues are exacerbated in England due to the lack of a standardized national culture resource management system, where well-developed local systems have little consistency with one another (Lock 2003:198-199). While it may be imperfect, presence/absence was chosen because it allowed for the integration of both datasets from the widest range of reports available. The issues and potentials of this approach are further discussed in the next sub-section of this chapter.

Not all excavation reports possessed both of the requisite datasets (see, Figure 7). For all site-types, sites possessing both datasets were the most common, followed by zooarchaeological reports and lastly archaeobotanical reports. The only site-type that diverges from this trend were those from the rural sites in Essex, which demonstrate zooarchaeological and archaeobotanical special reports occurring at an equivalent rate. Overall, this pattern indicates that zooarchaeological data are more abundant than archaeobotanical data in the study area. These differences likely originate in the different methods required to collect these datasets during excavation; notably, the hand collection and sieving for zooarchaeological remains versus the sieving and floatation of archaeobotanical remains, though this is not a perfect delineation.

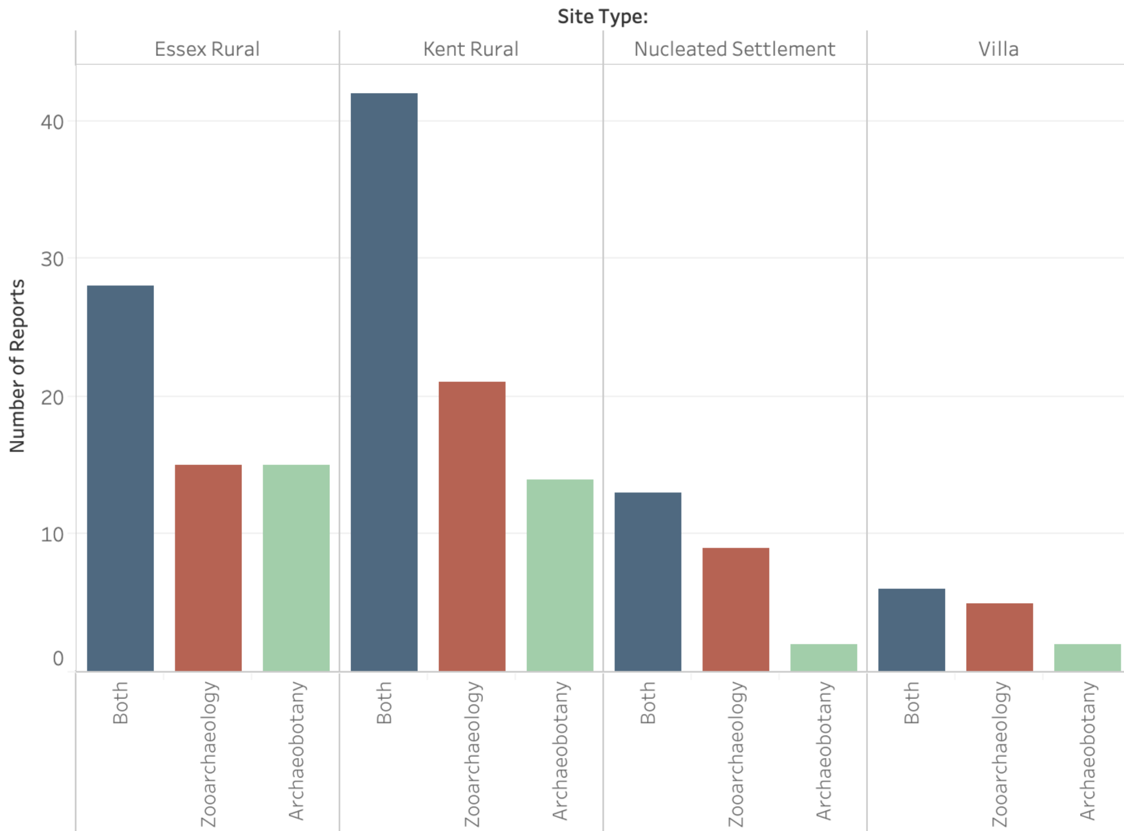


Figure 7: Number of Reports per Datatype

Additionally, patterns can also be evidenced in the taxonomic richness – that is, the number of different plant and animal species identified as foods – contained within the archaeobotanical and zooarchaeological reports. Of the 178 sites recorded in this study, 150 sites fall within the boundary of ten species or less for plant and animal foods (see, Figure 8). Other than several outliers from rural sites in both Kent and Essex, the most diverse reports, those with more than 20 zooarchaeological identified species and more than fifteen archaeobotanical species, are all from nucleated settlements and villas. This difference demonstrates that rural sites were more likely to evidence a more contained food representation. However, nucleated settlements and villas were more likely to show diverse food representation in their archaeobotanical and zooarchaeological records.

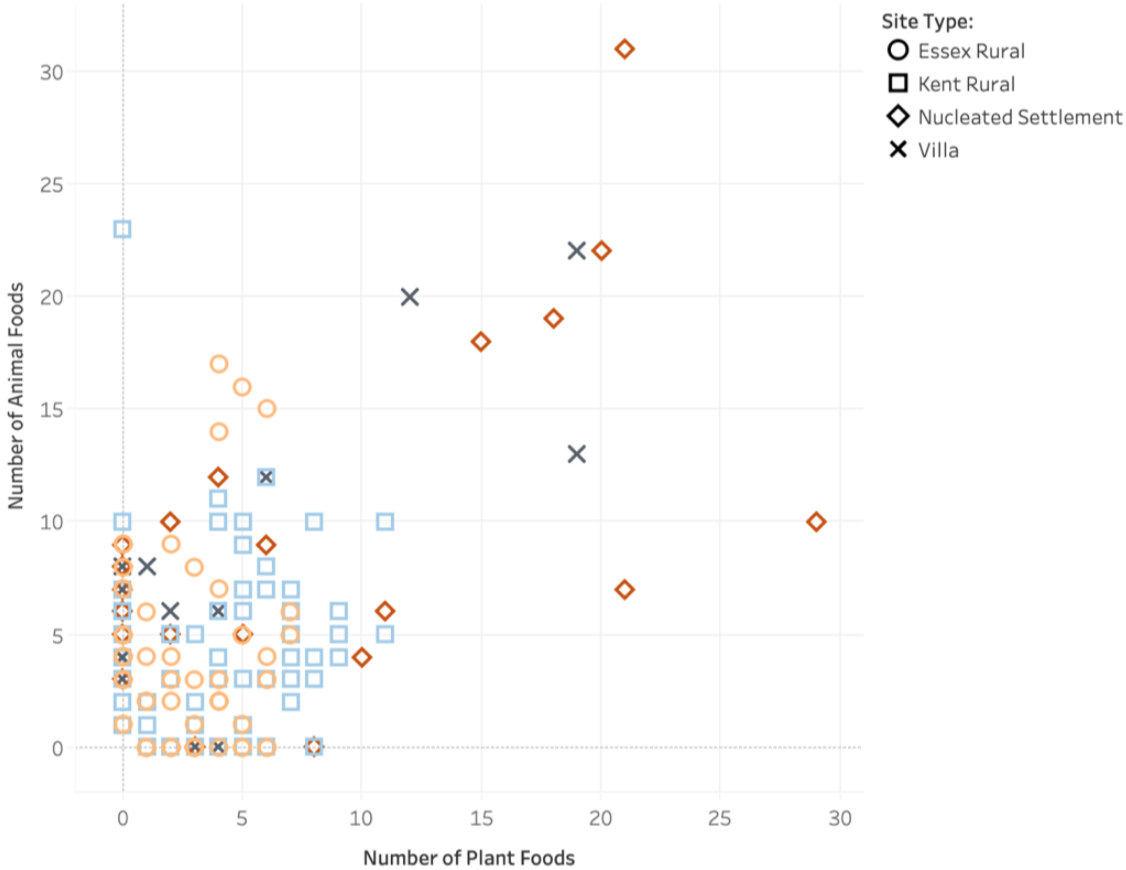


Figure 8: **Taxonomic Richness of Plant and Animal Foods**
Note: See Appendix D for the site-type specific versions of this figure.

3.2. The Limitations and Potential of Occurrence Data

The limitations of presence/absence data have been widely discussed in archaeobotanical and zooarchaeological applications. Scholars have identified issues associated with interpretation based simply on presence and absence, arguing that absences do not necessarily equate to avoidance, and that presence does not necessarily equate to usage (Peres 2014:18). Absence, given all the taphonomic biases that may impact preservation and recovery, is commonly identified as essentially uninterpretable (Pearsall 2019:60). However, quantified assemblages do not possess a unique exemption from the challenges imposed by taphonomic factors. For example, absolute counts, weights, and even semi-quantitative measures, such as ubiquity (see, VanDerwarker 2014; Morell-Hart 2019), are hampered by many of these interpretive issues (Wright 2014:52). Additionally, archaeology is unique among those disciplines demarcated as scientific, as "inference and reasoning from absence are common in archaeology" (Wallach 2019:8).

A range of large-scale archaeobotanical studies have continued to employ occurrence data despite its aforementioned issues (e.g., Bakels and Jacomet 2003; Colledge et al. 2004; Fuller and Harvey 2006; van der Veen et al. 2008; Livarda 2011; McClatchie et al. 2014). Beyond archaeobotanical studies, a diverse range of researchers interested in the wider archaeology of food have likewise stressed the continued relevance of occurrence data. For Hilary Cool (2006:191), the presence or absence of specific food-related archaeological material "is… partially a matter of choice on the part of the inhabitants as well, of course, as of the vagaries of the archaeological record". Similarly, Benjamin Peter Luley (2014) interprets Roman colonization in southern France through the presence of particular food-related Roman material culture, particularly, cooking pots. Luley's (2014) reliance on presence of specific materials also implies that absence of these materials signifies the absence of Roman colonial forces. Additionally, even in research where scholars criticize a reliance on presence/absence data (e.g., Meadows 1995:136), it is possible to find interpretations rooted in these notions within their work (e.g., Meadows 1995:138). J.A. Hurley (2019:992), aligning with Cool (2006) and Luley (2014), suggests that "the presence or absence of food items in archaeological contexts is a culturally expressive choice, and not merely a response to environmental circumstance". From this perspective, absence, despite potential issues, must hold a degree of interpretive value.

Alexia Smith and Natalie D. Munro (2009) provide an analytical perspective on this issue. In their study on animal husbandry and crop usage, Smith and Munro (2009) employed correspondence analysis on both an abundance and occurrence versions of their dataset, resulting in near identical patterns of clustered sites. Based on their results, Smith and Munro (2009:928) suggest that occurrence data can be utilized to offset some of the limitations encountered in mixed, archaeobotanical and zooarchaeological, datasets. Perhaps the most direct argument for the utility of absence comes from Millett (2017:69-70), who identifies the overarching potential of patterns of absence in artifact-based studies. Although foods, given their organic nature must be interpreted more cautiously (see, Wallach 2019:7), the interpretive potential of presence/absence should not be fully discounted.

If, following Cool (2006), Luley (2014), and Hurley (2019), food presence is meaningful, the archaeobotanical data becomes available to the approaches used to engage similar binary (present/absent) datasets elsewhere in archaeology. One growing field that has engaged with the usage of both occurrence and abundance data is network analysis. A diverse range of network studies have rooted their connections in the presence/absence of a particular form of archaeological material (e.g., Coward 2010; Blake 2013; Arthur et al 2018; Pezzarossi 2020) or features of that material (e.g., Feugnet 2017), including the only previous network analysis based specifically on archaeobotanical material (Livarda and Orengo 2015; Orengo and Livarda 2016). As such, I now turn to the two methods utilized in this study, occurrence analysis and the aforementioned network analysis.

3.3. Occurrence Analysis Methods

The occurrence analysis of the plant (Chapter 5) and animal (Chapter 6) foods was conducted using the methods outlined thus far in this chapter. The animal and plant foods data contained within the original Excel datasheet was converted to represent a percentage. This conversion was done by taking the number of sites at which each food occurred, dividing by the number of sites conforming to that site-type with that data (archaeobotanical or zooarchaeological) present. For example, if there were twenty villas, but only eleven of those sites possessed archaeobotanical data, the number of plant foods occurrences was divided by eleven, the number of sites of that type with the relevant datatype. The resulting percentages were subsequently converted to represent percentages out of one hundred, allowing for standardization across all site- and datatypes. This standardization approach ensured that sites lacking a specific data type did not influence the occurrence analysis. Following conversion, the new Excel worksheet had columns of foods, with rows representing site-types, and the cells containing the corresponding presence ratio.

Following this conversion process, the standardized data was imported into the data visualization software Tableau. Within Tableau, the foods were divided into distinct categories as to not overwhelm the visualizations with all foods of a specific datatype presented in a singular instance. For the plant foods, these categorizes were: (1) cereals, (2) pulses, (3) wild and locally established plant foods, (4) imported plant foods, and (5) potentially imported plant foods. For the animal foods, these categorizes were:

(1) major domesticates, (2) mammalian foods, (3) avian foods, (4) marine and freshwater foods (excluding molluscs), and (5) marine and freshwater molluscs. The relevant foods could then be grouped together to form charts that expressed the site-type variation of food occurrence.

Tableau allows for efficient chart manipulation; therefore, as context was added to these foods, they could be rearranged to fit the most relevant category. Additionally, archaeobotanically- and zooarchaeologically-identified species that were determined not to have been primarily exploited as foods, could easily be removed from the charts. Furthermore, within each chart, colour and shape were utilized to distinguish between site-types, facilitating easier visualization of the differences present within the study area. Charts were sorted from the most occurring food, to the least. This sorting was determined via an auto-calculated average of each site-type's value for that food. For consistency, these visualization features were applied to each category of foods.

Beyond the calculated differences of food presence at each site-type, the role of the different foods charted in this analysis were contextualized using both the archaeological literature and historical sources. For the archaeological literature, a diverse range of archaeobotanical and zooarchaeological research was consulted to provide contextualizing information for both Essex and Kent, the Roman period of Britain, and the wider discourse of the empire itself. This pre-existing research provides scaffolding (see, Wylie 2016) on which I build my own interpretations of the data. Additionally, the controversies and divergent opinions expressed within this pre-existing discourse provide avenues to consider conflicting interpretations that may impact my dataset.

3.3.1. The Role of Historical Sources

The presence of texts is what differentiates historical archaeologies, including classical archaeologies, from the wider discipline. Historically, the presence of these texts has dominated Roman archaeology, with the archaeological evidence often limited to the addition of texture to a pre-determined narrative (Dyson 1993:195; Woolf 1997:340; Papadopoulos 1999). This archaeological subservience manifests in the notion of "archaeology as the handmaiden of history" (Allison 2001:181). Problematically, the over emphasis of historical texts has limited interpretation of the archaeological record to the colonial perspective of the Roman elites and does not give voice to the conquered majority (Laurence 2001:94). Text-based theory and interpretation is incapable of fully realizing the complexities of responses to Roman colonialism evident in the archaeological record (Pitts 2008:494; c.f., Barrett 1997:2). Rather than relying on these texts that foreground the privileged few, scholars have shown increasing recognition that historical archaeologies need to treat historical texts as another datatype.

The reorientation of the relationship between archaeological material and historical text will result in archaeological practices that are not simply used to justify the predetermined narrative of texts (Graff 2018:307). A by-product of this movement away from interpretation based on the historical record has been the object-turn, drawn from the wider discipline's theoretical developments (e.g., Witmore 2008; Olsen 2010), that has dominated a segment of classical archaeology's discourse in the last decade (e.g., Versluys 2014; Pitts 2017). Part of this shift in perspective has resulted from an educational change. Increasingly, many British Roman archaeologists are being trained in archaeology departments and are more versed in the methods and theories of the archaeology than their classically trained colleagues (Woolf 2014:49). Rather than dismiss the textual sources outright, I take a middle-ground approach; that is, rather than providing the basis of my interpretation, I utilize the available historical sources as a second dataset that can provide valuable contextual information for my occurrence analysis. In this approach, I treat the textual sources much as I treat the archaeological data, in that they provide useful but incomplete and biased information on Roman food, agriculture, and animal husbandry.

The presence of texts is a characteristic of Roman archaeology that, no matter previous mis- and overuse, must not be ignored, as they provide valuable insights otherwise unattainable from the archaeological record. As such, from the historical sources I seek to establish what Christine Hastorf (2017:22) calls the "rules of edibility", the non-fixed category wherein "historical habits and beliefs" converge to regulate if a certain animal or plant is considered a viable food. Edibility is a cultural construction wherein many technically edible and viable food sources are ignored (Dietler 2007:224), and poisonous sources may be consumed (Hastrof 2017:22-23). Therefore, defining food is not about determining what animals and plants could provide nourishment, but what people considered to be edible (Twiss 2015b:92). Through their ascribed edibility, the plants and animals considered viable foods are fundamentally embedded into social and cultural identities (van der Veen 2008:83; Campana 2010:129).

The Roman historical texts provide us with a means of establishing an initial perspective on edibility of the archaeobotanically- and zooarchaeologically-identified species. This perspective is important because colonizing peoples often installed the "essentials of their home diet" in newly conquered lands (Beaudry 2013:285). However, as these sources are limited to a particular segment of the population, they need to be employed critically and not exclusively. By using these sources, I can not only engage with the manifestation of the textual evidence for Roman culinary traditions in Britain arising from colonialism, but also with the divergences occurring between both Britain and Rome, and within Britain itself. This distinction ties my usage of the historical sources into the wider emphasis on the plurality that has emerged in British Roman archaeology, refining my research question from the impact of Roman colonization on diet, to how this impact manifested in different places (regions and site-types).

3.4. Network Analysis

The final section of this chapter discusses network analysis, the features of networks, archaeological applications, and the application utilized in this study.

3.4.1. Data, Relations, and Visualizations

Drawn from complexity science (Brughmans et al. 2019:9), network analysis employs "techniques for identifying, examining and visualizing patterns of relationships" (Brughmans 2010:277). These relationships can be as simple as the connection between two nodes (see, Figure 9), or as complex as the connection between hundreds of thousands of nodes. These nodes can represent the people, places, or things that are connected through some form of a relationship, an edge (see, Figure 9). Edges can be undirected or directed, with directed edges ascribing a unidirectional flow to the relationship represented by that edge. For example, if you were looking at a relationship between fathers and sons, the paternal relationship would flow from each father to each son. However, if you were looking at relatives, unidirectional flows would not make contextual sense, as this relationship is attributed to both individuals. In addition to directionality, edges can also be weighted or unweighted, with weighted edges ascribing a value to the relationship represented by the edge (see, Figure 10, Network A). For example, the relationship might be the number of text messages sent from one person to another. The underlying relationship represented by an edge must be clearly explicated to provide context to the network. As such, edges must have a clear – and fixed – meaning within a particular network.

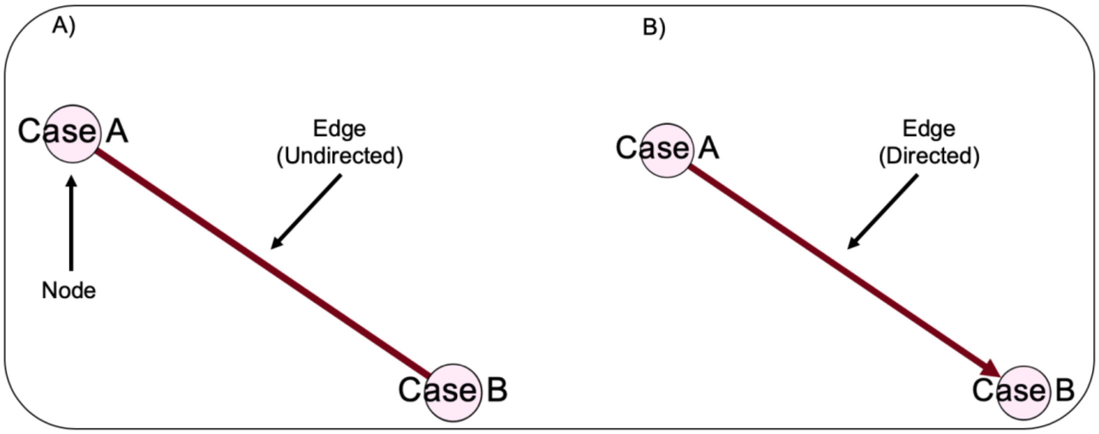


Figure 9: Basic Network Features
Note: Network A demonstrates an undirected edge connecting two nodes. Network B demonstrates a directed edge connecting those same nodes. Note the shift from a line to an arrow connecting the nodes.

Network data is typically produced as separate node and edge tables, or in the form of an adjacency matrix (see, Table 1). These tables or matrices are imported into a network software, such as Gephi (Bastian et al. 2009), which is used to produce a network representation of this data. As with other multivariate dimensional reduction techniques (such as Principle Component Analysis, Correspondence Analysis, and non-metric Multidimensional Scaling), network visualizations summarize high numbers of variables in a reduced number of visual axes (Golitko et al. 2019:8). Raw network visualizations are often incredibly dense and look like random clouds of data. These clouds require visualization algorithms to provide meaningful clarity to the network. While georeferenced-based algorithms can provide useful visualizations of spatial data, networks most commonly employ a type of force algorithm, or spring embedding algorithms (Golitko et al. 2012:510), to spatialize the network. Nodes, like charged particles, are repulsed from each other, and edges act like springs as if to pull them back together (Greene 2018:146). In weighted networks, edge weight determines how strongly this spring-like pull acts upon the nodes. Importantly, force algorithm-based visualizations are enacted in relational space; there is no connection between the spatial positioning of a node and the node's position in these visualizations.

Table 1: Example of Adjacency Matrix

	Case A	Case B	Case C	Case D	Case E
Case A	-	2	1	1	1
Case B	2	-	1	1	0
Case C	1	1	-	0	0
Case D	1	1	0	-	0
Case E	1	0	0	0	-

A range of network-level, or global, statistics can be employed to explicate the overarching shape, or cohesion, of a network (Borgatti and Evertt 2006:477). The employment of network statistics is valuable because it provides researchers with "a qualitative method that produces quantitative output" (Östborn and Gerding 2014:84). Although a range of other statistics can be easily extracted from network software, these have been developed to utilize specific types of data and in specific types of networks. Therefore, while all statistics are obtainable, they do not provide readily interpretable information for all contexts. Only one of these statistics is of relevance for this study, node degree. In a standard one-mode network, a node's degree is the number of edges connecting that node to other nodes in the network (Borgatti 2011:426). From the previous example of a network based on text messages, node degree would be the number of people a person (node) sent messages to.

Networks are merely abstract representations that help describe "something" and are explicitly not the thing that is actually being described. As such, qualitative insights can be drawn directly from the visualization process. Visual inspection of a network can provide insights into the network's underlying data that would not have been otherwise apparent. Visual inspection provides an explorative approach for considering the underlying narrative function of network diagrams, helping explicate what the network is communicating about the data. A network's nodes and edges can be coded by size, shape, and colour to ascribe easily identifiable interpretable features onto the network. For example, Figure 10 (Network A) visualizes edge weight to easily identify the strongest edge in network. Alternatively, Figure 10 (Network B) use size to reflect node degree, providing quick identification for the nodes that are both highly and minimally connected. Assessing these visual features instigates a deeper exploration and understanding of these data that constitutes the network (Decuypere 2020:86-87).

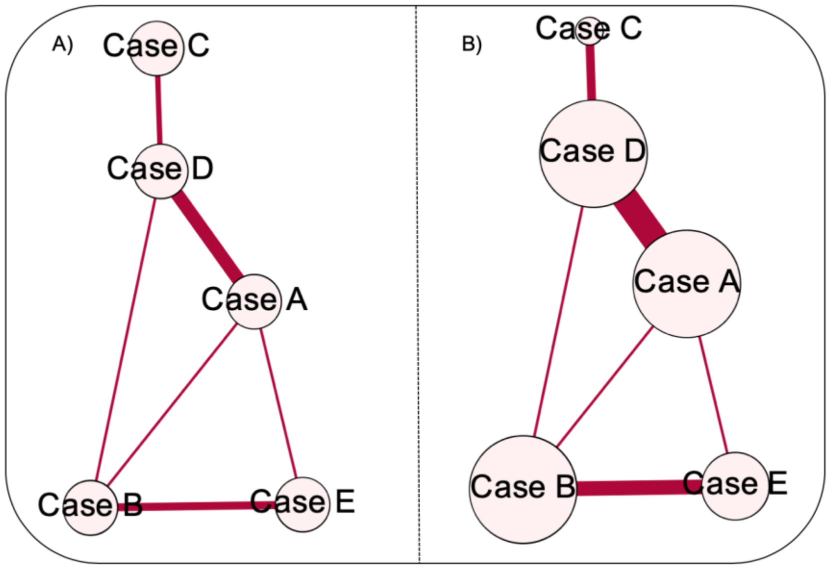
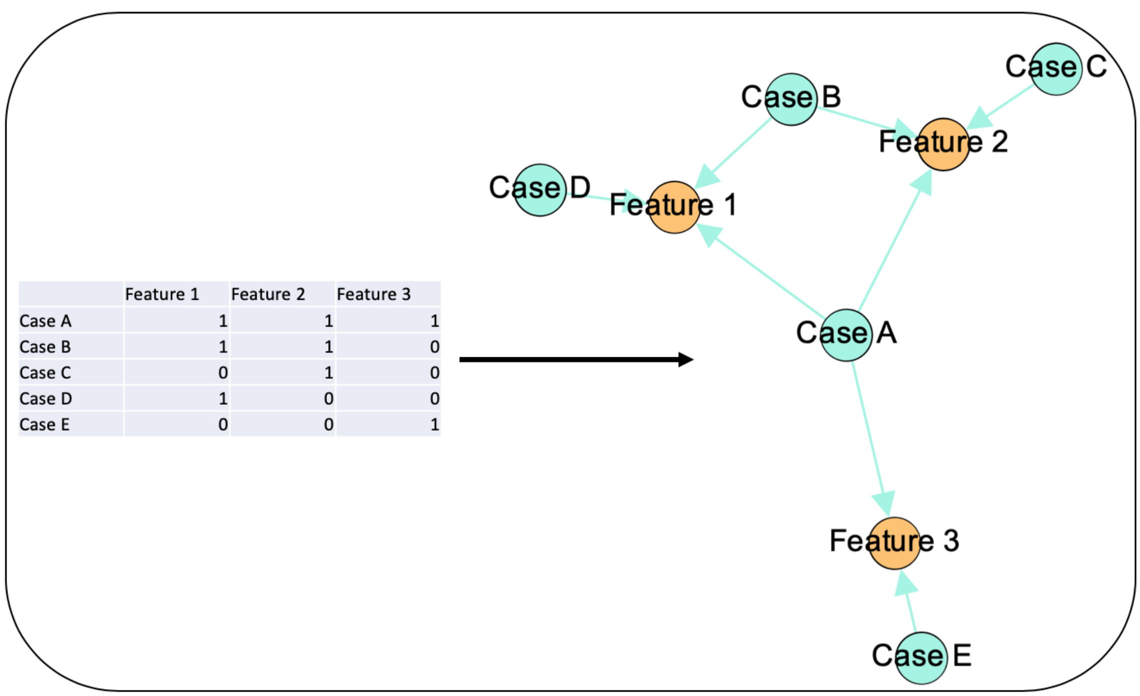


Figure 10: Example of Networks Visualizing Specific Structural Properties
Note: Network A visualizes differences in edge weight as thickness. Network B adds node degree to the visualization using size.



	Feature 1	Feature 2	Feature 3
Case A	1	1	1
Case B	1	1	0
Case C	0	1	0
Case D	1	0	0
Case E	0	0	1

Figure 11: Example of Bipartite (Two-Mode) Network
Note: On the left is a contingency table from Microsoft Excel which has been processed in Gephi to produce a Bipartite (Two-Mode) Network.

Beyond the standard networks that have, thus far, formed the basis of this review, a second type of network bears discussion, bipartite networks. Bipartite networks – also known as two-mode networks – consist of two different types of nodes. Affiliation networks are a specific class of bipartite networks in which nodes can be divided into two different types of entities (Borgatti et al. 2011:417; see, Figure 11). One set of nodes is considered “actors” and the other set “events” (Faust 1997:157; Arthur et al. 2018:222) or “affiliations” (Hansen et al. 2011). These networks are non-dyadic, in that the two types of nodes cannot connect to nodes of the same type, only to nodes of the other type (Faust 1997:158). In Figure 11, node-type is linked to colour, demonstrating the non-dyadic nature of a two-mode affiliation network. Affiliation networks allow researchers to explore data that could not be otherwise explored through a standard, one-mode network (Arthur et al. 2018:222). Specifically, affiliation networks provide a means of connecting nodes that would not have an apparent relationship to form an edge in a standard (one-mode) network. For example, a university’s students may share relationships based on the courses in which they are registered. In this example, students are the actors, and the courses are their affiliations.

Bipartite networks can be ‘projected’ into two separate one-mode networks, that can be analyzed in much the same way as true one-mode networks (see, Figures 12 and 13). An actor-to-actor affiliation network is created from the indirect relationship between actors via their affiliations (see, Figure 13, Network B), whereas an affiliation-to-affiliation network is created by the actors shared between different affiliations (Hansen et al. 2011:80-81; see, Figure 13, Network C). Weighted edges can be established as part of the projection process through matrix multiplication, where the shared connections between either actors or affiliations are summed. Furthering the example of students and courses, a projected student-to-student network would have edges based on the number of courses two students have in common. While, a course-to-course network would differ in that it would be based on the number of students enrolled in the same courses. Alternatively, similarity metrics may be employed to establish edges that are weighted not by the sum of their shared connections, but by the resulting value of a similarity or distance metric (Golitko et al. 2019:4). Many of these metrics are common to archaeological research, including both the Brainerd-Robinson Coefficient of Similarity (Robinson 1951) and the Jaccard Similarity Index (Jaccard 1902).

A)

	Feature 1	Feature 2	Feature 3
Case A	1	1	1
Case B	1	1	0
Case C	0	1	0
Case D	1	0	0
Case E	0	0	1

B)

	Case A	Case B	Case C	Case D	Case E
Case A		2	1	1	1
Case B	2		1	1	0
Case C	1	1		0	0
Case D	1	1	0		0
Case E	1	0	0	0	

C)

	Feature 1	Feature 2	Feature 3
Feature 1		2	1
Feature 2	2		1
Feature 3	1	1	

Figure 12: Matrix Projection Example

Note: The conversion of the contingency table (A) in Figure 12 to the adjacency matrices B and C reflects the projection process used in the creation of the networks in Figure 13.

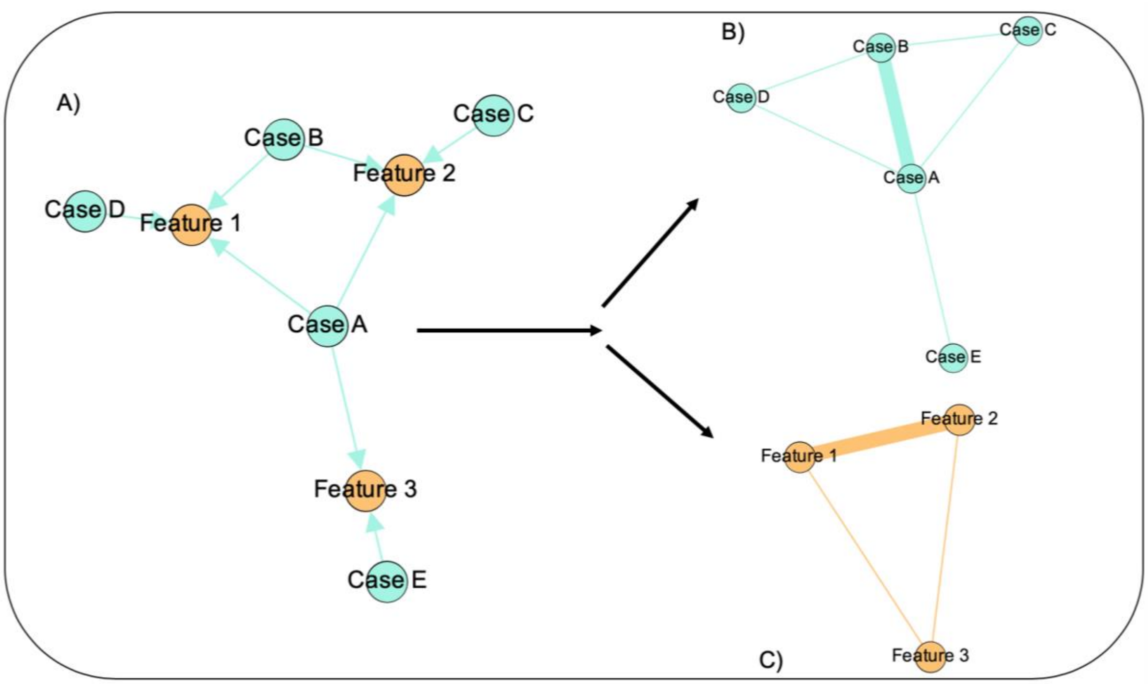


Figure 13: Network Projection Example
Note: Bipartite (two-mode) Network A is projected into two separate one-mode networks (B and C), one projection for each type of nodes present in the original network.

There are two major drawbacks are commonly associated with the projection process: that projections lose the detail of the original bipartite network, and that they inflate the number of edges present in the resulting network (Zhang et al. 2013:6870; c.f., Everett 2013). To help alleviate issues caused by the inflated number of edges, cut-off values can be assigned to the resulting similarity value or sum of shared connections, only allowing edges to form that surpass the user-defined cut-off. For the student-to-student projected network example, edges may be limited to situations where students share a minimum of two courses. Although these cut-offs may be useful for simplifying the resulting projected network, one drawback is the loss of these weak – but potentially important – connections. Additionally, scholars working with the weighted projections of affiliation networks must be cautious of over-reliance on statistical measurements common to standard network; for while the calculation may work, the changes to these data occurred in the projection process may result in values that are misleading, if not scrutinized critically (Arthur et al. 2018:226). Projected affiliation networks, despite their advantages for exploring indirect relationships, must be used with caution, as they are two-mode projections and not true one-mode networks.

3.4.2. Archaeological Affiliation Networks

Networks were both terminologically (e.g., Trigger 1984) and methodologically (Irwin-Williams 1977; Boissevain 1979; Shuchat 1984) introduced into archaeological discourse during the height of processualism. Although the last decade has seen exponential growth in archaeological applications of network analysis, these more recent studies have primarily avoided drawing on their early processual forbearers. This lack of connection to processual approaches is evidenced in the near absence of references to the older network analysis literature in current publications (Brughmans 2014:19). Instead, North American archaeologists have primarily drawn upon the sociological literature of social network analysis, while British/European archaeologists have primarily drawn network methods from complexity science and physics (Knappett 2011:48; Brughmans and Peeples 2017:6).

The different disciplines that have incorporated network analysis into their research practices have often developed distinct network terminology. For example, the nodes of computer science become actors in sociology, vertices in mathematics, and sites in physics (Mol 2013:84); with edges, changing to ties, links, or bonds (Mol 2013:84). The disciplinary origins of the literature utilized by archaeologists' manifests as terminological differences in their publications. For archaeologists in the Americas, sociology and social network analysis provide a more accessible literature from which to draw out and borrow applications, methods, and terms, than the mathematical complexities often foregrounded in the literature of complexity science and physics. However, the ease of adoption afforded by social network analysis has resulted in uncritical usage of the analytical tools, and their underlying algorithms, designed for use in social network analysis. The fragmentary nature archaeological data provides inherent issues to network statistics that rely on – at least relatively – complete datasets. Qualitative social network tools were designed for use with social networks, and archaeologists do not, in most cases, observe social networks (Munson 2018:43). The uncritical usage of social network analysis tools results in quantitative outputs provided by the network software that are interpreted without an understanding of how they are produced, or if they are meaningful (Crabtree and Borck 2014:7); turning the network analysis software into a Blackbox that churns out quantitative values for interpretation with limitations that are not understood (Sindæk 2013).

The previously stark Atlantic divide has significantly eroded over the last several years, as co-publications demonstrate an increased engagement between scholars across the Atlantic (e.g., Brughmans and Peeples 2017). The lingering impact of this increased engagement has resulted in the development of an archaeological approach to network analysis, less reliant on the direct adoption of techniques and tools from other disciplinary usages. Archaeological affiliation networks have emerged as a prominent approach with considerable potential for applying network methods to archaeological data (e.g., Brughmans 2012a:199; Collar 2013:38). Archaeological affiliation networks centralize the material relationships between places, often archaeological sites. The scale of such analysis is flexible, with sites, regions, households, rooms, or individual burials applied as actors, and different types of materials used as affiliations. Affiliations can be structured via shared raw material sources (e.g., Meissner 2017; Golitko 2019; Ladefoged 2019), artifact-types (e.g., Sindæk 2007; Blake 2013; Arthur et al. 2018), and consumption (e.g., Mills et al. 2013; Mills 2016; Giomi and Peeples 2019). The vast majority of archaeological affiliation networks have focused on regional variance in the consumption of ceramics, employing a sites-to-ceramics two-mode approach (e.g., Mills et al. 2013). The interpretive value of these material culture-based affiliation networks is predicated on the assumption "that shared material cultural styles or classes of objects suggest possible social ties among the inhabitants of the places where these objects were recovered" (Peeples 2019:477).

In sum, network analysis provides a mediating perspective between processual and post-processual archaeologies. Network methods show similarity to the methods, and the quantitative ways of thinking about those methods, familiar to – and preferred by – processual archaeologists (Collar et al. 2015:10). For example, this assessment is echoed by Kristian Kristiansen (2014:16). These methods allow for the consideration of the large-scale archaeological questions that often concern processual-leaning scholars, questions that are often dismissed for more local, micro- rather than macro-, concerns by many post-processual archaeologies (Brughmans 2012b:364; e.g., Salmon 1978; Ruddiman 2010:8; Kristiansen 2014:14). Simultaneously, network methods also frame the interpretation of relationships in terms that are comparable to many post-processual approaches (Collar et al. 2015:10), particularly those concerned with the dialectic between agency and structure (e.g., Joyce and Lopiparo 2005; Robb 2010). Finally, network analysis provides archaeologists with methods and interpretive concerns that bridge the increasingly porous barrier between processual and post-processual archaeologies.

3.4.3. Network Analysis Methods

The imported plant foods provide an important category for further exploration of the Roman impact on the regional foodscape, as the spread of these foods is directly linked to the Roman colonial change occurring in the region. This dataset was identified for network analysis because of its observed interpretive potential following occurrence analysis. A network based on staple foods would have been much less interpretively valuable, as, for example, wheat, barley, cattle, and sheep/goats were consumed at the majority of sites. Additionally, many of the collected reports did not include both archaeobotanical and zooarchaeological data (see, sec. 3.1.7, Figure 7). This absence of data necessitated a choice between composing the network of only sites with both datasets, or only from sites with one of the two datasets. Given that edges represent a consistent relationship between nodes, it was determined that using a single dataset would better enable the network's edges to maintain consistency. Future research can explore other subsets of the data presented in the occurrence analysis chapters; a marine foods network may offer a particularly valuable future network. Alternatively, the utilization of a software that can visualize multiple types of edges may allow for the usage of multiple datatypes; Gephi, the software employed in this study, can include multiple edges, but is unable to visualize overlapping edges connecting the same nodes. As such, sites that, for example, would have shared both plant and animal taxa would have only been visualized using a single edge (one of the two present), reducing the interpretive value of the network visualization.

The initial imported plant foods dataset was exported from the original Excel sheet and placed into a new sheet, where columns represented the imported foods and the rows represented the individual sites, not site-types. Each cell had a binary indicator for presence (1) and absence (0). This new Excel sheet was loaded into the freeware network visualization and analysis software, Gephi (Bastian et al. 2009). The initial network formed through the importation of this data was a two-mode affiliation network, which connected sites-to-foods, as the two types of nodes. This network, an affiliation network, possessed no connections from sites-to-sites or foods-to-foods. Gephi's importation process automatically removes all nodes (foods and sites) with no connections within the network. Therefore, the resulting network is based purely on nodes with connections to nodes of different types.

The initial visualization, the raw ‘data cloud’, distributes the nodes randomly, and is not conducive to visual analysis. In order to impart visual clarity onto the network, a layout algorithm, in this case ForceAtlas 2 (Jacomy et al. 2012), was applied, providing controlled modification of the network’s nodes layout. Rather than repositioning nodes according to geographic distances, ForceAtlas 2 is a force algorithm which treats the nodes like charged particles that repulse away from each other, while the edges act as springs pulling together similar nodes. Nodes with shared and similar connections cluster together in the visualization, as well-connected nodes are pulled towards the interior of the network through this combination of attraction and repulsion (Greene 2018:146). Force layouts provide the user with valuable, and often subtle, control over the visualization process (Venturini et al. 2019), including the ability to adjust the strength of attraction and repulsion utilized in the algorithm. This variable control allows for visual patterns within the network to emerge and facilitates the conveyance of dense information in a relatively compact and visually appealing medium (Mol 2013:93).

Following the application of ForceAtlas 2, other visualization features of Gephi were utilized. Node size was linked to degree, that is, the number of foods present at a given site, or the number of sites at which a given food is present. Node size was a ranked modifier; therefore, size was assigned within a specified range depending on the degree value of the node. Additionally, a column was added to Gephi’s data laboratory window, this column was assigned ‘node type’. Each site within the network was checked, twice, against the initial excel sheet for a site-type. Each type was then assigned a value of 1-4, and foods were given the value of 5, this data was added into Gephi for each site. Each node was assigned to both differentiate between the network’s two types of nodes, sites and foods, and the different site-types. Node colour was assigned as a unique modifier, wherein each value 1-5 was given a different colour. This process allows for a visual distinction between sites and foods, and the different types of sites. Following these changes to the network, ForceAtlas 2 was run once again, respacing the nodes based on their newly assigned size. The no-overlap feature of ForceAtlas 2’s algorithm was enabled, preventing the titular overlapping of nodes. The first level of network analysis was conducted using the resulting visualization of the two-mode network.

While the two-mode network provides a valuable means of visual inspection of patterns, these types networks can be projected into two one-mode networks that can be analyzed similarly to non-projected one-mode networks (see, Chapter 2, 2.4.1). Given the focus on the relationship between sites within the study area, the site-to-site one-mode projected network was the next subject of analysis. The site-to-site one-mode projection was created by transforming the data matrix contained within the Excel sheet into an adjacency matrix. This transformation process was done using the matrix multiplication in Excel, a standard feature of the software. This process manipulates the data so that columns and rows list the same feature, the sites. The number placed at the intersection of a column and a row is the sum of the shared variables (foods) present in the original table. The resulting adjacency matrix was then imported into Gephi as a separate network than the original two-mode network.

Given that all sites were represented twice, once as columns and once as rows, unmodified, the network would have possessed duplicate edges. These duplicate edges were removed using Gephi's averaging of duplicate edge feature during the importation process. Since the value for all duplicates is the same, the resulting average is equivalent to the value of one of the two duplicates. Additionally, self-linkage, created when the same site is present at both the row and column intersection in the adjacency matrix, was removed using Gephi's self-edge filter plugin. As with the two-mode network, ForceAtlas 2 was applied to the imported raw network for visual clarification. Beyond the force layout utilized, node size was once again linked to degree, a measure of the number of edges the node has to other nodes in the network (Borgatti 2011:426). In this projected one-mode network, degree relates to the number of sites with shared affiliations – that is, the same foods present – rather than the number of foods connected, as seen with the two-mode network. Again, node colour was used to reflect site-type. As part of projection process, the two-mode network's unweighted directed edges became weighted undirected edges (see, Chapter 2, sec. 2.3.1). Edge weight is determined via the number of imported plant foods – that is, affiliations – shared between the connected nodes. Edge weight was visualized as two ranked modifiers, thickness and colour (orange to dark red). The second level of network analysis was conducted using the resulting visualization (see. Chapter 6, sec. 6.2).

Despite the valuable insights into key relational interactions between sites provided by the force spatialized one-mode projected network, archaeology is an inherently spatial discipline, necessitating an analysis of the network from a spatial perspective. Columns for latitude and longitude were added for each node in Gephi's Data Laboratory window. These new columns were linked to their counterparts in the add-on georeferencing layout algorithm, Geo Layout (Jacomy 2019). Geo Layout was applied to re-visualize the network using the exact spatial coordinates of the sites represented by the nodes (see, Appendix A). The georeferenced network was then exported as two .shp files, one for nodes and one for edges, using the add-on plugin SHPExporter (Seidl 2013). The exported .shp files were loaded as vector files into the opensource geographic information software, QGIS (QGIS Development Team 2020). The vector files were positioned on top of an opensource background map. Node colour and size were relinked to site-type and degree, respectively. While edge width and colour were relinked to edge weight. Several versions of the resulting map and overlaying network were exported from QGIS. An edge weight threshold was applied to each subsequent export of the map and network. These four exported image files were combined to produce a singular figure, which presents the network edges of lower weight removed in stages. The third, and final level of network analysis was conducted using the resulting georeferenced visualization (see. Chapter 6, sec. 6.3).

3.5. Chapter Summary

Throughout this chapter, I have discussed the food data collected in this project, how the project's study area was identified, and how the classification schemas utilized were established. Additionally, the two sections that precede this conclusion have been devoted to the methods that are employed throughout the remainder of this study – that is, network and occurrence analysis. These methods will allow me to fully realize the potential of the collected dataset and facilitate a nuanced discussion of the diverse impact of Roman conquest on the British foodscape.

Chapter 4. Occurrence Analysis of Plant Foods

In this chapter, I undertake an analysis that deconstructs the archaeobotanical data of plant food occurrence throughout the study area. The plant food data provides a means to identify and discuss the nuanced ways in which Roman colonization impacted the regional foodscape. To facilitate this analysis, the plant food data are subdivided into five discrete categories: cereals, pulses, local and established plant foods, imported plant foods, and potentially imported plant food. These categories are utilized to analyze the ascribed foods from each site-type outlined in the preceding chapter. Following the occurrence analysis, this chapter concludes with a discussion of Roman horticulture and the implications of its manifestation in Britain on the regional foodscape.

4.1. Cereals

Domesticated cereals – that is, the grasses of the *Poaceae* family that are cultivated for their grains (Nesbitt 2015:94-95) – were the dominant crops of the study area. Cereals demonstrate an expansive history in Britain, as recent aDNA research has situated imported domesticated wheat crops in Britain prior to neolithization. This pre-agriculture occurrence suggests the utilization of imported wheat by British hunter-gather groups prior to the adoption of agriculture (Larson 2015). Seven cereals were encountered during data collection, six locally cultivated cereals, and one of likely imported origin (see, Table 2). All site-types, save for nucleated settlements, exhibit an expected trend amongst cereal presence; wheat is the most frequently present cereal type, followed by barley, oats, rye, and a single occurrence of millet (see, Figure 14).

Table 2: Cereals Present in Study Area

Taxonomic Name	Common Name	Status
Triticum dicoccum	Emmer Wheat	Established
Triticum aestivum ssp. *aestivum*	Free-Threshing Wheat	Established(?)
Triticum aestivum ssp. *spelta*	Spelt Wheat	Established
Secale cereale	Barley	Established
Avena sp.	Oats	Established
Secale cereale	Rye	Established
Panicum miliaceum	Broomcorn Millet	Introduced

Three types wheat were identified at the species level in the study regions, *Triticum dicoccum* (emmer wheat), *Triticum aestivum* ssp. *spelta* (spelt wheat), and

Triticum aestivum ssp. *aestivum* (free-threshing or bread wheat). Rather than focusing on the specific percentages of the different wheat species evidenced in the archaeobotanical data, I have summarized these different species into a more general category. By utilizing a general 'wheat' category, I am able to include those sites whose archaeobotanical reports only provide generalized identifications, such as *Triticum* sp., *Tricitum aestivum* ssp. *spelta/* ssp. *aestivum* or *Tricitum dioccum/spelta*.

Soil samples taken from the Roman layers of British archaeological sites are often dominated by spelt, which has regularly resulted in the assertion that Roman conquest instigated a transition in wheat cultivation from 'Iron Age' emmer to 'Roman' spelt (e.g., Stevens 2003; Cunliffe 2005; van der Veen and Jones 2006:224). Despite this cultivation shift's dominance in the literature, recent research has emphasized that this transition was an overgeneralization of often complex changes, and that emmer, free-threshing, and spelt, were likely prominently cultivated throughout the Roman period. Alternatively, to the claim of a unified reactionary change, Roman period variation in wheat cultivation is now perceived to be dependent on both local soil conditions and pre-existing traditions, including the often-simultaneous cultivation of multiple species (Campbell 2017:138). Spelt wheat's dominance of the archaeobotanical record may represent a depositional, rather than cultivation bias. Glume wheats, such as spelt and emmer, require extra processing – dehusking – following the threshing process in order to remove the grain from their titular hulls. Dehusking affords greater opportunities for the excess material removed from the grain to be exposed to accidental, or intentional, charring events (Fuller et al. 2014:198). Conversely, free-threshing wheat does not require this additional processing, necessitating threshing remains – rachis segments – for identification. These depositional biases may result in free-threshing wheat's underrepresentation in charred archaeobotanical assemblages (Kirleis and Fischer 2014:82). Therefore, caution must be used in attributing the dominance of spelt wheat in the archaeobotanical record to the dominance of spelt wheat cultivation in Early Roman Britain.

In addition to wheat, *Hordeum vulgare* (barley), *Avena* sp. (oats), *Secale cereale* (rye), and, at one nucleated settlement in Essex, *Panicum miliaceum* (broomcorn millet), were recovered. Barley occurred more commonly at nucleated settlements than wheat, and less frequently at villas and rural sites in both regions. This difference should not be taken to suggest that barley was a more important food than wheat at nucleated settlements in the study area; it merely demonstrates that barley remained of significant economic importance in post-conquest Britain. The historic sources (e.g., Plin. *HN* XVIII.XIV), note that barley was used for both making bread and griddle cakes (Cool 2006:78). In addition to its use in baking, germinated barley was used in the brewing of alcohol in the provinces of the empire, with the growing demand for beer perhaps fostering a cash crop usage of barley and other excess grains in Britain following the Roman conquest (van der Veen 2016:812).

Figure 14: Cereal Occurrence

Wheat and barley were clearly intentionally cultivated crops during the Roman period; however, the status of oats and rye is less certain. Questions remain as to whether these cereals were also intentionally cultivated or unintentionally collected as weeds occurring in cereal fields (Cool 2006:71). Lisa Lodwick's (2018:805) study of weeds commonly deposited as by-products of cereal processing classifies oats as one of the most common arable weeds associated with the processing of spelt wheat. If the oats identified in the study area were merely intrusive, unintentionally collected weeds, spelt wheat's Roman period proliferation would have also provided oats with a greater chance to proliferate. This interpretation situates oats an example of "backdoor domestication", wherein a secondary weed crop is eventually established as a domesticate cultivated in its own right (Zohary et al. 2012:7). However, oats are historically identified by Galen (*De al. fac.* I.14) as both fodder and a famine food. While, Pliny (*HN* XVIII.XLIV) identifies oats as both a “disease in wheat”, a weed, and a crop that was cultivated by the non-Roman inhabitants of Germany. From Pliny’s statement, therefore, oats are both weeds and intentionally cultivated in the Roman Empire and, as such, a clear delineation between the two states is problematic.

As with oats, the cultivation status of rye during the Roman period remains uncertain. Rye demonstrates a considerably reduced occurrence in the study area, correlating with trends of minimal usage at Roman Period sites identified by other researchers (e.g., Murphy et al. 2000:42). Given this limited presence, rye cultivation is not believed to have occurred in Britain until the Anglo-Saxon period (Moffett 2011b:351; Campbell 2017:139). Although the occurrence of rye in the archaeobotanical assemblages of rural sites in each county and villa is limited to less than 20%, rye was identified at over 30% of the nucleated settlements in the study area. Rye is clearly not as present as the two major cultivated cereal crops, barley and wheat, and also lags behind the presence of oats. However, as with oats, rye is identified by Galen (*De al. fac.* I.13), who describes it as a crop common to Thrace and Macedon which produces an unpleasant and fibrous black bread. As a crop, rye is particularly suited to the exploitation of diverse ranges of soil condition, while being resistant to drought, and tolerant of a more northern climate (Zohary et al. 2012:57). Given that the Roman period is often characterized by intensified, though varied, exploitation of the landscape (McCarthy 2013:142), the usage of known crops that may further this exploitation should not yet be dismissed.

The single occurrence of *Panicum miliaceum* (broomcorn millet) recorded in this study likely represents the preserved remains of imported material, and not the remnants of regional cultivation. This single occurrence is notable because although millet cultivation and consumption are mentioned in the historical sources (e.g., Plin. *HN* XVIII.X; Gal. *De al. fac.* I.15), scholars (e.g., Marnival 1992; Popova and Marinova 2000) have previously minimized the importance of millet throughout the empire. Although millet is rarely evidenced in the charred assemblages in Britain, its absence can be framed the result of preparation and preservation biases, rather than a lack of usage. Both textual (Plin. *HN* XVIII.XXIV; Gal. *De al. fac.* I.12) and ethnographic sources (e.g., Motuzaite-Matuzeviciute, et al. 2013:1073) suggest millet would have been mixed with lard, olive oil, or milk (Murphy 2016:68) and consumed as a porridge (Giacosa 1994:16).

Unlike grinding wheat for flour, boiling millet grains whole would have resulted in reduced chances for accidental charring (Murphy 2016:68). The further masking of millet's archaeobotanical representation was identified in controlled charring experiments, which have demonstrated that the carbonization of millet seeds results in the expansion and distortion of the millet grains, leaving much of the grain morphically unidentifiable (Märkle and Rösch 2008). As such, those seeds that do become charred are more difficult to identify. Millet, as with the other cereal grains, was not limited to a singular method of consumption. Yeast was extracted from wine-soaked millet for baking bread (Plin. *HN* XVIII.XXV-XXVI; Giacosa 1994:16) and the cereal was fermented into a beverage that Pliny (*HN* XIV.XIX) identifies as a type of artificial wine.

Beyond millet's culinary usages, millet cultivation was agriculturally beneficial, as the cereal could be planted in overly exploited fields (Plin. *HN* XVIII.LXVII) to help replenish nitrogen depleted soil (Nesbitt and Summers 1988:94; Foxhall et al. 2012:104; c.f. Cumo 2015). Millet was likely more integral to Roman agriculture and cuisine than many preceding archaeobotanical studies have identified, with preservation biases problematizing conclusions based strictly on carbonized remains. Rather than the distortion processes of carbonization, mineralized preservation is the preferred method for millet recovery. Mineralization of millet grains allows them to retain their morphologically identifiable original organic structure (Murphy 2014:4948). Unfortunately, no mineralized assemblages were identified during data collection. Despite the impact of preservation biases, millet cultivation and consumption are attested in the assemblages of Roman Italy (e.g., Rowan 2017; Murphy et al. 2013) and Gaul (Marinval 1992; Jacob et al. 2008). Therefore, the minimal presence of millet in Britain may reflect a true absence of cultivation. As such, my data substantiates a limited archaeobotanical presence of imported millet in Britain, though the extent of this occurrence is likely impacted by preservation biases rooted in preparation, utilization, and preservation.

The data collected for this study situate wheat as the most commonly present crop at all site-types, save for barley at nucleated settlements. This pattern aligns with previous research that positions wheat, particularly spelt, as the most important plant food in southeastern Roman Britain (e.g., Hurley 2018:998). However, this analysis also aligns with Frits Heinrich's (2019:103-104) suggestion that nucleated settlements – that is, urban spaces – demonstrate greater diversification in the cereals available for consumption than the rural sites. This increased diversity is supposed by the presence of millet and the heightened presence of barley and rye at nucleated settlements.

4.2. Pulses

Pulses, also known as legumes, are the edible crops of the *Fabaceae* family. Diverging from this simple modern classification, Roman authors historically defined pulses as those cereals from which bread is not produced (Gal. *De al. fac.* I.16). Pulses were an essential agricultural resource in the Roman world (Heinrich and Hansen 2019:116), which provided an important dietary compliment to cereal crops (Horden and Purcell 2000:203) given their high protein content (Fuller and Harvey 2006:219). In addition to their nutritional benefits, the Romans exploited pulses as fodder and used these crops to replenish depleted nutrients in fields typically used to grow cereals (Columella*, Rust.* II.X). Four cultivated species were identified (see. Table 3), along with a range of genus-level identifications (grouped together as Unidentified Pulses, Figure 14). Of the identified species, *Vicia faba* (broad bean) was the only species firmly established as a crop in Pre-Roman Britain (Treasure and Church 2017), *Pisum sativum* (garden pea) is a potential Roman introduction (Cool 2006:127), whereas *Lens culinaris* (Lentil) and *Trigonella foenum-graecum* (fenugreek) were most likely introduced and imported crops (Cool 2006:127; Campbell 2017:142).

Table 3: Pulses Present in Study Area

Taxonomic Name	Common Name	Status
Pisum sativum	Garden Pea	Introduced(?)
Vicia faba	Broad Bean (Faba Bean, Celtic Bean, Horse Bean)	Established
Lens culinaris	Lentil	Introduced
Trigonella foenum-graecum	Fenugreek	Introduced

Pisum sativum is present at 46.7% of the nucleated settlements and 33.3% of the villa*s* identified in the study area (see, Figure 15). Rural representation is significantly limited, with the garden pea identified at only 12.3% of the rural sites in Kent, and 2.3% of the rural sites in Essex. Peas are rarely encountered in the archaeobotanical records of Britain prior to the Roman period (Cool 2006:127; c.f. Campbell 2017:141-142). Unlike the modern practice of harvesting immature seeds for direct consumption or canning and freezing, the "[m]ature dry seeds were the principal product of classical times" (Zohary et al. 2012:82). Consumption of dried peas highlights the possibility that these pulses could have been both imported and cultivated locally, as they would have been distributed across the empire's vast trade routes.

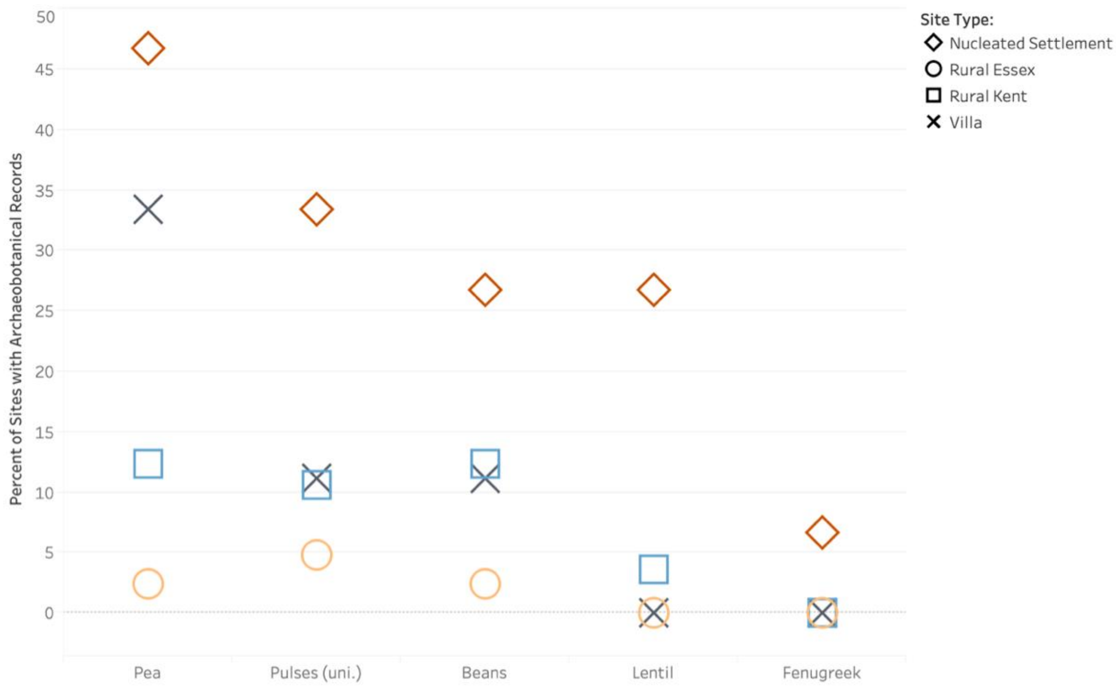


Figure 15: Pulse Occurrence

The other frequently cultivated pulse, *Vicia faba* (the broad bean, Celtic bean, or fava bean), is present at 26.7% of the nucleated settlements in the study area. *Vicia faba* was established in Britain as a major crop by the Middle Bronze Age and pottery impressions potentially push its presence as early as the Neolithic (Treasure and Church 2017:119-120). As with the pea, broad bean seeds can be consumed raw from unripe pods or extracted from ripe pods and dried (Zohary 2012:90). The broad bean is a staple of archaeobotanical assemblages from the Bronze Age onwards, occurring with a generally consistent seed size. However, divergence occurs in the Roman and/or Medieval periods with the appearance of broad beans with larger seed sizes (Treasure and Church 2017:119). As such, it is possible that *Vicia faba* was impacted by Roman colonialism in a similar way to cattle (*Bos* sp.), where the locally established food was systematically replaced by larger imported 'Roman' varieties (Seetah 2005:4; Mackinnon 2010). Therefore, while *Vicia faba* was not a Roman introduction, the pulse was likely directly impacted by shifting agricultural practices established by the Romans.

Rural representation is significantly less for both the pea and broad bean. The pulses occur at less than 3% of the rural sites in Essex and at 12.3% of rural sites in Kent. The minimal presence of pulses has been noted by previous researchers, including Treasure and Church (2017), who attribute this restricted presence to crop processing and preparation styles, echoing the aforementioned potential limitations for millet preservation. Treasure and Church's (2017) suggestion is supported by Galen (*De al. fac.* I.19-21*)* who identifies the need to soak and boil both crops in the construction of Roman dishes. As such, the archaeobotanical visibility of these pulse crops may be directly limited by their preparation and cooking processes.

The two pulses of likely imported origin, *Lens culinaris* (lentil) and *Trigonella foenum-graecum* (fenugreek), occur predominantly at nucleated settlements. Fenugreek was not identified at any other site-type. These two pulses were part of the wider complement of plant foods introduced to Britain by the Romans (Campbell 2017:142). Although researchers (Halbaek 1964:162) have previously argued that lentils were merely contaminants within cereal crops imported to Britain, most scholars now agree that lentils were most likely intentionally imported as dried seeds (Cool 2006:127; Campbell 2017:142). Whereas lentils are often employed as the main ingredient in Roman dishes (Faas 2005:199-200), fenugreek is commonly employed as a flavoring agent in Roman cuisine (Faas 2005:162; Zohary 2012:97) and utilized for animal fodder (Heinrich and Hansen 2019:118). Galen (*De al. fac.* I.24) identifies that fenugreek can be eaten prior to seed production, implying the pulse's leaves and stalks could be harvested and consumed at an earlier stage in development. The usage of the fenugreek plant prior to seed development may have contributed to its minimal archaeobotanical representation, as stalks and leaves are unlikely to preserve in charred contexts (Moffett 2011a:41). Although desiccation may preserve these perishable elements of plants (van der Veen 2007:970), no desiccated assemblages were found in the study area (see, Chapter 2, sec 2.2.1). Throughout the study area, fenugreek was only identified at nucleated settlements, aligning with the trend visible amongst other imported plant foods (see, Figure 15).

Apart from the intentionally cultivated species that have thus far been discussed, a range of other pulses were encountered in the archaeobotanical records during data collection. Although it is possible that common vetch (*Vicia* sativa), vetchling (*Lathyrus cicero*) and alfalfa (*Medicago sativa*) were all consumed, in most instances these occurrences likely represent unintentionally collected contaminants (weeds) occurring within intentionally cultivated cereal crops and pulses (Zohary 2012:95). As such, these other pulses likely do not represent gathered wild resources intended for consumption. Given their likely non-food origins, these species were not included as discrete categories within this analysis. Additionally, the ‘unidentified pulses’ category incorporated those pulses referred to in the collected reports that were not identified to the species level. For example, *Vicia* sp., *Pisum*/*Vicia* sp. and *Pisum sativum*/*Vicia faba*, may have been a number of different species including peas, broad beans, or a range of vetches. The ambiguity of this delineation necessitated the inclusion of a generalized category, as many of the edible pulses that were exploited by the Romans reside within the range of potential represented species.

Beyond those pulses present in the study area, two additional pulses that were exploited throughout the Roman world bear discussion. First, *Vicia ervilia* (bitter vetch) is a crop that was likely introduced to Britain by the Romans (van der Veen et al. 2008:13), although it was not identified in any of the specialist reports collected for this study. Bitter vetch is typically considered a fodder crop, that can be made edible in times of necessity through the boiling of its seeds (Gal. *De al. fac.* I.29; Valamoti et al. 2011). Second, *Cicer arietinum* (chickpea) was a crop utilized throughout the Roman world (Heinrich and Hansen 2019:117) that was absent from the study area. Unlike bitter vetch, which was only consumed out of necessity, chickpeas were fully integrated into Roman cuisine. Unripe chickpea seeds were harvested and consumed in a number of different ways, including boiling and roasting (Gal. *De al. fac.* I.22). Although no archaeobotanical evidence was identified to substantiate their importation into the study area, it is possible that dried chickpea seeds were utilized in Britain during the Roman period.

4.3. Wild and Locally Established Plant Foods

A range of wild and locally established plant foods were exploited throughout the study area (see, Figure 16). Nuts, fruits, condiments/herbs (flavorings used in the construction of cuisine), and vegetables are all attested in the category of wild and locally established plant foods. For all site-types, other than villa*s,* hazelnuts (*Corylus avellana*) are the most commonly occurring food from this category. Hazelnuts occur at 60% of the nucleated settlements in the study area, the greatest occurrence of any plant food at nucleated settlements, save for several of the cereals. Conversely, they only occur at less than 30% of rural sites and villas, a rather dramatic difference in occurrence between site-types. A second tree nut, the acorn of the oak tree, is also present, occurring minimally at rural sites in Kent. Despite this limited occurrence, the acorn is identified as an important staple food of the rural Roman world (Heinrich 2019:104). Pliny (*HN* XVI.Vi) notes that acorns provide a cereal alternative during grain shortages, as the nut could be dried and ground and used as a substitution for flour.

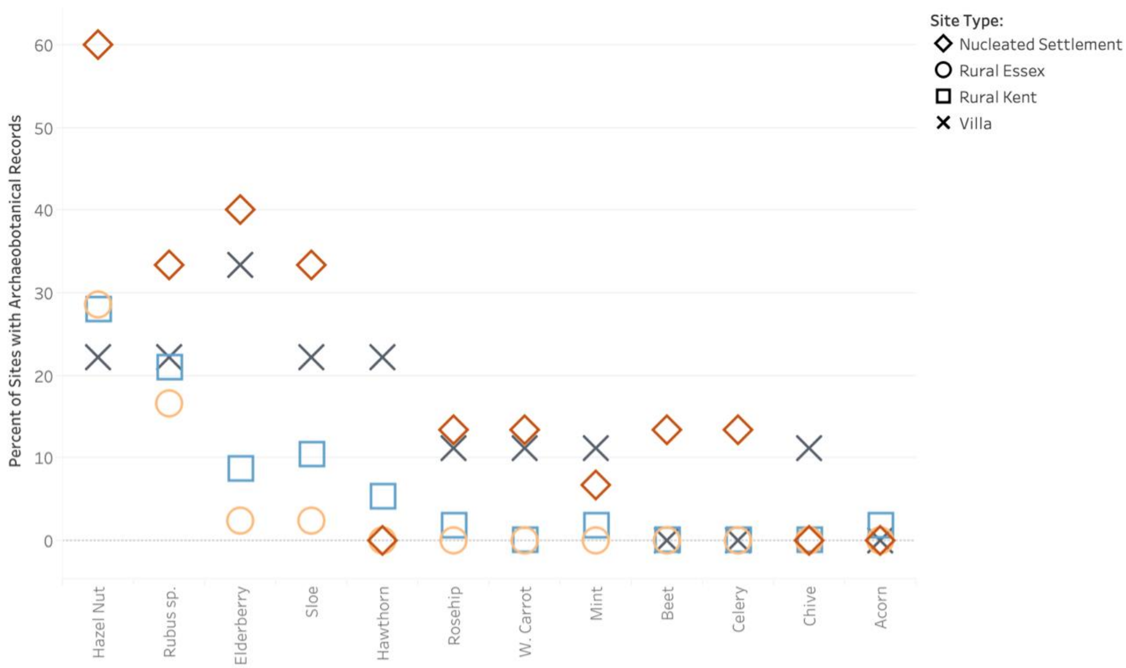


Figure 16: Potential Wild and Locally Established Plant Foods

Fruit from trees was similarly exploited, with elderberries (*Sambucus nigra*) present at 40% of nucleated settlements and 33.3%, of villas in the study area. The presence of the elderberry in rural settlements is limited to 10% in each county. A similar pattern is evidenced in sloe (*Prunus spinosa*). Although sloe is considered too astringent for modern tastes, the common presence of sloe pits indicates that this fruit was likely consumed raw during the Roman period (Cool 2006:125). However, Galen (*De al. fac.* II.38) equates sloe to blackberries and rosehips, as fruit that are not nutritious or pleasant. Additionally, hawthorn was minimally present at rural settlements in Kent, and present at 22.2% of villas. Notably, hawthorn (*Cataegus* sp.) was not identified at nucleated settlements.

Macroremains from the *Rubus* genus (bramble, blackberry, or raspberry) were the second most common food of this category. Given the morphological similarities of the seeds of the *Rubus* genus, these fruits were not commonly identified to the species level. As such, they are grouped by genus to reflect this ambiguity. Galen (*De al. fac.* II.13,38) identifies blackberries as one of the most regularly exploited wild foods by rural populations, and as a more astringent alternative to mulberries. Rosehips (*Rosa* sp.), a member of the *Rosaceae* family alongside *Rubus s*p., was identified in the study area. These edible berries were found at all site types, save for rural sites in Essex. A known wild food in the Roman world, rosehips were referred to as the fruit of the dog-rose by both Galen (*De al. fac.* II.14) and Pliny (*HN* XIL.XIII).

Beyond the aforementioned nuts and fruits, a number of herbs and vegetables were also identified in the study area. The presence of wild carrot (*Dracus carota)*, beet (*Beta vulgaris)*, celery (*Apium graveolens)*, chive/onion (*Allium* sp.), and mint (*Mentha* sp.) all indicate the presence of already locally established vegetables and herbs that may have been incorporated into Roman horticulture. Celery may have been utilized either as a vegetable or herb in Roman cuisine in Britain (Giacosa 1994:143; Faas 2005:154-155). Similarly, *Allium* sp., depending on the exact species represented, may have been used as a vegetable, onions (*Allium cepa*), or condiment, chives (*Allium schoenoprasum*). The presence of mint at both nucleated settlements and villas provides evidence of a locally established condiment/commonly employed in the construction of sauces for Roman cuisine (Giacosa 1994:27; Faas 2005:153). However, the occurrences of mint, celery, and beet could all represent the occurrence of the wild plants, as their seeds are difficult to morphologically distinguish between the cultivated and wild varieties (van der Veen et al. 2008:13).

A diverse range of fruits, nuts, and vegetables are represented in the wild and local established plant foods. Taken as a whole, these records highlight the potential importance of these native and locally-established foods at nucleated settlements and villas. While present at rural sites throughout both regions, rural sites in Kent demonstrate a more frequent presence of all of these foods, save hazelnuts. Additionally, the presence of these tree fruits and nuts in the archaeobotanical records highlights either an increase in woodland resource utilization or an increased tolerance for woodland encroachment on arable fields (Dark 2017:25; Hurley 2018:999-1000). The presence of these wild resources has widely been theorized to demonstrate a colonialoriented shift in people's relationship to the landscape, evidencing increased exploitation of both wild plants and animals (Hill 1993:60; Sykes 2011a: 340-341).

4.4. Imported Plant Foods

The category of 'Imported Plant Foods' is structured around those plant foods that are most likely of foreign origin and were not locally established prior to Roman conquest. Some of these, such as dates and olives, are true imports that were never established for local cultivation, while others, such as coriander and grapes, were integrated into local practices via Roman horticulture. Amongst these imported foods, a clear trend emerges – that is, nucleated settlements dominate the imported occurrences of these species (see, Figure 17).

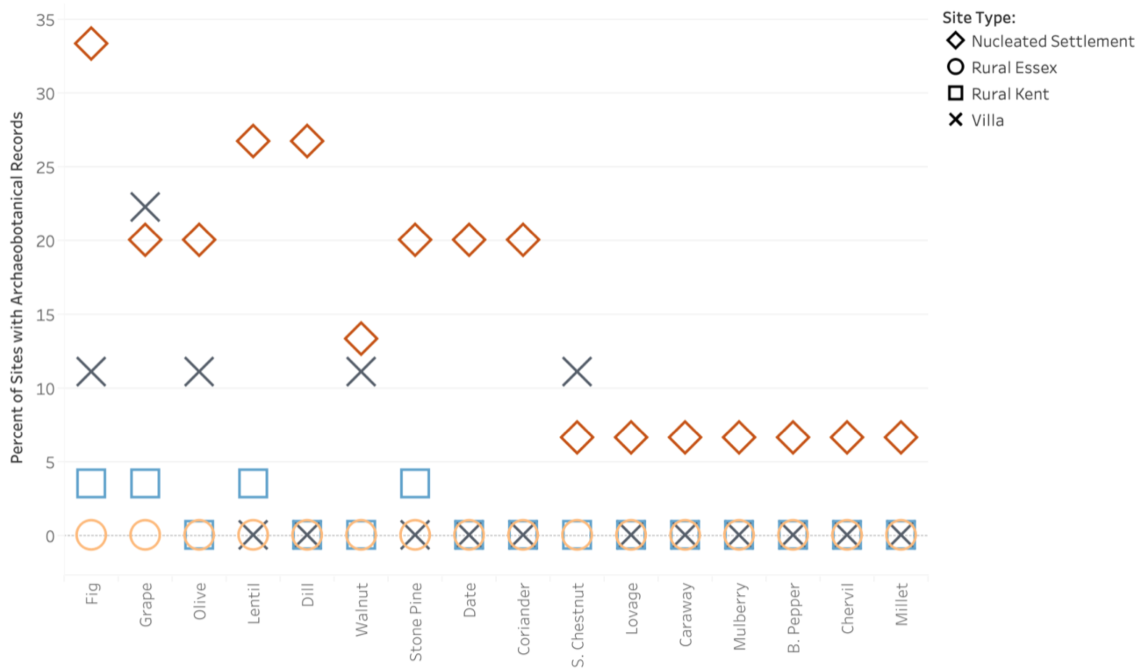


Figure 17: Imported Plant Foods

The 'Imported Plant Foods' category includes two primary members of the well-known Mediterranean Triad (e.g., Aldrete 2008:188; Elliot 2017:121), *Vitis vinifera* (the grape) and *Olea europea* (the olive). Both of these foods were shipped throughout the breadth of the empire in *amphorae*. Given the cultural importance of the olive in the empire and its Mediterranean foodscape, this food provides a valuable gage for the impact of Roman colonization on the British foodscape. Throughout the study area, olives were identified at 20% of the nucleated settlements and at 11.1% of villa sites. No olives were recorded at rural sites in either region. Olives were not cultivated in Britain and thus had to be imported through the empire's vast shipping network. Whole olives were transported preserved in honey-based syrup (Cool 2006:68) or in a mixture of oil, salt and vinegar after being repeatedly soaked in water (Giacosa 1994:185-186). However, these limited carbonized and waterlogged macroremains do not explicate the role of olive oil, which would require a detailed review of ceramic assemblages with an emphasis on *amphorae*. While limited, the presence of olive macroremains begins to reveal the greater integration of nucleated settlements and villas into a primary aspect of Roman cuisine, olive consumption, than the rural sites.

Grapes were identified at all site-types in the study area, with nucleated settlements demonstrating an occurrence rate of 20% and at 22.2% of villas. As such, grapes were the most commonly occurring imported plant food at villa sites. Grapes were eaten fresh, pressed to make wine and *passum*, and dried in the sun to make raisins (Giacosa 1994:194-195; Faas 2005:273). While the importation of wine may be evidenced through *amphora*e, the seeds found in the archaeobotanical record likely originated from raisins. The presence of grape seeds in Britain has resulted in longstanding debates regarding British viticulture during the Roman period. Proponents of British cultivation point to the presence of *Vitis* sp. pollen near cultivated soils (e.g., Brown et al. 2001; Dark 2017:28). Additionally, a significant amount of the evidence for British viticulture is based on unconfirmed reports of early excavations and historical sources (Williams 1977:328). One such source, Tactics (*Agr.* XII) identifies the grape vine as one of the plants that grows well in "warmer climates", which grows rapidly and ripens slowly in British soils. However, an account by Tacitus (*Agr.* XII) delineates between grape vines and the other plants "of warmer climates", which grow abundantly and productively. Detractors of British viticulture argue that the evidence is too ambiguous and many of the grape seeds likely originated from imported raisins (e.g., Williams 1977). A mediating perspective between these two extremes has emerged, with scholars now suggesting that viticulture may have been unsuccessfully attempted, alongside the importation of dried fruits and wine from other regions of the empire (e.g., Cool 2006:121; Campbell 2017:145). This middle ground is a logical stance, given the adoptions of other forms of Roman horticulture, and the influx of other imported plant foods.

Moving on from the members of the Mediterranean triad, the fig was another major import from the Mediterranean into Roman Britain. The seeds of the *Ficus carica* (the fig) were found at all site-types, save for rural sites in Essex. Figs were found at 33.3% of the nucleated settlements and 11.1% of the villas in the study area. As such, the fig is the most commonly present imported plant food at nucleated settlements. Despite the tendency for small fig seeds to be overlooked in archaeological contexts (Zohary 2012:128), the vast number of seeds contained in every fruit can quickly overwhelm archaeobotanical assemblages, if they are recognized. For example, fig seeds dominate the assemblages of sites in Roman Italy, including Herculaneum (Rowan 2017:325-326) and Pompeii (Murphy et al. 2013:414). While their archaeobotanical presence is less overwhelming in Britain, figs were widely dispersed throughout the study area when compared to other imported plant foods. While there has been some speculation concerning *Ficus carica* cultivation in Britain, most scholars (e.g., Campbell 2017:148) agree that *Ficus carica* was likely imported to Britain in a preserved form during the Roman Period, as the wasp needed for pollination cannot survive in Britain's climate (Cool 2006:119). Figs could either be dried in the sun or preserved in honey, either whole or stuffed with walnuts, hazelnuts, or pine nuts (Giacosa 1994:189-190). These acts of preservation facilitated their dispersal along the empire's extended trade routes and into Britain. Beyond direct consumption of the fresh and preserved fruit, dried figs were force-fed to pigs as a means of fattening their livers (Faas 2005:253-254,267). Thus, the fig held multiple roles in Roman cuisine and its presence at three of the four site-types in the study area highlights the spread of this import.

Beyond fruit, the imported tree crops of chestnut (*Castanea sativa*) and walnut (*Juglans regia*) were identified alongside the seed of the stone pine (*Pinus pinea*). Walnuts and stone pine most commonly occurred at nucleated settlements, while chestnut occurred most prominently at villas. None of these imports were identified at rural sites in Essex, and only stone pine was identified at rural sites in Kent. Despite their more limited representation, the presence of imported tree nuts and seeds at rural settlements demonstrates their relatively widespread dissemination throughout Kent. As discussed with the locally-established acorn, chestnuts provided an alternative to cereals, as they could be milled, ground, and used to make “breads, porridges and soups” (Heinrich 2019:104). While stone pines were often incorporated into Roman gardens as ornamental features (Lodwick 2017), the seed of the stone pinecone was a valuable horticultural food in the Roman world (Mutke et al. 2012:156).

A range of imported condiments was also encountered in the study area. These included: black pepper (*Piper nigrum*), caraway (*Carum carvi*), coriander (*Coriandrum sativum*), and dill (*Anethum graveolens*), all of which were only identified at nucleated settlements. Dill was most common, identified at 27.6% of the nucleated settlements, followed by coriander at 20%, with black pepper and caraway both at 6.8%. From its origin in India, black pepper was disseminated along trade routes across the empire, appearing in Roman archaeobotanical assemblages from Egypt (e.g., van der Veen and Morales 2015) to Britain (van der Veen et al. 2007). While encountering black pepper in of Roman Britain is rare (van der Veen et al. 2007:202), this condiment’s presence demonstrates how the intensive connection facilitated by Roman globalization impacted the local foodscape. Both the seeds and leaves of coriander and dill, on the other hand, were commonly used by the Romans as condiments (Faas 2005:156,236). As was previously mentioned with fenugreek (see, Section 4.2), the non-seed material is unlikely to preserve, resulting in herb plants commonly underrepresented in the archaeobotanical record.

The differences between fruits/vegetables and condiments/herbs discussed throughout this section imply the differential adoption of Roman foods when compared to Roman cuisine. Several Roman foods discussed in this section were disseminated more widely, occurring at multiple site-types. Conversely, the occurrence of flavoring agents utilized to create Roman-style cuisine were limited to nucleated settlements. This difference equates to the regional incorporation of a more diverse range of foods, rather than the incorporation of the Roman cuisine constructed from those foods. However, not all of the non-condiment imports spread widely, as such, nucleated settlements also had a wider range of new ‘Roman’ resources available; for example, mulberries were not evidenced outside of nucleated settlements. Alternatively, these differences may result from the vagaries induced by stochastic process and taphonomic impacts on the archaeobotanical record. However, if these absences are meaningful, then these differences highlight the discrepant acceptance of how ‘Roman’ foods were incorporated into the regional foodscape.

4.5. Potentially Imported Plant Foods

The final category of plant food for discussion is the potentially imported plants. This categorization is structured around those plants with uncertain status as a Roman introduction. This uncertain categorization also includes foods that are limited by their lack of species-level identification. For example, *Prunus avium*/*cerasus* (sweet or sour cherry), *Malus* sp. (apple or crab apple), and *Brassica* sp. (mustard or cabbage) all represent multiple different species, some of which were locally established or introduced. The first of these, the cherry, is the most frequently occurring plant food at villas, outside of cereals (see, Figure 18). Cherries were identified at 26.7% of the nucleated settlements, and 5.6% of the rural sites in Kent. No rural sites in Essex evidence cherry occurrence. The minimal cherry occurrences at rural sites is of particular note, given the high rate of occurrence evidenced at villas, which themselves are technically rural. Pliny (*HN* XV.XXX) notes that the cherry tree was imported to Italy from Pontus in the first century BCE, before it spread throughout the empire, with Britain mentioned specifically. However, the cherry's status as a Roman import is uncertain, as the wild variety of the sweet cherry is widely identified as native to Britain (e.g., van der Veen 2008:87; see also, Witcher 2013, for more discussion on the topic of Roman plant and animal introductions). However, there is limited evidence that these wild cherries were exploited in the Pre-Roman period (Livarda 2008:79). Therefore, the cherries in the study area may represent either local wild fruits, fruits that had been imported from the continent, or Roman introductions that were established through horticultural practices.

Following the cherry, apples are the next most commonly occurring fruit from this category. As with cherries, apples demonstrate their greatest presence at villas, followed by nucleated settlements, and a minimal presence at rural sites in Kent. Prior to Roman conquest, wild apples were extant in Britain (van der Veen 2008:87), with the domesticated variety believed to have been introduced following the conquest. An additional consideration that must be made is the morphological issues encountered when differentiating between apples and pears, which are in many cases too difficult to distinguish (van der Veen et al. 2008:12). As such, those occurrences here listed as *Malus* sp. may also represent *Pyrus* sp., which the Romans also exploited in both cultivated and wild forms (Gal. *De al. fac.* II.38; Plin. *HN* XVIII.VII). As such, these occurrences represent a diverse grouping of potential foods, including wild and domesticated apples and pears.

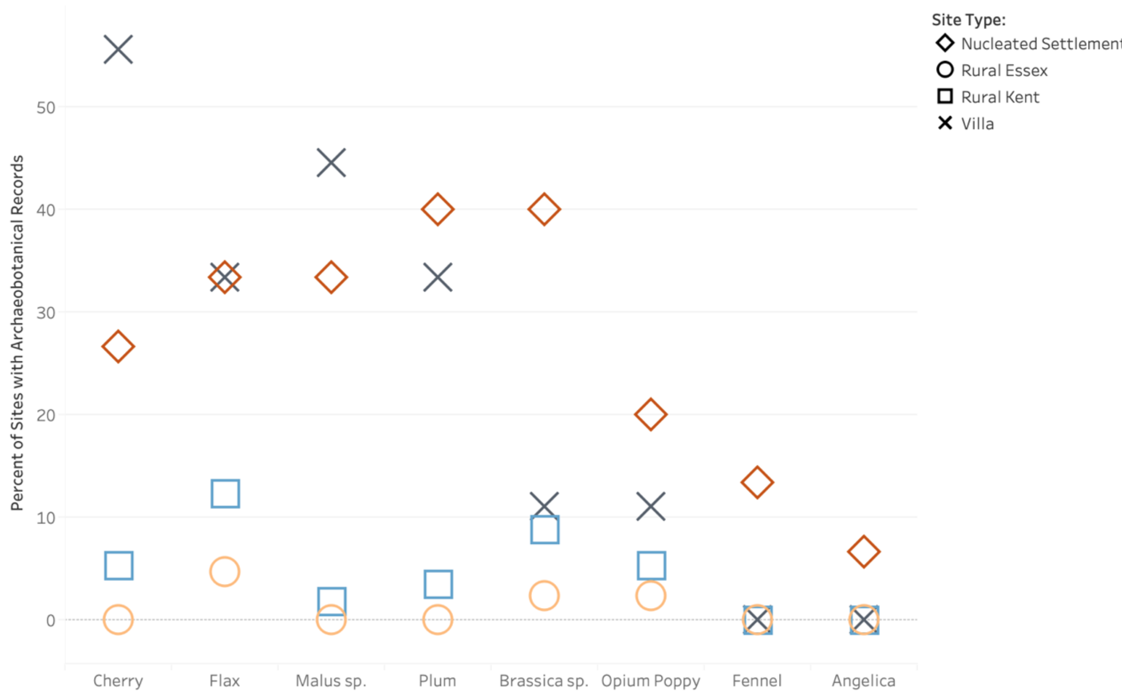


Figure 18: Potentially Imported Plant Foods

Outside of the occurrences of apples and cherries, nucleated settlements continue to demonstrate the most varied and frequent presence of plant foods. Plums (*Prunus domestica* ssp. *domestica)* and Damsons (*Prunus domestica* ssp. *Institia)*, were combined into a single category given the often-uncertain designations made to these *Prunus* sp. stones in the specialist reports. The smaller, locally available sloe (*Prunus spinosa*), however, was more commonly differentiated from other *Prunus* sp. varieties (for sloe see, Figure 16). Plums were identified at 40% of the nucleated settlements and 33.3% of the villas within the study area. Rural representation is significantly restricted, with only 3.5% occurrence in Kent and no occurrences identified in Essex. Imported tree cuttings could be grafted onto local trees (van der Veen et al. 2008 35; Campbell 2017:146), and plums were likely also introduced to Britain as dried fruits and/or preserved in syrup (Cool 2006:125). Galen (*De al. fac.* II.31) identifies that although less-astringent, plums were preferred, and that bitter varieties, such as damsons, could be boiled with honey or eaten raw alongside honey-wine. In addition to direct consumption, the Romans utilized plums to create sauces for fowl, lamb, venison, and eels (Giacosa

1994:99-100,109-110, 118-119,127; Faas 2005:286-287), demonstrating the plum's diverse and prominent role in the transformation of animal foods into Roman cuisine.

Three possible oilseeds crops, *Brassica* sp., flax (*Linum usitatissimum*), and the opium poppy (*Papaver somniferum*), were identified in the study area. While the *Brassica* sp. seeds may have represented imported condiments (mustard seed - *Brassica nigra*) or garden vegetables (cabbage - *Brassica oleracea*), they may also have been oil-seed crops, rapeseed (*Brassica napus*). *Brassica* sp. demonstrates an occurrence rate of 40% at nucleated settlements, and significantly more restricted rates, 11% or lower, at all other site types. The Romans employed mustard as a condiment to flavor meat (Fass 2005:274-275) and vegetables (Giacosa 1994:140), while also utilizing processed seeds as a preservative (Giacosa 1994:184-185). Context from finds elsewhere in Roman Britain situate *Brassica* sp. alongside imported herbs (Cool 2006:128), suggesting intentional consumption, rather than wild species inclusion in the archaeobotanical record. As such, while the *Brassica* sp. identified in this study cannot be definitively situated as specific foods or oilseeds, some of these seeds likely do represent crops intended for consumption.

Flax, the second potentially imported oil crop, occurs at 33.3%. of both nucleated settlements and villas. For rural sites, presence is over twice as common in Kent than Essex. Flax has both short-stemmed oil varieties with larger seeds, and long-stemmed fibrous varieties with small seeds (Zohary 20120:101). While the fibrous varieties were often used to make linen clothing (Plin. *HN* XIX:10-11), the oil varieties were processed for the titular oil that could be extracted from their seeds. While this oil may have been used for cooking, olive oil was the prized cooking oil for Roman cuisine (Cool 2006:62). Flax seeds were also integrated into Roman cuisine, used to flavour sauce for fish and scattered atop breads (Gal. *De al. fac.* I.32). Galen (*De al fac.* I.32) identifies its usage by "country people", implying a classed division in its usage as a food; a division that is not reflected in the study area. Flax was likely established in the Pre-Roman period (Meadows 1999:112; Vaisey-Genser and Morris 2003:2), however, Nicole Boivin (2017:367) situates the oil crop as an Iron Age/Classical biotic translocate with no clear delineation between Pre-Roman and Roman dispersal. The fragility of flax when exposed to charring conditions has resulted in its underrepresentation in the archaeobotanical record, limiting the significance of Pre-Roman absence (Riehl 2011:157).

The final imported oil crop identified, the opium poppy was exploited for both the opium produced in the unripe pods, and the oil rich seeds within those pods (Zohary 20120:109). The opium poppy was identified at all site-types, with the greatest occurrence (20%) at nucleated settlements. Unlike many of the plants discussed thus far, the opium poppy is unique for its likely domestication in the western Mediterranean, rather than in the fertile crescent (Zohary 20120:109). Opium poppies were a staple of Roman gardens (Boivin 2017:377), with a deep history of iconographic representation across the Mediterranean (Day 2013:5810-5811). Opium was taken for both its medicinal and hallucinogenic properties (Plin. *HN* XIX.168-169; Day 2013:5810-5811). Note that these usages were not mutually exclusive, as the poppy was cultivated in Roman gardens alongside vegetables and herbs (Columella*, Rust.* XI.III). As with flax, the seeds of the poppy were utilized as decorative condiments scattered across the top of breads (Gal. *De al. fac.* I.31) or incorporated into both sweet and savory pastries (Giacosa 1994:201; Fass 2003:160-161). The poppy's status as a Roman introduction is challenged by Marijke van der Veen (2016:819), who identified the poppy, along with flax, as oilseed crops available in the Pre-Roman Iron Age. Gil Campbell (2017:143) concurs with this notion, though he posits that these Pre-Roman occurrences may represent arable weeds, rather than intentionally cultivated crops. Wild poppies were likewise exploited by the Romans, though primarily for their perceived medical benefits, rather than for consumption as a food (Plin. *HN* XVIII.229).

4.6. From the Garden

The diverse range of plants represented in the preceding occurrence analysis highlight the role of horticulture in the colonization of Britain. Horticulture played a central role in the introduction of new plants, associated cultivation practices, and represented a significant addition to the British foodscapes. Archaeologists have long grappled with how to define horticulture and delineate it from agricultural practices, resulting in a number of factors that must be considered. Horticulture is defined as the management of seasonal and perishable fruits, herbs, and vegetables (van der Veen 2008:103), occurring in gardens, consisting of greater diversity and a lower abundance of each particular species under cultivation than agricultural fields (van der Veen et al. 2007:204; Sloth et al. 2012:27). Further, gardens are defined spatially via their close proximity to households and restricted size when compared to agricultural fields (e.g., Bogaard

2005:179; Jones 2005:165; Wyatt 2015; c.f., Scarry and Scarry 2005). A garden's restriction in size does not necessarily equate to modest production, as many gardens were spaces of intensive and varied cultivation, with production ranging from staple (e.g., Jones 2005) to cash crops (van der Veen 2005:160). For archaeologists, gardens present designed landscapes that centralized their living plant components (Phibbs 1991:118). These specialized landscapes are manifested through human activities and a continued modification of nature (Hunt 2012:189), resulting in an "ecological system that demands constant human monitoring" (Malek 2013:15). As such, gardens can be viewed as modified natural spaces existing in a state of continual evolution through human modification (Currie 2005:2).

Despite a general suite of features that archaeologists have associated with garden-based horticulture, the definition of a garden is, in many instances, culturally determined, with the delineation between agricultural field and horticultural garden shifting on a case-by-case basis (Sloth et al. 2012:27). In addition to challenges in identifying what actually constitutes a garden, the interpretation of horticultural practices is often problematized by the incorporation and management of local wild plants into gardens (Johnston 2005:212; Sloth et al. 2012:33); for an example, see Gal. *De al. fac.* II.56 on fennel. Additionally, the morphological resemblance that many domesticated horticultural crop seeds bare to their wild progenitors problematizes identification (Moffett 2011b:355), further masking the interpretation of the nuanced relationship between managed wild and domesticated plants in gardens. Gardens are diverse spaces that present multiple interpretive barriers, in their definition, function, and archaeological manifestation.

Roman gardens, *horti (hortus* - singular), fulfilled a key role in diversification of the rural foodscape, both at expansive villa estates and at small farms throughout the empire (Farrar 2016:138-139). Roman gardens were not developed in isolation, as the Romans drew on the horticultural practices of the Greeks, who had previously imported Persian knowledge (von Baeyer 2010). For the Romans, the *hortus* was a space of intense and diverse cultivation (Baker 2018:143). Roman workers became specialized in the care of particular types of plants; for example, an *arborator* specialized in the grafting and pruning of fruit trees, while an *olitor* (or *holitor*) specialized in the care of vegetables (Farrar 2016:168). Historical accounts highlight the detailed care, regimented planting schedules, and construction necessary to create a garden that supports crops effectively

(Columella*, Rust.* XI.III). In addition to these general gardens, orchards and vineyards present horticultural spaces specializing in the cultivation of fruit trees and grape vines respectively (Sykes 2011b:301).

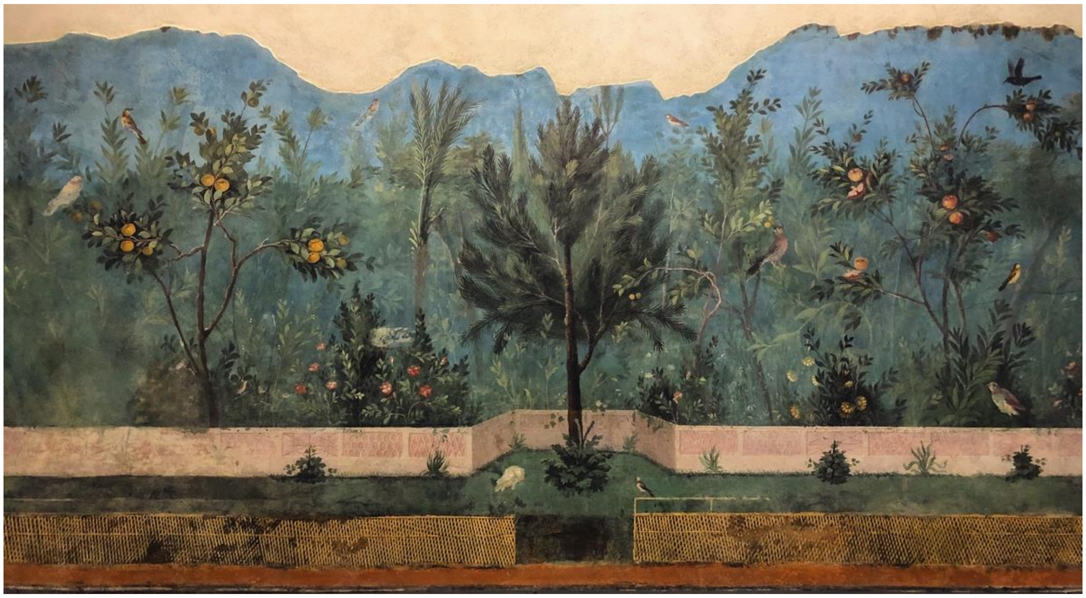


Figure 19: Garden Room Fresco, Villa of Livia *(Rome)*
Note: Image by Author (*Palazzo Massimo alle Terme*, 2019)

Although cereal crops constituted the most prominent plant foods throughout the empire (Rickman 1980:262; Erdkamp 2005:76; Heinrich 2019:107), horticultural crops provided both diversification to the diet, and the ingredients necessary for the establishment of Roman cuisine (van der Veen 2015:530). While the gardens of rural settlements and villas supplied both their occupants and larger urban markets with fresh produce and herbs, urban dwellers were not without their own gardens. Ornamental gardens were a fixture of the Roman *domus*, and often included fresh vegetables and herbs for use in the household (Aldrete 2008:107). Outside of the *domus*, public gardens (*porticii*) were found in association with many public buildings and temples (Farrar 2016:149). Market gardens (*hortulli*) were large commercial growing centres located within, or in close proximity to, cities. These urban market gardens provided fresh produce and medicinal plants to urban consumers (Farrar 2016:151-152). The intensive archaeological excavation of Pompeii has allowed archaeologists (e.g., Jashemski 1974; Jashemski 1979) to confirm the presence of commercial, or market, gardens within this urban centre. Beyond the gardens themselves, the Roman’s concern with controlled nature, manifested in gardens, is echoed in the frescos and mosaics that adorned lavishly decorated *domus* throughout the empire (Janick 2014:1209-1210). Many of these artistic representations highlight the ecological diversity represented in the expansive gardens of the elite (see, Figure 19).

A diverse range of crops that would have been part of Roman horticultural practices were identified in the study area. The instillation of these crops and the associated horticultural practices provides an archaeologically apparent Roman impact on the colonized British landscape. As such, the presence of these 'Roman' plants in Britain directly reflects Roman colonialism. Fruit trees, including those of the apple, cherry, plum, and sloe, showcase a range of both local and imported crops frequently present in assemblages from nucleated settlements and villas (see, Figures 16, 17, and 18). While these plant foods are generally less present at rural sites, with many completely absent from the rural sites in Essex, their – albeit limited – presence highlights that these foods were becoming integrated into the regional foodscape. A range of grafting techniques developed by the Romans (Cato*, Agr.* 40-42; Columella*, Rust.* V.XI; Pereira-Lorenzo and Fernandez-Lopez 1997:731), would have allowed for the potential translocating of the imported fruit trees into Britain. This external introduction corresponded with intensive usage of the locally available resources. These practices linked with the diversification of diet, represent strategic modification of the landscape. Such changes echo the notion of 'transported landscapes' that has been explored elsewhere in archaeology. Transported landscapes refer to ecologically transformative colonization, wherein a colonizing people alters the landscape to reflect that of their homeland (Anderson 2003:183; Anderson 2009; Dixon 2015). Besides plants, the Romans would have brought with them the important "cognitive models of land use and management" (Dixon 2015:296, citing Kirch 2009:416) associated with these plants; notably, horticulture.

In addition to fruit trees, a range of vegetables and herbs were identified in the study area. Caraway, chervil, coriander, and dill demonstrate the presence of horticulturally cultivated herbs at nucleated settlements. Despite the presence of these 'Roman' herbs in Britain prior to the Roman conquest in 43 CE (see, Lodwick 2014), there is no evidence of local cultivation. These pre-conquest occurrences resulted from the intensification of relations between the Roman controlled mainland and the elites of Britain's established tribal groups during this intermediate period following Caesar's aborted conquest of the island (Bédoyère 2013 20-21). The post-conquest expansion can be explained through the introduction of the horticultural practices needed to cultivate these plants, allowing for local cultivation, rather than continued reliance on imported seeds. Similarly, the increased presence of Roman herbs at Uppåkra, an Iron Age site in Sweden beyond the Roman frontier, is linked with the introduction of Roman horticulture (Larsson and Ingemark 2015). Although the adoption of Roman practices has previously been framed as Romanization (e.g., Millett 1990), the transmission of these plants and their cultivation practices, can be framed through the expansion and diversification of the regional foodscapes through increased globalization instigated by macro-level influences.

Previous archaeobotanical research (e.g., van der Veen et al. 2008) has identified a redefinition of people's relationship with nature following Roman conquest, exploiting local wild resources to a greater extent (for a zooarchaeological perspective see, Sykes 2011b:305-308). Similarly, the introduction of horticulture engaged a new colonizing relationship with the landscape, adding a new dimension to the regional foodscape rooted in Roman horticultural practices. This interpretation is based on the shift towards garden space articulating a new sense of integration between humanity and the natural world, occurring in the first century BCE (Spencer 2010:140). The controlled nature of gardens manifests this shifting relationship and provides a physical expression of Roman perceptions of nature. This is further exemplified by Pliny (*HN* XIX.LIV), who states that despite mustard growing wild in most regions, it is "improved by transplanting".

Horticulture provides a prime example of how Roman colonization provided new foods and cultivation practices associated with those foods that simultaneously reshaped how peoples related to their landscape.

4.7. Chapter Summary

The Roman conquest of Britain significantly reshaped the island's foodscape. However, these changes were not universal, and their representation is not without bias. Although the archaeobotanical dominance of cereals, pulses, and hazelnuts reflects the probable importance of these resources, they are also the most likely to be preserved in charred contexts (Day 2013:5806). Waterlogged records were significantly less common, and no desiccated or mineralized remains were identified in the collected specialist reports. As such, the vegetables, fruits, and herbs that are evidenced likely occurred with much greater frequency than their actual preservation indicates. Therefore, these occurrence analyses demonstrate the minimal extent of these foods' availability. However, different types of sites appear to have engaged with the newly available plant foods in different ways. As such, the plant contribution to the foodscape of Roman Britain is characterized by unequal diversity.

Chapter 5. Occurrence Analysis of Animal Foods

In this chapter, I examine the animal foods identified during data collection. The inclusion of this dataset is valuable because the consumption of meat was a signifier of status in the classical world (Mackinnon 2019:155). As such, these data provide a culturally important indication of the impact of Roman colonization on the regional foodscape, which we can subsequently contextualize against the literature pertaining the occurrence of animal foods in the wider Roman Empire. As with the previously discussed plant food data, these animal data are subdivided into five discrete categories to facilitate analysis and discussion, including: major domesticates, mammalian foods, avian foods, marine and freshwater foods (excluding molluscs), finally, marine and freshwater molluscs. Following the occurrence analysis, this chapter concludes with a discussion of Roman oyster culture, and how its absence impacts the regional foodscape.

5.1. Major Mammalian Domesticates

The major mammalian domesticates occur in nearly every zooarchaeological assemblage identified within the study area. This category includes cattle (*Bos Taurus*), pigs (*Sus* sp.), and sheep/goats (*Caprinae*). Sheep and goats were combined into a single category, as this combined categorization was the most common method used in the reporting. Although several morphometric methods for differentiating between *Caprinae* have been identified (e.g. Haruda 2017), the persistence of identification issues when working with fragmentary remains has frequently resulted in the continued use of this grouped categorization. Studies that have sought to differentiate between the *Caprinae* have identified both sheep (*Ovis aries*) and goats (*Capra aegagrus hircus*) throughout Roman Britain, though sheep are identified as the more commonly encountered *Caprinae* (Maltby 2015:185).

Pigs, as with sheep/goats, are also uncertainly identified in the zooarchaeological reports. Domesticated pigs (*Sus scofa domesticus)* are among the most difficult domesticates to differentiate their wild progenitors, the wild boar (*Sus scrofa ferus*) (Rowley-Conway et al. 2012:2). The problematic identification encountered with pigs and boars in Roman Britain presents a microcosm of this issue throughout the entirety of the

Sus genus throughout the world (Albarella et al. 2006:210-211). Traditionally linear measures of bones and/or teeth have been used to distinguish between the larger wild boar and smaller domesticates (Evin et al. 2013:736). However, using these morphometric criteria, large domesticated pigs are nearly indistinguishable, from immature kills of the wild variety (Maltby 2016:800). Specific diagnostic features are typically required to enable morphometric differentiation of these species; the lack of these features among excavated remains results in identification by genus, *Sus* sp., rather than distinguishing the specific variety. The majority of *Sus* sp. remains identified in the study area most likely come from domesticated pigs; however, wild boar is likely also represented.

Figure 20: Major Mammalian Domesticates

Throughout the study area, cattle, sheep/goats, and pigs occur at near equivalent rates at both nucleated settlements and villas. Rural sites provide the major site-type variation between species occurrence (see, Figure 20). Rural occurrence, in both regions, of sheep/goats is less common than that of cattle. Pigs present the lowest occurrence of the three domesticates at rural settlements. Interestingly, occurrence at the rural sites in Essex is greater for cattle, equivalent to that of rural sites in Kent for sheep/goats, and less common for pigs. However, this pattern may be explained by cattle's larger, more robust bones. These skeletal differences provide superior resistance to taphonomic factors, and increase the likelihood of detection during excavation; a bias that has been observed when relying on zooarchaeological assemblages recovered by hand collection, which are not then supplemented by fine sieving (Edwards 2006:57).

One major difference between the study area – and Roman Britain more broadly – and the zooarchaeological records of Roman Italy is the importance of beef and pork in the diet. In Roman Italy, pork was the most commonly consumed of these domesticates (King 1984; King 1999), beef was the most commonly consumed meat in Roman Britain (Maltby 2017:190). One interpretation has been that this difference "reflect[s] the culinary habits of the Roman army" (Meadows 1999:105, citing King 1991), rather than the textually evidenced culinary habits of the Roman elites. The reduction in pig bone occurrence at rural sites, may reflect their more 'elite' association. However, a true abundance study utilizing both number of identified specimen (NISP) and minimum number of individuals (MNI) would be required to address this potential interpretation more directly.

Cattle, pigs, and sheep/goats were exploited for more than just their meat, providing a range of edible foods and other products for the population of Roman Britain. Pliny (*HN* VIII.LXX) notes that different breeds of cattle from varying regions produced milk of differing qualities. Perhaps these preferences influenced the transition in cattle breeds that occurred following conquest (e.g., Albarella et al. 2008; Rizzetto et al. 2017:540). Milk was an important resource as a surplus could be made into cheese (MacKinnon 2019:150). Cheese production provided a valuable way to preserve easily perishable milk prior to electric refrigeration, extending the viability of this resource (Faas 2005:168). Both firm and soft cheeses were produced by the Romans (Gal. *De al. fac.* III.16), with different regions producing prized cheeses (Plin. *HN* XL.XCVI-XCVII). In addition to their meat and milk, the blood and many of the organs of these domesticates were consumed, including hearts, kidneys, testes, and tongues (Gal. *De al. fac.* III). Moreover, hides provided a valuable material and animal fat was often burned as fuel to provide light (Grant 2004:371).

The zooarchaeological literature of Roman Britain has been dominated by questions related to these major mammalian domestics. These pre-occupations echo the archaeobotanical discourse's preoccupation with the transition from Iron Age emmer to Roman period spelt wheat (e.g., van der Veen and Jones 2006). The historic focuses of zooarchaeological research have included the transition from sheep/goats to cattle following Roman conquest (e.g., Hawkes 2001; Cool 2006:80; Albarella 2007; Hurley 2018; Pierre-Emmanuel 2018), the introduction of 'Roman' cattle stock (e.g., Albarella et al. 2008; Rizzetto et al. 2017:540), and corresponding shifts in butchery practices (e.g., Seetah 2005). Although these pre-existing research focuses are important for contextualizing the impact of the Roman colonization of Britain, they have problematically limited the zooarchaeological discourse to singular facets of dietary change (see also, Grant 2004:385). Although these domesticates were the most important and widely used animal foods, they were by no-means used to the exclusion of other species; the Roman period is defined by the diversification of the foodscape including – but also beyond – these domesticates.

Several other domesticated mammals were encountered in the zooarchaeological reports, including cats (*Felis catus*), dogs (*Canis familiaris*), and horses (*Equus* sp.). These species were excluded from this study as most scholars agree that these species were not regularly consumed in Britain or the wider empire (e.g., Cool 2006:91-92; Maltby 2016:799; Maltby 2017:201; Mackinnon 2019:152). Although it should be noted that butchery marks have been found on horse remains elsewhere in the empire (e.g., Lauwerier 1999:107-108), suggesting the processing of the animal for consumption or perhaps hide removal. Although horsemeat consumption has been archaeologically evidenced in the Roman world, consumption of these animals likely violated edibility taboos. From a military-perspective, this taboo, and aspect of Roman 'taste', may have been rooted in the idea horses were the companions of soldiers, much as their fellow soldiers were (Lauwerier 2004:70). However, a violation of these taboos might occur in times of necessity. Despite minimal consumption, the majority of horse remains found in Britain appear to indicate that these domesticates lived to maturity and were exploited for use as transportation and pack animals (Maltby 2015:185). As such, although horses were frequently present in the zooarchaeological assemblages of the study area, they served other cultural functions (Maltby 2016:799). Similarly, cats and dogs also served other cultural functions, notably as pets (Russell 2012:262). Following this contextualization, these three mammalians domesticates were excluded from this study.

5.2. Mammalian Foods

Mammalian foods, beyond the three major domesticates thus far discussed, were identified in the study area. Unlike the major mammalian domesticates, save for a degree of variance evidenced in pig occurrence, these other mammalian foods demonstrate rather dramatic differentiation between site types. Three species of deer, red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), and fallow deer (*Dama dama*), were all identified to the species level. Additionally, the category of unidentified deer, which occurred at roughly 10% of all site-types, represents those deer that were not identified to a particular species and were only ascribed the general moniker of "deer" in the reports.

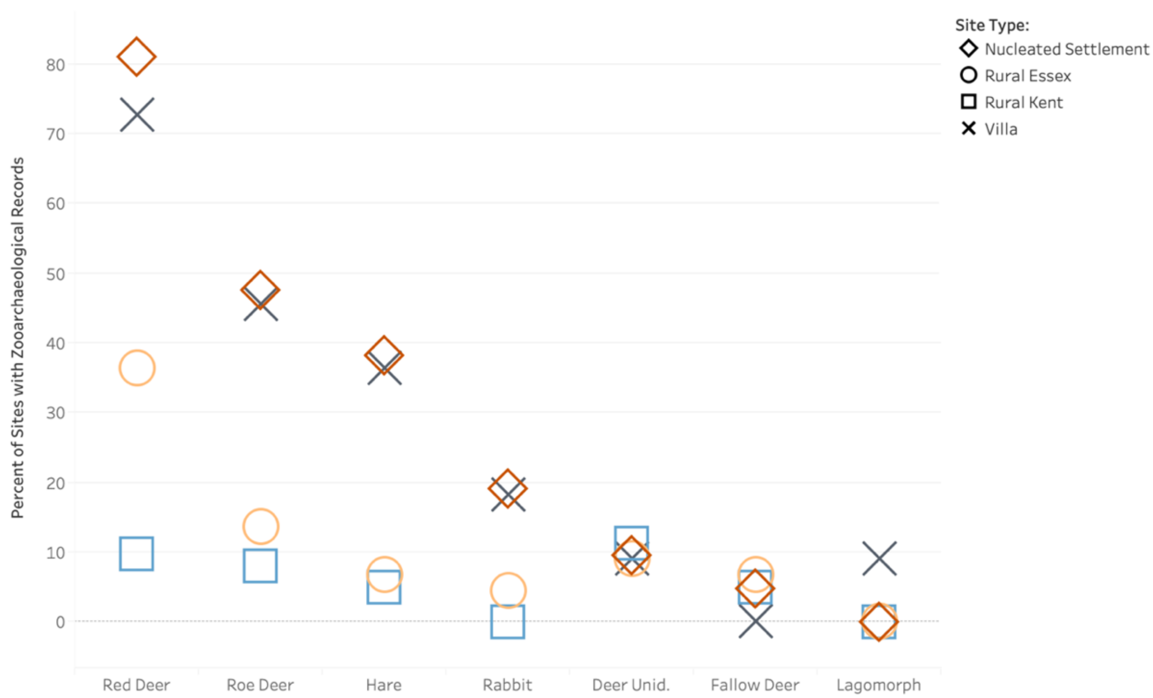


Figure 21: Mammalian Foods

Throughout the study area, red deer occur at 81% of the nucleated settlements, 72.7% of villas, 36.4% of rural sites in Essex, and 9.7% of rural sites in Kent. A similar trend is found in roe deer which occur at 47.6% of the nucleated settlements, 45.5% of villas, 13.6% of rural sites in Essex, and 8.1% of rural sites in Kent. Although all other site types demonstrate a dramatic decline between the percentage of red deer verse roe deer in their assemblages, rural sites in Kent demonstrate less than 2% difference. In comparison, rural sites in Essex demonstrate a difference of over 20%. Continuing this trend of relative consistency at rural sites in Kent, and change at other site-types, fallow deer, a species most likely imported to Britain from the continent by the Romans (Sykes et al. 2011; Miller et al. 2016; c.f., Sykes 2004:77-79), occur at 4.7% of the rural sites in Kent. In comparison, fallow deer also occur at 4.7% of the nucleated settlements in the study area.

The limited presence of red and roe deer at rural sites in Kent may be the result of taphonomic processes, but fallow deer do occur at a similar rate to the other deer species. The potential of this pattern resulting purely from taphonomic process unique to Kent is disputed on account of the fact that red and roe deer frequently occur at villas, the majority of which come from Kent (see, Chapter 3, sec. 3.1.6). One final factor that may influence the zooarchaeological representation of fallow deer is a potential hesitancy by zooarchaeologists to ascribe fallow deer to the Roman period, as the species has long been considered an Anglo-Saxon introduction (Sykes 2010:55). As such, interpretive biases may limit species-level identification of fallow deer at Roman period sites. Alternatively, deer were simply a less utilized resource at rural sites in Kent, with other resources, such a fish (see, Figure 23), potentially filling the dietary void.

In addition to the three deer species evidenced in the study area, two lagomorphs, hare (*Lepus europaeus*) and rabbits (*Oryctolagus cuniculus*), were also identified. Hares occur more frequently than rabbits at all site types. Both species occur at nucleated settlements and villas at similar rates, while also occurring at rural settlements at similar rates in both regions. As with deer, some zooarchaeological special reports were unable to differentiate between lagomorphs, necessitating the inclusion of a general 'lagomorph' category; these occur at 9.1% of the villas in the study area. Mark Maltby (2015:185) suggests that a recovery bias may influence the representation of hare and rabbit remains, when compared to large mammals, which have larger and more robust bones. As such, hares and rabbits may have been more wide-spread and heavily exploited than the current zooarchaeological data indicates. The Romans introduced rabbits to northern Europe (Faas 2006:287; Maltby 2016:800), including Britain, from Spain (Gal. *De al. fac.* III.1). While both hares and rabbits were exploited for their flesh and pelts, hare's blood was a prized product in its own right, viewed more favorably than that of domesticated fowl, cattle, sheep, and pigs (Gal. *De al. fac.* III.1, III.22).

Outside of those species discussed thus far, a number of other wild mammalian fauna were identified in the zooarchaeological records, including badger (*Meles meles*), fox, moles, weasels (*Mustela nivalis*), and a range of rodents (e.g., *Apodemus sylvanticus/favicollis, Sorex araneus*, and *Rattus* sp.). These species were excluded from the study as they were not primarily exploited as foods. While badgers and foxes may be found with butchery marks at Roman sites, these markings most likely represent the extraction and usage of the animal's pelts (c.f., Thomas and Stallibrass 2008:9). There are a variety of rodents that were eaten by the Romans, the dormouse (*Glis glis*) and garden dormouse (*Eliomys quercinus*), though neither was identified in the study area. As such, these non-food mammalian species were excluded from the study.

5.3. Avian Foods

After reviewing the mammalian foods of Britain's Roman Period, the study now turns to avian foods. Of those avian species utilized as foods, the domesticated fowl (*Gallus gallus domesticus*), also known as the chicken, was the most commonly occurring of these species in the study area (see, Figure 22). Domesticated fowl occurred at 66.7% of nucleated settlements, 55% of villas, 31.9% of rural sites in Essex, and 21% of rural sites in Kent. There is a clear divergence in the occurrence of domesticated fowl between nucleated settlements and rural sites, occurring with over three times the frequency at nucleated settlements than at rural sites in Kent. The focus of domesticated fowl at nucleated settlements conforms to the growing notions that these sites demonstrated significantly more diverse food availability, while also corresponding to the pattern identified in previous zooarchaeological research employing abundance data (Maltby 1997). The frequent presence of domesticated fowl at nucleated settlements has been linked to the introduction of cockfighting during the Roman period (Doherty 2012; Sykes 2012), indicating a socio-cultural role external to the bird's consumption as a food.

Throughout the Roman world, the domesticated fowl was an important food, and was often, alongside fish, more commonly eaten than other meats (Aldrete 2008:112). However, the greater presence of domesticated fowl at nucleated settlements and villas potentially aligns with previous research that has positioned the food as a high-status item in Roman Britain (Cool 2006:99-100). In addition to their meat, the eggs of domesticated fowl provided a valuable resource to the peoples of Roman Britain (Maltby

2016:800). Although domesticated fowl were identified in Britain prior to the Roman period (O'Connor 2010:6; Poole 2010:156,158), these occurrences are rare, and their increased presence correlates with Roman conquest (Maltby et al. 2018:1003).

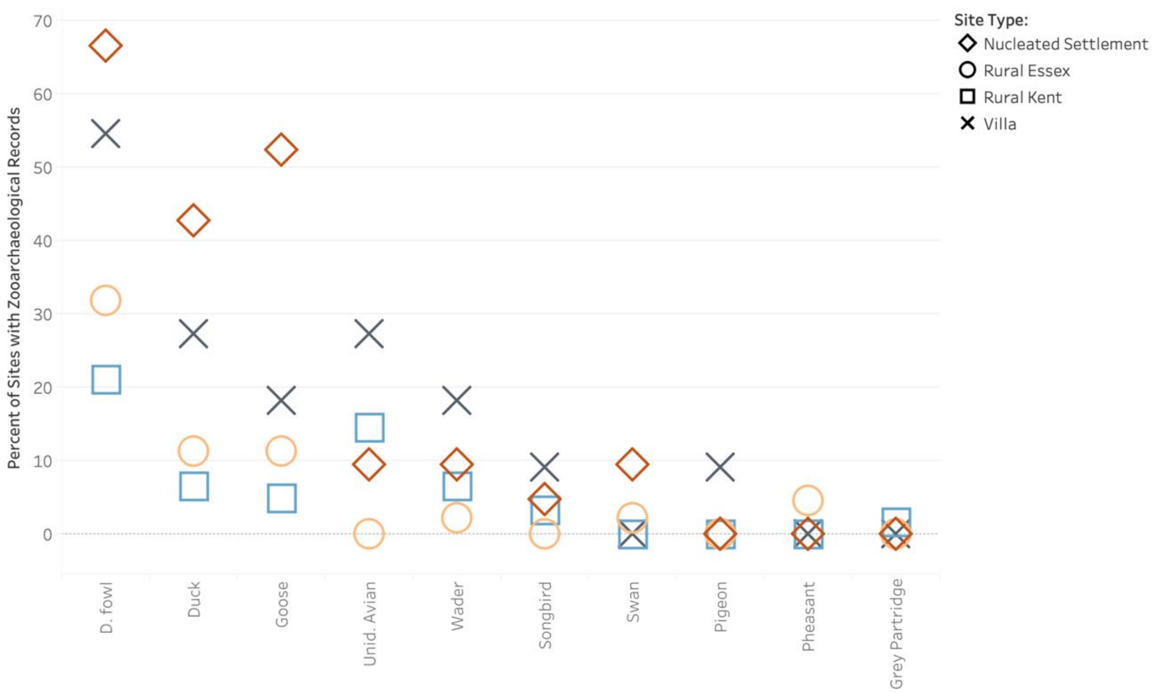


Figure 22: Avian Foods

In addition to domesticated fowl, ducks (*Anas* sp.) and geese (*Anser* sp.) also commonly occurred in the zooarchaeological records of the study areas. Both species occurred most often at nucleated settlements, followed by villas, rural sites in Essex, and rural sites in Kent. Geese are present at 52.4% of nucleated settlements, with ducks present at 42.8% of these sites. This difference is reversed at villa sites, as ducks are present at 27.3% of these sites and geese at only 18.2% of these sites. The rural sites in Essex are equivalent, and ducks are only again more present at rural sites in Kent. The Romans had well-established breeding practices for geese and significantly more limited control over duck breeding (Albarella 2005). Although it is possible to differentiate between larger modern-domesticated and more gracile wild geese, archaeologically morphological differences are less certain (Burrow and Mudd 2010:68). As such, imported domesticated varieties cannot be morphologically distinguished from native wild varieties (Boivin 2017:360-366), preventing a clear assertion as to whether remains in the study area represent the Romans having introduced a managed population or the exploitation of pre-existing wild populations. Given the introduction of other extra-local fauna and exploitation of wild fauna (discussed in the next paragraph), it is possible that both scenarios were occurring simultaneously.

The domesticate fowl, duck, and goose were often managed populations, whereas other avian foods were obtained through opportunistic hunting. A range of other species occur at lower rates throughout the study area, including large fowl, such as swans (*Cygnus* sp.), grey partridges (*Perdix perdix*), and pheasants (*Phasianus* sp.), as well as small game birds, such as songbirds (*Passeri*), pigeons (*Columbidae* sp.), and waders (Charadriiformes). Waders refer to a broad grouping of birds within the order of Charadriiformes, and those more exactly identified in the study area include the common snipe (*Gallinago gallinago*) and woodcocks (*Scolopax* sp.). While no longer consumed in Britain (Cool 2006:114-115), songbirds, including thrushes (*Turdidae* sp.), were viewed as edible foods by the Romans (Shrubb 2013:17) and remain a delicacy in modern France (Jiguet et al. 2019). Although these avian foods were not major components of the diet (Parker 1988), their presence emphasizes the Roman's diverse, and likely opportunistic, exploitation of local wild resources throughout the study area.

Unlike the morphological issues which often limit zooarchaeologists' abilities to delineate between imported domesticated and native wild ducks and geese, the pheasant is believed to have been a Roman introduction (Maltby 2016:801; Boivin 2017:360-366). The pheasant was a prized food, with Galen (*De al. fac.* III.18) describing its meat as more nutritious and flavourful than that of domesticated fowl. Similarly, pheasant eggs were also prized and viewed as superior to those of geese (Gal. *De al. fac.* III.21). Previous archaeological research has linked pheasant remains to elite sites in Roman Britain (Poole 2010:159); however, in my study pheasants occurred only at the rural sites in Essex. While typological issues related to site-type may mean that some of these rural sites were in-fact 'elite' (see, sec. 3.1.5, for site-type terminological issues), the fowl does not appear at any villas or nucleated settlements in the study area. These absences suggest the potential need to re-evaluate the strict categorization of pheasant as an elite food.

The avian species identified in the zooarchaeological specialist reports were not limited to those thus far discussed in this section. However, several species were excluded from this study as they were not primarily exploited as foods during the Roman period, including members of the *Corvus* genus, notably ravens (*Corvus corax*) and rooks (*Corvus frugilegus*). Rather than consumed as food, Corvids were often deposited in ritual contexts, and are also believed to have been kept as pets (Cool 2006:115; Serjeantson and Morris 2011; Shrubb 2013:17; Maltby 2016:801). Similarly, the occurrences of birds of prey, including falcon (*Falco pereginus*), sparrowhawk (*Accipter* nisus), and eagle (*Haliaetus albicilla*), were also excluded. These birds of prey were likely hunted for their feathers, and not exploited – at least commonly – as foods (c.f., Parker 1988:204).

5.4. Marine and Freshwater Foods (Excluding Molluscs)

Turning now to marine foods, many foods identified in this category have been categorized by family, not species, allowing for those sites where identification was only made to the family-level to be included. Flatfish were the most common marine foods, excluding molluscs, at villas in the study area (see, Figure 23). This broad category includes a wide range of species, including dab (*Limanda limanda*), flounder (*Platichthys flesus*), halibut (*Hippoglossus hippoglossus*), and sole (*Soleidae* sp.), amongst others. For rural sites, flatfish were identified at 11.3% of the sites in Kent, and only 4.6% of the sites in Essex. The frequent presence of flatfish reflects the wide availability of many of these species in the shallow coastal waters around Britain (Locker 2007:156-157).

The eel (*Anguilla anguilla*) was one of two species found at nucleated settlements, occurring at 19.1%. These migratory fish are found in both salt and freshwater, providing opportunities for catch at both freshwater riverine and interstitial coastal environments. Eels were present at 9% of the villa sites, occurring roughly 50% as frequently at these sites as opposed to nucleated settlements. Eels were present at 9.7% of the rural sites in Kent, and 6.8% of the rural sites in Essex. Despite this low occurrence percentage, eel is the most commonly occurring marine foods, excluding molluscs, at rural sites in Essex.

At the rural sites in Kent, the *Gadidae* family is the most frequently encountered marine food, occurring at 21% of these sites. Although the zooarchaeological remains of members of the *Gadidae* were often only identified to the family level, necessitating the usage of this level of categorization, individual species were also identified. For example, cod (*Gadus* sp.), haddock (*Melanogrammus aeglefinus*), and whiting (*Merlangius merlangus*), were all identified at rural sites in Kent. This family was also one of the two most occurring marine foods at nucleated settlements, alongside the aforementioned eels, occurring at 19.1% of these sites. Interestingly, the members of this family do not occur at any villas within the study area, and at only 2.7% of the rural sites in Essex. The strong similarity in *Gadidae* occurrence between the nucleated settlements and rural sites in Kent is echoed nowhere else amongst the animal or plant foods recorded for this study. Additionally, the difference between nucleated settlements and villas is more pronounced than for any other animal food collected in this study. It should be noted, however, that the larger, more robust bones of cod are more favourable for preservation than the gracile bones of many smaller fish species (Locker 2007:142). While deep-sea cod fishing did not likely flourish until the medieval period (Barrett et al. 2011:1517; Orton et al. 2014), there are *Gadidae,* including varieties of cod that were identified in the English Channel, that can be found closer to shore (Maltby and Hamilton-Dyer 2012:171). The occurrence of cod, and other *Gadidae*, is both a reflection of this resource's utilization and the preservation and recovery biases that lead to its representation in the zooarchaeological record of the study area.

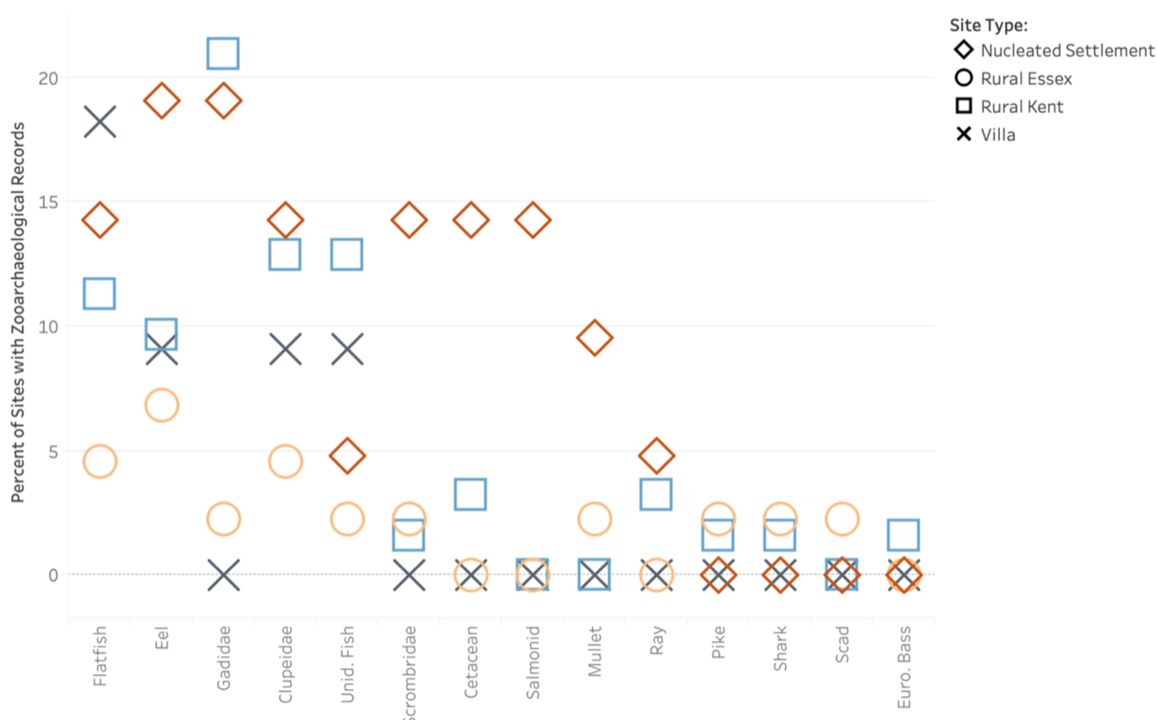


Figure 23: **Marine and Freshwater Foods (Excluding Molluscs)**

Following, flatfish, eels, and *Gadidae*, the members of the *Clupeidae* family were the next most commonly occurring grouping. As with the *Gadidae*, reports differed on their level of identification, with some specialists identifying *Clupeidae* to the family, or sub-family level. Herrings and shads, both sub-families within the *Clupeidae* family, were explicitly identified in the zooarchaeological reports. However, given the expediency of spoilage to occur in oily fish, and the presence of these oily fish at inland sites, they were likely disseminated following preservation (Cool 2006:105). To facilitate this preservation, the Romans dried, salted, and smoked fish (Marzano 2019:170). While these transformative processes were commonly enacted on raw fish, they could be fried prior preservation (Giacosa 1994:182).

The fish of the *Clupeidae* family, along with those of the *Scombridae* family and others (Grainger 2011:121), may have been used in the production of *garum*, a fermented fish sauce used as a table condiment by the Romans (for issues concerning the definition of *garum*, see Grainger 2014). Although evidence for the production of *garum* in Roman Britain is extant (Cool 2006:105; Locker 2007:155), it is rare (Maltby 2016:801). Similar to *garum*, *liquamen* was also produced from a mixture of fermented fish, however, this sauce was used in the cooking process itself (Grainger 2011:122). Further, as a by-product of the manufacture of *liquamen*, *allec*, a boneless fish paste, was also produced following the separation of solids and liquids amongst the ferments (Grainger 2011:122). These different fermented fish products would provide both fundamental ingredients for the construction of Roman cuisine, while also allowing for the distribution of marine resources in a less perishable state.

While there were a range of other species, and families, of marine and freshwater foods identified in the zooarchaeological specialist reports of the study area, *Cetacea* and sharks (*Selachimorpha*) may be the most unexpected inclusions. Of the *Cetacea* marine mammals, both whales and dolphins were identified. These species occurred at both rural sites in Kent and nucleated settlements, with nucleated settlement occurrence equating to the same as that for *Scombridae* and *Clupeidae*. Interpretation of these marine mammals as foods is based on Galen (*De al. fac.* III.30.728), who compares the consumption of whale and dolphin as a more pleasant alternative to tuna (*Thunnus* sp.). Additionally, Galen (*De al. fac.* III.35) suggests that the flesh of these marine mammals is improved through pickling. While it has been suggested that dolphin may have been a high-status food in Roman Britain (Maltby 2015:185-186), the presence of *Cetacea* at the rural sites in Kent refutes this strict delineation. Additionally, the sharks identified in the study area were found at rural sites in both regions, and not at nucleated settlements or villas, similarly refuting a high-status restriction.

5.5. Marine and Freshwater Molluscs

Marine and freshwater molluscs provide a valuable indicator of the impact of Roman-induced change onto the regional foodscape. Both bivalves and aquatic snails were evidenced in the zooarchaeological records of the study areas. Of the molluscs identified as part of this study, edible/flat oysters (*Ostrea edulis*) were the most frequently occurring at all site-types (see, Figure 24). Outside of the major domesticates – that is, red deer and domesticated fowl – oysters were the most frequently occurring food and were more abundant than red deer and domesticated fowl at rural sites in each region. While oysters occur at over 45% of nucleated settlements, villas, and rural sites in Essex, they only occur at 24.2% of the rural sites in Kent. Oysters could be eaten fresh or boiled (Gal. *De al. fac.* III.32.734), used as an alternative to fish in the making of *garum* (Grainger 2011:121), or preserved in brine, enabling their dissemination to inland sites (Marzano 2019:172-179). This dissemination may have also occurred in water-filled amphora (Marzano 2019:190) or even in closely-packed dry baskets and ceramics (Winder 2017:244). The frequent presence of oysters at sites in the study area provides a clear indication of the incorporation of a 'Roman' food into the British foodscape.

Following oysters, mussels (*Mytlius edulis*) were the second most common marine mollusc encountered. This food was found at nearly 40% of the nucleated settlements and villas in the study area but were limited to 22.7% of the rural sites in Essex and 9.7% of the rural sites in Kent. While oysters appear to have been the more common food, based on their more frequent recovery at all site-types, there is a likely recovery bias between these species. Mussel shell recovery often depends on the use of fine sieving, whereas hand collection is more common for large, robust oyster shells.

Whelks (*Buccinum undatum*) and cockles (*Cerastoderma edule*) continue the same trend in site-type occurrence as mussels and oysters, though at more restricted levels, whereas periwinkles (*Littorina* sp.) do not occur at villa sites. Scholars have suggested that these smaller molluscs may represent intrusive inclusions among intentionally gathered mussels and oysters (Cool 2006:108-109). However, these molluscs are harvested in different ways (Edwards 1997:85), suggesting that some intentional gathering likely occurred. The two most infrequently encountered foods, limpets (*Patellidae* sp.) and the common cuttlefish (*Sepia officinalis*), were only identified at the rural sites in Kent. While the third most infrequently encountered food, scallops (*Chalmys* sp.), was identified at rural sites in both regions, but not at nucleated settlements or villas. These rare occurrences suggest that rural sites engaged in less frequent, but perhaps more diverse exploitation of the locally available marine and freshwater molluscs.

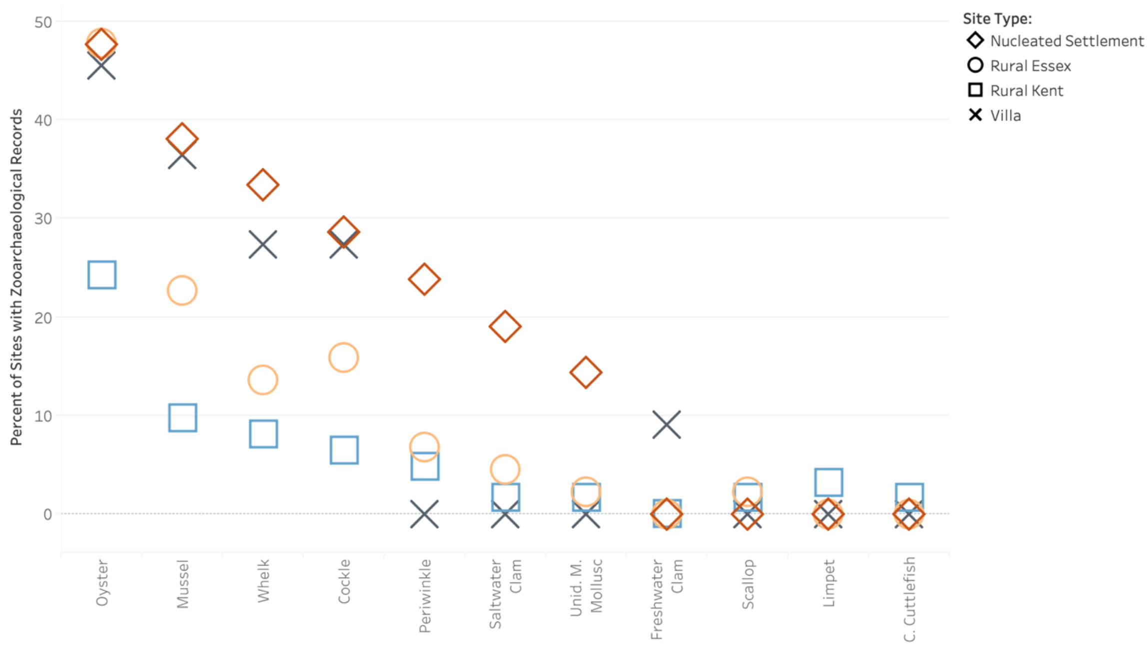


Figure 24: **Marine and Freshwater Molluscs**

5.6. From the Sea

The previous two sections of this chapter (6.4 and 6.5) have highlighted the presence of a diverse range of marine and freshwater resources that were exploited throughout the study area during the Roman period. This diverse usage reflects the importance of marine and freshwater foods in cuisine throughout the Roman world. One of clearest examples of this diversity is the mosaic of marine life that was found in the *triclinium* of House VIII.2.14 in Pompeii, which presents a detailed depiction of the varied marine life known to the Romans of the imperial period (see, Figure 25). The Roman conquest of Britain brought these diversifying consumption practices to the island, inducing a major change to the regional foodscape. As the garden plants of the Romans were associated with horticultural practices, a clear system of aquatic-food management is associated with the Romans' consumption of fish and marine molluscs – that is, aquaculture. Unlike horticulture, however, Roman aquaculture was not initially introduced to Britain despite the post-conquest period's increased demand for these foods.

Figure 25: Mosaic of Marine Life, triclinium of house VIII.2.14 (Pompeii)
Note: Image by Author, Museo Archeologico Nazionale di Napoli (2019)

In Italy, the Romans developed distinctive aquaculture practices which centred around purpose-built ponds, *piscinae*. Freshwater *piscinae* became commonplace during the Republican period and were likely adopted from the practices of the Greeks (Déry 1998:98). Rather than being used to raise fish, freshwater *piscinae* were used to hold previously caught live fish (Nash 2010:18). *Piscinae* provided fresh fish for the tables of the elite, the surplus of which would have been sold to meet the demand of urban markets (Marzano and Brizzi 2009:215). Most *piscinae* were built in-land and had to feed saltwater along manmade channels from the coast (Higginbotham 1997:13). In addition to purpose-built structures, the coastal *piscinae* manipulated the landscape, isolating pre-existing features of the coastline to form lakes and lagoons along the Mediterranean Sea (Marzano and Brizzi 2009:218). *Piscinae* could be either open-air or covered by pavilions (Nash 2010:18) but were in most cases covered by grates to prevent the fish from escaping (Higginbotham 1997:13). Despite several fishponds found in association with British villas (e.g., Hurst et al. 2016), there is as-of-yet little evidence to suggest fish were actually kept in these ponds (Locker 2007:142-143). Instead of providing a food supply, as was done with their Italian counterparts, these ponds appear to be expressions of wealth at Britain's most lavish villas (Locker 2007:142).

In addition to fish, Roman *piscinae* were also used to practice oyster culture. In Roman Italy, oysters were a delicacy prized by the wealthy elite (Déry 1998:104). While wild oysters continued to be exploited, aquaculture was utilized to service this increasing demand (Marzano 2013:173). Once again building on the practices of the Greeks, the Romans would dangle bundles of sticks into ponds or lakes to collect oyster spat (Stickney and Treece 2012:42). Upon maturity, this system would allow ease of extraction and management of the cultivated population. Pliny (*HN* IX.LXXIX) accredits the development of these oyster ponds to Sergius Orata, from the Gulf of Baiae in Campania. From Italy, Roman oyster culture spread throughout much of the Roman world (Marzano 2013:174).

Britain possessed naturally rich oyster beds, along the island's southern coast (Campbell 2010) and throughout the Thames Estuary (Cool 2006:107). Prior to Roman conquest, these oyster beds demonstrated little-to-no exploitation (Cool 2006:108). However, following Roman conquest they experienced a dramatic increase in usage. The availability of this wild resources appears to have been abundant enough to meet the increased demand for this food. However, archaeological evidence for the gathering and growing of oysters on intentionally provided clutch, the material used to attract immature oysters following spawning, made from oyster, mussel, and cockle shells, has been identified in the archaeological record of Roman London (Marzano 2013:190). Therefore, despite the abundance of oysters in the coastal waters around Britain, Roman management practices were utilized in Britain to facilitate fresh oyster availability at a broader range of locations. This movement is further evidenced by the remains of large timber-lined tanks used to store and transport oysters that have been recovered at Wickford, Essex (Alcock 1998:28). While the consumption of oysters demonstrates relational entanglement of a Roman food into the British foodscape, the presence of oyster culture related material demonstrates material entanglement of the cultural practices associated with this food.

The integration of oyster culture into the Britain foodscape is also evident in Gil Campbell's (2010) study of oysters in Late Roman Britain. Campbell (2010) identifies a shift from multiple shell shapes in the oysters recovered from Roman archaeological sites in Winchester to a singular style of shell shape in the Late Roman period. Campbell (2010) correlates this morphological change to an ecological change (see also, Winder 2017:238); wherein oysters were originally collected from multiple different locations with varying ecological conditions, transitioning to oysters being collected from a single location with uniform ecological conditions. Campbell (2010) interprets this shift as the manifestation of the transition from wild oyster collection to oyster management practices. However, this transition may alternatively reflect the wild oysters being reduced to a single unmanaged population on account of over overexploitation. Campbell's (2010) study and the evidence from Roman London suggest that both wild and managed populations were being exploited, with potentially increased management as the resource became scarcer in specific locations.

Oyster culture, as with horticulture (see, Chapter 4, sec. 4.6), demonstrates the material entanglement of Roman food-related practices into the British foodscape. Previously un- or under-exploited resources were utilized in the post-conquest period, diversifying the foodscape.

5.7. Chapter Summary

The Roman conquest of Britain retained the animal food staples previously dominating the foodscape. However, conquest provided hitherto unseen diversification of animal foods that came to compose a more minimal portion of the regional diet. New animals were introduced to the island and local wild resources became viewed as edible. The major mammalian domesticates remained the major contributor to the regional diet, however, other species are evidenced throughout the study area and at all site-types. These changes should be viewed less as the Romanization of the foodscape, but as a reflection of the complex and selective adoption of elements of Roman cuisine and cultural practices, instigated through increased globalization of the foodscape. Although the animal foods data is not directly utilized within the network presented in Chapter 6 (see, Chapter 3, sec. 3.4.3 for the methodological and software contains that necessitated this decision), these data provides imported contextual information for the imported plant network and the occurrence data of Chapter 4. As such, the inclusion of this secondary dataset allows for more nuanced recognition of the differences between the site types, including the observation of differences not immediately apparent when observing variance in a singular dataset (see, Chapter 7, sec. 7.1).

Chapter 6. Network Analysis of Imported Plant Foods

Network analysis provides a powerful tool for further exploration of the dataset collected for this study. Networks focus not on individual cases (sites in this instance) but on the complex interaction of the network as a whole. As discussed in Chapter 3 (sec. 4.3), the imported plant foods dataset was chosen as the network to be utilized in this study. Occurrence analysis of this dataset demonstrated significant site-type differences that were deemed worthy of further consideration. This chapter, therefore, is structured around the exploration of several networks based on the imported plant foods data (see, Chapter 3, sec. 3.4). First, I explore a two-mode affiliation network of the sites and the associated imported plant foods present at those sites. Following the two-mode network, I explore a one-mode projection of the preceding two-mode network, which analyzes sites via their shared affiliations (imported plant foods). Finally, I analyze the spatial relationships of the network through a georeferenced version of the one-mode projected network to provide insights into how the relational connections are shaped by the island's geography. Following an examination of these related networks, I discuss the impact of absent connections on these networks, and archaeological affiliation networks in general.

6.1. The Two-Mode Affiliation Network

The first network under consideration is a two-mode affiliation network. These networks require two nodes of differing types that can connect to nodes of the opposing type via an edge. The first type of nodes I utilize are sites, which are colour coded via their site-type in the visualization (see, Figure 26). Further, sites were assigned site-codes, represented by an "E" for Essex or "K" for Kent, followed by a number which is associated with the order in which the excavation data were recorded. This nomenclature was used to facilitate network visualizations that were more readable, avoiding the lengthy names often associated with the sites in their original excavation reports (for a full list of the corresponding site codes and names, see Appendix A). The second type of nodes I utilize are the imported plant foods previously discussed. In this network, sites can only connect to foods, and foods can only connect to sites. Those sites that were absent of any of the foods present were excluded from the network, as network connections are based solely on presence. Alternatively, these unconnected sites could have been represented as notes disconnected from the network. Sites with none of the foods under consideration were excluded from the network, as the network is based on the presences of these species. As such, only a single rural site from Essex is included in the network (node E6 in Figure 26), as all of the other sites from Essex with the requisite foods were either classified as villas or nucleated settlements.

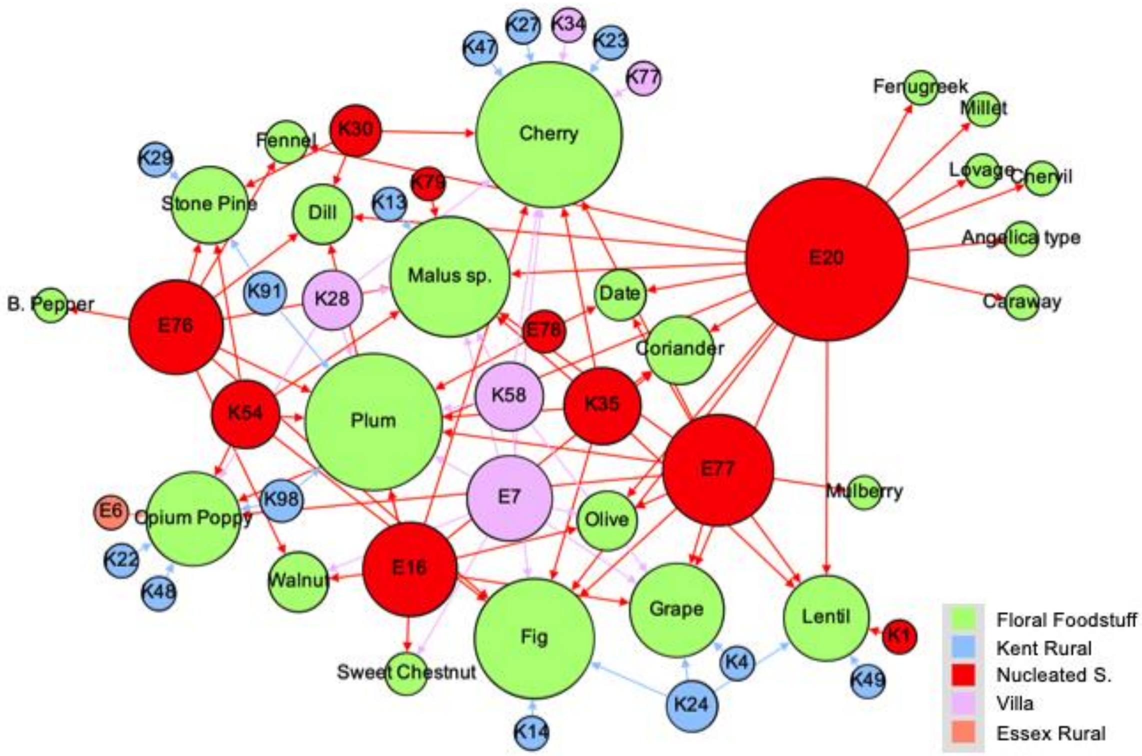


Figure 26: Two-Mode Network of Imported Plant Foods

This two-mode network highlights a few key relationships within the underlying data that constitutes the network. First, the cherry (*Prunus avium*) and plum (*Prunus domestica*) are the most frequently occurring plant foods in the network (see, Figure 26). This network visualization highlights a key structural difference in the edges possessed by these two species. While the plum only registers a single degree less than the cherry (eleven to twelve edges), five of the cherry's edges connect to sites that demonstrate no other connections in the network. Of these sites, two are villas in Kent and three are rural sites, also in Kent. Conversely, each of the plum's connected sites demonstrate at least one other edge within the network. This difference suggests that cherries were more likely to be found at sites absent of other imported plant foods. While plums were more likely to found alongside other imported plant foods. The more frequent occurrence of plums alongside other imported plant foods suggests that these fruits were themselves integrated more readily into sites engaged in broader Roman food consumption.

The degree of the site-nodes, here reflected as node size, noticeably differentiates between nucleated settlements and rural sites. None of the rural sites possessed a degree of over three, with only one rural site (K24) possessing three edges, and only two sites (K98 and K91) possessing two edges. The remainder of the rural sites are restricted to a single edge – that is, one imported food present. This limitation suggests that rural sites form weaker, less vital connections within the network. Nucleated settlements, on the other hand, are highly connected, and are thus necessary for maintaining the networks structure. Given the theoretical stance that food represents embodied material culture, nucleated settlements consumed a much broader range of Roman material culture. Villas hold a mediating position between these two extremes, with some (such as, E7 and K58) demonstrating significant connections, and others (such as, K34 and K77) possessing only a singular connection. Contextualized through the preceding occurrence analysis, this difference further cements the notion that while Roman cuisine was more likely to manifest at nucleated settlements, rural sites were incorporating a more limited range of newly available 'Roman' foods into existing practices.

6.2. The One-Mode (Projected) Affiliation Network

As described in Chapter 2 (2.4.1), two-mode networks can be converted into one-mode projections of the original network. The projection process allows for the direct visualization and analysis of site-to-site connections, based on their shared affiliation of artefact types; in this case, imported plant foods. The projection process is valuable as it visualizes the network in an alternative way that can provide new insights into the underlying relationships between sites. While there are a range of network statistics that can be exploited to learn more about the structural properties of a network, visual inspection provides a useful qualitative approach that facilitates the exploration of the data represented by the network (Decuypere 2020). Network analysis does not create new data but allows preexisting data to be visualized in different, highly controllable, ways (Seland 2016:203-204).

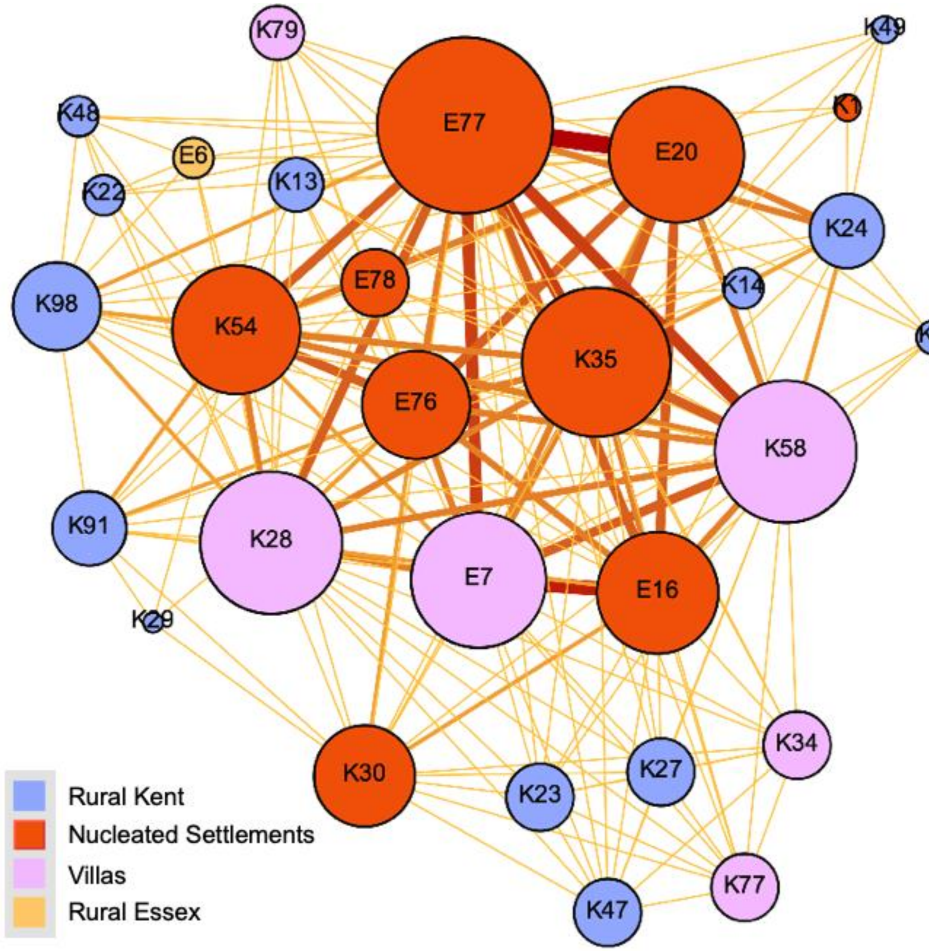


Figure 27: One-Mode (Projection) Network of Site Affiliations (No Edge Cutoff)
Note: This network is spatialized using Gephi's ForceAtlas2 algorithm (Jacomy et al. 2014) and is not georeferenced; distances are mathematically determined based on the strength of connections between nodes, not geographic distances. Node size reflects degree, with nodes becoming larger as degree increases. Nodes are colored based on site-type divisions (Red = Nucleated Settlement, Purple = Villa, Blue = Rural Kent, Orange = Rural Essex). Edges (connections) become thicker and transition from orange to red, the more plant foods that are shared between the nodes (sites) they connect.

Following the projection process, one major difference emerges, the re-evaluation of site degree. Degree in a two-mode network is simply the number of imported foods identified at a site (or vice-versa), degree in a one-mode network is based on the number of sites with which a particular site shares affiliation, that is, foods. As such, sites that may have exhibited less food-based connections may be altered to have higher degrees, if those foods they are connected to are themselves well connected to other sites. For example, site E77 demonstrates a lower degree than E20 in the two-mode affiliation network (see, Figure 26). However, in the projected network, E77 overtakes E20 as the site with the highest degree in the network (see, Figure 27). This shift is based on E77's affiliation with cherries, the plant food with the highest degree. When E20's lack of cherries, and thus those edges within the network, is taken in conjunction with high number of isolated connections, the site's role in the projected network is minimized. As such, the one-mode projected network emphasizes the presence of shared affiliations, rather than the pure number of affiliations.

The process of force-spatialization clusters nucleated settlements to the core of the one-mode network, the only exceptions being K1 and K30. Node K30 represents the nucleated settlement excavated at West Hawk Farm, Ashford (Booth et al. 2008), which possesses weaker edges – that is, fewer similar foods – to the other nucleated settlements. These differences manifest in K30's peripheral position in the network. While K30 has its strongest connections to E76 and E16, both nucleated settlements in Essex, the weight of these connections is weaker than those connecting other nucleated settlements and villas. Additionally, K30 has many weak connections to rural settlements in Kent. K1, the site of Syndale Park Motel in Ospringe (Harding 2003; Wilkinson 2008), possess no edges with a weight above 1, as only lentils were identified at this site. As such, K1 shares no more than a single imported plant food with any other site. The distinction between these two nucleated settlements and the rest of their site-type suggests a potential need to re-evaluate the site classification process in future research. Particularly, differentiating major nucleated settlements (i.e. larger towns and *Coloniae*) from smaller nucleated settlements or villages.

Similarly, villa sites demonstrate increased visual variance in their layout within the force-spatialized network, as several sites cluster to the core of the network (e.g., E7, K28, K58), while others are expelled to the periphery (e.g., K34, K77, K79). This differentiation in network position may reflect the problematic classification of villas in Roman Britain (see, Chapter 3, sec. 3.1.6). Conversely, while rural sites in Kent demonstrate visual variance in their degree, the majority of these nodes are positioned around the periphery of the network. The only rural site from Essex to evidence imported plant foods (E6) visually conforms to the pattern exhibited by rural sites from Kent. Through the network visualization process, a degree of validity, and problematization, is ascribed to site-type categorizations. This approach holds the potential to serve as a categorization confirmation step in large, multi-site research projects, using these data to contribute to categorization.

6.3. The Georeferenced Network

While the force spatialized networks provide valuable visualization of the relationships that structure the imported plant foods network, georeferencing remains a critical step in archaeological affiliation network analysis. The georeferenced network of imported plant foods, a re-spatialized version of the site-to-site projected network, demonstrates that the strongest connections of the network exists between sites within Camulodunum*,* modern-day Colchester (see, Figure 28, esp. nodes E77 and E20). Camulodunum was originally a pre-Roman *oppidum* that served as the capital of the Trinovantes (Stevens and Millett 2015). Following the site’s conquest by the Romans, Camulodunum was transformed into a Roman fort in the immediate post-conquest period, shortly thereafter transitioning into a *colonia* as the Roman military pushed further into Britain (Fishwick 1997:32; Bédoyère 2016:41). Camulodunum served as the initial provincial capital, with Londinium assuming this position by the mid-second century CE (Millett 2005:52). The strong ties between sites within Camulodunum demonstrate the diversity of extra-local foods that were present within the *colonia* and give this settlement regional primacy in both the trade and social dissemination of these imports.

The georeferenced network demonstrates that as edges of low weight are progressively removed from the network, the remaining strongly weighted edges connect only nucleated settlements and villas*.* While the dominance of these site types is to be expected based on the preceding occurrence analysis, this reduction also highlights how these strongly connected sites, beyond those in Camulodunum*,* are located in southwestern Essex and northwestern Kent near the River Thames. The concentration of strong connections based on imported plant foods along the River Thames highlights the role of this waterway in the flow of extra-local trade into the Roman province during this period (see, Figure 29, Networks B, C, and D). Additionally, while it resides beyond the extent of the geographic boundaries of this study, the strongly connected sites along the Thames highlight the potential role of Londinium within the real-world networks that gave rise to this archaeological network. Londinium’s strategic position further up the Thames from the coast highlights a potential explanation for the increased presence of these extra-local plant foods along this river. Imported foods shipped from the continent would be transferred to smaller vessels that would travel up the River Thames and disseminated via inland trade routes (Fulford and Allen 2017:9). In the years following its destruction during Boudicca's rebellion, Londinium was quickly rebuilt and flourished as a hub of trade, spreading peoples, ideas, and goods from across the empire into Britain (Bédoyère 2016:40). The only previous application of network analysis to plant foods (Livarda and Orengo 2015) focused on the temporal variance of imported resource distribution within Londinium. However, Livarda and Orengo's (2015) study did not tie this local redistribution of imported goods into the wider regional narrative. Future research must incorporate this major trade hub as part of the network of not only southeastern Britain, but Britain as a whole, and perhaps even in connection with continental trading ports.

Beyond situating the importance of the River Thames and Londinium, the georeferenced network also highlights the strong connection between Camulodunum and the Isle of Thanet. The nucleated settlement situated on the Isle of Thanet, K54 (see, Figure 28), is located in the modern village of Monkton (Bennett et al. 2008). The strong edge connecting the settlement on Thanet and Camulodunum conforms to previous research where scholars, basing their interpretations on historical accounts, have maintained that the original landing of the Claudian invasions occurred in western Kent (Scullard 1997:36-38; Snyder 2003: 32; Millett 2005:9; Cunliffe 2005:227; Bédoyère 2012:19,25,28-29; Cunliffe 2012:368-369). While recent scholarship has challenged the often-dogmatic adherence to the historical narrative of Britain's conquest (Sauer 2002; Hoffmann 2019:22-25), archaeological evidence from the settlement of Rutupiae (modern Richborough), across the Wantsum Channel from Thanet, demonstrates an early Roman military presence that reinforces this interpretation (Frere and Fulford 2001). The strong edge evidenced in the georeferenced network foregrounds the strong similarity in imported plant foods between these two sites. Despite the continuing debate over the landing point of the Claudian invasion (Grainge 2014:14-16), the extensive Roman presence in East Kent aligns with the notion that this location may have served as an important gateway for Roman expansion into the rest of Britain (Fulford 2007:58).

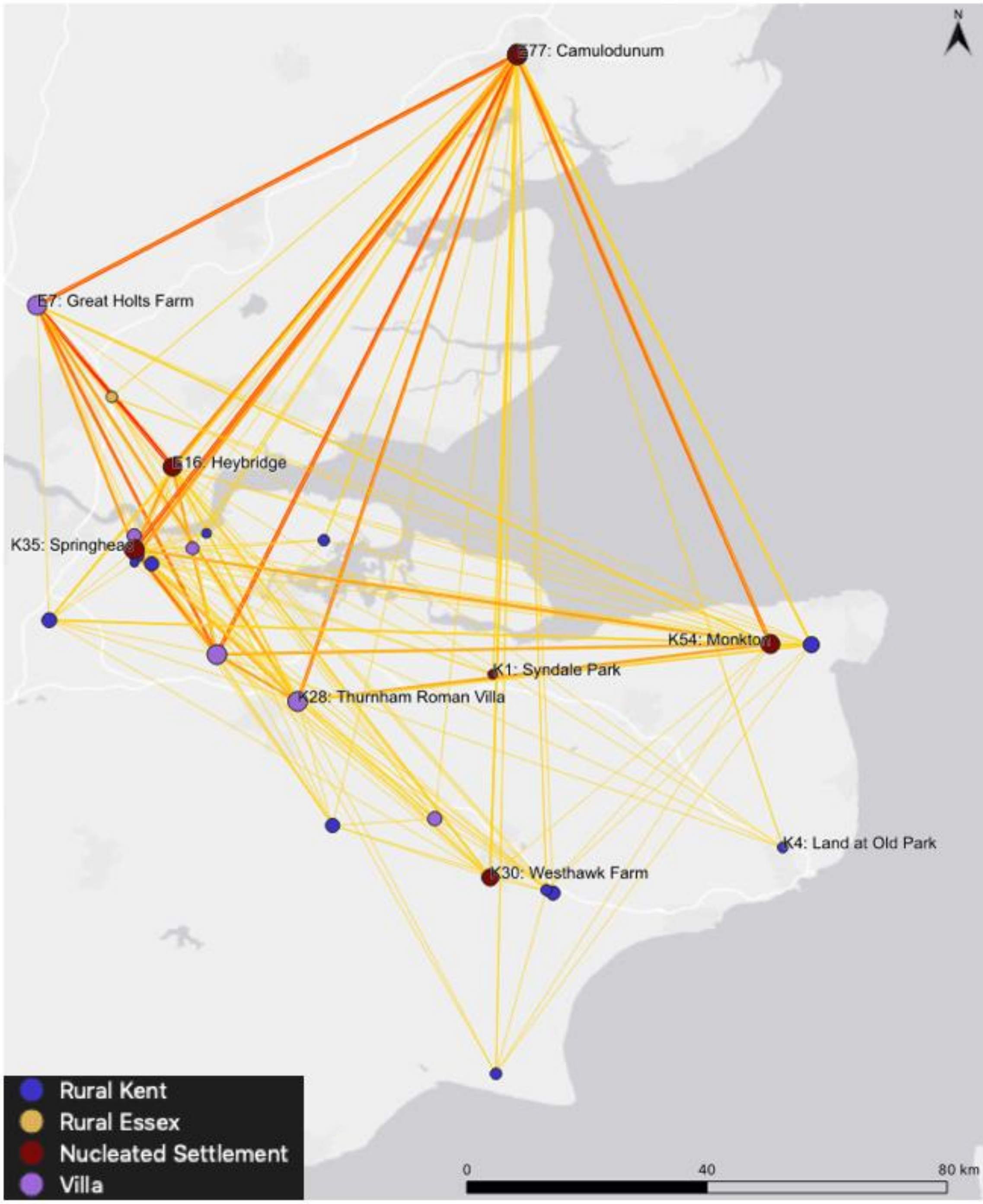


Figure 28: Georeferenced Imported Plant Food Network

Note: All networks use node (site) colour to differentiate between site types. All networks use node size to reflect degree. Network uses edge thickness and edge colour (yellow to red) to depict the number of plants shared between nodes. Several sites are identified via their 'site name' and the site code they were assigned in this project. See Appendix E, Figure E3, for Network with all site codes.

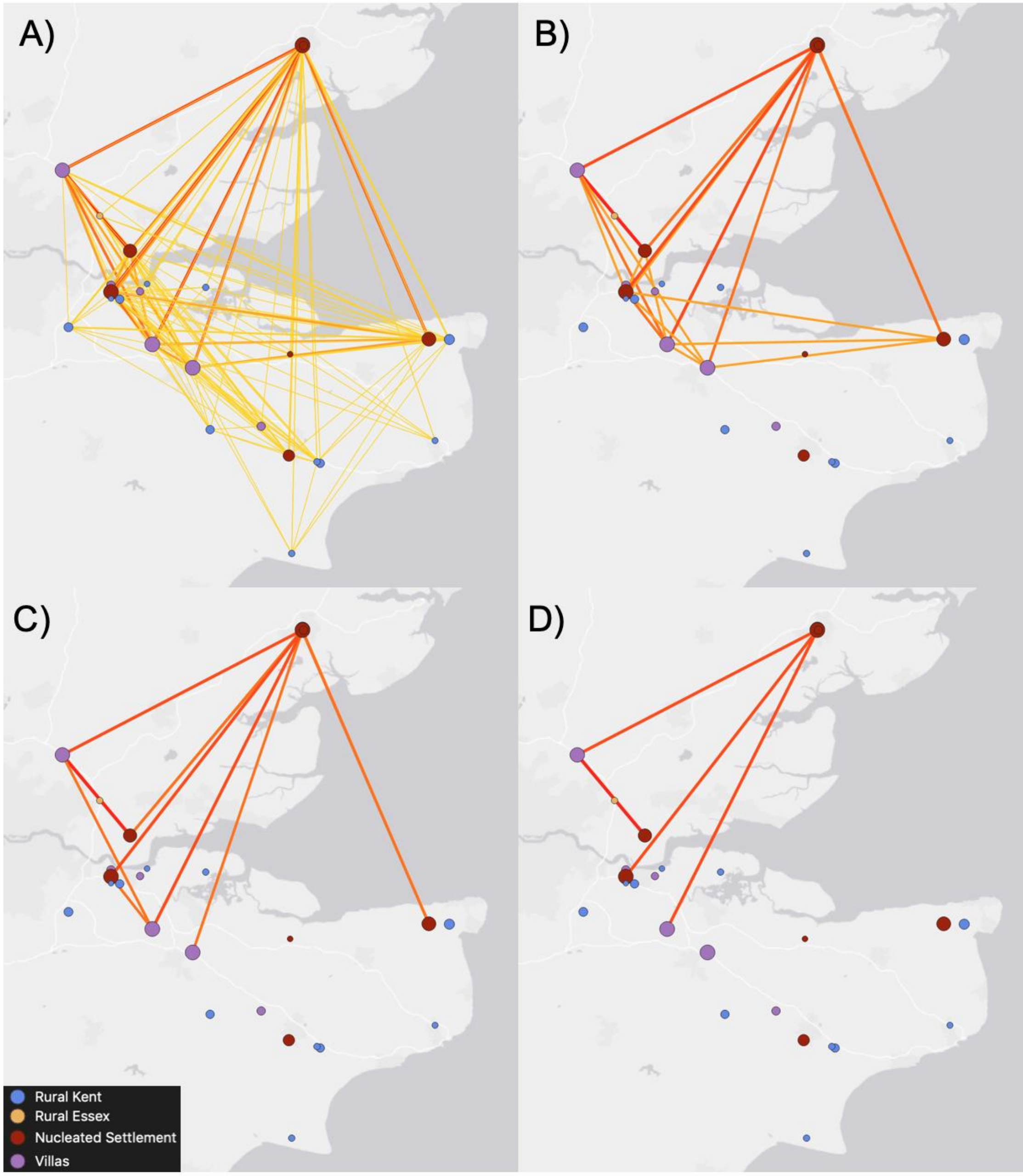


Figure 29: Georeferenced Network with Various Cutoff Values
Note: Network A) has no edge cutoff. Network B) has an edge cutoff of >1. Network C) has an edge cutoff of >3. Network D) has an edge cutoff of >5.

In addition to presenting a reflection of the proposed route of Rome's initial conquest, the strongly weighted edge between Thanet and Camulodunum also foregrounds the importance of the Isle of Thanet as an exchange point within the economic network of Roman Britain. The Roman Period concentrated trade in the Thames estuary, replacing pre-existing pre-Roman exchange points along Britain's southern coast, including those at Hengistbury Head, Dorset (Cunliffe 2013:361). Beyond the strong connection evidenced in this study, Stanford's ORBIS project (Meeks and Grossner 2012a; Meeks and Grossner 2012b; Scheidel 2014) similarly highlights the Isle of Thanet, and the aforementioned site of Rutupiae*,* as a major hub for goods arriving along the empire's vast maritime trade routes. At Thanet, these goods would have been offloaded from larger seafaring vessels and transferred to smaller vessels that could navigate Britain's maritime routes across the Thames estuary to Essex, riverine routes down the Thames to Londinium, and overland routes through northern Kent. The geospatial modelling of ORBIS provides contextual information for exploring the flow of goods represented by the georeferenced archaeological affiliation network (see, Figure 28 and 29).

Aside from the interpretive potential of the strongly weighted edges present in the georeferenced network, insights can also be garnered from the more numerous weak edges of the network. In particular, these lightly weighted edges showcase the extent of the region's access to these extra-local foods. Although the imported plant food representation may have been more limited from an occurrence perspective, the presence of these edges throughout rural sites in Kent enmeshed these sites into the study area's trade and social networks. Consequently, this incorporation would suggest that despite the perceived lower status of rural sites, their occupants were not excluded from the imported trade goods inundating the region following Roman conquest. This rural access to imports disputes a status-based restriction of access. Implying that rather than status, economic factors and proximity to major markets, may have been the determining factor of extra-local resource access in Southeastern Roman Britain (c.f., Cheung et al. 2011:71).

The near absence of imported goods at all rural sites in Essex is likewise of particular note. The numerous, though low-level, connections at the rural sites in Kent implies that these sites were able to obtain access to these extra-local products, demonstrating rural availability in southeastern Britain. Furthermore, although this absence in Essex may initially be viewed as a taphonomic bias in the archaeobotanical representation of the region, the presence of these foods at both nucleated settlements and villas in Essex complicates this strictly preservation-based absence. Additionally, the regional trade networks did incorporate the rural sites from Essex, as many of these inland sites demonstrate the dissemination of marine molluscs. As such, foods were dispersed from coastal/major trade hubs to rural sites in Essex, disputing that the lack of imported plant foods reflects a lack of integration into local social/economic networks. Therefore, this lack of connections may ultimately reflect a resistance or rejection of these imported plant foods.

6.4. Missing Connections

One key consideration that must be given to archaeological affiliation networks is the certainty of the absence of extant connections within the network. Given the preservation, sampling, recovery, and analysis biases that may influence archaeobotanical visibility, we must acknowledge the incompleteness of networks that result from this data (see, Section 6.4). Archaeological affiliation networks evidence the minimal extent of the real-world networks – economic, social, and beyond – that would have contributed to their archaeological manifestation. Additionally, when looking at plant foods through a network approach, consideration must be given to those plants eaten for their leaves, tubers, or roots, as these edible structures of the plant are far less likely to preserve under the standard preservation condition; notably, charring (Moffett 2011a:41). As such, all archaeological affiliation network-based interpretation must be prefaced by stating that archaeologists can only extract the minimal representation of a network, never its full extent. A brief case study of the lack of connection between Bower Road, Smeeth and Westhawk farm brings this issue to the foreground of consideration.

The site here referred to as K22, was a small rural settlement in Kent located at Bower Road, Smeeth (see, Figure 30). K22 is identified as a farmstead with features associated with animal husbandry and crop processing in the site’s unpublished excavation report (Diez and Booth 2006:13-14). K22 exhibited minimal late Pre-Roman Iron Age activity, with a pair of parallel ditches feeding into a pond/waterhole ascribed to this period (Diez and Booth 2006:6). Following the Roman conquest, K22’s evidence of occupation intensified, with Early Roman activity evidenced through the creation of four new ditches, two of which fed into a sump (Diez and Booth 2006:7). Furthering this expansion, the Middle Roman phase of the site follows a significant increase in development, with the addition of an enclosure system and structure (Diez and Booth 2006:8-11). While the site appears to have undergone further modifications in the Middle to Late Roman Periods, including the construction of a new building and second enclosure (Diez and Booth 2006:14), these phases of occupation exceed the temporal constraints of this study – that is, the Early and Early-Middle Roman period. As such, these later periods and their associated finds were not included during data collection. Despite the applied periodization, K22's dating is based solely on the site's recovered pottery sequence and coinage, with no radiocarbon dating currently reported.

Figure 30: Map of Bower Road, Smeeth and West Hawk Farm

K22 was situated within close proximity to small Roman-period town (K30), excavated at Westhawk Farm (Booth et al. 2008). Valérie Diez and Paul Booth (2006:14) suggest that the town at Westhawk Farm would have served as the local market centre to which the residents of surrounding settlements, including K22, would have transported their excess produce and livestock. Throughout the Roman world, rural peoples would have travelled to larger towns and cities to exchange their goods, either at the city gates or at specifically designated urban markets (Erdkamp 2005:109). While both sites demonstrate the presence of imported foods, these foods are different. From this absence of shared foods, the network utilized in this study, based on shared co-presences, established no direct connection between these likely associated sites. This lack of connection problematically ignores the fundamental reciprocal relationship between urban and rural peoples during the Roman Period (Snyder 2003:49), isolating these sites from one another in the network.

The absence of a connection between Bower Road (K22) and Westhawk Farm (K30) highlights one of the major interpretive challenge of networks based on archaeobotanical data, the limitations imposed by taphonomic factors and sampling practices. These issues are entwined throughout the research process and manifest to conceal probable network connections. Following this, and likely other similar absent connections, it is not unreasonable to question if the taphonomic limitations may make archaeobotanical data unsuited to network analysis. However, similar issues exist within all forms of archaeological data. Ceramics, which have constituted the majority of archaeological network research undertaken thus far (e.g., Mills et al. 2015; Mills 2016), are problematized by issues of repair, reuse, and repurposing. Archaeological data are fragmentary by their very nature. Archaeological networks are always incomplete, based on fragmentary archaeological data (Arthur et al. 2018:222), with no dataset is immune to the interpretive barriers that these absences and inconstancies impose. Although organic material is perhaps the type of evidence most subject to loss, archaeologists should look for ways to employ the data that is preserved, and work to find solutions to these interpretive challenges. Additionally, these challenges require critical reflection be given to interpretations that are being made. Interpretive opportunity must be left for alternatives based on these biases in the ensuing discourse, and this study has to achieve this through the use of hedging language and direct acknowledgement of these limitations.

One potential solution to the issue of absent edges within the network of imported plant foods used in this study, could be the creation of assumed edges. An assumed edge approach would link sites with any imported plant foods within a specific geographic distance. Site-type could be used to determine the geographic distance required to form an edge. As an example, edges may be created between two nucleated settlements at a greater distance than one created between a villa and a nucleated settlement, and greater still than that created between the nucleated settlement and a villa. Further refining of site-type, such as differentiating between *coloniae* and small towns, could also be factored into this generation process, reflecting the prominence these sites, particularly Camulodunum, in the network.

A spatially generated network would need to be presented alongside, and clearly differentiated from, the true archaeological affiliation network. Critical engagement between these different types of networks may prove valuable in limiting the restrictions imposed on network approaches by preservation and excavation biases. The blending of network analysis and spatial analysis is not a novel suggestion (e.g., Isaksen 2013; Warner-Smith 2020). For instance, Viviana Amati (et al. 2018) suggests using predictive modeling to fill in the gaps of incomplete networks by using site size or function as edge-structuring properties to shape the resulting modelled network. Although the implementation of such a modeling-based approach is beyond the scope of this study, it highlights the potential for future research to bridge the gaps present in archaeological networks.

6.5. Chapter Summary

Drawing together the differing strands of interpretation presented in this chapter, three distinct patterns emerge from the archaeological affiliation network. First, nucleated settlements and many villas demonstrate strong connections with multiple types of shared imported plant foods. These sites most probably adopted aspects of Roman cuisine beyond the foods themselves, as many flavouring agents (herbs and condiments) are restricted to these sites. Second, rural sites in Kent demonstrates many weak connections with these more connected sites, signifying limited numbers of shared imported plant foods. Conversely, the rural sites in Kent, while adopting limited numbers of foods, likely did not engage with Roman cuisine in the same way as their nucleated settlement and villa sites, for they lacked many of the flavouring agents and strong network connections of these other site-types. Finally, the absence of network connections at the rural sites in Essex possibly reflects a lack of adoption of Roman plant foods into the local foodscape. The different engagement with Roman foods evidenced in the network visualizations, demonstrates the diversity of the regional foodscape. While Roman globalization resulted in new foods in the regional foodscape, the local foodscapes of sites all reacted differently. This variance echoes Mattingly's (2004;2007;2011) notion of discrepant identity, as these were discrepant experiences of Roman colonialism expressed through food.

Network analysis provides a viable means to explore the archaeological record of food consumption, with significant potential for future research. A network-based approach to the archaeology of food provides several distinct advantages. First, the network visualization process beneficially affords an exploratory approach that is particularly suited to highlighting the interaction occurring within large datasets. Second, the relational approach of network analysis allows archaeologists to explore the interconnection of the network as a whole, offering the opportunity to expand beyond a purely site-centric research approach. Third, networks are highly compatible with spatial analysis and provide alternative ways of approaching such analysis. Despite this utility, archaeological networks should never be considered complete. They are the minimal archaeological manifestation of multiple real-world networks, as Section 6.4 highlights. Archaeological networks are as fragmentary as pottery sherds. As the ceramist must reconstruct and interpret the sherds, often with missing sherds that may be integral to vessel structure, researchers undertaking a network approach must similarly piece together networks with apparent and unapparent absences.

Chapter 7. Discussion and Conclusion

The goal of this thesis was to provide insights into how Roman colonial encounters impacted the British foodscape. The preceding chapters have explored a range of foods that both represent change in the foodscape, but also continuities from the pre-Roman Period. This final chapter draws together the evidence of these diverse reactions using the theoretical framework established in this thesis to demonstrate the differential impact of the Roman colonialism occurring throughout the British counties of Kent and Essex.

7.1. Site-Type Variance

7.1.1. Rural Kent

Rural sites in Kent are the most abundant site-type amongst the collected excavation reports (see, Chapter 3, sec. 3.1.6, Figure 5). Primarily, these reports stem from unpublished developer-funded excavations (see, Figure 6), and the majority included both archaeobotanical and zooarchaeological datasets. However, reports with only archaeobotanical datasets were more common than reports with only zooarchaeological data. Rural sites from the county of Kent demonstrate little evidence for the presence of imported and potentially imported plant foods. The limited presence of figs, gapes, lentils, stone pine, and flax demonstrate that these rural sites were able to procure the Mediterranean plants introduced by the Romans. These sites, moreover, demonstrate little evidence for the herbs and vegetables that would signify Roman horticultural practices. The large number of sites that are incorporated into the network of Chapter 6, on the other hand, reflects the availability of many of the imported foodstuffs at these sites. However, the weak edges connecting these sites demonstrate that most of these sites exploited only a limited number of imported taxa. Wild / locally established plant foods are more common at these sites than imported plants foods, with hazelnuts and berries of the *Rubus* genus occurring most frequently.

Overall, rural sites in Kent demonstrate the most minimal representation of wild mammalian species and the least frequent presence of the three major avian species identified: domesticated fowl, ducks, and geese. Perhaps the most distinctive feature of the animal foods evidenced at these sites is the marine taxa. The frequent presence of members of the *Gadidae* family (e.g., cod, haddock, and whiting) makes this grouping the most common animal species to occur at these sites, other than the three major domesticates. Other fish species, such as eel, flatfish, and *Clupeidae* are also frequently found in these assemblages. Although the most common marine molluscs (e.g., oyster, mussel, whelk, and periwinkle) demonstrate less frequent presence at these sites, several of the most infrequently present marine molluscs identified, scallops, limpets, and cuttlefish, all appear at all of the rural sites in Kent.

7.1.2. Rural Essex

Rural sites in Essex are the second most abundant site-type amongst the excavation reports collected in this study (see, Chapter 3, sec. 3.1.6, Figure 7). As with the rural sites from Kent, these sites are primarily recorded in unpublished developer-funded excavations (see, Figure 6). The archaeobotanical records of rural sites in Essex demonstrate the most minimal occurrence of pulses, imported plants, potential imported plants, and wild plants. The only exception to this trend is hazelnuts, which occur at a greater percentage of rural sites in Essex than at villas, and roughly the same percentage of the rural sites in Kent. Additionally, no imported plants are identified at these sites, despite their presence at nucleated settlements and villas in the county. Only three of the potentially imported plants, *Brassica* sp., flax, and the opium poppy occur at these sites. The lack of imported, and potentially imported, plant foods at these rural sites is reflected in their absence from network of Chapter 6. The rural site from Essex that is included in the network demonstrates the same weak connections as the rural sites from Kent.

The animal foods at rural sites in Essex demonstrate their own variances from rural sites in Kent. Pigs demonstrate their lowest occurrence at these sites (see, Chapter 5, Figure 20); however, the wild mammalian foods occur more frequently than at the rural sites in Kent (see, Figure 21). Similarly, domesticated fowl, ducks, and geese (see, Figure 22) are also more common at rural sites in Essex than their counterparts in Kent. Additionally, the only pheasant, a potential Roman import, was identified at a rural site in Essex. The most commonly occurring fish species/types, flatfish, eel, *Gadidae*, and *Clupeidae* only rarely occur at the rural sites in Essex. However, several infrequently reported fish occur at these rural sites, including, pike, shark, and scad. As such, fish appear to have been infrequently, but diversely, exploited at the rural sites in Essex— a clear divergence from their common occurrence at the rural sites in Kent. The rarity of fish remains in Essex is contrasted by the common presence of marine molluscs. Oysters occur at nearly half of these sites, the same occurrence rate identified at nucleated settlements. Mussels, whelks, cockles, and periwinkles, the next four most commonly identified marine molluscs in the study area, occur greater rates than the rural sites in Kent. As such, while fish are less common at the rural sites in Essex than those in Kent, there appears to have been greater avian, mollusc, and wild mammal consumption.

7.1.3. Villas

Villas are the least common, and perhaps most problematic site-type (see, Chapter 3, sec. 3.1.6 and Figure 5). The extant villas are more commonly located in Kent than Essex, and these excavations were primarily published in monographs (see, Figure 6). Reports with only zooarchaeological data were nearly as common as reports with both datasets (see, Figure 10), and reports with only the archaeobotanical data were rare. Villas are distinguished from rural sites due to their more frequent occurrence of wild, imported, and potentially imported plant foods. Moreover, they demonstrate the greatest occurrence of apples, cherries, grapes, hawthorn, sweet chestnuts, whereas elderberry, figs, sloe, olives, plums, and walnuts occur at double, or greater, the rate of these same foods at rural sites, though less commonly than nucleated settlements. Many of these plants, both wild and imported by the Romans, would have been conducive to Roman arboriculture and other forms of Roman horticulture. In the imported foods network presented in Chapter 6, villas possessed the most diverse positioning. The visualization of node degree and edge weight situates these sites as a mediation between nucleated settlements and rural sites.

Furthermore, villas demonstrate that mammalian foods, beyond the domesticates, (e.g., rabbit, hare, red deer, and roe deer) are represented at nearly the same occurrence rate as at nucleated settlements (see, Chapter 5, sec. 5.2, Figure 21). The three main avian species, domesticated fowl, geese, and ducks occur more frequently at villas than rural sites, but less frequently than nucleated settlements (see, Figure 22). Fish demonstrate no constant pattern, with some types (e.g., flatfish) occurring most frequently at villas, while others (e.g., *Gadidae*) do not occur in any of the zooarchaeological reports from these sites (see, Figure 23). This absence is notable as they occur most frequently at rural sites in Kent, the county where the majority of villas were identified. A second major variation from the rural sites in Kent is the frequent presence of marine molluscs, particularly, oysters, mussels, whelks, and cockles (see, Figure 24). Additionally, villas were the only site-type where freshwater clams were identified. These differences suggest that site-type may be more significant than region – county in the case of this study – particularly, if villas possessed more elite occupants than other rural sites.

7.1.4. Nucleated Settlements

The final site-type considered in this study are the nucleated settlements. Nucleated settlements were more common in Essex than Kent (see, Chapter 3, sec. 3.1.6, Figure 5), and were primarily recorded in published monographs (see, Figure 6). As with villas, sites with both datasets were the most common, followed by sites with only zooarchaeological data, whereas sites with only archaeobotanical data were the least common (see, Figure 7). The nucleated settlements observed in the study area are distinctive due to their frequent presence of a diverse range of plant and animal foods. Nucleated settlements are the only site-type where barley was more common than wheat (see, Figure 14). Additionally, rye occurred most commonly at nucleated settlements, and these sites presented the only example of millet (specifically, broomcorn millet) from the study area. These sites demonstrate the most frequent occurrence of the four identified pulses: peas, beans, lentils, and fenugreek (see, Figure 15). Overall, nucleated settlements demonstrate the most common occurrence for the majority of wild, imported, and potentially imported foods (see, Figures 16, 17, 18). Several of these plant foods occur significantly more frequently at these sites than at other site-types, including, *Brassica* sp., coriander, dates, dill, figs, and hazelnuts. The majority of herbs/flavourings utilized in Roman cuisine occur exclusively at these sites (e.g., black pepper, chervil, coriander, dill, and fennel). Many of the fruits that occur at these sites also occur, occasionally more frequently, at villas (e.g., apples, cherries, grapes, and plums). As such, while nucleated settlements provide the greatest evidence of the flavouring agents grown in Roman gardens that would have been used to manifest Roman cuisine in Britain, villas demonstrate equal or greater evidence for the fruits that would have been integrated as part of Roman arboriculture. In the imported plant foods network (see, Chapter 7), nucleated settlements are the most distinctive sites of the network, with their degree and heavily weighted edges reflecting this prominence.

These sites demonstrate both the greatest presence of sheep/goats and pigs, occurring at equivalent rates to cattle at this site-type (see, Figure 20); cattle are more frequently encountered at rural sites. The other mammalian foods occur at similar rates to villas, and are, thus, significantly more common than at rural sites (see, Figure 21). Domesticated fowl, ducks, and geese occur more commonly at these nucleated settlements, though the less commonly encountered avian species (e.g., waders, songbirds, and pigeons) are more common at villas (see, Figure 22). The only zooarchaeological evidence for swans from the study area comes from these nucleated settlements. Nucleated settlements are positioned as one of the two most common site-types for the majority of the marine species (excluding molluscs), infrequently overtaken by villas or rural sites from Kent (see, Figure 23). Evidence for *Cetacea*, *Scombridae*, *Salmonids,* and mullet comes near exclusively from nucleated settlements. Eels and *Gadidae* are the most frequently encountered fish at these sites. All the commonly encountered marine molluscs, oysters, mussels, whelks, cockles, periwinkles, and saltwater clams, occur most frequently at nucleated settlements (see, Figure 24). The animal foods of nucleated settlements are the most diverse of all the site-types. Their domesticate and mammalian food evidence is similar to that of villas, whereas their fish consumption is more reflective of the rural sites in Kent.

7.1.5. Regionality and Pre-Roman Tribal Groups

The rural sites of Kent and Essex demonstrate clear regional differences. These differences, if they are meaningful beyond taphonomic biases, could potentially reflect differences in the Pre-Roman groups of these regions. Different historically evidenced Pre-Roman groups are ascribed to these regions; the Trinovantes are believed to have been the dominate group of Essex prior to conquest (Cunliffe 2005:149), while Kent was believed to have been populated by the Cantiaci (Elliot 2018:15, citing Jones and Mattingly 1990; this group is also referred to as the Cantii, see Cunliffe 2005:165-167). Each of these tribal groups issued coinage prior to conquest that has been used to extrapolate the extent of their territory (compare, Hill 1995:81 and Millett 2005:25, for the translation from coinage distribution maps to tribal territories). The stark differences between rural sites in Kent and those in Essex may represent the lingering Roman period culinary differences between these Pre-Roman groups. For example, the regional difference in animal foods is highlighted by the frequent presence of marine mollsucs in Essex, but their minimization in Kent; or the frequent presence of many fish in Kent, and their minimization in Essex. Differences are also evident in the plant foods, with rural sites in Kent demonstrating much more diverse plant food occurrence. While it is problematic to assign all rural sites in a given region to these specific Pre-Roman peoples – as the movement of peoples to Britain from across the empire is well attested in the isotopic literature (e.g., Leach et al. 2009; Eckardt et a. 2014), there are clear region-based differences emerging in the food occurrence data. Further research will help to substantiate this possible trend; specifically, a Pre-Roman Iron Age component would need to be incorporated into future research to see if these differences maintain, or emulate, differences extant prior to Roman conquest.

7.2. Major Components of the Regional Foodscape

The impact of Roman colonial encounters on Britain's foodscape is a complex topic given the diversity that occurs at the different site-types in the region. However, several overarching trends in the foodscape of Kent and Essex are evident, notably, the overall maintenance of staple foods from the Pre-Roman period and the incorporation of imported and wild foods into the foodscape.

7.2.1. Staple Foods

The staple foods of the Pre-Roman Late Iron Age remained consistent following Roman conquest. Cereals, pulses, and domesticated mammals remained the major contributors to the British foodscape, however, they do demonstrate some internal variations. For example, cattle replace sheep as the major mammalian domesticates (e.g., Hurley 2018; Pierre-Emmanuel 2018), but both species remain prominent throughout Kent and Essex (see, Chapter 5, sec. 5.1, Figure 20). What is notable, however, is that the specific breeds of cattle that are herded (e.g., Albarella et al. 2008; Rizzetto et al. 2017:540) and the varieties of wheat that are being cultivated appear to have changed (e.g., van der Veen and Jones 2006:224; Pelling 2012:4),and centralization continues despite variation. These staple foods occur at between eighty and one hundred percent of all site-types. The only other food identified in this study to approach this status was red deer, but this high occurrence rate is only identified at nucleated settlements (see, Figure 21). Although the staples peoples ate remained relatively consistent between the Pre-Roman and Roman periods, this was also a time of diversification in the supplementary aspects of the British diet.

7.2.2. Imported Foods

The second consideration for the impact of Roman colonization, and the subsequent colonial encounters that occur, is the introduction of translocated animals and plants from the continent. These newly introduced foods played a vital role in shaping Britain's foodscape in the post-conquest period. While they were not staple foods, these imported foods provided beneficial diversification in the diet and allowed for the creation of Roman cuisine. Imported foods can be subdivided into two main categories, true imports and imports that were established locally; there are also a number of plants whose status as imports remains uncertain (e.g., apples, cherries, and plums) due to their domesticated status in the empire, but their wild varieties established in Pre-Roman Britain. The intensified introduction of horticultural crops – fruits, vegetables, and herbs – to nucleated settlements and villas, and their more limited dissemination to rural settlements, highlights a profound shift in the regional foodscape following Roman conquest.

7.2.3. Wild Foods

The third consideration for the impact of Roman colonization on Britain is the incorporation of wild plants and animals into the foodscape. The hypothesized Pre-Roman Iron Age taboo against the consumption of wild foods appears to have been discarded following colonial encounters with the Romans. Previously ignored wild plants (e.g., elderberries and sloe), and animals from the land (e.g., red deer), sky (e.g., songbirds), and sea (e.g., eels and oysters), transition to viable foods. Beyond influencing what people ate, the newly colonized landscape reshaped how people interreacted with nature, adding a new dimension of cultivation practices to the cultural lexicon of Britain.

7.3. Food Entanglements

The concept of entanglement was introduced in Chapter 2 (sec. 2.2.4) to provide terminology to discuss the different integration of foods evidenced at sites in this study. Although this terminology has been widely integrated into the archaeological lexicon, different authors have employed the term in varying fashions. For example, Ian Hodder (e.g., 2011; 2014) presents entanglement as a methodology wherein tanglegrams – graphs similar to networks that are built around potential, but not necessarily observed, phenomena, are used to situate the interrelated uses of materials. Alternatively, a more actionable version of entanglement builds on the scholarly tradition that treats entanglement as a metaphor that can explicate particular past processes (e.g., Stockhammer 2012; Silliman 2016). Rather than using the term hybridization, scholars employ entanglement terminology to provide different ways of discussing the manifestation of cultural interactions – that is, different entanglements.

7.3.1. Relational Entanglement

Relational entanglement, in the context of food, is those foods that are incorporated into pre-existing cultural practices. For example, hazelnuts and red deer are both native to Britain but appear not to have been exploited as major foods prior to Roman conquest. Following conquest, hazelnuts were found at 60%, and red deer at over 80%, of the nucleated settlements in the study area. As such, these local resources that were not previously incorporated become reframed as edible foods in the post-conquest foodscape. Similarly, imported foods could also be incorporated into the pre-existing diet of peoples through relational entanglement. The markets of nucleated settlements afforded peoples residing in the surrounding landscape the opportunity to obtain and consume previously unavailable foods.

7.3.2. Material Entanglement

Material entanglement, in the context of food, is those foods that are not only incorporated into pre-existing cultural practices but incorporate their own cultural practices into the foodscape. Each of the occurrence analyses (Chapters 4 and 5) foreground examples of material entanglement which occurred in Roman Britain, notably, horticulture and arboriculture from the archaeobotanical evidence and aquaculture form the zooarchaeological evidence. Roman horticulture was introduced to Britain alongside many of the Mediterranean (Roman) plants that were utilized as foods. Caraway, coriander, dill, and lovage (*Levisticum officinale*) are all examples of herbs evidenced in this study that may have been cultivated in these introduced Roman gardens. Roman cultivation practice was integrated into the pre-existing foodscape, providing new foods and flavorings that adhered to Roman tastes. The presence of these flavorings allowed for the construction of Roman dishes, recreating — at least in part — the cuisine of the empire.

The presence of tree fruits (e.g., apples, cherries, elderberries, and sloe) and tree nuts/seeds (e.g., hazelnuts, walnuts, stone pine seeds, and sweet chestnuts) at nucleated settlements and villa sites likely demonstrates Roman tree management practices – arboriculture – that would have enabled increased exploitation of these locally available, and newly imported, resources. Particularly, the introduction of Roman grafting techniques provides a second example of material entanglement occurring in the plant foods of Kent and Essex. Similarly, Roman aquaculture – particularly oyster culture – was also introduced alongside the demand for this titular shellfish, the oyster. Although the evidence for oyster culture (see, Chapter 5, sec. 5.6), comes from beyond the study area, this food has been found at nearly 50% of three site-types considered in this study (see, Chapter 5, sec. 5.5). The widespread dissemination of oysters, and to a lesser extent other shellfish, throughout the rural sites in Essex, villas, and nucleated settlements, presents a likely example of the material entanglement of a food, and the management practices that were utilized to ensure the food's supply.

7.3.3. Entanglement and Networks

The archaeological affiliation network, explored in varying forms throughout Chapter 6, can also be interpreted through this established entanglement terminology. This network presents both strong and weak edges. If these differences are valuable beyond the influence of taphonomic factors, then these different edges may provide evidence of the various types of entanglement. Heavily weighted edges within the network indicate many different shared imported plant foods between the connected sets. Meanwhile, those weakly connected sites, whose edges only represent a single shared taxon, may demonstrate relational entanglement wherein only limited foods were incorporated into the pre-existing cuisine of the pre-existing non-Roman peoples.

7.4. Conclusion

This study has utilized the wealth of archaeological reports, including the grey literature produced through British commercial archaeology, to enable a multifaceted discussion of the British foodscape following Roman colonization. The concurrent usage of multiple methods and data has enabled a more nuanced depiction of the regional and site-type differences of Roman Kent and Essex. This study evidences that the peoples occupying different types of sites were impacted by colonial encounters with the Roman Empire in distinctive ways. There was no singular Roman experience as was central to the concept of Romanization. Instead, the plant and animal foods evidenced throughout the study area show differences in their archaeobotanical and zooarchaeological representation. However, despite these differences, there is one clear universal impact that emerges, notably, these peoples, from small rural sites to expansive nucleated settlements, were impacted by Roman conquest. The integration of greater nuance into archaeological discussions of Roman colonial encounters provides the ultimate path towards a more accurate archaeological discourse of the empire and its internal variation. Additionally, the usage of entanglements allows discussions of these variations in the foodscape to be given greater explication than afforded by the broader concept of hybridity. An archaeology of the foodscape, and its conceptualization through the integration of multiple datasets and methods, demonstrates noteworthy potential for refining archaeological understanding of the variability inherent to Roman colonial encounters.

7.5. Recommendations for Future Research

This study has identified several key areas for future research into the foodscapes of Roman Britain. The most apparent future direction is the expansion into other time periods; specifically, the incorporation of the Pre-Roman Iron Age would allow for further exploration of the connection between regionality and different Pre-Roman groups. Additionally, this approach has been beneficially used in network analysis to show ‘snapshots’ of a network’s evolution across different timeframes (e.g., Feinman et al. 2019; Giomi and Peeples 2019), allowing researchers to visually detect shifts in the role of different sites, or materials, in the network. A second suggestion to expand this research is to incorporate the available abundance, and semi-quantitative, data into the study. This would allow for the comparison between the abundance data and occurrence data, allowing for confirmation or rejection of the trends evidenced in the occurrence analysis (e.g., Smith and Munro 2009). Additionally, this expansion would open the data to a multitude of other multidimensional scaling techniques (e.g., principal component analysis and correspondence analysis), which could be compared and contrasted against the network analysis.

A third suggestion for future research is the incorporation of additional data. This expansion could include using network analysis to explore other subsets of the data presented in this study (as suggested with Marine Animal Foods in the introduction to Chapter 6), or the incorporation of entirely new datasets. Ceramics is an obvious choice for an additional dataset, however, inconstancies in their classification presents integrative challenges. The bone of a cow, or a grain of wheat, is always that – at least when correctly identified, the interpretation of ceramic fabric and form does not have the same pre-defined associations. As such, different archeologists in different British counties have utilized different classification strategies and guides. For example, modern excavations in Kent often rely on the Canterbury Archaeological Trust fabric type series, while modern excavations in Essex often utilize the *National Roman Fabric Reference Collection: A Handbook* (Tomber and Dore 1998), published by the Museum of London Archaeology. Although ceramics present integrative challenges, this data would beneficially expand a study of the foodscape, as they would provide evidence for how people stored, prepared, and served the plant and animal foods discussed throughout this study (Mills 2016:247). Additionally, the utility of network analysis based on ceramic abundance data has been shown elsewhere (e.g., Rossenberg 2012; Mol 2013; Mills et al. 2015; Roding 2019). Following these recommendations, this thesis can serve as the foundation for future research using both food and network analysis to further expand beyond the homogenous vision of Roman Britain that was fostered by the previous century of Romanization.

Ancient Sources

Cato, *On Agriculture*. Translated by William Davis Hooper and Harrison Boyd Ash. Harvard University Press, Cambridge, 1934.

Columella. *Of Husbandry* and *Concerning Trees*. Translated by Anon. A. Millar, London, 1745.

Galen. *On the Properties of Foodstuffs*. Translated by Owen Powell. Cambridge University Press, Cambridge, 2003.

Marcus Terentius Varro. *On Agriculture*. Translated by William Davis Hooper and Harrison Boyd Ash. Harvard University Press, Cambridge, 1934.

Pliny, the Elder. *Natural History*. Translated by Harris Rackham. W. Heinemann, London, 1938.

Tacitus. The Life of Cnæus Julius Agricola. In *The Complete Works of Tacitus*. Translated by Sara Bryant. Random House, New York, 1942.

References

Adema, Pauline

2007 Rumblings from the World of Food. *Gastronomica* 7(1):3.

Albarella, Umberto

2005 Alternate Fortunes? The Role of Domestic Ducks and Geese from Roman to Medieval Times in Britain. *Documenta Archaeobiologiae III: Feathers, Grit and Symbolism*, edited by G. Grupe and J. Peters, pp. 249-258. International Council for Archaeozoology, Rahden.

2007 The End of the Sheep Age: People and Animals in the Late Iron Age. In *The Later Iron Age in Britain and Beyond,* edited by Colin Haselgrove and Tom Moore, pp. 389-402. Oxbow Books, Oxford.

Albarella, Umberto, Cluny Johnstone, Kim Vickers

2008 The Development of Animal Husbandry from the Late Iron Age to the End of the Roman Period: A Case Study from South-Eastern Britain. *Journal of Archaeological Science* 35:1828-1848.

Albarella, Umberto, Keith Dobney, Peter Rowley-Conway

2006 The Domestication of the Pig (*Sus scrofa):* New Challenges and Approaches. In *Documenting Domestication: New Genetic and Archaeological Paradigms,* edited by Melinda A. Zeder, Daniel G. Bradley, Bruce D. Smith, and Eve Emshwiller, pp. 209-227. University of California Press, Berkley.

Alcock, Joan P.

1998 Pisces in Britannia. The Eating and Portrayal of Fish in Roman Britain. *Fish: Food from the Waters*, *Proceedings of the Oxford Symposium on Food and Cookery 1997*, edited by Harlan Walker, pp. 20-35. Prospect Books, Totnes.

Aldrete, Gregory S.

2008 *Daily Life in the Roman City: Rome, Pompeii, and Ostia*. University of Oklahoma Press, Norman.

Allison, Penelope M.

2001 Using the Material and Written Sources: Turn of the Millennium Apporaches to Roman Domestic Space. *American Journal of Archaeology* 105(2):181-208.

Amati, Viviana, Termeh Shafie, Ulrik Brandes

2018 Reconstructing Archaeological Networks with Structural Holes. *Journal of Archaeological Method and Theory* 25:226-253.

Anderson, Atholl

2003 Entering Uncharted Waters: Models of Initial Colonization of Polynesia. In *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation*, edited by Marcy Rockman and James Steele. Routledge, London.

2009 The Rat and The Octopus: Initial Human Colonization and the Prehistoric Introduction of Domestic Animals to Remote Oceania. *Biological Invasions* 11(7):1503-1519.

Arthur, Paul, Marco Leo Imperiale, Giuseppe Muci
2018 Amphoras, Networks, and Byzantine Maritime Trade. In *Maritime Networks in the Ancient Mediterranean World,* edited by Justin Leidwanger and Carl Knappett, pp. 219-237. Cambridge University Press, Cambridge.

Bakels, Corrie, Steganie Jacomet
2003 Access to Luxury Foods in Central Europe During the Roman Period: The Archaeobotanical Evidence. *World Archaeology* 34(3):543-557.

Baker, Patricia
2018 Tastes and Digestion: Archaeology and Medicine in Roman Italy. In *Taste and the Ancient Senses*, edited by Kelli C. Rudolph, pp. 138-160. Routledge, Abingdon.

Barreto, Cristiana
2014 Social Complexity in Ancient Amerindian Societies: Perspectives from the Brazilian Lowlands. In *Against Typological Tyranny in Archaeology*, edited by Cristóbal Gnecco, Carl Langebaek, pp. 1-23. Springer, New York.

Barrett, J. C.
1997 Theorising Roman Archaeology. In *TRAC 96: Proceedings of the Sixth Annual Theoretical Roman Archaeology Conference, Sheffield* 1996, edited by, Karen Meadows, Chris Lemke, and Jo Heron, pp. 1-7. Oxbow Books, Oxford.

Barrett, James H., David Orton, Cluny Johnstone, Jennifer Harland, Wim Van Neer, Anton Ervynck, Callum Roberts, Alison Locker, Colin Amundsen, Inge Bødker Enghoff, Sheila Hamilton Dyer, Dirk Heinrich, Anne Karin Hufthammer, Andrew K.G. Jones, Leif Jonsson, Daniel Makowiecki, Peter Pope, Tasmin C. O'Connell, Tessa de Roo, Michael Richards
2011 Interpreting the Expansion of Sea Fishing in Medieval Europe Using Stable Isotope Analysis of Archaeological Cod Bones. *Journal of Archaeological Science* 38(7):1516-1524.

Bastian M., S. Heymann, M. Jacomy
2009 Gephi: an open source software for exploring and manipulating networks. *Third International AAAI Conference on Weblogs and Social Media*: 361–362. Electronic Document, https://www.aaai.org/ocs/index.php/ICWSM/09/paper/view/154, accessed January 12, 2020.

Beaudry, Mary C.
2013 Mixing Food, Mixing Culture: Archaeological Perspectives. *Archaeological Review from Cambridge* 28(1):285-297.

Becuţ, Anda Georgiana, Kàtia Lurbe i Puerto
2017 Introduction. Food history and identity: Food and eating practices as elements of cultural heritage, identity and social creativity. *International Review of Social Research* 7(1)1-4.

Bédoyère, Guy de la
2013 *Roman Britain: A New History*. 2nd Edition. Thames & Hudson, New York.
2016 *The Real Lives of Roman Britain*. Yale University Press, New Haven.

Bennett, Paul, Peter Clark, Alison Hicks, Jonathan Rady, Ian Riddler
2008 *At the Great Crossroads: Prehistoric, Roman and Medieval Discovers on the Isle of Thanet 1994-95*. Canterbury Archaeological Trust Occasional Paper No. 4. Canterbury.

Binford, Lewis R.
1964 A Consideration of Archaeological Research Design. *American Antiquity* 29(4):425-441.

Bintliff, John
1993 Why Indiana Jones is Smarter Than the Post-Processualists. *Norwegian Archaeological Review* 26(2):91-100.

Black, E.W.
1994 Vila-Owners: Romano-British Gentlemen and Officers. *Britannia* 25:99-110.

Blake, Emma
2013 Social Networks, Path Dependence, and the Rise of Ethnic Groups in pre-Roman Italy. In *Network Analysis in Archaeology: New Approaches to Regional Interaction*, edited by Carl Knappett, pp. 203–222. Oxford University Press, Oxford.

Blewitt, Rosemarie
2016 *Loss and Discard of Traditional Ecological Knowledge: Archaeology of Catawba Foodways*. Master Thesis, Department of Anthropology, University of North Carolina at Chapel Hill.

Bogaard, Amy
2005 'Garden Agriculture' and the Nature of Early Farming in Europe and the Near East. *World Archaeology* 37(2):177-196.

Boissevain, Jeremy
1979 Network Analysis: A Reappraisal. *Current Anthropology* 20(2):392-394.

Boivin, Nicole
2017 Proto-Globalisation and Biotic Exchange in the Old World. In *Human Dispersal and Species Movement: From Prehistory to the Present*, edited by Nicole Boivin, Rémy Crassard, and Michael Petraglia, pp.349-408. Cambridge University Press, Cambridge.

Borgatti, Stephen P., Daniel S. Halgin
2011 Analyzing Affiliation Networks. In *The SAGE Handbook of Social Network Analysis*, edited by John Scott and Peter J. Carrington, pp. 417-433. SAGE Publications, London.

Borgatti, Stephen P., Martin G. Everett
2006 A Graph-Theoretic Perspective on Centrality. *Social Networks* 28:466-484.

Booth, Paul, Anne-Marie Bingham, Steve Lawrence
2008 *The Roman Roadside Settlement at Westhawk Farm, Ashford, Kent: Excavations 1998-1999*. Oxford Archaeology Monograph, edited by Edward Biddulph and Ian Scott. Oxford Archaeology, Oxford.

Booth, Paul, D.G. Bird
2017 Kent Roman Rural Settlement. In *Agriculture and Industry In South-East Roman Britain,* edited by David Bird, pp. 55-83. Oxbow Books, Oxford.

Boozer, Anna L.
2015 The Tyranny of Typologies: Evidential Reasoning in Romano-Egyptian Domestic Archaeology. In *Material Evidence: Learning from Archaeological Practice*, edited by Robert Chapman and Alison Wylie, pp.92-110. Routledge,

Breeze, David
2018 The Value of Studying Roman Frontiers. *Theoretical Roman Archaeology Journal* 1(1):1-17.

Brown, A.G., I. Meadows, S.D. Turner, David Mattingly
2001 Roman Vineyards in Britain: Stratigraphic and Palynological Data from Wollaston in the Nene Valley, England. *Antiquity* 75(290):745-757.

Brughmans, Tom
2010 Connecting the Dots: Towards Archaeological Network Analysis. *Oxford Journal of Archaeology* 29(3):277-303.
2012a Facebooking the Past: A Critical Soul Network Analysis Approach for Archaeology. In *Thinking Beyond the Tool: Archaeological Computing and The Interpretive Process,* BAR International Series 2344, edited by Angeliki Chrysanthi, Patricia Murrieta Flores, Constantinos Papadopoulous, pp. 191-203. Archaeopress, Oxford.
2012b Connecting the Dots: An Introduction to Critical Approaches in Archaeological Network Analysis. In *Proceeding of the 39th Conference on Computer Applications and Quantitative Methods in Archaeology Beijing, 12-16 April 2011*, edited by Mingquan Zhou, Iza Romanowska, Zhongke Wu, Pengfei Xu, Philip Verhagen, pp. 359-369. Pallas Publications, Amsterdam.
2014 The Roots and Shoots of Archaeological Network Analysis: A Citation Analysis and Review of the Archaeological Use of Formal Network Methods. Archaeological Review from Cambridge 29(1):18-41.

Brughmans, Tom, Matthew A. Peeples
2017 Trends in Archaeological Network Re-Search: A Bibliometric Analysis. *Journal of Historical Network Research* 1:1-24.

Brughmans, Tom, John William Hanson, Matthew J. Mandich, Iza Romanowska, Xavier Rubio-Campillo, Simon Carrignon, Stephen Collins-Elliot, Katherine Crawford, Dries Daems, Francesca Fulminante, Tymon de Haas, Paul Kelly, Maria del Carmen Moreno Escobar, Elfetheria Paliou, Luce Prignano, Manuela Ritondale
2019 Formal Modelling Approaches to Complexity Science in Roman Studies: A Manifesto. *Theoretical Roman Archaeology Journal* 2(1):1-19.

Burgoine, Thomas, Amelia A. Lake, Elaine Stamp, Seraphim Alvanides, John C. Mathers, Ashley J. Adamson
2009 Changing Foodscapes 1980-2000, using the ASH30 Study. *Appetite* 53:157-165.

Burrow, Adrian, Andrew Mudd
2010 Early Bronze Age, Iron Age and Roman Pit Deposits at Bluntisham, Cambridgeshire. *Proceedings of the Cambridge Antiquarian Society* 99: 61-74.

Campana, Douglas V.
2010 Archaeology and Colonialism: An Introduction. In *Anthropological Approaches to Zooarchaeology: Colonialism, Complexity and Animal Transformations*, edited by Douglas V. Campana, Pamela Crabtree, S.D. deFrance, Justin Lev-Tov, and A.M. Choyke, pp. 129-130. Oxbow Books, Oxford.

Campbell, Gil
2010 Oysters Ancient and Modern: Potential Shape Variation with Habitat in Flat Oysters (*Ostrea edulis* L.), and its Possible Use in Archaeology. *Munibe* 31:176-187.
2017 Market Forces – A Discussion of Crop Husbandry, Horticulture and Trade in Plant Resources in Southern England. In *Agriculture and Industry in South-East Roman Britain,* edited by David Bird, pp. 134-155. Oxbow Books, Oxford.

Caspi, Caitlin E., Glorian Sorensen, S.V. Subramanian, Ichiro Kawachi
2012 The Local Food Environment and Diet: A Systemic Review. *Health & Place* 18:1172-1187.

Cheung, Christina, Hannes Schroeder, Robert E. M. Hedges
2012 Diet, Social Differentiation and Cultural Change in Roman Britain: New Isotopic Evidence from Gloucestershire. *Archaeological and Anthropological Sciences* 4(1):61-73.

Collar, Anna
2013 *Religious Networks in the Roman Empire: The Spread of New Ideas*. Cambridge University, Cambridge.

Collar, Anna, Fiona Coward, Tom Brughmans, Barbara J. Mills
2015 Networks in Archaeology: Phenomena, Abstraction, Representation. *Journal of Archaeological Method and Theory* 22:1-32.

Colledge, Sue, James Conolly, Stephen Shennan
2004 Archaeobotanical Evidence for the Spread of Farming in the Eastern Mediterranean. *Current Anthropology* 45:S35-S58.

Cool, Hilary E.M.
2006 *Eating and Drinking in Roman Britain*. Cambridge University Press, Cambridge.

Coward, Fiona
2010 Small Worlds, Material Culture and Ancient Near Eastern Social Networks. In *Social Brain, Distributed Mind*, edited by Robin Dunbar, Clive Gamble, John Gowlett, pp. 449-479. Oxford University Press, Oxford.

Crabtree, Pam J.
1990 Zooarchaeology and Complex Societies: Some Uses of Faunal Analysis for the Study of Trade Status, and Ethnicity. *Archaeological Method and Theory* 2:155-205.

Crabtree, Stefani A., Lewis Borck
2014 Social Networks for Archaeological Research. In *Encyclopedia of Global Archaeology,* edited by Claire Smith, pp. 1-12. Springer, Berlin.

Cumo, Christopher
2015 *Plants and People: Origin and Development of Human-Plant Science Relationships*. CRC Press, Boca Raton.

Cunliffe, Berry
2005 *Iron Age Communities in Britain*. 4th Edition. Routledge, New York.
2013 *Britain Begins*. Oxford University Press, Oxford.

Currie, Chris
2005 *Garden Archaeology: A Handbook*. Council for British Archaeology, York.

Dark, Ken R., Petra Dark
1997 *The Landscape of Roman Britain*. Sutton Publishing, Stroud.

Dark, Petra
2017 The Environment of Southern Roman Britain. In *Agriculture and Industry in South-Eastern Roman Britain.* Edited by David Bird, pp. 15-34. Oxbow Books, Oxford.

Day, Jo
2013 Botany Meets Archaeology: People and Plants in the Past. *Journal of Experimental Botany* 64(18):5805-5816.

Decuypere, Mathias
2020 Visual Network Analysis a Qualitative Method for Researching Sociomaterial Practice. *Qualitative Research* 20(1):73-90.

Déry, Carol A.
1998 Fish as Food and Symbol in Ancient Rome. In *Fish Food from the Waters: Oxford Symposium and Cookery 1997*, edited by Tom Jaine, pp. 94-115. Prospect Books, Devon.

Dietler, Michael
1998 Consumption, Agency, and Cultural Entanglement: Theoretical Implications of a Mediterranean Colonial Encounter. In *Studies in Culture Contact: Interaction, Culture Change, and Archaeology*, edited by James G. Cusick, pp. 288-315. Southern Illinois University Press, Carbondale.
2007 Culinary Encounters: Food, Identity, and Colonialism. In *The Archaeology of Food and Identity*. Center for Archaeological Investigations, Occasional Paper No. 34, edited by Katherine Twiss, pp. 218-242. Southern Illinois University, Carbondale.

Diez, Valérie, Paul Booth
2006 *The Roman Settlement at Bower Road, Smeeth, Kent*. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service, Electronic Document, DOI: 10.5284/1009794, accessed November 28, 2019.

Diehl, Michael W.
2017 Paleoethnobotanical Sampling Adequacy and Ubiquity: An Example form the American Southwest. *Advances in Archaeological Practice* 5(2):196-205.

Dixon, Boyd
2015 Okinawa as Transported Landscape: Understanding Japanese Archaeological Remains on Tinian Using Ryūkyū Ethnohistory and Ethnography. *Asian Perspectives* 54(2):274-304.

Dmitriev, Sviatoslav
2009 (Re-)constructing the Roman Empire: From 'Imperialism' to 'Post-Colonialism'. An Historical Approach to History and Historiography. *Annali della Scuola Superiore di Pisa*. *Classe di Lettere e Filosofia, Series 5* Vol. 1(1):123-164.

Doherty, Sean
2013 New Perspectives on Urban Cockfighting in Roman Britain. *Archaeological Review from Cambridge* 28(2):82-95.

Dunnell, Robert C.
1992 The Notion of Site. In *Space, Time, and Archaeological Landscapes*, edited by Jaqueline Rossignol and LuAnn Wandsnider, pp. 21-41. Springer, Boston.

Dyson, Stephen L.
1993 From New to New Age Archaeology: Archaeological Theory and Classical Archaeology – A 1990s Perspective. *American Journal of Archaeology* 97(2):195-206.

Dzino, Danjel
2018 Afterword: A View on ‘Romanization 2.0’ From the Ultimate Periphery. In *Reflections of Roman Imperialisms.* Reflections of Roman Imperialisms, edited by Marko A. Janković and Vladimir D. Mihajlović, pp. 370-377. Cambridge Scholars Publishing, Newcastle upon Tyne.

Eckardt, Hella, Gundula Müldner, Mary Lewis
2014 People on the Move in Roman Britain. *World Archaeology* 46(4):534-550.

Edwards, Eric
1997 Molluscan Fisheries in Britain. In *The History, Present Condition, and Future of Molluscan Fisheries of North and Central America and Europe: Volume 3 Europe*, NOAA Technical Report NMFS 129, edited by Clyde L. MacKenzie Jr., Victor G. Burrell Jr., Aaron Rosenfield, Willis L. Hobart, 85-101. U.S. Department of Commerce, Seattle.

Edwards, Nancy
2006 *The Archaeology of Early Medieval Ireland.* Routledge, Oxon.

Elliot, Simon
2017 *Empire State: How the Roman Military Built an Empire*. Oxbow Books, Oxford.
2018 *Ragstone to Riches. Imperial Estates, metalla and the Roman military in the South East of Britain During the Cccupation.* BAR British Series 638. BAR Publishing, Oxford.

Erdkamp, Paul
2005 *The Grain Market in the Roman Empire. A Social, Political and Economic Study.* Cambridge University Press, Cambridge.

Everett, Martin G., Stephen P. Borgatti
2013 The Dual-Projection Approach for Two-Mode Networks. *Social Networks* 35:204-210.

Evin, Allowen, Thomas Cucchi, Andrea Cardini, Una Strand Vidarsdottir, Greger Larson, Keith Dobey
2013 The Long and Winding Road: Identifying Pig Domestication Through Molar Size and Shape. *Journal of Archaeological Science* 40:735-743.

Faas, Patrick.
2005 *Around the Roman Table: Food and Feasting in Ancient Rome*. The University of Chicago Press, Chicago.

Farrar, Linda
2016 *Gardens and Gardeners of the Ancient World. History, Myth & Archaeology*. Windgather Press, Oxford.

Faust, Katherine
1997 Centrality in Affiliation Networks. *Social Networks* 19:157-191.

Feinman, Gary M., Mark Golitko, Linda M. Nicholas
2019 A Network Analysis of Prehispanic Obsidian Exchange: Implications for Macroregional Dynamics and Ancient Economies. In *Social Network Analysis in Economic Archaeology - Perspectives from the New World*, edited by Tim Kerig, Christian Mader, Katerina Ragkou, Michaela Reingeld, Tomáš Zachar, pp. 13-36. Dr. Rudolf Habelt GmbH, Bonn.

Feugnet, Aurélia, Fabrice Rossi, Clara Filet
2017 Co-Presence Analysis and Economic Patterns: Mediterranean Imports in the Celtic World. *Frontiers in Digital Humanities* 4(1):1-25.

Fishwick, Duncan
1997 The Provincial Centre at Camulodunum: Towards an Historical Context. *Britannia* 28:31-50.

Fleming, Andrew
2006 Post-Processual Landscape Archaeology: a Critique. *Cambridge Archaeological Journal* 16(3):267-280.

Ford, Richard I.
1979 Paleoethnobotany in American Archaeology. In Advances in Archaeological Method and Theory Volume 2, edited by Michael Schiffer. p. 285-336. Academic Press, New York.

Fowler, Chris
2017 Relational Typologies, Assemblage Theory and Early Bronze Age Burials. *Cambridge Archaeological Journal* 27(1):95-109.

Fox, Cyril
1932 *The Personality of Britain: Its Influence on Inhabitant and Invader in Prehistoric and Early Historic Times*. The National Museum of Wales, Cardiff.

Foxhall, Lin., Martin Jones, Hamish Forbes
2012 Human Ecology and the Classical Landscape Interaction: The Greek and Roman Worlds. In *Classical Archaeology*, 2nd edition, edited by Susan E. Alcock and Robin Osborne., pp.93-121. Wiley-Blackwell, Malden.

Frere, Sheppard, Michael Fulford
2001 The Roman Invasion of A. D. 43. *Britannia* 32:45.55.

Fuller, Dorian Q., Emma L. Harvey
2006 The Archaeobotany of Indian Pulses: Identification, Processing and Evidence for Cultivation. *Environmental Archaeology: The Journal of Human Palaeoecology* 11(2):219-246.

Fuller, Dorian Q., Chris Stevens, Meriel McClatchie
2014 Routine activities, Tertiary Refuse, and Labour Organization: Social Inferences from Everyday Archaeobotany. In *Ancient Plants and People: Contemporary Trends in Archaeobotany*, edited by Marco Madera, Carla Lancelotti, and Manon Savard, 174-218. The University of Arizona Press, Tucson.

Fulford, Michael
2007 Coasting Britannia: Roman Trade and Trade Around the Shores of Britain. In *Communities and Connections: Essays in Honour of Barry Cunliffe*, edited by Chris Gosden, Helena Hamerow, Philip de Jersey, Gary Lock, pp. 54-74. Oxford University Press, Oxford.

Fulford, Michael, Martyn Allen
2017 Introduction. In *Agriculture and Industry in South-East Roman Britain,* edited by David Bird, pp. 1-14. Oxbow Books, Oxford.

Fulford, Michael, Neil Holbrook
2018 Relevant Beyond the Roman period: Approaches to the Investigation, Analysis, and Dissemination of Archaeological investigations of the Rural Settlements and Landscapes of roman Britain. *Archaeological Journal* 175(2):214-230.

Gallagher, Daphne E.
2014 Formation Processes of the Macrobotanical Record. In *Method and Theory in Paleoethnobotany*, edited by John M. Marston, Jade D'Alpoim, and Christina Warinner, pp. 19-34. University Press of Colorado, Boulder.

Gardner, Andrew
2003 Seeking a Material Turn: The Artefactuality of the Roman Empire. In *TRAC 2002: Proceedings from the Twelfth Annual Theoretical Roman Archaeology Conference, Canterbury 2002*, edited by G. Carr, E. Swift, and J. Weekes, pp. 1-13. Oxbow Books, Oxford.
2013 Thinking about Roman Imperialism: Postcolonialism, Globalisation and Beyond? *Britannia* 44:1-25.

Geraghty, Ryan M.
2007 The Impact of Globalization in the Roman Empire, 200 BC-AD 100. *The Journal of Economic History* 67(4):1036-1061.

Ghisleni, Lara
2018 Contingent Persistence: Continuity, Change, and Identity in the Romanization Debate. *Current Anthropology* 59(2):138-166.

Giacosa, Ilaria Gozzini
1994 *A Taste of Ancient Rome*. Translated by Anna Herklotz. The University of Chicago Press, Chicago.

Gifford-Gonzalez, Diane
2018 *An Introduction to Zooarchaeology.* Springer, New York.

Giomi, Evan, Matthew A. Peeples
2019 Network Analysis of Intrasite Material Networks and Ritual Practice at Pueblo Bonito. *Journal of Anthropology Archaeology* 53:22-31.

Given, Michael
2004 *The Archaeology of the Colonized.* Routledge, London.

Goldberg, D. Martin
2009 The Dichotomy in Romano-Celtic Syncretism: Some Preliminary Thoughts on Vernacular Religion. In *TRAC 2008: Proceedings of the Eighteenth Annual Theoretical Roman Archaeology Conference, Amsterdam 2008*, edited by Mark Driessen, Stijn Heeren, Joep Hendricks, Fleur Kemmers, Ronald Visser, pp.187-202. Oxford, Oxbow Books.

Golitko, Mark, Gary M. Feinman, Linda M. Nicholas
2019 Archaeological Network Analysis Viewed through Mesoamerica Obsidian. In *Social Network Analysis in Economic Archaeology - Perspectives from the New World*, edited by Tim Kerig, Christian Mader, Katerina Ragkou, Michaela Reingeld, Tomáš Zachar, pp. 1-12. Dr. Rudolf Habelt GmbH, Bonn.

Gosden, Chris
2004 Archaeology and Colonialism: Cultural Contact from 5000 BC to the Present. Cambridge University Press, Cambridge.

Graff, Sarah R.
2015 Archaeology of Cooking. In *Archaeology of Food: An Encyclopedia, Volume 1: A-K*, edited by Karen Bescherer Metheny and Mary C. Beaudry, pp.32-33. Rowman & Littlefield, Lanham.
2018 Archaeological Studies of Cooking and Food Preparation. *Journal of Archaeological Research* 26:305-351.

Grahame, Mark
1998 Redefining Romanization: Material Culture and the Question of Social Continuity in Roman Britain. In *TRAC 97: Proceedings of the Seventh Annual Theoretical Roman Archaeology Conference Nottingham 1997,* edited by C. Forcey, J. Hawthorne, and Robert Witcher, pp. 1-10. Oxbow Books, Oxford.

Grainge, Gerald
2014 *The Roman Invasions of Britain*. The History Press, Stroud.

Grainger, Sally
2011 Roman Fish Sauce: An Experiment in Archaeology. In *Cured, Fermented and Smoked Foods*. Proceedings from the Oxford Symposium on Food and Cookery 2010, edited by Helen Saberi, pp. 121-131. Prospect Books, Devon.
2014 *Garum*, *Liquamen* and *Muria*: a New Approach to the Problem of Definition. In *Fish & Ships: Production and Comerce of Salsamenta During Antiquity*, edited by Emmanuel Botte and Victoria Leitch, pp. 37-45. Centre Camille Jullian, Aix-en-Provence.

Grant, Annie
2004 Domestic Animals and Their Uses. In *A Companion to Roman Britain*, edited by Malcon Todd, pp. 371-392. Blackwell Publishing, Malden.

Greene, Elizabeth S.
2018 Shipwrecks as Indices of Archaic Mediterranean Trade Networks. In *Maritime Networks in the Ancient Mediterranean World,* edited by Justin Leidwanger and Carl Knappett, pp. 132-162. Cambridge University Press, Cambridge.

Greene, Kevin
1990 *The Archaeology of the Roman Economy*. University of California Press, Berkley.

Grew, Francis
2001 Representing Londinium: The Influence of Colonial and Post-Colonial Discourses. In *TRAC 2000: Proceedings of the Tenth Annual Theoretical Roman Archaeology Conference*, *London 2000*, edited by Gwyn Davies, Andrew Gardner, and Kris Lockyear, pp. 12-24. Oxbow Books, Oxford.

Guptial, Amy E., Denise A. Copelton, Betsy Lucal
2013 *Food & Society: Principles and Paradoxes*. Polity, Cambridge.

Hanscam, Emily
2019 Postnationalism and the Past: The Poltiics of Theory in Roman Archaeology. *Theoretical Roman Archaeology Journal* 2(1):1-14. DOI: 10.16995/traj.370, accessed December 12, 2019.

Hansen, Derek L., Ben Shneiderman, Mac A. Smith
2011 Analyzing Social Media Networks with NodeXL: Insights from a Connected World. Morgan Kaufmann, Burlington.

Harding, Dennis W.
2017 *The Iron Age in Northern Britain: Britons and Romans, Natives and Settlers*. 2nd edition. Routledge, New York.

Harding, Phil
2003 Syndale Park, Ospringe, Kent. Archaeological Evaluation and an Assessment of the Results). Wessex Archaeology, Salisbury. Archaeology Data Service, Electronic Document, DOI: 10.5284/1027936, accessed November 4, 2019.

Haruda, Ashleigh F.
2017 Separating Sheep (*Ovis aries* L.) and Goats (*Capra hircus* L.) Using G3eometric Morphometric Methods: An Investigation of Astragalus Morphology from late and Final Bronze Age Central Asian Contexts. *International Journal of Osteoarchaeology* 27:551-562.

Hastorf, Christine A.
2017 *The Social Archaeology of Food: Thinking about Eating from Prehistory to the Present*. Cambridge University Press, Cambridge.

Haverfield, Francis
1912 *The Romanization of Roman Britain*. British Academy.

Hawkes, Gillian
1999 Beyond Romanization: The Creolization of Food. A Framework for the Study of Faunal Remains from Roman Site. *Papers from the Institute of Archaeology* 10:89-95.
2001 An Archaeology of Food: A case study from Roman Britain. In *TRAC 2000: Proceedings of the Tenth Annual Theoretical Roman Archaeology Conference*, edited by Gwyn Davies, Andrew Gardner and Kris Lockyear, pp. 94-103. Oxbow Books, Oxford.

Hegemon, Michelle
2003 Setting Theoretical Egos Aside: Issues and Theory in North American Archaeology. *American Antiquity* 68(2):213-243.

Heinrich, Frits
2019 Cereals and Bread. In *The Routledge Handbook of Diet and Nutrition in the Roman World,* edited by Paul Erdkamp and Clare Holleran, pp. 101-115. Routledge, New York.

Heinrich, Frits, Annette M. Hansen
2019 Pulses. In *The Routledge Handbook of Diet and Nutrition in the Roman World,* edited by Paul Erdkamp and Clare Holleran, pp. 116-128. Routledge, New York.

Hester, Thomas R. Harry J. Shafer, Keeneth L. Feder
2016 *Field Methods in Archaeology.* 7th edition. Routledge, New York.

Higginbotham, James
1997 *Piscinae: Artificial Fishponds in Roman Italy.* The University of North Carolina Press, Chapel Hill.

Hill, J.D.
1995 The Pre-Roman Iron Age in Britain and Ireland (ca. 800 B.C. to A.D. 100): An Overview. *Journal of World Prehistory* 9(1):47-98.

Hingley, Richard
1993 Attitudes to Roman Imperialism. In *Theoretical Roman Archaeology: First Conference Proceedings*, edited by E. Scott, pp. 23-27. Aldershot, Avebury.
1996 The ‘Legacy’ of Rome: The Rise, Decline, and Fall of the Theory of Romanization. In *Roman Imperialism: Post-Colonial Perspectives*, edited by Jane Webster and N. Cooper, Leicester Archaeology Monographs No. 3, pp. 34-48, School of Archaeological Studies, University of Leicester.
1999 Rethinking Historical Archaeology. In *Historical Archaeology: Back from the Edge*, edited by Pedro Paulo A. Funari, Martin Hall, and Siân Jones, pp. 23-36. Routledge, New York.
2000 *Roman Officers and English Gentlemen*. Routledge, London.
2008 Not So Romanized? Tradition, Reinvention or Discovery in the Study of Roman Britain. *World Archaeology* 40(3):427-443.

2011 Globalization and the Roman Empire: The Genealogy of ‘Empire’. *SEMATA, Ciencias Soclais e Humanidades* 23:99-113.
2016 Early Studies in Roman Britain: 1610 to 1906. In *The Oxford Handbook of Roman Britain*, edited by Martin Millett, Louise Revell, and Alison Moore, pp. 3-21. Oxford University Press, Oxford.

Hitchner, R. Bruce
2008 Globalization Avant la Lettre: Globalization and the History of the Roman Empire. *New Global Studies* 2(2):1-12.

Hodder, Ian
2002 Review: Two Approaches to an Archaeology of the Social. *American Anthropologist* 104(1):320-324.
2005 Post-Processual and Interpretive Archaeology. In *Archaeology: The Key Concepts*, edited by Colin Renfrew and Paul Bahn, pp. 207-212. Routledge, New York.
2011 Human-Thing Entanglement: Towards an Integrated Archaeological Perspective. *Journal of Royal Anthropological Institute* 17:154-177.
2014 The Entanglements of Humans and Things: A Long-Term View. *New Literary History* 45(1):19-36.

Hoffmann, Birgitta
2019 *The Roman Invasion of Britain: Archaeology Versus History.* Pen and Sword Archaeology, Yorkshire.

Holbrook, Neil and Richard Morton
2008 Assessing the Research Potential of Grey Literature in the Study of Roman England Stage 1 Report. 1-63. Archaeoloigcal Data Service. DOI: 10.5284/1000418, accessed November 23, 2019.

Horden, Peregrine, Nicholas Purcell
2000 *The Corrupting Sea. A Study of Mediterranean History*. Blackwell Publishing, Malden.

Hunt, John Dixon
2012 A Note on Adaptation in Gardens. *Change Over Time* 2(2):188-200.

Hurley, J.A.
2018 Developing an Integrated, Large-Scale Approach to the Archaeological Study of Food: A Pilot Study of Iron Age and Roman Cambridgeshire. *Journal of Archaeological Science: Reports* 19:992-1002.

Irwin-Williams, Cynthia
1977 A Network Model for the Analysis of Prehistoric Trade. In *Exchange Systems in prehistory,* edited by T. K. Earle and J. E. Ericson, pp. 141-151. Academic Press, London.

Isaksen, Leif
2013 ‘O What A Tangled Web We Weave’ — Towards a Practice that Does Not Deceive. In *Network Analysis in Archaeology: New Approaches to Regional Interaction*, edited by Carl Knappett, pp. 43-67. Oxford University Press, Oxford.

Jaccard, Paul
1902 Lois de distribution florale dans la zone alpine. *Bull Soc Vaudoise Sci Nat* 38:69-130.

Jacob, Jérémy, Jean-Robert Disnar, Fabien Arnaud, Emmanuel Chapron, Maxime Debrot, Elisabeth Lallier-Vergès, Marc Desmet, Marie Revel-Rolland
2008 Millet cultivation history in the French Alps as evidenced by a sedimentary molecule. *Journal of Archaeological Science* 35:814-820.

Jacomy M., T. Venturini, S. Heymann, M. Bastian
2014 ForceAtlas2, a continuous graph layout algorithm for handy network visualization designed for the Gephi software. *PLoS ONE* 9(6): e98679.

Janick Jules
2014 Horticulture and Art. In *Horticulture: Plants for People and Places, Volume 3*: Social Horticulture, edited by Geoffrey R. Dixon and David E. Aldous, pp. 1197-1224. Springer, Dordrecht.

Jashemski, Wilhelmia
1974 The Discovery of a Market-Garden Orchard at Pompeii: The Garden of the “House of the Ship Europa”. *American Journal of Archaeology* 78(4):391-404.
1979 “The Garden of Hercules at Pompeii” (II.viii.6): The Discovery of a Commercial Flower Garden. *American Journal of Archaeology* 83(4):403-411.

Jiguet, Frédéric, Kevin J. Kardynal, Keith A. Hobson
2019 Stable Isotopes Reveal Captive vs Wild Origin of Illegally Captured Songbirds in France. *Forensic Science International* 302:109884.

Jiménez, Alicia
2008 A Critical Approach to the Concept of Resistance: New ‘Traditional’ Rituals and Objects in Funerary Contexts of Roman Baetica. *TRAC 2007: Proceedings of the Seventeenth Annual Theoretical Roman Archaeology Conference, London 2007*, pp.15-30. Oxbow Books, Oxford.

Johnson, Matthew
1999 Rethinking Historical Archaeology. In *Historical Archaeology: Back from the Edge*, edited by Pedro Paulo A. Funari, Martin Hall, and Sian Jones, pp. 23-36. Routledge, New York.

Johnston, Robert
2005 A Social Archaeology of Garden Plots in the Bronze Age of Northern and Western Britain. *World Archaeology* 37(2):211-223.

Jones, Glynis
2005 Garden Cultivation of Staple Crops and Its Implications for Settlement Location and Continuity. *World Archaeology* 37(2):164-176.

Jones, Siân
1997 *The Archaeology of Ethnicity: Constructing Identities in the Past and Present*. Routledge, London.

Joyce, Rosemary A., Jeanne Lopiparo
2005 PostScript: Doing Agency in Archaeology. *Journal of Archaeological Method and Theory* 12(4):365-374.

King, Anthony
1984 Animal Bones and The Dietary Identity of Military and Civilian Groups in Roman Britain, Germany and Gaul. In *Military and Civilian in Roman Britain: Cultural Relationships in A Frontier Province,* edited by T.F.C. Blagg and Anthony C. King, pp. 187-217. British Archaeological Reports, Oxford.
1999 Diet in the Roman World: A Regional Inter-Site Comparison of the Mammal Bones. *Journal of Roman Archaeology* 12(1):168-202.

Kirleis, Wiebke, Elske Fischer
2014 Neolithic Cultivation of Tetraploid Free Threshing What in Denmark and Northern Germany: Implications for Crop Diversity and Societal Dynamics of the Funnel Beaker Culture. *Vegetation History and Archaeobotany* 2:81-96.

Knappett, Carl
2011 *An Archaeology of Interaction: Network Perspectives on Material Culture and Society*. Oxford University Press, Oxford.
2017 Globalization, Connectivites and Networks. An Archaeological Perspective. In *The Routledge Handbook of Archaeology and Globalization,* edited by Tamar Hodos, pp. 29- 41. Routledge, New York.

Kristiansen, Kristian
2014 Towards a New Paradigm? The Third Science Revolution and its Possible Consequences in Archaeology. *Current Swedish Archaeology* 22:11-34.

Kristiansen, Kristian, Michael Rowlands
1998 *Social Transformations in Archaeology: Global and Local Perspectives*. Routledge, New York.

Ladefoged, Thegan, Caleb Gemmell, Mark McCoy, Alex Jorgensen, Hayley Glover, Christopher Stevenson, Dion O'Neale
2019 Social Network Analysis of Obsidian Artefacts and Mãori Interaction in Northern Aotearoa New Zealand. *PloS one* 14(3):1-26.

Lake, Amelia A., Thomas Burgoine, Fiona Greenhalgh, Elaine Stamp, Rachel Tyrrell
2010 The Foodscape: Classification and Field Validation of Secondary Data Sources. *Health & Place* 16:666-673.

Lake, Amelia A., Thomas Burgoine, Elaine Stamp, Rachael Grieve
2012 The Foodscape: Classification and Field Validation of Secondary Data Sources Across Urban/Rural and Socio-Economic Classifications in England. *International Journal of Behavioral Nutrition and Physical Activity* 9(37):1-12.

Landon, David B.
2015 Zooarchaeology. In *Archaeology of Food: An Encyclopedia*, Volume 2: L-Z, edited by Karen Bescherer Metheny and Mary C. Beaudry, pp. 559-561. Rowman & Littlefield, London.

Larson, Gregor
2015 How Wheat Came to Britain. *Science* 347(6225):945-946.

Larsson, Mikael
2015 Roman Horticulture Beyond the Frontier: Garden Cultivation at Iron Age Uppåkra (Sweden). *Journal of Roman Archaeology* 28:393-402.

Laurence, Ray
2001 Roman Narratives: The Writing of Archaeological Discourse – A View from Britain?. *Archaeological Dialogues* 8(2):90-101.

Lauwerier, Roel C. G. M.
1999 Eating Horsemeat: The Evidence in the Roman Netherlands. *Archaeofauna: Revista de la Asociación Española de Arqueozoología* 8:101-113.
2004 The Economic and Non-Economic Animal: Roman Deposits and Offerings. In *Behavior Behind Bones: The Zooarchaeology of Ritual, Religion, Status and Identity. Proceedings of the 9th Conference of the International Council of Archaeozoology, Durham, August 2002*, edited by Sharyn Jones O'Day, Win Van Neer, and Anton Ervynck, pp.66-72. Oxbow Books, Oxfor d.

Leach, Stephany, Mary Lewis, Carolyn Chenery, Gundula Müldner, Hella Eckart
2009 Migration and Diversity in Roman Britain: A Multidisciplinary Approach to the Identity of Immigrants in Roman York, England. *American Journal of Physical Anthropology* 140:546-561.

Livarda, Alexandra
2008 New Temptations? Olive, Cherry and Mulberry in Roman and Medieval Europe. In *Food and Drink in Archaeology I*, University of Nottingham Postgraduate Conference 2007, edited by Sera Baker, Martyn Allen, Sarah Middle. pp.73-83. Prospect Books, Totnes.
2011 Spicing up Life in Northwestern Europe: Exotic Food Plant Imports in the Roman and Medieval World. *Vegetation History and Archaeobotany* 20(2):143-164.
2016 Foodscapes, Plants, and Ecofacts in Bronze Age Greece. The Mycenean Seminar Series 2015-15. *Bulletin of the Institute of Classical Studies* 59(1):133-144

Livarda, Alexandra, Hector A. Orengo
2015 Reconstructing the Roman London Flavourscape: New Insights into the Exotic Food Plant Trade Using Network and Spatial Analysis. *Journal of Archaeological Science* 55:244-252.

Livarda, Alexandra, Marijke van der Veen
2008 Social Access and Dispersal of Condiments in North-West Europe from the Roman to Medieval Period. *Vegetation History and Archaeobotany* 17(Suppl 1):S201-S209.

Lock, Gary
2003 *Using Computers in Archaeology: Towards Virtual Pasts*. Routledge, New York.

Locker, Alison
2007 In *piscibus diversis*; the Bone Evidence for Fish Consumption in Roman Britain. *Britannia* 38:141-180.

Lodwick, Lisa
2017 Evergreen Plants in Roman Britain and Beyond: Movement, Meaning and Materiality. *Britannia* 48:135-173.
2018 Arable Weed Seeds as Indicators of Regional Cereal provenance: A Case Study from Iron Age and Roman Central-Southern Britain. *Vegetation History and Archaeobotany* 27(6):801-815.

Luley, Benjamin Peter
2014 Cooking, Class, and Colonial Transformations in Roman Mediterranean France. *American Journal of Archaeology* 118(1):33-60.

Mackendrick, Norah
2014 Foodscape. *Contexts* 13(3):16-18.

Mackinnon, Michael
2010 Cattle 'Breed' Variation and Improvement in Roman Italy: Connecting the Zooarchaeological and Ancient Textual Evidence. *World Archaeology* 42(1):55-73.
2019 Meat and Other Animal Products. In *The Routledge Handbook of Diet and Nutrition in the Roman World,* edited by Paul Erdkamp and Clare Holleran, pp. 150-162. Routledge, New York.

Malek, Amina-Aïcha
2013 Gardens for Archaeologists. In *Sourcebook for Garden Archaeology,* edited by Amina-Aïcha Malek, pp. 13-20. Foundation des Parcs et Jardins de France, Paris.

Maltby, Mark
1997 Domestic Fowl on Romano-British Sites: Inter-Site Comparison of Abundance. *International Journal of Osteoarchaeology* 7:402-414.

2015 Commercial Archaeology, Zooarchaeology and the Study of Romano-British Towns. In *The Towns of Roman Britain: the Contribution of Commercial Archaeology since 1990*, edited by M. Fulford and N. Holbrook, pp. 175-193. The Society for the Promotion of Roman Studies, London.
2016 The Exploitation of Animals in Roman Britain. In *The Oxford Handbook of Roman Britain*, edited by Martin Millett, Louise Revell, and Alison Moore, pp. 791-806. Oxford University Press, Oxford.
2017 The Exploitation of Animals and Their Contribution to Urban Food Supply. In *Agriculture and Industry in South-East Roman Britain,* edited by David Bird, pp. 180-209. Oxbow Books, Oxford.

Maltby, Mark, Martyn Allen, Julia Best, B. Tyr Fothergill, Beatrice Demarchi
2018 Counting Roman Chickens: Multidisciplinary Approaches to Human-Chicken Interactions in Roman Britain. *Journal of Archaeological Science: Reports* 19:1003-1005.

Maltby, Mark, Sheila Hamilton-Dyer
2012 Big Fish and Great Auks: Exploitation of Birds and Fish on the Isle of Portland, Dorset, During the Romano-British Period. *Environmental Archaeology: The Journal of Human Paleoecology* 17(2):168-176.

Märkle, Tanja., Manfred Rösch
2008 Experiments on the Effects of Carbonization on Some Cultivated Plant Seeds. *Vegetation History and Archaeobotany* 17(Supplement 1): S257–S263.

Marinval, Philippe
1992 Archaeobotanical data on millets (Panicum miliaceum and Setaria italica) in France. *Review of Palaeobotany and Palynology* 73:259-270.

Martyn, Allen, Nathan Blick, Tom Brindle, Tim Evans, Michael Fulford, Neil Holbrook, Lisa Lodwick, Julian D Richards, Alex Smith
2018 *The Rural Settlement of Roman Britain: an online resource*. Webpage/Database, DOI: 10.5284/1030449, accessed November 20, 2019.

Marzano, Annalisa
2013 Harvesting the Sea: The Exploitation of Marine Resources in the Roman Mediterranean. Oxford University Press, Oxford.
2014 Villas and Farms in the Mediterranean World. In *Encyclopedia of Global Archaeology*, edited by Claire Smith, pp. 7639-7646, Springer Reference.
2019 Fish and Seafood. *In The Routledge Handbook of Diet and Nutrition in the Roman World,* edited by Paul Erdkamp and Clare Holleran, pp. 163-173. Routledge, New York.

Marzano, Annalisa, Giulio Brizzi
2009 Costly Display or Economic Investment? A Quantitative Approach to the Study of Marine Aquaculture. *Journal of Roman Archaeology* 22:215-230.

Mattingly, David
1996 From One Colonialism to Another: Imperialism and the Maghreb. In *Roman Imperialism: Post-Colonial Perspectives*, edited by Jane Webster and N. Cooper, Leicester Archaeology Monographs No. 3, pp. 49-69, School of Archaeological Studies, University of Leicester.
2004 Being Roman: Expressing Identity in a Provincial Setting. *Journal of Roman Archaeology* 17: 5-25.
2007 *An Imperial Possession*. *Britain in the Roman Empire.* Penguin Books, London.
2011 *Imperialism, Power, and Identity. Experiencing the Roman Empire*. Princeton University Press, Princeton.

McCarthy, Mike
2013 *The Roman-British Peasant: Towards a Study of People, Landscapes and Work During the Roman Occupation of Britain*. Windgatherer Press, Oxford.

McClatchie, M., Amy Bogaard, S. Colledge, N.J. Whitehouse, R.J. Schulting, P. Barratt, T.R. McLaughlin
2014 Neolithic Farming in North-Western Europe: Archaeobotanical Evidence from Ireland. *Journal of Archaeological Science* 51:206-215.

McGowen, Stacey
2014 Western Roman Provinces, Archaeology of the. In *Encyclopedia of Global Archaeology*, edited by Claire Smith, pp. 7798-7812, Springer Reference.

Meadows, Karen
1995 You Are What You Eat: Diet, Identity, and Romanisation. In *TRAC 94: Proceedings of the Fourth Annual Theoretical Roman Archaeology Conference*, edited by S. Cottam, D. Dungworth, S. Scott, and J. Taylor, pp. 133–140. Oxbow Books, Oxford.
1999 The Appetites of Households in Early Roman Britain. In *The Archaeology of Household Activities*, edited by Penelope M. Allison, pp. 101-120. Routledge, New York.

Meeks, Elijah, Karl Grossner
2012a ORBIS: An Interactive Scholarly Work on the Roman World. *Journal of Digital Humanities* 1(3):1-3. http://journalofdigitalhumanities.org/1-3/orbis-an-interactive-scholarly-work-on-the-roman-world-by-elijah-meeks-and-karl-grossner/, accessed March 3, 2020.
2012b Modeling Networks and Scholarship with ORBIS. *Journal of Digital Humanities* 1(3):42-47. http://journalofdigitalhumanities.org/1-3/modeling-networks-and-scholarship-with-orbis-by-elijah-meeks-and-karl-grossner/, accessed March 3, 2020.

Meissner, Nathan J.
2017 A Social network Analysis of the Postclassic Lowland Maya Obsidian Projectile Industry. *Ancient Mesoamerica* 28:137-156.

Miksicek, Charles H.
1987 Formation Processes of the Archaeobotanical Record. *Advances in Archaeological Method and Theory* 10:211-247.

Miller, Holly, Ruth F. Carden, Jane Evans, Angela Lamb, Richard Madgwick, David Osborne, Robert Symmons, Naomi Sykes
2016 Dead or Alive? Investigating Long-Distance Transport of Live Fallow Deer and Their Body Parts in Antiquity. *Environmental Archaeology: The Journal of Human Palaeoecology* 21(3):246-259.

Miller, Naomi F.
1988 Ratios in Paleoethnobotanical Analysis. In *Current Paleoethnobotany: Analytical Methods and Cultural Interpretations of Archaeological Plant Remains*, edited by Christine A. Hastorf and Virginia S. Popper, pp. 72-85. The University of Chicago Press, Chicago.

Millett, Martin
1990 *The Romanization of Britain: An Essay in Archaeological Interpretation.* Cambridge University Press, Cambridge.
2005 *Roman Britain*. Revised Edition. B T Batsford, London.
2016 'By Small Things Revealed" Rural Settlement and Society. In *The Oxford Handbook of Roman Britain*, edited by Martin Millett, Louise Revell, and Alison Moore, pp. 699-719. Oxford University Press, Oxford.
2017 Discussion. Reflections on the Representational use of Artefact Evidence. In *Materialising Roman Histories*, edited by Astrid Van Oyen and Martin Pitts, pp. 65-72. Oxbow Books, Oxford.

Mills, Barbara J.
2016 Communities of Consumption: Cuisines as Constellated Networks of Situation Practice. In K*nowledge in Motion: Constellations of Learning Across Time and Place*, edited by Andrew P. Roddick and Ann B. Stahl, pp. 247-270. University of Arizona Press, Tucson.

Mills, Barbara J., John M. Roberts Jr., Jeffery J. Clark, William R Haas Jr., Deborah Huntley, Matthew A. Peeples, Lewis Borck, Susan C. Ryan, Meaghan Trowbridge, Ronald L. Breiger
2013 The Dynamics of Social Networks in the Late Prehispanic US Southwest. In *Network Analysis in Archaeology: New Approaches to Regional Interaction*, edited by Carl Knappett, pp. 181–202. Oxford University Press, Oxford.

Mills, Barbara J., Matthew A. Peeples, W. Randall Haas Jr., Lewis Brock, Jeffery J. Clark, John M. Roberts Jr.
2015 Multiscalar Perspectives on Social Networks in the Late Prehistoric Southwest. *American Antiquity* 80(1):3-24.

Moffett, Lisa
2011a The Archaeology of Medieval Plant Foods. In *Food in Medieval England: Diet and Nutrition.* edited by, C.M. Woolgar, D. Serjeantson, and T. Waldron, pp. 41-55. Oxford University Press, Oxford.

2011b Food Plants on Archaeological Sites: The Nature of the Archaeobotanical Record. In *The Oxford Handbook of Anglo-Saxon Archaeology*, edited by Helena Hamerow, David A. Hinton, and Sally Crawford, pp. 346-360.

Mol, Angus A. A.
2013 *The Connected Caribbean: a Socio-Material Network Approach to Patterns of Homogeneity and Diversity in the Pre-Colonial Period*. Sidestone Press, Leiden.

\Monnier, Gilliane F.
2006 The Lower/Middle Paleolithic Periodization in Western Europe: An Evaluation. *Current Anthropology* 47(5):709-744.

Morell-Hart, Shanti
2019 Techniques for Integrating Macrobotanical and Microbotanical Datasets: Examples from Pre-Hispanic Northwestern Honduras. *Journal of Field Archaeology* 44(4):234-249.

Morley, Neville
2016 Globalisation and the Roman Economy. In *Globalisation and the Roman World: World History, Connectivity, and Material Culture,* edited by Martin Pitts, and Miguel John Versluys, pp. 49-68. Cambridge University Press, Cambridge.

Morrison, Kathleen D.
2012 Great Transformations. On the Archaeology of Cooking. In *The Menial Art of Cooking: Archaeological Studies of Cooking and Food Preparation*, edited by Sarah R. Graff and Enrique Rodríguez-Alegría pp. 231-244. University Press of Colorado, Boulder.

Mosby, Ian, Catherine Carstairs
2015 Foodscapes of Plenty and Want: Historical Perspectives on Food, Health, and the Environment in Canada. *Canadian Bulletin of Medical History* 32(2):247-251.

Motuzaite-Matuzeviciute, Giedre, Richard A. Staff, Harriet V. Hunt, Xinyi Liu, Martin K. Jones
2013 The Early Chronology of Broomcorn Millet (*Panicum miliaceum*) in Europe. *Antiquity* 87:1073–1085.

Murphy, Charlene
2014 Mineralization of Macrobotanical Remains. In *Encyclopedia of Global Archaeology*, edited by Claire Smith, pp. 4948-4952, Springer Reference.
2016 Finding Millet in the Roman World. *Archaeological and Anthropological Sciences* 8:65-78.

Murphy, Charlene, Gill Thompson, Dorian Q. Fuller
2013 Roman Food Refuse: Urban Archaeobotany in Pompeii, Regio VI, Insula 1. *Vegetation History and Archaeobotany* 23:409-419.

Murphy, Peter, Umberto Albarella, Mark Germany, Alison Locker
2000 Production, Imports and Status: Biological Remains from a Late Roman Farm at Great Holts Farm, Boreham, Essex, UK. *Environmental Archaeology* 5(1):35-48.

Mutke, Sven, Rafael Calama, Santiago C. Gonzâlez-Martínez, Gregorio Montero, F. Javier Gordo, David Bono, Luis Gil
2012 Mediterranean Stone Pine: Botany and Horticulture. *Horticultural Reviews* 39(1):153-201.

Nash, Colin
2010 *The History of Aquaculture*. Wiley-Blackwell, Ames.

Nesbitt, Mark
2015 Cereals. In *Archaeology of Food: An Encyclopedia*, Volume 1: A-K, edited by Karen Bescherer Metheny and Mary C. Beaudry, pp. 94-97. Rowman & Littlefield, London.

Nesbitt, Mark, G. D. Summers
1988 Some Recent Discoveries of Millet (*Panicum miliaceum* L. and *Setaria italica* (L.) P. Beauv) at Excavations in Turkey and Iran. *Anatolian Studies* 38:85-97.

O'Brien, Michael J., R. Lee Lyman, Michael Brian Schiffer
2005 *Archaeology as a Process: Processualism and Its Progeny*. The University of Utah Press, Salt Lake City.

O'Connor, Terry
2010 Introduction – The British Fauna in a Changing World. In *Extinctions and Invasions: A Social History of British Fauna*, edited by Naomi Sykes and Terry O'Connor, pp. 1-10. Windgather Press, Oxford.

Olsen, Bjørnar
2010 *In Defense of Things: Archaeology and the Ontology of Objects.* Rowman Altamira, Plymouth.

Olstein, Diego
2015 *Thinking History Globally*. Palgrave/Macmillan, London.

Orengo, Hector, Alexandra Livarda
2016 The Seeds of Commerce: A Network Analysis-Based Approach to the Romano-British Transport System. *Journal of Archaeological Science* 66:21-35.

Orton, David C., James Morris, Alison Locker, James H. Barrett.
2014 Fish for the City: Meta-Analysis of Archaeological Cod Remains and the Growth of London's Northern Trade. *Antiquity* 88:516-530.

Östborn, Per, Henrik Gerding
2014 Network Analysis of Archaeological Data: A Systematic Approach. *Journal of Archaeological Science* 46:75-88.

Palmié, Stephan
2006 Creolization and its Discontents. *Annual Review of Anthropology* 35:433-456.

Papadopoulos, John K.
1999 Archaeology, Myth-History and the Tyranny of the Text: Chalkidike, Torone and Thucydides. *Oxford Journal of Archaeology* 18(4):377-394.

Parker, A. J.
1988 The Birds of Roman Britain. *Oxford Journal of Archaeology* 7(2):197-226.

Pearsall, Deborah M.
2019 Case Studies in Paleoethnobotany. Understanding Ancient Lifeways Through the Study of Phytoliths, Starch, Macroremains, and Pollen. Routledge, New York.

Peeples, Matthew A.
2019 Finding a Place for Networks in Archaeology. *Journal of Archaeological Research* 27:451-499.

Pereira-Lorenzo, S., J. Fernandez-Lopez
1997 Propagation of Chestnut Cultivators by Grafting: Methods, Rootstocks and Plant Quality. *Journal of Horticultural Science* 72(5):731-739.

Peres, Tanya M.
2014 Methodological Issues in Zooarchaeology. In *Integrating Zooarchaeology and Paleoethnobotany. A Consideration of Issues, Methods, and Cases*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 15-36. Springer, New York.

Pezzarossi, Guido
2020 “Beyond” the Grid of Labor Control: Salvaged, Persisting, and Leaky Assemblages in Colonial Guatemala. *International Journal of Historical Archaeology* 1:30.

Phibbs, John L.
1991 The Archaeology of Parks — The Wider Perspective. In *Garden Archaeology: Papers Presented to a Conference at Knuston Hall, Northamptonshire, April 1988*, edited by A.E. Brown, pp. 118-122. Council for British Archaeology, Dorchester.

Philip, Brian
1973 *Excavations in West Kent 1960-1970: The Discovery and Excavation of Prehistoric, Roman, Saxon and Medieval Sites, Mainly in the Bromley area and in the Darent Valley.* Kent Archaeological Rescue Unit, Dover.

Pierre-Emmanuel, Paris
2018 Sussiones vs Atrebates: A Social Zooarchaeological Approach of Late Iron Age Animal Exploitation in Northern France and Southern Britain. *Journal of Archaeological Science: Reports* 20:896-909.

Pitts, Martin

2007 The Emperor's New Clothes? The Utility of Identity in Roman Archaeology. *American Journal of Archaeology* 111(4):693-713.

2008 Globalizing the Local in Roman Britain: An Anthropological Approach to Social Change. *Journal of Anthropological Archaeology* 27:493-506.

2017 Gallo-Belgic Wares. Objects in Motion in the Early Roman Northwest. In *Materializing Roman Histories,* edited by Astrid Van Oyen and Martin Pitts, pp. 47-64. Oxbow Books, Oxford.

Pitts, Martin, Miguel John Versluys

2015 Globalisation and the Roman World: Perspectives and Opportunities. In *Globalisation and the Roman World: World History, Connectivity, and Material Culture,* edited by Martin Pitts, and Miguel John Versluys, pp. 3-31. Cambridge University Press, Cambridge.

Pollock, Nacy J.

2017 Diversification of Foods and their Values: Pacific Foodscapes. In *Tides of Innovation in Oceania: Value, Materiality, and Place,* edited by Elisabetta Gnecchi-Ruscone and Anna Paini, pp.261-294. Australian National University Press, Acton.

Poole, Kristopher

2010 Bird Introductions. In *Extinctions and Invasion: A Social History of British Fauna*, edited by Terry O'Connor and Naomi Sykes, pp. 156-165. Windgather Press, Oxford.

Popova, Tzvetana, Elena Marinova

2000 Archaeobotanical and Anthracological Analysis of the Roman and Early Byzantine Castle Abritus in North-Eastern Bulgaria: Some Palaeoethnobotanical and Environmental Aspects. *Aarchaeologia Bulgarica* 4(2):49-58.

QGIS Development Team

2020 QGIS Geographic Information System. Open Source Geospatial Foundation Project. http://qgis.osgeo.org, accessed February 3, 2020.

Redfern, Rebecca C., Sharon N. DeWitte

2011 A New Approach to the Study of Romanization in Britain: A Regional Perspective of Cultural Change in Late Iron Age and Roman Dorset Using the Siler and Gompertz-Makeham Models of Morality. *American Journal of Physical Anthropology* 144(2): 269- 285.

Reifschneider, Meredith

2018 Enslavement and Institutionalized Care: The Politics of Health in Nineteenth-Century St Croix, Danish West Indies. *World Archaeology* :1-18.

Revell, Louise
2010 Romanization: A Feminist Critique. In *TRAC 2009: Proceedings of the Nineteenth Annual Theoretical Roman Archaeology Conference, Michigan and Southampton 2009*, edited by A. Moore, G. Taylor, E. Harris, P. Girdwood, L. Shipley, pp. 1-10. Oxbow Books, Oxford.

Rickman, G. E.
1980 The Grain Trade Under the Roman Empire. *Memoirs of the American Academy in Rome* 36:261-275.

Riehl, Simone
2011 Climate and Agricultural Decision-Making: Environmental Constraints and Economic Development in Near Eastern Sites Between 5000-3500 cal BP. In *Between Sand and Sea: Archaeology and Human Ecology in Southwestern Asia. International Symposium in Honor of Hans-Peter Uerpamnn*, edited by Nicholas J. Conard, Philipp Drechsler, and Arturo Morales, pp. 147-166. Kerns Verlag, Tübingen.

Rippon, Stephen, Chris Smart, Ben Pears
2015 The Fields of Britannia. Continuity and Change in the Late Roman and Early Medieval Landscape. Oxford University Press, Oxford.

Rizzetto, Mauro, Pam J. Crabtree, Umberto Albarella
2017 Livestock Changes at the Beginning and End of the Roman Period in Britain: Issues of Acculturation, Adaptation, and 'Improvement'. *European Journal of Archaeology* 20(3):535-556.

Robb, John
2010 Beyond Agency. *World Archaeology* 42(4):493-520.

Robinson, W.S.
1951 A Method for Chronologically Ordering Archaeological Deposits. *American Antiquity* 16(4):293-301.

Roding, Christopher B.
2019 Social Networks and the Archaeology of the Native American South. *Proceedings of the National Academy of Sciences* 116(14):6519-6521.

Rossenberg, Ericus Anthonius van
2012 Cultural Landscapes, Social Networks and Historical Trajectories: A Data-Rich Synthesis of Early Bronze Age networks (c. 2200-1700 BC) in Abruzzo and Lazio (Central Italy). PhD Dissertation. Faculty of Archaeology, University of Leiden, Leiden.

Rowan, Erica
2017 Bioarchaeological Preservation and Non-Elite Diet in the Bay of Naples: An Analysis of the Food Remains from the Cardo V Sewer at the Roman of Herculaneum. *The Journal of Human Palaeocology* 22(3):318-336.

2019 Same Taste, Different Place: Looking at the Consciousness of Food Origins in the Roman World. *Theoretical Roman Archaeology Journal* 2(1):1-18.

Rowley-Conway, Peter, Umberto Albarella, Keith Dobney
2012 Distinguishing Wild Boar from Domestic Pigs in Prehistory: A review of Approaches and Recent Results. *Journal of World Prehistory* 25(1):1-44.

Ruddiman, William F.
2010 Bridging a Disciplinary Gap. In *Climates, Landscape, and Civilization*, edited by Liviu Giosan, Dorian Q. Fuller, Kathleen Nicole, Rown K. Flad, Peter D. Clift, pp. 1-10. American Geophysical Union, Washington.

Russell, Nerissa
2012 *Social Zooarchaeology: Humans and Animals in Prehistory*. Cambridge University Press, Cambridge.

Salmon, Merrilee
1978 What Can Systems Theory Do for Archaeology?. *American Antiquity* 43(2):174-183.

Sargent, Andrew
2002 The North-South Divide Revisited: Thoughts on the Character of Roman Britain. *Britannia* 33:219-226.

Sauer, Eberhard
2002 The Roman Invasion of Britain (AD 43) in Imperial Perspective: A Response to Frere and Fulford. *Oxford Journal of Archaeology* 21(4):333-363.

Scarry, C. Margaret, John F. Scarry
2005 Native American "Garden Agriculture' In Southeastern North America. *World Archaeology* 37(2):259-274.

Scheidel, Walter
2014 The Shape of the Roman World: Modelling Imperial Connectivity. *Journal of Roman Archaeology* 27:7-32.

Scullard, H.H.
1997 *Roman Britain. Outpost of the Empire.* Thames and Hudson, London.

Seidl, Roman
2013 SHPExporter. GitHub Forum Post. https://github.com/romanseidl/SHPExporter, accessed November 4, 2019.

Seetah, Krish
2005 Butchery as a Tool for Understanding the Changing Views of Animals: Cattle in Roman Britain. *BAR International Series* 1410:1-8.

Seland, Eivind Heldaas
2016 The Periplus of the Erythraean Sea: A Network Approach. *Asian Review of World History* 4(2):191-205.

Serjeantson, D., J. Morris
2011 Ravens and Crows in Iron Age and Roman Britain. *Oxford Journal of Archaeology* 30(1):85-107.

Shrubb, Michael
2013 *Feasting, Fowling and Feathers: A History of the Exploitation of Wild Birds.* T & DA Poyser, London.

Shuchat, Alan
1984 Matrix and Network Models in Archaeology. *Mathematics Magazine* 57(1):3-14.

Silliman, Stephen W.
2016 Disentangling the Archaeology of Colonialism and Indignity. In *Archaeology of Entanglement*, edited by Lindsey Der and Francesca Fernandini, pp. 31-49. Routledge, New York.

Sindæk, Søren Michael
2007 The Small World of the Vikings: Networks in Early Medieval Communication and Exchange. *Norwegian Archaeological Review* 40(1):59-74.
2013 Broken Links and Black Boxes: Material Affiliations and Contextual Network Synthesis in the Viking world. In *Network Analysis in Archaeology: New Approaches to Regional Interaction*, edited by Carl Knappett, pp. 71–94. Oxford University Press, Oxford.

Sloth, Pernille Rohde, Ulla Lund Hansen, Sabine Karg
2012 Viking Age Garden Plants from Southern Scandinavia – Diversity, Taphonomy and Cultural Aspects. *Danish Journal of Archaeology* 1(1):27-38.

Smith, Alexia, Natalie D. Munro
2009 A Holistic Approach to Examining Ancient Agriculture. *Current Anthropology* 50(6):925-936.

Snyder, Christopher A.
2003 *The Britons*. Blackwell Publishing, Malden.

Spencer, Diana
2010 *Roman Landscape: Culture and Identity*. Greece & Roman New Surveys in the Classics No. 39. Cambridge University Press, Cambridge.

Steele, Teresa E.
2015 The Contributions of Animal Bones from Archaeological Sites: The Past and Future of Zooarchaeology. *Journal of Archaeological Science* 56:168-176.

Stek, Tesse D.
2014 Roman Imperialism, Globalization and Romanization in Early Roman Italy. Research Questions in Archaeology and Ancient History. *Archaeological Dialogues* 21(1):30-40.

Stevens, Chris
2003 An Investigation of Agricultural Consumption and Production Models for Prehistoric and Roman Britain. *Environmental Archaeology: The Journal of Human Palaeoecology* 8(1):61-76.

Stevens, Edward, Martin Millett
2015 Camulodunum. In *Oxford Classical Dictionary,* 4th edition, edited by Simon Hornblower, Antony Spawforth, and Esther Eidinow. Oxford University Press, Oxford. https://www.oxfordreference.com/view/10.1093/acref/9780199545568.001.0001/acref-9780199545568-e-1331, accessed March 4, 2020.

Stickney, Robert R., Granvil D. Treece
2012 History of Aquaculture. In *Aquaculture Production Systems*, edited by James H. Tidwell, pp. 15-50. Wiley-Blackwell, Ames.

Stockhammer, Philipp W.
2012 Conceptualizing Cultural Hybridization in Archaeology. *Conceptualizing Cultural Hybridization*: *A Transdisciplinary Approach*, edited by Philipp Wolfgang Stockhammer, pp. 43-58. Springer, Berlin.
2016 Past Food for Thought: The Potential of Archaeology. *Gastronomica: The Journal of Critical Food Studies* 16(3):91-101.

Stockhammer, Philipp W., Bogdan Athanassov, Maria Ivanova
2018 Introduction: Social Dimensions of Food. In *Social Dimensions of Food in the Prehistoric Balkans,* edited by Mariya Ivanova, Bogdan Athanassov, Vanya Petrova, Desislava Takorova and Philipp W. Stockhammer, pp. VII-XVII. Oxbow Books, Oxford.

Story, Mary, Karen M. Kaphingst, Ramona Robinson-O'Brien, Karen Glanz
2008 Creating Healthy Food and Eating Environments: Policy and Environmental Approaches. *Annual Review Public Health* 29:253-272.

Sunseri, Charolle K.
2015 Food Politics of Alliance in a California Frontier Chinatown. *Journal of Historical Archaeology* 19:416-431.

Svyatko, Svetlana V., Andrey V. Polyakov, Vasilii I. Soenov, Nadezhda F. Stepanova, Paula J. Reimer, Neil Ogle, Ekaterina A. Tyurina, Sergi P. Grushin, Marina P. Rykun.
2017 Stable Isotope Paleodietary Analysis of the Early Bronze Age Afanasyevo Culture in the Altai Mountains, Southern Siberia. *Journal of Archaeological Science Reports* 14:65-75.

Sykes, Naomi
2004 The Introduction of Fallow Deer to Britain: A Zooarchaeological Perspective. Environmental Archaeology: The Journal of Human Paleoecology 9:75-83.
2011a Woods and the Wild. In *The Oxford Handbook of Anglo-Saxon Archaeology*, edited by Helena Hamerow, David A, Hinton, and Sally Crawford, pp. 327-345. Oxford University Press, Oxford.
2011b Worldviews in Transition: The Impact of Exotic Plants and Animals on Iron Age/Romano-British Landscapes. *Landscape Archaeology and Ecology – Animals, Man and Treescapes* 9:301-321.
2012 A Social Perspective on the Introduction of Exotic Animals: The Case of the Chicken. *World Archaeology* 44(1):158-169.

Sykes, Naomi, Karis H. Baker, Ruth F. Carden, Thomas F.G. Higham, A. Rus Hoelzel, Rhiannon E. Stevens
2011 New Evidence for the Establishment and Management of the European Fallow Deer (*Dama dama dama)* in Roman Britain. *Journal of Archaeological Science* 38:156-165.

Taylor, Jeremy
2013 Encountering Romanitas: Characterising the Role of Agricultural Communities in Roman Britain. *Britannia* 44:171-190.

Terrenato, Nicola
1998 The Romanization of Italy: Global Acculturation or Cultural Bricolage?. In *TRAC 97: Proceedings of the Seventh Annual Theoretical Roman Archaeology Conference, Nottingham 1997*, pp. 20-27. Oxbow Books, Oxford.

Thomas, Richard, Sue Stallibrass
2008 For Starters: Producing and Supplying Food to the Army in the Roman North-West Provinces. In *Feeding the Roman Army: The Archaeology of Production and Supply in NW Europe*, edited by Sue Stallibrass and Richard Thomas, pp.1-17. Oxbow Books, Oxford.

Tomber, Roberta, John Dore
1998 *National Roman Fabric Reference Collection: A Handbook.* Museum of London Archaeology Service Monograph 2. Museum of London Archaeology Service, London.

Treasure, Edward R., Mike J. Church
2017 "Cant Find a Pulse?" Celtic Bean (*Vicia faba* L.) in British Prehistory. *Environmental Archaeology* 22(2):113-127.

Trigger, Bruce
1984 Archaeology at the Crossroads: What's New?. *Annual Review of Anthropology* 13(1):275-300.
2006 *A History of Archaeological Thought*. 2nd edition. Cambridge University Press, Cambridge.

Twiss, Katheryn C.
2007 We Are What We Eat. In *The Archaeology of Food and Identity*, pp. 1-15. Carbondale: Center for Archaeological Investigations, Southern Illinois University Carbondale.
2015a Food and Identity. In *Archaeology of Food: An Encyclopedia, Volume 1: A-K*, edited by Karen Bescherer Metheny and Mary C. Beaudry, pp.189-191. Rowman & Littlefield, Lanham.
2015b Methodological and Definitional Issues in the Archaeology of Food. In *Commensality: From Everyday Food to Feast,* edited by Susanne Kerner, Cynthia Chou, Morten Warmind, pp. 89-98. Bloomsbury Academic, New York.
2019 *The Archaeology of Food. Identity, Politics, and Ideology in the Prehistoric and Historic Past*. Cambridge University Press, Cambridge.

Vaisey-Genser, Marion, Diane H. Morris
2003 *Flax: The Genus Linum*. CRC Press, Boca Raton.

Valamoti, Soultana Maria, Aikaterini Moniaki, Angeliki Karathanou
2011 An Investigation of Processing and Consumption of Pulses Among Prehistoric Societies: Archaeobotanical, Experimental, and Ethnographic Evidence from Greece. *Vegetation History and Archaeobotany* 20:381-396.

VanDerwarker, Amber M.
2014 Simple Measures for Integrating Plant and Animal Remains. In *Integrating Zooarchaeology and Paleoethnobotany. A Consideration of Issues, Methods, and Cases*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 65-74. Springer, New York.

VanDerwarker, Amber M., Tanya M. Peres
2014 Introduction. In *Integrating Zooarchaeology and Paleoethnobotany. A Consideration of Issues, Methods, and Cases*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 1-14. Springer, New York.

van der Veen, Marijke
2005 Gardens and Fields: The Intensity and Scale of Food Production. *World Archaeology* 37(2):157-163.
2007 Formation Processes of Desiccated and Carbonized Plant Remains – The Identification of Routine Practice. *Journal of Archaeological Science* 34:968-990.
2008 Food as Embodied Material Culture: Diversity and Change in Plant Food Consumption in Roman Britain. *Journal of Roman Archaeology* 21:83-109.
2014 The Materiality of Plants: Plant-People Entanglements. *World Archaeology* 46(5):799-812.
2015 Vegetables. In *Archaeology of Food: An Encyclopedia. Volume 2: L-Z,* edited by Karen Bescherer Metheny and Mary C. Beaudry. pp. 528-530. London, Rowman & Littelfield.
2016 Arable Farming, Horticulture, and Food. In *The Oxford Handbook of Roman Britain*, edited by Martin Millett, Louise Revell, and Alison Moore, pp. 807-833. Oxford University Press, Oxford.

Van der Veen, Marjike, Glynis Jones
2006 A Re-Analysis of Agricultural Production and Consumption: Implications for Understanding the British Iron Age. *Vegetation History and Archaeobotany* 15(3):217-228.

van der Veen, Marijke, Jacob Morales
2015 The Roman and Islamic Spice Trade: New Archaeological Evidence. *Journal of Ethnopharmacology* 167:54-63.

van der Veen, Marijke, Alexandra Livarda, Alistair Hill
2007 The Archaeobotany of Roman Britain: Current State and Identification of Research. *Britannia* 38:181-210.
2008 New Plant Foods in Roman Britain – Dispersal and Social Access. *Environmental Archaeology* 13(1):11-36.

van Dommelen, Peter
2011 Postcolonial Archaeologies Between Discourse and Practice. *World Archaeology* 43(1):1-6.
2012 Colonialism and Migration in the Ancient Mediterranean. *Annual Review of Anthropology* 41:393-409.
2014 Fetishizing the Romans. *Archaeological Dialogues* 21(1):41-45.

Van Oyen, Astrid
2015 Deconstructing and Reassembling the Romanization Debate Through the Lens of Postcolonial Theory: From Global to Local and Back. *Terra Incognita* 6:205-226.
2016 Historicizing Material Agency: From Relations to Relational Constellations. *Journal of Archaeological Method and Theory* 23:354-378.

Van Oyen, Astrid, Martin Pitts.
2017 What Did Objects Do in the Roman World? Beyond Representation. In *Materializing Roman Histories*, edited by Astrid Van Oyen and Martin Pitts, pp. 3-20. Oxbow Books, Oxford.

Venturini, Tommaso, Mathieu Jacomy, Pablo Jensen
2019 What Do We See When We Look at Networks. An Introduction to Visual Network Analysis and Force-Directed Layouts. SSRN. Electronic Document. doi.org/10.2139/ssrn.3378438, accessed December 12, 2019.

Versluys, Miguel John
2014 Understanding Objects in Motion. An Archaeological Dialogue on Romanization. *Archaeological Dialogues* 21(1):1-20.

Vaisey-Genser, Marion, Giane H. Morris
2003 Introduction: History of the Cultivation and Uses of Flaxseed. In *Flax: The Genus Linum*, edited by Alister D. Muir and Neil D. Westcott, pp. 1-21. Taylor & Francis, Boca Raton.

VanDerwarker, Amber M., Dana N. Bardolph, Kristin M. Hoppa, Heather B. Thakar, Lana S. Martin, Allison L. Jaqua, Matthew E. Biwer, Kristina M. Gilll
2016 New World Paleoethnobotany in the New Millennium (2000–2013). *Journal of Archaeological Research* 24(2):125-177.

Vaz, Filipe Costa, María Martín-Seijo, Sérgio Carneiro, João Pedro Tereso
2015 Waterlogged Plant Remains from the Roman Healing Spa of *Aquae Flaviae* (Chaves, Portugal): Utilitarian Objects, Timber, Fruits and Seeds. *Quaternary International* 404:86-103.

von Baeyer, Edwinna
2010 The Development and History of Horticulture. In *World Environmental History*, edited by Mauro Agnoletti*.* Eolss Publishers, Oxford.

Voss, Barbara L.
2015 What's New? Rethinking Ethnogenesis in the Archaeology of Colonialism. *American Antiquity* 80(4):655-670.

Wacher, John
1997 *The Towns of Roman Britain*. Routledge, New York.

Wallach, Efraim
2019 Inference from Absence: The Case of Archaeology. *Palgrave Communications* 5(1):1-10.

Warner-Smith, Alanna L.
2020 Mapping the GIS Landscape: Introducing "Beyond (within, through) the Grid". *International Journal of Historical Archaeology* :1-13.

Webster, Jane
1996 Roman Imperialism and the 'Post Imperial Age'. In *Roman Imperialism: Post-Colonial Perspectives*, edited by Jane Webster and N. Cooper, Leicester Archaeology Monographs No. 3, pp. 1-17, School of Archaeological Studies, University of Leicester, Leicester.
2001 Creolizing the Roman Provinces. *American Journal of Archaeology* 105:209-225.

Wilkinson, P.
2008 Syndale Park Motel, London Road, Ospringe, near Faversham, Kent: Archaeological Evaluation Interim Report. SWAT Archaeology, Faversham. Archaeology Data Service, Electronic Document, DOI: 10.5284/1030483, accessed, November 2, 2019.

Williams, D.
1977 A Consideration of the Sub-Fossil Remains of 'Vitis Vinifera' L. as Evidence for Viticulture in Roman Britain. *Britannia* 8:327-334.

Winder, Jessica
2017 Oysters in Archaeology. In *Molluscs in Archaeology: Methods, Approaches and Applications*, edited by Michael J. Allen, pp. 238-258. Oxbow Books, Oxford.

Witcher, Robert E.
2013 On Rome's Ecological Contribution to British Flora and Fauna: Landscape, Legacy and Identity. *Landscape History* 34(2):5-26.
2017 The Globalized Roman World. In *Routledge Handbook of Globalization and Archaeology*, edited by T. Hodos, pp. 634-651. Routledge, Abingdon.

Witmore, Christopher L.
2008 Symmetrical Archaeology: Excerpts of a Manifesto. *World Archaeology* 39:546-562.

Woolf, Greg
1990 World-systems analysis and the Roman Empire. *Journal of Roman Archaeology* 3:44-58.
1997 Beyond Romans and Natives. *World Archaeology* 29(3):339-350.
2004 The Present State and future Scope of Roman Archaeology: A Comment. *American Journal of Archaeology* 108(3):417-428.
2014 Romanization 2.0 and Its Alternatives. *Archaeological Dialogues* 21(1):45-50.

Wright, Patti J.
2003 Preservation or Destruction of Plant Remains by Carbonization. *Journal of Archaeological Science* 30:577-583.
2014 Methodological Issues in Paleoethnobotany: A Consideration of Issues, Methods, and Cases. In *Integrating Zooarchaeology and Paleoethnobotany. A Consideration of Issues, Methods, and Cases*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 37-64. Springer, New York.
2015 Macrobotanical Remains. In *Archaeology of Food: An Encyclopedia Volume 2: L-Z,* edited by Karen Bescherer Metheny and Mary C. Beaudry, pp. 294-296. Rowman & Littlefield, Lanham.

Wyatt, Andrew R.
2015 Agricultural/Horticultural Sites. In *Archaeology of Food: An Encyclopedia, Volume 1: A-K,* edited by Karen Bescherer Metheny and Mary C. Beaudry. pp. 4-6. London, Rowman & Littelfield.

Wylie, Alison
2016 How Archaeological Evidence Bites Back: Strategies for Putting Old Data to Work in New Ways. *Science, Technology, & Human Values* 42(2):203-225.

Zohary, Daniel, Maria Hopf, Ehud Weiss
2012 *Domestication of Plants in the Old World*. 4th Edition. Oxford University Press, Oxford.

Zhang, Peng, Jinliang Wang, Xiaojia Li, Zengru Di, Ying Fan
2013 Clustering Coefficient and Community Structure of Bipartite Networks. *Physica A: Statistical Mechanics and its Applications* 387(27):6869-6875.

Appendix A. List of Collected Excavation Reports

Site Name	Site Code	Citation
Stanford Wharf Nature Reserve, Essex	E1	Biddulph, Edward, Stuart Foreman, Elizabeth Stafford, Dan Stansbie, Rebecca Nicholson 2012 London Gateway. Iron Age and Roman Salt Making in the Thames Estuary. Excavation at Stanford Wharf Nature Reserve Essex. Oxford Archaeology Monograph No. 18. Oxford.
South of Chignall Roman Villa	E2	Clarke, C.P. 1998 Excavations to the South of Chignall Roman Villa, Essex 1977-81. East Anglian Archaeology Report No. 83. Essex County Council, Chelmsford.
Little Oakley	E3	Badford, P.M., M.J. Corbishley, J. Bayley, M. Charles, L.W. Cornwall, K. Dobney, C.J. Going, B. Hartley, B. Meddens, P.R. Sealey, T. Williams. East Anglian Archaeology Report No. 98. Essex County Council, Chelmsford. 2002 Excavations at Little Oakley, Essex, 1951-78: Roman Villa and Saxon Settlement.
Hill Farm, Gestingthorpe	E4	Draper, Jo, Leo Biek, Martin Henig, W.H. Manning, H.S. Toller, R.F. Tylecote 1985 Excavations by Mr. H.P. Cooper on the Roman Site at Hill Farm, Gestingthorpe, Essex. East Anglian Archaeology Report No. 25.
Hob's Hole	E5	Biddulph, Edward, Kate Brady, Enid Allison, Sheila Boardman, Sandra Bonsall, Lisa Brown, John Cotter, Mike Donnelly, Damian Goodburn, Elizabeth Huckerby, Kath Hunter, Lynne Keys, Cynthia Poole, Lena Strid, Ian Scott, Ruth Shaffrey, Helen Webb. 2015 Excavations Along the M25: Prehistoric, Roman and Anglo-Saxon Activity Between Averley and Epping, Essex. Essex Society for Archaeology and History. Occasional Papers, New Series, No. 3, Colchester
Passingford Bridge Bund	E6	Biddulph, Edward, Kate Brady, Enid Allison, Sheila Boardman, Sandra Bonsall, Lisa Brown, John Cotter, Mike Donnelly, Damian Goodburn, Elizabeth Huckerby, Kath Hunter, Lynne Keys, Cynthia Poole, Lena Strid, Ian Scott, Ruth Shaffrey, Helen Webb. 2015 Excavations Along the M25: Prehistoric, Roman and Anglo-Saxon Activity Between Averley and Epping, Essex. Essex Society for Archaeology and History. Occasional Papers, New Series, No. 3, Colchester
Great Holts Farm, Boreham	E7	Germany, Mark 2003 Excavations at Great Holts Farm, Boreham, Essex, 1992-94. East Anglian Archaeology Report No. 105. Essex County Council, Chelmsford. Murphy, Peter, Umberto Albarella, Mark Germany, Alison Locker 2000 Production, Imports and Status: Biological Remains from a Late Roman Farm at Great Holts Farm. *Environmental Archaeology* 5:35-48.
Site B, North of Gosebecks Archaeological Park, Colchester	E8	Benfield, Stephen, Justine Bailey, Peter Berridge, Ernest Blck, Anne-Marie Bojko, Nigel Brown, Hilary Cool, Nina Crummy, John Davies, Brenda Dickinson, Val Fryer, Marlin Holst, R. W. O'B Know, G. K. Lott, Hilary Major, Peter Murphy, Val Rigdy, Paul R. Sealey. 2008 Excavations of Late Iron Age and Roman features and a Roman road north of Gosebecks Archaeological Park, Colchester, Essex 1995-1996. Colchester Archaeological Trust.

Site Name	Site Code	Citation
Site C, North of Gosebecks Archaeological Park, Colchester	E9	Benfield, Stephen, Justine Bailey, Peter Berridge, Ernest Blck, Anne-Marie Bojko, Nigel Brown, Hilary Cool, Nina Crummy, John Davies, Brenda Dickinson, Val Fryer, Marlin Holst, R. W. O'B Know, G. K. Lott, Hilary Major, Peter Murphy, Val Rigdy, Paul R. Sealey. 2008 Excavations of Late Iron Age and Roman features and a Roman road north of Gosebecks Archaeological Park, Colchester, Essex 1995-1996. Colchester Archaeological Trust.
Kelvedon, Essex	E10	Rodwell, K. A. 1988 The Prehistoric and Roman Settlement at Kelvedon, Essex. Chelmsford Archaeological Trust.
Walden Road, Great Chesterford	E11	Moan, Pat, Katie Anderson, Natasha Dodwell, Rachel Foseberry, Denis Sami, Stephen Wadeson 2018 A Roman Road and Cremation Cemetery, Walden Road, Great Chesterford, Essex. Archaeological Excavation. Oxford Archeology East.
Harlow Roman Temple	E12	France, N.E., B.M. Gobel 1985 The Romano-British Temple at Harlow, Essex. West Essex Archaeological Group. Alan Sutton Publishing, Gloucester.
Elite Burial Site, Samulodunum	E13	Crummy, Philip, Stephen Benfield, Nina Crummy, Valery Rigby, Donald Simmin 2007 Stanway: An Elite Burial Site at Camulodunum. Britannia Monograph Series No. 24. Society for the Promotion of Roman Studies, London.
Mucking	E14	Lucy, Sam, Christopher Evans, Rosemary Jefferies, Grahame Appleby, Chris Going Romano-British Settlement and Cemeteries at Mucking Excavations by Margaret and Tom Jones, 1965-1978. Oxbow Books, Oxford.
Orsett "Cock" Enclosure	E15	Carter, G.A., N. Brown, P. Cheer, J. Davies, B.R. Hartley, E. Healey, F. Jenkins. A.C. King, H. Major, M. Mowatt, P. Murphy, S. Tyler 1998 Excavations at the Orsett 'Cock' Enclosure, Essex 1976. East Anglian Archaeology Report No. 86, Essex County Council, Chelmsford.
Heybridge, Maldon	E16	Atkinson, Mark, Steve Preston 2015 Heybridge, a Late Iron Age and Roman Settlement: Excavations at Elms Farm 1993-5. Volume 1. East Anglian Archaeology Report No. 154. Essex County Council, Chelmsford. Monckton, Angela 2015 Charred plant remains. In M. Atkinson and S.J. Preston Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993-5, Internet Archaeology 40. Murphy, Peter 2015 Plant macrofossils from waterlogged contexts. In M. Atkinson and S.J. Preston Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993-5, Internet Archaeology 40. Locker, Alison 2015 The Fish Bones. In M. Atkinson and S.J. Preston Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993-5, Internet Archaeology 40. Johnstone, Cluny, Umberto Albarella 2015 The Late Iron Age and Romano-British mammal and bird bone assemblage from Elms Farm. In M. Atkinson and S.J. Preston Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993-5, Internet Archaeology 40. Winder, Jessica M. 2015 Oysters and Other Marine Shells. In M. Atkinson and S.J. Preston Heybridge: A Late Iron Age and Roman Settlement, Excavations at Elms Farm 1993-5, Internet Archaeology 40.

Site Name	Site Code	Citation
Ivy Chimneys, Witham	E17	Turner, Robin, Denise Allen, David G. Buckley, Anthony Clark, Elisabeth Crowfoot, Nina Crummy, John Davies, Brenda Dickinsn, John Evans, Miranda Green, Kay Hartley, Elizabeth Healey, Marcus Jecock, Martin Jeffries, Glenys Lloyd-Morgan, Rosmary-Margaret Luff, Donalod Mackreth, Hilary Major, Peter Murhpy, Warwick J. Rodwell, Catriona Turner-Walker, Colin Wallace, Graham Webster, John P. Wild, John Wymer 1999 Excavations of an Iron Age Settlement and Roman Religious Complex at Ivy Chimneys, Witham, Essex 1978-83 East Anglian Archaeology No.88. Essex County Council, Chelmsford.
Great Chesterford	E18	Medlycott, Maria, I.L. Baxter, H. Cool, R. Hobbs, H. Major, T.S. Martin, P. McMichael, S. Tyler, R. Tyrrell, C.R. Wallace, S. Willis 2011 The Roman Town of Great Chesterford. East Anglian Archaeology Report No. 137. Essex County Council, Chelmsford.
Dry Street, Basildon	E19	Brooks, Howard 2006 An Archaeological Evaluation at Dry Street, Basildon, Essex May-June 2006. Colchester Archaeological Trust. Colchester Archaeological Trust Online Report Library
Fenwick Colchester, Colchester High Street	E20	Wightman, Adam, Philip Crummy, Stephen Benfield, Nina Crummy, Julie Curl, Val Fryer, Lisa Grey, Martin Henig, Emma Hogarth, Richard Madgwick, Bruce Neville, Pip Parmenter, Matt Phelps, Courtney Ward 2017 An Archaeological Excavation and Watching Brief at Fenwick Colchester (Formerly Willims & Griffin), 147-151 High Street, Colchester, Essex. April-August 2014. Colchester Archaeological Trust.
Channel's Golf Club, Belstead Lane, Little Waltham	E21	Morgan, Stephen, Rachel Fosberry, Angelos Hadjikoumis, Ted Levermore, Helen Stocks-Morgan 2016 Phases 3a and 3b, Channels Golf Club, Belstead Lane Little Waltham Essex. Excavation Report. Oxford Archaeology East. Oxford Archaeology Library
Icknied Way, South of Stanley Road, Great Chesterford	E22	Moan, Pat, Chris Faine, Rachel Fosberry, Chris Howard-Davis, Alice Lyons, Rhiannon Philip, Zoë Uí Choileáin 2014 A Romanised Section of the Icknield Way, South of Stanley Road, Great Chesterford, Essex. Archaeological Evaluation and Excavation. Oxford Archaeology East. Oxford Archaeology Library.
Gilden Way, Harlow	E23	Sykes, Dan 2007 Gilden Way Harlow Essex. Archaeological Evaluation Report. Oxford Archaeology East. Oxford Archaeology Library.
Strood Hall (A120 Trunk Road Stansted Airport to Braintree)	E25	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.
Rayne Roundabout (A120 Trunk Road Stansted Airport to Braintree)	E26	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.
Parsonage Lane (A120 Trunk Road Stansted Airport to Braintree)	E27	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.
East of Little Dunmow Road (A120 Trunk Road Stansted Airport to Braintree)	E28	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.

Site Name	Site Code	Citation
Frogs Hall East (A120 Trunk Road Stansted Airport to Braintree)	E29	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.
West of Panners Roundabout (A120 Trunk Road Stansted Airport to Braintree)	E31	Anon 2003 A120 Trunk Road Stansted Airport to Braintree Essex TL 5345 2200 to 7460 2215. Post-Excavation Assessment and Publication Proposal Version 2. Highways Agency. Essex County Council. Oxford Archaeology Library.
Site 1 at Beaulieu, Chelmsford	E32	Stocks-Morgan, Helen 2016 Multi-period Remains form the Beaulieu Minerals Extraction Site (Site 1), Beaulieu, Chelmsford. Post-Excavation Assessment. Oxford Archaeology East. Oxford Archaeology Library.
Site 8 at Beaulieu, Chelmsford	E33	Stocks-Morgan, Helen 2016 Iron Age, Roman and Post-Medieval Remains at Site 8, Beaulieu Chelmsford. Archaeological Excavation. Oxford Archaeology East. Oxford Archaeology Library.
East View Close, Radwinter	E34	Moan, Pat 2016 Roman-British Settlement and Funerary Activity at East View Close, Radwinter, Essex. Post-Excavation Assessment. Oxford Archaeology East. Oxford Archaeology Library.
Coleman's Farm, Rivenhall (Transco Pipeline)	E35	Roy, Mike 2003 Transco Pipeline Coleman's Farm, Rivenhall End Essex. Archaeological Monitoring and Excavation. Essex County Council Field Archaeology Unit.
South Gate Hotel, Thremhall Avenue, Stanstead Airport	E36	House, Jonathan, Lawrence Billington, Chris Howard-Davis, Chris Faine, Rachel Fosberry 2012 Prehistoric and Roman Remains at South Gate Hotel Site, Thremhall Avenue, Stanstead Airport. Oxford Archaeology East. Oxford Archaeology Library.
Matching Green AGI	E37	Fairbairn, James, Robert Atkins, Anthony Haskins, Chris Faine, Steve Wadeson 2013 Archaeological Strip Map Record and Excavation at Matching Green AGI, Essex. Excavation Report. Oxford Archaeology East. Oxford Archaeology Library.
Weaverhead Close, Thaxted	E38	Morgan, Stephen, Rachel Fosberry, Sarah Percival 2014 Late Iron Age and Early Roman Activity at Weaverhead Close, Thaxted, Essex. Archaeological Evaluation. Oxford Archaeology East. Oxford Archaeology Library.
Thorpe Lea, Walden Road, Great Chesterford	E39	Webster, Michael, Zoe Ui Choileain, Rachel Fosberry, Anthony Haskins, Ted Levermore, Helen Stocks-Morgan, Stephen Wadeson 2016 Thorpe Lea, Walden Road, Great Chesterford, Essex. Archaeological Evaluation Report. Oxford Archaeology East. Oxford Archaeology Library.
Land at East View Close, Radwinter	E40	House, Jonathan, Chris Faine, Rachel Fosberry, Alice Lyons, Ruth Shaffrey 2013 Land at East View Close, Radwinter, Essex. Prehistoric and Roman Remains. Archaeological Evaluation. Oxford Archaeology Library.
Turner Village Hospital, Colchester	E41	Anon 2007 Turner Village Hospital, Colchester, Essex. Archaeological Evaluation and Watching Brief Report. Wessex Archaeology, London.
White Notley	E42	Bailey, G., Percival, S. 2009 Archaeological Excavation and Monitoring of the Anglian Water Pipeline from Cressing to Terling, Essex. Norwich: NAU Archaeology. NAU Archaeology Report 1648.
Birch Pit, Maldon Road, Birch	E43	Benfield, Stephen, Emma Spurgeon 2008 An Archaeological Excavation at Birch Pit, Stage 3 Western Extension, Maldon Road, Birch Colchester, Essex July-August 2007. Colchester Archaeology Trust Report 485.

Site Name	Site Code	Citation
Chigborough Farm	E44	Walli, S., M. Waughman 1998 *Archaeology and the Landscape in the Lower Blackwater valley* East Anglian Archaeology 82 East Anglian Archaeology
Slough House Farm	E45	Walli, S., M. Waughman 1998 *Archaeology and the Landscape in the Lower Blackwater valley* East Anglian Archaeology 82 East Anglian Archaeology
Blackwater Redhills (Site 11)	E46	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Blackwater Redhills (Site 12)	E47	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Blackwater Redhills (Site 13)	E48	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Blackwater Redhills (Site 20)	E49	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Blackwater Redhills (Site 29)	E50	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Blackwater Redhills (Site 32)	E51	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Abbotstone Field, Warren Lane, Stanway	E52	Pooley, Laura, Stephen Benfield 2005 Excavations at Abbotstone Field, Bell House Pit, Tarmac Colchester Quarry, Warren Lane, Stanway, Colchester, Essex 1999-2001. Colchester: Colchester Archaeological Trust. CAT Report 312.
North Shoebury Settlement	E53	Wymer, J.J., N.R. Brown 1995 North Shoebury: Settlement and economy in South-east Essex 1500BC - AD1500. East Anglian Archaeology 75. East Anglian Archaeology, Chelmsford.
Stebbing Green	E54	Bedwin, Owen, Miranda Bedwin A Roman malt house: excavations at Stebbing Green, Essex 1988 East Anglian Archaeology Occasional Paper 6. East Anglian Archaeology, Chelmsford.
Billericay, School	E55	Rudling, David R. 1990 Late Iron Age and Roman Billericay: Excavations 1987. *Essex Archaeology and History* 21:19-47.
Sampford Road, Thaxted	E56	Stansbie, D., K. Brady, E. Biddulph, A. Norton 2008 A Roman Cemetery at Sampford Road Thaxted Essex. Archaeological Publication Report. Oxford Archaeology. Oxford Archaeology Library.
Stanley Road, Great Chesterford	E57	Moan, Pat, Rachl Fosberry 2014 Roman Road at Land South of Stanley Road, Great Chesterford, Essex. Interim Report. Oxford Archaeology East. Oxford Archaeology Library.
21-31 Long Wyre Street, Colchester	E58	Brooks, Howard, Stephen Benfield, Joanna Bird, Anne-Marie Bojko, H.E.M. Cool, Nina Crummy, John Davies, Brenda Dickinson, Val Fryer, Lynne Keays, Paul R. Sealey. Susan Tyler, Alex Wade, Helen Walker 2001 Excavations at 21-31 Long Wyre Street, Colchester, Essex, in 1998. *Journal of the Colchester Archaeological Trust* 1:26-103.
Colchester Holiday Park, Cymbeline Way	E59	Pooley, Laura, Stephen Benfield, Lisa Gray 2016 Archaeological Evaluation at the Colchester Holiday Park, Cymbeline Way, Colchester, Essex, CO3 4AG. Colchester Archaeological Trust Report 1024.

Site Name	Site Code	Citation
Thames Site 1: Leigh Beck (Castle Point District)	E60	Wilkinson, T.J., P.L. Murphy 1995 *Archaeology of the Essex Coast vol. 1. The Hullbridge Survey.* East Anglian Archaeology 71. East Anglian Archaeology, Chelmsford.
Stansted Framework Project	E61	Anon 2009 The Stansted Framework Project [data-set]. Framework Archaeology. York: Archaeology Data Service. https://doi.org/10.5284/1000029
Anglian Water Pipeline from Cressing to Terling	E62	Percival, Sarah, Glenn Bailey 2009 Archaeological Excavation and Monitoring of the Anglian Water Pipeline from Cressing to Terling, Essex. NAU Archaeology, Report 1648. NPS Group, Norwich.
Chelmsford, mansio	E63	Drury, P. J. 1988 The Mansio and other sites in the south-eastern sector of Caesaromagus CBA Research Report 66 London: Council for British Archaeology. https://doi.org/10.5284/1000332.
Haverhill Business Park, Sturmer	E64	Gardner, Rhodri 2004 Haverhill Business Park, Sturmer, Essex STBHB 03. A Post Excavation Assessment of the Archaeological Excavation 2003. Suffolk County Council Archaeological Service
Great Dunmow	E65	Wickenden, N.P. 1988 Excavations at Great Dunmow, Essex: a Romano-British Small Town in the Trinovantian Civitas. East Anglian Archaeology Report No. 41. Chelmsford Archaeological Trust Report No. 7. Chlemsford.
Duck Street, Wendens Ambo	E66	Ennis, T. 2006 Duck Street, Wendens Ambo, Archaeological Evaluation. Braintree: Essex County Council Field Archaeology Unit. Project number 1595. Chelmsford.
Woodlands Park	E67	Barker, Ben 2003 Woodlands Park, Phases 3 and 4 Great Dunmow, Essex. Archaeological Evaluation by trial trenching and open area excavation. Braintree: Essex County Council Field Archaeology Unit.
Elsenham Quarry, Elsenham	E68	Jones, Christopher, Jim Brown 2011 Archaeological Evaluation on Land for the Extension of Elsenham Quarry, Elsenham, Essex April - May 2011. SAFWM: 2011.20. Northamptonshire Archaeology, Northampton.
Stifford Clays, Thurrock	E69	Wilkinson, T.J. 1988 Archaeology and Environment in South Essex. East Anglian Archaeology 42. East Anglian Archaeology, Chelmsford.
Iceni House, Ickleton Road	E70	Crossan, Carl, Martyn Smoothy, Colin Wallace 1990 Salvage Recording of Iron Age and Roman Remains at Ickleton Road, Great Chesterford. *Essex Archaeology and History* 21:11-18.
St. Peter's School, Coggeshall	E71	Clarke, C.P. 1989 Roman Coggeshall. *Essex Archaeology and History* 19:47-90.
East Street Site, Coggeshall	E72	Clarke, C.P. 1989 Roman Coggeshall. *Essex Archaeology and History* 19:47-90.
Rayne	E73	Smoothy, M.D. 1989 A Roman rural site at Rayne, Essex; Excavations 1987. *Essex Archaeology and History* 20:1-29.
Bulls Lodge Farm, Boreham	E74	Lavende, N.J. 1993 A '*Principia*' at Boreham: Excavations 1990. *Essex Archaeology and History* 24:1-21.
Braintree (84-90)	E75	Harvis, R. 1993 A '*Principia*' at Boreham: Excavations 1990. *Essex Archaeology and History* 24:22-68.

Site Name	Site Code	Citation
29-39 Head Street, Colchester	E76	Brooks, Howard, Joanna Bird, HEM Cool, Nina Crummy, Julie Curl, P de Jersey, Brenda Dickson, David Dungworth, Val Fryer, Martin Henig, R. Hobbs, R.F. Kenyon, Alison Locker, Hazel Martingell, Jane Timby, P.J. Wise 2004 Archaeological Excavation at 29-39 Head Street, Colchester, Essex May-September 2000. Colchester Archaeological Trust, Colchester.
Culver Street, Colchester	E77	Gascoyne, Adrian, David Radford 2013 *Colchester: Fortress of the War God: An Archaeological Assessment*. Oxbow Books, Oxford. Murphy, P. 1985 Culver Street Under the Microscope. *News of Archaeological Excavations in Colchester* 18:3-4. Luff, Rosemary 1981 Colchester Archaeological Report 12: Animal Bones from Excavations in Colchester, 197185. Colchester Archaeological Reports, Colchester.
Lion Walk (1971-74)	E78	Crummy, Philip Colchester Archaeological Report 3: Excavations at Lion Walk, Balkerne Lane, and Middleborough, Colchester, Essex. Colchester Archaeological Trust, Colchester. "Luff, Rosemary 1981 Colchester Archaeological Report 12: Animal Bones from Excavations in Colchester, 197185. Colchester Archaeological Reports, Colchester.
Balkerne Lane (1973-76)	E79	Crummy, Philip Colchester Archaeological Report 3: Excavations at Lion Walk, Balkerne Lane, and Middleborough, Colchester, Essex. Colchester Archaeological Trust, Colchester. Luff, Rosemary 1981 Colchester Archaeological Report 12: Animal Bones from Excavations in Colchester, 197185. Colchester Archaeological Reports, Colchester.
The Gilbert School	E80	Luff, Rosemary 1981 Colchester Archaeological Report 12: Animal Bones from Excavations in Colchester, 197185. Colchester Archaeological Reports, Colchester.
Middleborough	E81	Luff, Rosemary 1981 Colchester Archaeological Report 12: Animal Bones from Excavations in Colchester, 197185. Colchester Archaeological Reports, Colchester.
Nazeingbury	E82	Huggins, P.H. 1978 Excavation of Belgic and Romano-British Farm and Middle Saxon Cemetery and Churches at Nazeingbury, Essex, 1975-6. *Essex Archaeology and History* 10:29-117.
Maltings Lane, Witham	E83	Robertson, A., E. Davis 2004 Maltings Lane, Witham, Essex, Archaeological Excavation. Essex County Council, Field Archaeology Unit, Braintree.
Ospringe (a), Syndale Park Motel	K1	Harding, Phil 2003 Syndale Park, Ospringe, Kent: evaluation (Time Team). Salisbury: Wessex Archaeology. Wilkinson, P. 2008 Syndale Park Motel, London Road, Ospringe, near Faversham, Kent: Archaeological Evaluation interim report. Faversham: SWAT Archaeology.
Nonington	K2	Helm, Richard, Wendy Carruthers 2011 Early Roman Evidence for Intensive Cultivation and Malting of Spelt Wheat at Nonington. *Archaeologia Cantiana* 131:353-372.
Kingsborough Farm, Eastchurch	K3	Stevens, Simon 2009 An Archaeological Investigation at Kingsborough Farm and Kingsborough Manor, Eastchurch, Isle of Sheppy. *Archaeologia Cantiana* 129:129-154.

Site Name	Site Code	Citation
Land at Old Park	K4	Anon 2008 Land at Old Park, Phase III, Whitfield, Dover, Kent. Summary of Results and Assessment of Potential for Analysis and Publication. Wessex Archaeology.
Puma Power Plant, Ash	K5	Watson, Bruce, Ian Betts, Jackie Kelly, Charlotte Thompson, Alan Pipe, Lucy Whittingham 2009 Archaeological Investigations at the Puma Power Plant, Ash, Kent. Museum of London Archaeology. Rural Roman Settlement Database.
Market Way, St. Stephen's, Canterbury	K6	Helm, Richard, Jon Rady, Luke Barder, Lynne Bevan, Chris Butler, Lisa Cooper, Brian Gilmour, Susan Jones, Louise Loe, Malcolm Lyne, Barbara McNee, Ruth Pelling, Susan Pringle, Andrew Savage, Andrew Richardson, Roger Tomlin, Helen Webb 2010 Excavations at Market Way, St. Stephen's Canterbury.
Saltwood Tunnel	K7	Mckinley, J, I. Riddler, M. Trevarthen 2006 The prehistoric, Roman and Anglo-Saxon funerary landscape at Saltwood Tunnel, Kent. Oxford Wessex Archaeology Joint Venture.
Bramble Lane, Wye	K8	Meaton, Clive 2009 Archaeological Investigations at the Former Oil Depot Site, Bramble Lane, Wye, Ashford, Kent Post-Excavation Assessment and Project Design for Publication. Archaeology South East Unpublished Report Series, Report No. 2008148. Archaeology South East. ASE Project No. 2558.
Oakleigh Farm, Higham	K9	Catherall, P.D., R. J. Rollard, R. C. Turner, M.A. Monk 1983 A Romano-British Pottery Manufacturing Site at Oakleigh Farm, Higham, Kent.
Castle Road, Sittingbourne	K10	Hutchings, P. 2002 Archaeological watching brief (and excavation) at Plot LII, Eurolink Phase 3, Castle Road, Sittinghourne, Kent. Canterbury Archaeological Trust.
Bredgar, Sittingbourne	K11	Boden, Damien C. 2006 A Late Iron-Age/Early Roman Site at Bredgar, near Sittingbourne. *Archaeologia Cantiana* 106:345-374.
Home Farm, Holborough	K12	Anon 1998 Land at Holborough near Rochester, Kent. Second Stage Field Evaluation: Trial Trenching. Wessex Archaeology.
Churchfields, Snodland	K13	Dawkes, Giles, Lucy Allott, Luke Barber, Anna Dohery, Gemma Driver, Sue Pringle, Sarah Porteus, Chris Butler, Elke Raemen, Lucy Sibun, Dan Swift 2009 A Post-Excavation Assessment Report and Updated project Design on Archaeological Excavations at High St, Snodland, Kent. Archaeology South-East.
Medway estuary, Kingsnorth	K14	Howell, Isca, Michael Henderson, Graham Spurr 2011 Excavations of Prehistoric Roman and Saxon Remains by the Medway Estuary at Kingsnorth. Museum of London Archaeology, Excavation Report. (Online) Kent Archaeological Society
Tothill Street, Minster in Thanet	K15	Cotton, J., I. Betts, M. Henderson, N. Macpherson-Grant, M. Marshall, G. Monteil, J. Morris, A. Pipe, K. Stewart, A. Thorp 2011 Prehistoric and Roman Settlement at Tothill Street Minster in Thanet, Kent. Museum of London Archaeology. Kent Archaeological Society.
Farningham to Hadlow Gas Pipeline East of Ightham Court	K16	Powell, Andrew B., Phil Andrews, Catherine Barnett, Kayt Marter Brown, Nicholas Cooke, Jessica M. Grimm, Phil Harding, Jacqueline I. MicKinley, Lorraine Mepham, Chris J. Stevens, Rob Goller, S.E. James 2015 Archaeological Discoveries along the Farningham to Hadlow Gas Pipeline, Kent. Wessex Archaeology. Kent Archaeological Society.
Farningham to Hadlow Gas Pipeline New Ash Green	K17	Powell, Andrew B., Phil Andrews, Catherine Barnett, Kayt Marter Brown, Nicholas Cooke, Jessica M. Grimm, Phil Harding, Jacqueline I. MicKinley, Lorraine Mepham, Chris J. Stevens, Rob Goller, S.E. James 2015 Archaeological Discoveries along the Farningham to Hadlow Gas Pipeline, Kent. Wessex Archaeology. Kent Archaeological Society.

Site Name	Site Code	Citation
Farningham to Hadlow Gas Pipeline Fairlawne Park, Plaxtol	K18	Powell, Andrew B., Phil Andrews, Catherine Barnett, Kayt Marter Brown, Nicholas Cooke, Jessica M. Grimm, Phil Harding, Jacqueline I. McKinley, Lorraine Mepham, Chris J. Stevens, Rob Goller, S.E. James 2015 Archaeological Discoveries along the Farningham to Hadlow Gas Pipeline, Kent. Wessex Archaeology. Kent Archaeological Society.
Leybourne Grange, West Malling	K19	Biddulph, Edward, K. L. Hunter, Lynne Keys, David Mullin, Ian R Scott, Ruth Shaffrey, Lena Strid 2017 A late Iron Age and Roman Settlement at Leybourne Grange, West Malling, Kent. Oxford Archaeology South. Kent Archaeological Society.
Wingfield Bank, Northfleet	K20	Wheaton, Kate, Alan Hardy, Andrew Norton 2008 Excavations of Bronze Age, Roman and Medieval Settlement on Land at Wingfield Bank, Northfleet, Kent 2008. Kent Archaeological Reports Online.
Beechbrook Wood, Westwell / Hothfield	K21	Brady, Kate, Alistair Barclay, Andrew Fitzpatrick 2006 The Prehistoric and Roman Landscape at Beechbrook Wood, Westwell, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service.
Bower Road, Smeeth	K22	Diez, Valérie, Paul Booth 2006 The Roman Settlement at Bower Road, Smeeth, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service
Northumberland Bottom, Southfleet	K23	Askew, Portia, Paul Booth 2006 The Prehisotric, Roman and Medieval Landscape at Northumberland Botton, Gravesend, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service.
Pepper Hill,	K24	Biddulph, Edward, Paul Booth 2006 The Roman Cemetery at Pepper Hill, Southfleet, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service.
Downlands, Walmer	K25	Jarman, Crispin, Robin Bendrey, Lynne Bevan, Barbara McNee, Ruth Pelling, Andrew Savage 2010 Excavations at Downlands, Walmer, Kent. Canterbury Archaeological Trust Occasional Paper No. 7. Canterbury.
Sandwich Villa	K26	Parfitt, K. 1999 Report on a Watching Brief Near Sandwich Roman villa. Dover Archaeological Group, Dover.
Little Stock Farm, Mersham	K27	Ritchie, Kevin, Andrew Fitzpatrick 2006 The Prehistoric Settlement at Little Stock Farm, Mersham, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service
Thurnham Roman Villa	K28	Anon 1997 Thurnham Roman Villa and Land South of Corbier Hall, Thurnham, Kent, ARC THM 96. Oxford Archaeology, Oxford.
Springhead Roman Town, Southfleet	K29	Boyle, Angela, Robert Early 1999 Excavations at Springhead Roman Town, Southfleet, Kent. Oxford Archaeological Unit.
Westhawk Farm, Ashford	K30	Booth, Paul, Anne-Marie Bingham, Steve Lawrence, 2008 The Roman Roadside Settlement at Westhawk Farm, Ashford, Kent: Excavations 1998-1999. Oxford Archaeology. Oxford Archaeology Monograph, edited by Edward Biddulph and Ian Scott. Oxford.
A2/A282/M5 Improvement Scheme, Dartford District	K31	Andrew, Simmonds, Francis Wenban-Smith, Martin Bates, Kelly Powell, Dan Sykers, Rebecca Devaney, Daniel Stansbie, David Score 2011 Excavations in North-West Kent, 2005-2007. One Hundred Thousand Years of Human Activity in and Around the Darent Valley. Oxford Archaeology Monograph No. 11.

Site Name	Site Code	Citation
Roman Villa Site at Keston	K32	Philip, Brian, Keith Parfitt, John Willson, Wendy Williams 1999 The Roman Villa Site at Keston, Kent. Second Report (Excavations 1967 and 1978-1990). Eighth Research Report in the Kent Monograph Series. The Kent Archaeological Rescue Unit.
Swanscombe	K33	Mackinder, Anthony, Jon Giorgi, Richenda Goddin, Lynne Keys, Louise Rayner, Kevin Reilly, Terence Paul Smith, Angela Wardle 2010 A Romano-British Site at Swanscombe, Kent. Museum of London Archaeology. The Kent Archaeological Society.
Northfleet Roman Villa	K34	Andrews, Phil, Edward Biddulph, Alan Hardy, Richard Brown 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 1: The Sites. Oxford Wessex Archaeology, Oxford. Biddulph, Edward, Rachael Seager Smith, Jorn Schuster 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 2: Late Iron Age to Roman Finds Reports. Oxford Wessex Archaeology, Oxford. Barnett, Catherine, Jacqueline I Mickinley, Elizabeth Stafford, Jessica M. Grimm, Chris J. Stevens 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 3: Late Iron Age to Roman Human Remains and Environmental Reports. Oxford Wessex Archaeology, Oxford. Andrews, Phil, Lorraine Mepham, Jorn Schuster, Chris J. Stevens
Springhead Roadside Settlement	K35	Andrews, Phil, Edward Biddulph, Alan Hardy, Richard Brown 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 1: The Sites. Oxford Wessex Archaeology, Oxford. Biddulph, Edward, Rachael Seager Smith, Jorn Schuster 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 2: Late Iron Age to Roman Finds Reports. Oxford Wessex Archaeology, Oxford. Barnett, Catherine, Jacqueline I Mickinley, Elizabeth Stafford, Jessica M. Grimm, Chris J. Stevens 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 3: Late Iron Age to Roman Human Remains and Environmental Reports. Oxford Wessex Archaeology, Oxford.

Site Name	Site Code	Citation
Springhead Sanctuary	K36	Andrews, Phil, Edward Biddulph, Alan Hardy, Richard Brown 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 1: The Sites. Oxford Wessex Archaeology, Oxford. Biddulph, Edward, Rachael Seager Smith, Jorn Schuster 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 2: Late Iron Age to Roman Finds Reports. Oxford Wessex Archaeology, Oxford. Barnett, Catherine, Jacqueline I Mickinley, Elizabeth Stafford, Jessica M. Grimm, Chris J. Stevens 2011 Settling the Ebbsfleet Valley. High Speed 1 Excavations at Springhead and Northfleet, Kent. Th Late Iron Age, Roman, Saxon, and Medieval Landscape. Volume 3: Late Iron Age to Roman Human Remains and Environmental Reports. Oxford Wessex Archaeology, Oxford.
West of Boxley Road, Boxley	K37	1997 West of Boxley Road, Boxley, Kent. Oxford Archaeology Unit. Oxford Archaeology Library.
South-east of Park Farm, Ashford	K41	Powell, Andrew B. 2012 Excavations South-East of Park Fam, Ashford, Kent Part 1: Main Report. Wessex Archaeology. Kent Archaeological Society. Powell, Andrew B. 2012 Excavations South-East of Park Fam, Ashford, Kent Part 2: Finds and Environmental Reports. Wessex Archaeology. Kent Archaeological Society.
Tollgate, Gravesham	K42	Bull, Raoul, Alistair Barclay 2006 The Prehistoric, Roman and Medieval Landscape at Tollgate, Gravesham, Kent. Oxford Wessex Archaeology Joint Venture. Archaeology Data Service.
Junction 5 of the M2	K43	Peacock, Rebecca, Alex Davis, Edward Biddulph 2018 M2 Junction 5 Improvements, Kent. Archaeological Evaluation Report. Oxford Archaeology South. Oxford Archaeology Library.
Herne Bay, Kent	K44	Leivers, Matt Kirsten Egging Dinwiddy, Catherine Barnett, Kayt Marter Brown, Nicholas Crooke, Anna Doherty, Lorraine Mepham, David Norcott, Chris J. Stevens, Lucy Sibun, Kitty Foster Excavation of a Multi-Period Site at Herne Bay, Kent. Wessex Archaeology. Kent Archaeological Society.
Foster Road, Ashford	K45	Powell, Andrew B., Vaughan Birbeck, Phillip Allen, Catherine Barnett, Lorraine Mepham, David Norcott, Chris J. Stevens, Sarah F. Wyles 2006 Excavation of a Multi-period site at Foster Road, Ashford, 2006. Wessex Archaeology. Kent Archaeological Society.
Whitehill Road Barrow, Longfield and New Barn	K46	Barclay, A., R. Bull 2006 The Prehistoric Landscape at Whitehill Road Barrow, Longfield and New Barn, Kent. Oxford Wessex Archaeology Joint Venture Unpublished Report Series.
Land at Ulcombe Road, Headcorn	K47	Rady, Jon, Andrew Macintosh 2018 Land at Ulcombe Road, Headcorn, Kent. Archaeological Evaluation Report. Canterbury Archaeological Trust. Archaeology Data Service.
Scotney Court	K48	Barber, L. 1998 An Early Romano-British Salt-Working Site at Scotney Court. *Archaeologia Cantiana* 118:327-353.
Area I9, Shorne Pipeline, Isle of Grain	K49	Dawkes, Giles, Lucy Allot, Luke Bader, Anna Doherty, Gemma Driver, Sarah Porteus, Chris Butler, Elke Raemen, Lucy Siburn 2009 Archaeological Investigations at Grain - Shorne Pipeline, Isle of Grain, Kent. Phase 7. Post-Excavation Assessment and Project Design for Publication.

Site Name	**Site Code**	**Citation**
West of Blind Lane, Sevington	K50	Hayden, C. 2001 West of Blind Lane, Sevington, Kent, ARC BLN 98. Detailed Archaeological Works Assessment Report Final. Oxford Archaeological Unit. Roman Rural Settlement Database.
Thanet Earth	K51	Rady, Jon 2010 Excavations at Thanet Earth 2007-2008 Assessment Report Volume 1. Canterbury: Canterbury Archaeological Trust. Report No: 2010/78.
North Lane Canterbury	K52	Rady, Jon, Trever Anderson, Robin Bendrey, John Cotter, Ian Riddler, Andrew Savage, Tania Wilson, Susan Youngs 2009 Excavations at North Lane, Canterbury 1993 and 1996. Canterbury Archaeological Trust Occasional Paper No. 6., Canterbury.
Wainscott Northern By-Pass	K53	Clark, Peter, Jonathan Rady, Christopher Sparey-Green 2009 Wainscott Northern By-Pass. Archaeological Investigations 1992-1997. Canterbury Archaeological Trust Occasional Paper No. 5, Canterbury.
Monkton, Isle of Thanet	K54	Bennett, Paul, Peter Clark, Alison Hicks, Jonathan Rady, Ian Riddler 2008 At the Great Crossroads: Prehistoric, Roman and Medieval Discovers on the Isle of Thanet 1994-95. Canterbury Archaeological Trust Occasional Paper No. 4. Canterbury.
Wises Lane, Borden, Sittingbourne	K55	Coles, Sarah. Stephen Hammond, Jo Pine, Steve Preston, Andy Taylor. 2003 Bronze Age, Roman and Saxon Sites on Shrubsoles Hill, Sheppy and at Wises Lane, Borden, Kent. A Landscape of Ancestors and Agriculture by The Swale. Thames Valley Archaeological Services Ltd Monograph 4, Reading.
Cheriton Road Sports Ground, Folkstone	K56	McNicoll-Norbury, James 2018 Iron age and Early Roman Occupation and a Middle Iron Age Burial at Cheriton Road Sports Ground, Folkstone, Kent. Thames Valley Archaeological Services Ltd Occasional Paper 32, Reading.
Ickham	K57	Bennett Paul, Ian Ridder, Christopher Sparey-Green, Christopher Young, Malcolm Lyne, Quita Mould, Robert Spain 2010 The Roman Watermills and Settlement at Ickham, Kent. The archaeology of Canterbury New Series Volume 5. Canterbury Archaeological Trust Ltd, Canterbury.
Cantium Way, Snodland	K58	Dawkes, Giles 2015 Flavian and Later Buildings at Snodland roman Villa: Excavations at Cantium Way, Snodland, Kent. Soilheap Monograph Series No. 9. Soilheap Publications
Dickson's Corner, Worth	K59	Parfitt, Keith 2000 A Roman Occupation Site at Dickson's Corner, Worth. *Archaeologia Cantiana 120:107-148.*
Great Mongeham, Deal	K60	Parfitt, Keith 2003 A Belgic-Early Roman Site at Great Mongeham, Near Deal. *Archaeologia Cantiana* 128:127-152.
North Foreland, Bishop's Avenue	K61	Moody, Gerald 2007 Iron Age and Romano-British Settlement at Bishop's Avenue, North Foreland, Broadstairs. *Archaeologia Cantiana* 127:197-212.
Queen Elizabeth Square, Maidstone	K62	Booth, P., C. Howard-Davis 2004 *Prehistoric and Romano-British settlement at Queen Elizabeth Square, Maidstone,* Oxford Archaeology Occasional Paper 11. Oxford Archaeology, Oxford.
Furfield Quarry, Boughton Monchelsea	K63	Mackinder, Tony 2006 East Field Furfield Quarry, Boughton Monchelsea, Maidstone, County of Kent. An Archaeological Post-Excavation. Museum of London Archaeology Service. Rural Roman Settlement Database.
Farningham Hill	K64	Philip, Brian, Joanna Bird, Alison Locker, Peter Couldrey, Derek Garrod, Peter Keller, Keith Parfitt, John Wilson, Andrew Woodcock 1984 Excavations in the Darent Valley, Kent. Fourth Research Report in the Kent Monograph Series. The Kent Archaeological Rescue Unit, Dover.

Site Name	Site Code	Citation
Keston, Bromley, Kent	K65	Philip, Brian, Keith Parfitt, John Wilson, Mike Dutto, Wendy Williams 1991 The Roman Villa Site at Keston, Kent. First Report (Excavations 1968-1978). Sixth Research Report in the Kent Monography Series. The Kent Archaeological Rescue Unit, Dover.
North Pole Lane, West Wickham	K66	Philip, Brian 1973 Excavations in West Kent 1960-197. The Discovery and Excavation of Prehistoric, Roman, Saxon and Medieval Sites, Mainly in the Bromley area and in the Darnet Valley. Second Research Report in the Kent Series. The Kent Archaeological Rescue Unit, Dover.
Villa at Daenth	K67	Philip, Brian 1973 Excavations in West Kent 1960-197. The Discovery and Excavation of Prehistoric, Roman, Saxon and Medieval Sites, Mainly in the Bromley area and in the Darnet Valley. Second Research Report in the Kent Series. The Kent Archaeological Rescue Unit, Dover.
Iwade	K68	Bishop, Barry, Mark Bagwell 2005 Iwade. Occupation of a North Kent Village from the Mesolithic to the Medieval Period. Pre-Construct Archaeology Limited Monograph No. 3. Rural Roman Settlement Database.
Augustine House, Rhodaus Town, Canterbury	K69	Helm, Richard, Enid Allison Ian Anderson, Luke Barber, Lynne Bevan, Rose Bradley, Wendy Carruthers, Susan Jones, Alison Locker, Malcolm Lyne, Rob Ixer, Susan Pringle, Andrew Richardson, Helen Webb 2014 Outside the Town: Roman Industry, Burial and Religion at Augustine House, Rhodaus Town, Canterbury. Canterbury Archaeological Trust Occasional Paper No. 10.
A2 Pepper Hill to Cobham, Site A/L	K70	Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 Pepperhill to Cobham Road-Scheme in Kent. Oxford Archaeology Monograph No. 16. Oxford.
A2 Pepper Hill to Cobham, Site B	K71	Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 Pepperhill to Cobham Road-Scheme in Kent. Oxford Archaeology Monograph No. 16. Oxford.
A2 Pepper Hill to Cobham, Site D	K72	Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 Pepperhill to Cobham Road-Scheme in Kent. Oxford Archaeology Monograph No. 16. Oxford.
Highstead, Near Chislet	K73	Bennett, Paul, Peter Couldrey, Nigel Macpherson-Grant 2007 Highstead. Near Chislet, Kent. Excavations 1975-1977
Roman Fort at Lympne	K74	Cunliffe, Barry, Richard Reece, Martin Henig, Sonia Chadwick Hawkes, Verna Care, C.J. Young 1980 Excavations at the Roman Fort at Lympne, Kent 1976-78. *Britannia* 11:227-288.
Nashenden Valley, Borstal	K75	Barclay, A. 2000 Nashenden Valley, Borstal, Kent ARC NSH 98. Detailed Archaeological Works Assessment Report Final. Oxford Archaeological Unit. Archaeological Data Service.
Deerton Street, Teynham	K76	Wilkinson, Paul 1997 Interim report on the Roman Villa at Deerton Street, Teynham, Kent. Swale Archaeological Survey. Archaeological Data Service.
Little Chart	K77	Eames, John 1957 A Roman Bath-House at Little Chart. *Archaeologia Cantiana* LXXI:130-146.
Princes Road, Dartfort	K78	Hutchings, Paul 2003 Ritual and riverside settlement: Princes Road, Dartford, *Archaeologia Cantiana* 123:41-79.
Reader's Estate Chalk	K79	Johnston, David E. 1972 A Roman Building at Chalk, near Gravesend. *Britannia* 3:112-148.

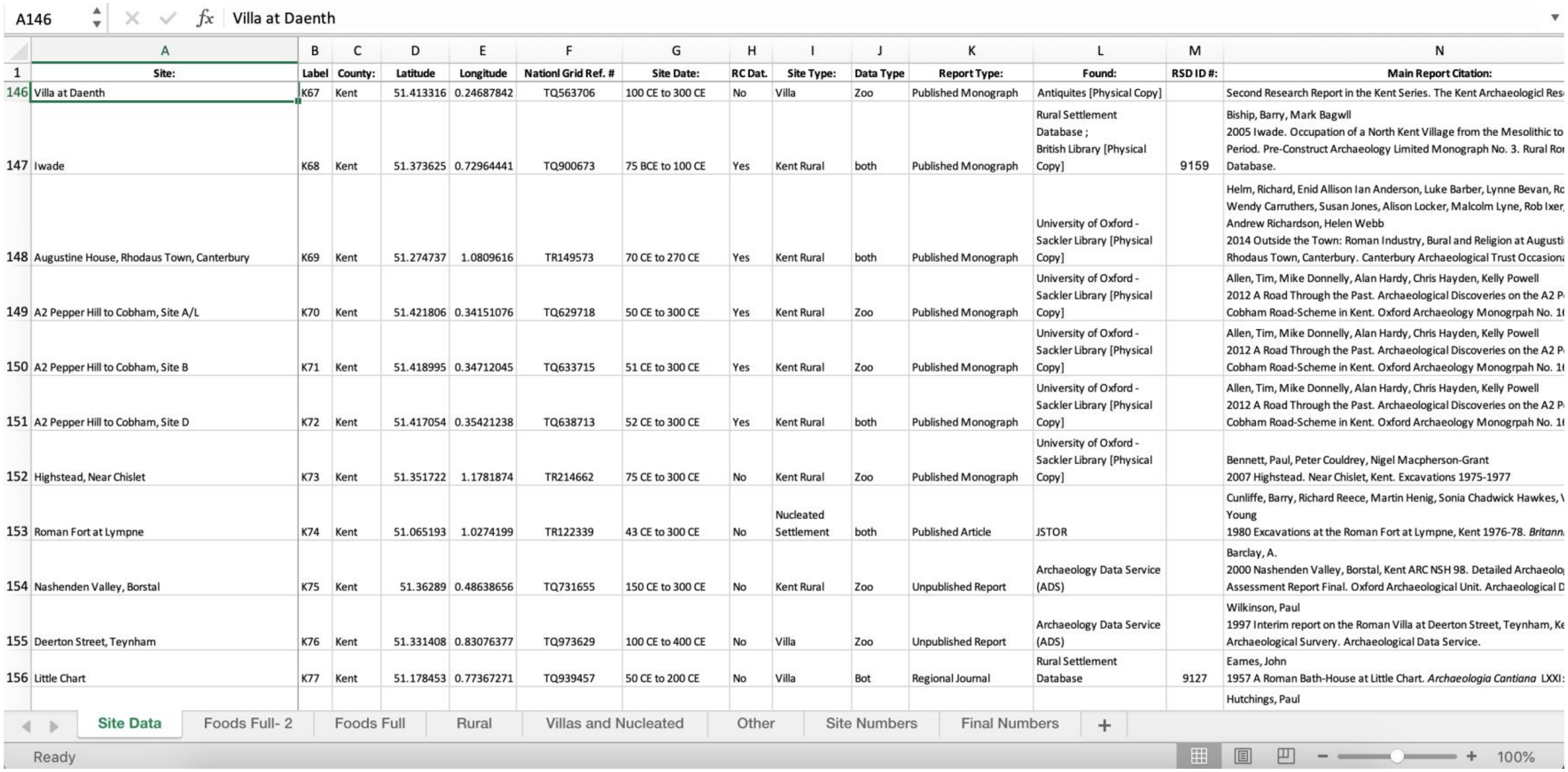
Site Name	**Site Code**	**Citation**
Boarley Farm	K80	Anon 1997 Boarley Farm, ARC BFM 97, An Archaeological Evaluation. Museum of London Archaeology Service, UNION RAILWAYS LIMITED.
Stone Castle Quarry, Greenhithe	K81	Detsicas, A.P. 1966 An Iron Age and Romano-British site at Stone Castle Quarry, Greenhithe. *Archaeologia Cantiana* 81: 136-190.
The Mount, Maidstone	K82	Houliston, Mark, E. Allison, R. Bendrey, G. M. Cruise, J. Davies, L. Harrison, D. Mackreth, R. I. Macphail, I. Riddler, M. Robinson, A. Savage 1999 Excavations at Mount Roman villa, Maidstone, 1994. *Archaeologia Cantiana* 119 :71-172.
Home Farm, Eynsford	K83	Philip, Brian, Maurice Chenery 2002 A Roman site at Home Farm, Eynsford. *Archaeologia Cantiana* 122:49-78.
Teston, Maidstone	K84	Anon 1991 Evaluation of Roman remains located on the route of a new sewer at Teston, near Maidstone, Kent in November 1991.Canterbury: Canterbury Archaeological Trust. C.A. T. Reference No. 279.
Bleak House, Broadstairs	K85	Moody, G.A. 2010 Land adjacent to Bleak House, Fort Road, Broadstairs. Interim Archaeological Report. Trust for Thanet Archaeology.
Runhams Farm, Lenham	K86	Philip, Brain 1994 The Iron Age and Roman-British site at Runhams, Kent: The discovery and excavation of an extensive farmstead and iron-working site at Runhams Farm, 1978-1986 Kent Archaeological Rescue Unit.
Fremlin Walk, Maidstone	K87	Edwards, Catherine 2007 Excavations at Fremlin Walk, Maidstone. *Archaeologia Cantiana* 127: 73-106
Ospringe (b), Syndale Park (Durolevum)	K88	Sibun, Lucy 2007 Excavation at Syndale Park, Ospringe. *Archaeologia Cantiana* 121: 171-196.
Brisley Farm, Ashford	K89	Johnson, Casper, Jim Stevenson 2003 Brisley Farm, Ashford, Kent (NGR TQ 992 401). A Post-Excavation Assessment Report on the Archaeological Excavations 1998-2002 with Proposals for Publication. Archaeology South East. Project No. (1372).
Cottington Hill, Cemetery	K90	Anon 2006 Margate and Broadstairs Urban Wastewater Treatment Scheme, Kent. Archaeological Assessment Report and Updated Project Design for Analysis and Publication. Salisbury: Wessex Archaeology. Report ref: 59481.02.
Lullingstone	K91	Anon 2007 An Archaeological Desk-Based Assessment of land at Lullingstone Roman Villa, Eynsford, Kent. English Heritage. Archer, Tim, Kerry Donaldson, David Sabin 2007 Multi-technique Geophysical Survey at Lullingstone Roman Villa in Kent. English Heritage. Sparey-Green, C. 2009 Lullingstone Roman Villa, Eynsford, Kent. Watching brief during improvement of visitor facilities. Canterbury: Canterbury Archaeological Trust. Report No: 2009/1. Ward, A. 2006 An Archaeological Watching Brief at Lullingstone Roman Villa, Lullingstone, Kent. Canterbury: Canterbury Archaeological Trust. Meates, G.W. 1979 The Roman Villa Site at Lullingstone, Kent, Volumes I and II. Monograph Series of the Kent Archaeological Society Vol. 1. Kent Archaeological Society.

Site Name	Site Code	Citation
North of Saltwood Tunnel	K92	Anon 1997 North of Saltwood Tunnel, Saltwood, Kent, ARC SLT 97. Archaeological Evaluation Report. Oxford Archaeology, Oxford.
Honeywood Parkway, White Cliffs Buiness Park, Dover	K93	Parfitt, Keith 2010 Report on Evaluation Trenching in 2010, Off Honeywood Parkway, White Cliffs Business Park, Dover (Proposed Development for, Holdingmaatschappij Hulssems BV) Canterbury Archaeological Trust Limited, Canterbury.
Dane Court Grammar School, Broadstairs	K94	Anon 2008 Dane Court Grammar School, Broadstairs, Kent, Archaeological Evaluation. Oxford Archaeology, Oxford.
Land at Stuart Road, Gravesend	K95	Seddon, Guy, Lorraine Darton 2005 Assessment of an Archaeological Excavation of Land at Stuart Rd, Gravesend, Kent. Pre-Construct Archaeology Limited, London.
Eynsford to Hornton Kirby Pipeline	K96	Andrew, Simmonds, Francis Wenban-Smith, Martin Bates, Kelly Powell, Dan Sykers, Rebecca Devaney, Daniel Stansbie, David Score 2011 Excavations in North-West Kent, 2005-2007. One Hundred Thousand Years of Human Activity in and Around the Darent Valley. Oxford Archaeology Monography No. 11.
Dartford Football Club, Princes Road, Dartford	K97	Andrew, Simmonds, Francis Wenban-Smith, Martin Bates, Kelly Powell, Dan Sykers, Rebecca Devaney, Daniel Stansbie, David Score 2011 Excavations in North-West Kent, 2005-2007. One Hundred Thousand Years of Human Activity in and Around the Darent Valley. Oxford Archaeology Monography No. 11.
East Kent Access (Landscape 1)	K98	Andrews, Phil, Paul Booth, A.P. Fitzpatrick, Ken Welsh 2015 Digging at the Gateway. Archaeological Landscapes of South Thanet. The Archaeology of East Kent Access (Phase II), Volume 2: The Finds, Environmental and Dating Reports. Oxford Wessex Archaeology Monograph No.8. Oxford Wessex Archaeology, Oxford and Salisbury.
East Kent Access (Landscape 2)	K99	Andrews, Phil, Paul Booth, A.P. Fitzpatrick, Ken Welsh 2015 Digging at the Gateway. Archaeological Landscapes of South Thanet. The Archaeology of East Kent Access (Phase II), Volume 2: The Finds, Environmental and Dating Reports. Oxford Wessex Archaeology Monograph No.8. Oxford Wessex Archaeology, Oxford and Salisbury.
East Kent Access (Landscape 3)	K100	Andrews, Phil, Paul Booth, A.P. Fitzpatrick, Ken Welsh 2015 Digging at the Gateway. Archaeological Landscapes of South Thanet. The Archaeology of East Kent Access (Phase II), Volume 2: The Finds, Environmental and Dating Reports. Oxford Wessex Archaeology Monograph No.8. Oxford Wessex Archaeology, Oxford and Salisbury.

Appendix B. Data Source Locations

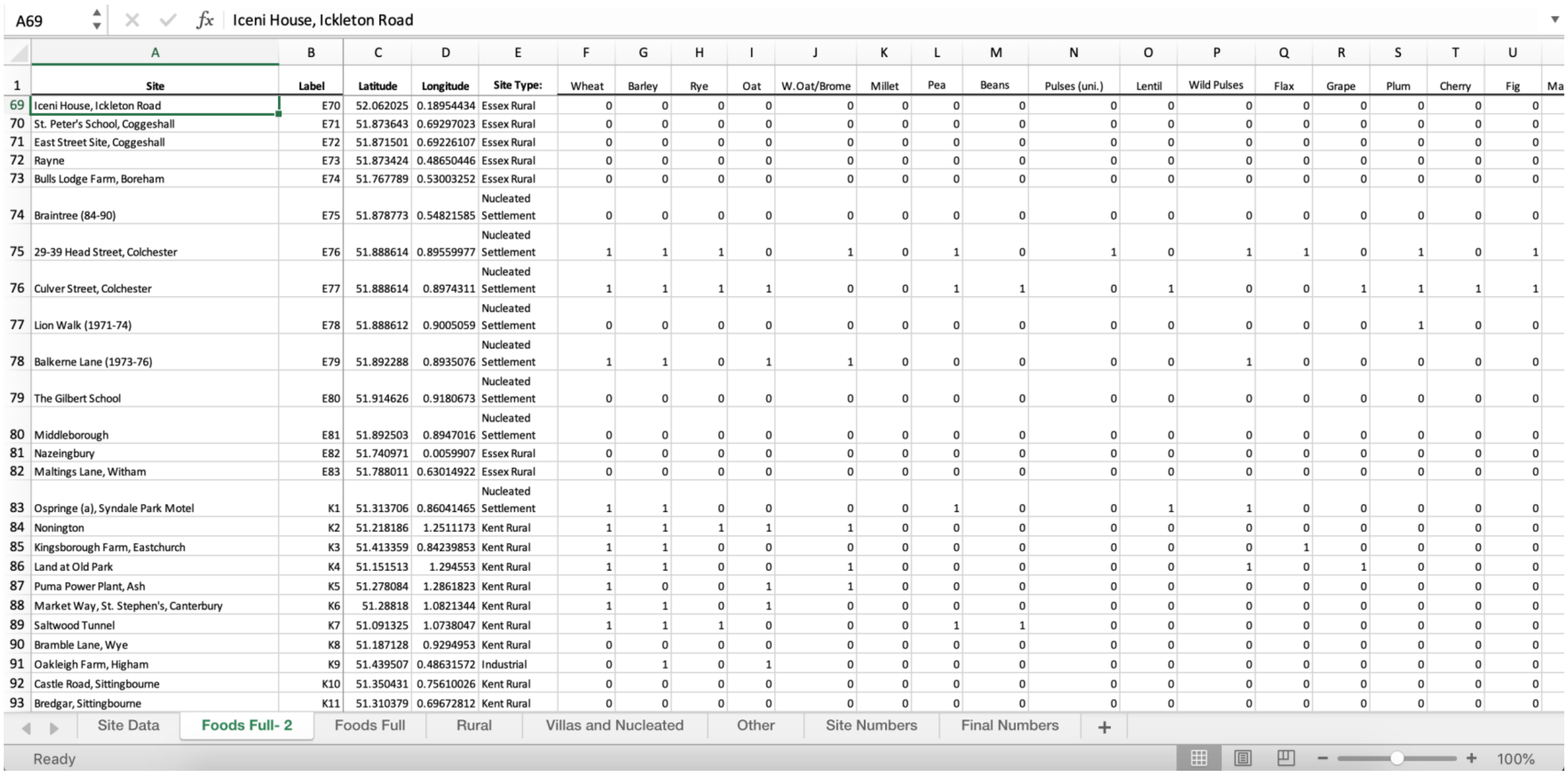
Name	URL
Archaeology Data Service	https://archaeologydataservice.ac.uk/
Archaeologia Cantiana	https://www.kentarchaeology.org.uk/Research/Pub/ArchCant/Intro.htm
Essex History and Archaeology	http://esah1852.org.uk/
Kent Archaeological Society	https://www.kentarchaeology.org.uk/publications/archaeological-reports
Museum of London (MOLA)	https://www.mola.org.uk/research-community/resource-library?field_resource_type_tid=All&field_resource_period_tid=311&field_artefact_tid=331&field_resource_location_tid=451
Oxford Archaeology Library (OA)	https://library.thehumanjourney.net/
Rural Settlement of Roman Britain (RSRB)	https://archaeologydataservice.ac.uk/archives/view/romangl/map.html
British Museum's Anthropology Library	https://bmus.ent.sirsidynix.net.uk/client/en_US/default
The University of Oxford's Sackler Library	https://www.bodleian.ox.ac.uk/sackler
Simon Fraser University's Library	https://www.lib.sfu.ca/

Appendix C. Data Collection Examples



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Site:	Label	County:	Latitude	Longitude	Nationl Grid Ref. #	Site Date:	RC Dat.	Site Type:	Data Type	Report Type:	Found:	RSD ID #:	Main Report Citation:
146	Villa at Daenth	K67	Kent	51.413316	0.24687842	TQ563706	100 CE to 300 CE	No	Villa	Zoo	Published Monograph	Antiquites [Physical Copy]		Second Research Report in the Kent Series. The Kent Archaeologicl Res
147	Iwade	K68	Kent	51.373625	0.72964441	TQ900673	75 BCE to 100 CE	Yes	Kent Rural	both	Published Monograph	Rural Settlement Database ; British Library [Physical Copy]	9159	Biship, Barry, Mark Bagwll 2005 Iwade. Occupation of a North Kent Village from the Mesolithic to Period. Pre-Construct Archaeology Limited Monograph No. 3. Rural Ro Database.
148	Augustine House, Rhodaus Town, Canterbury	K69	Kent	51.274737	1.0809616	TR149573	70 CE to 270 CE	Yes	Kent Rural	both	Published Monograph	University of Oxford - Sackler Library [Physical Copy]		Helm, Richard, Enid Allison Ian Anderson, Luke Barber, Lynne Bevan, Ro Wendy Carruthers, Susan Jones, Alison Locker, Malcolm Lyne, Rob Ixer, Andrew Richardson, Helen Webb 2014 Outside the Town: Roman Industry, Bural and Religion at Augusti Rhodaus Town, Canterbury. Canterbury Archaeological Trust Occasiona
149	A2 Pepper Hill to Cobham, Site A/L	K70	Kent	51.421806	0.34151076	TQ629718	50 CE to 300 CE	Yes	Kent Rural	Zoo	Published Monograph	University of Oxford - Sackler Library [Physical Copy]		Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 P Cobham Road-Scheme in Kent. Oxford Archaeology Monogrpah No. 1
150	A2 Pepper Hill to Cobham, Site B	K71	Kent	51.418995	0.34712045	TQ633715	51 CE to 300 CE	Yes	Kent Rural	Zoo	Published Monograph	University of Oxford - Sackler Library [Physical Copy]		Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 P Cobham Road-Scheme in Kent. Oxford Archaeology Monogrpah No. 1
151	A2 Pepper Hill to Cobham, Site D	K72	Kent	51.417054	0.35421238	TQ638713	52 CE to 300 CE	Yes	Kent Rural	both	Published Monograph	University of Oxford - Sackler Library [Physical Copy]		Allen, Tim, Mike Donnelly, Alan Hardy, Chris Hayden, Kelly Powell 2012 A Road Through the Past. Archaeological Discoveries on the A2 P Cobham Road-Scheme in Kent. Oxford Archaeology Monogrpah No. 1
152	Highstead, Near Chislet	K73	Kent	51.351722	1.1781874	TR214662	75 CE to 300 CE	No	Kent Rural	Zoo	Published Monograph	University of Oxford - Sackler Library [Physical Copy]		Bennett, Paul, Peter Couldrey, Nigel Macpherson-Grant 2007 Highstead. Near Chislet, Kent. Excavations 1975-1977
153	Roman Fort at Lympne	K74	Kent	51.065193	1.0274199	TR122339	43 CE to 300 CE	No	Nucleated Settlement	both	Published Article	JSTOR		Cunliffe, Barry, Richard Reece, Martin Henig, Sonia Chadwick Hawkes, Young 1980 Excavations at the Roman Fort at Lympne, Kent 1976-78. *Britann*
154	Nashenden Valley, Borstal	K75	Kent	51.36289	0.48638656	TQ731655	150 CE to 300 CE	No	Kent Rural	Zoo	Unpublished Report	Archaeology Data Service (ADS)		Barclay, A. 2000 Nashenden Valley, Borstal, Kent ARC NSH 98. Detailed Archaeolo Assessment Report Final. Oxford Archaeological Unit. Archaeological D
155	Deerton Street, Teynham	K76	Kent	51.331408	0.83076377	TQ973629	100 CE to 400 CE	No	Villa	Zoo	Unpublished Report	Archaeology Data Service (ADS)		Wilkinson, Paul 1997 Interim report on the Roman Villa at Deerton Street, Teynham, Ke Archaeological Survery. Archaeological Data Service.
156	Little Chart	K77	Kent	51.178453	0.77367271	TQ939457	50 CE to 200 CE	No	Villa	Bot	Regional Journal	Rural Settlement Database	9127	Eames, John 1957 A Roman Bath-House at Little Chart. *Archaeologia Cantiana* LXXI:
														Hutchings, Paul

Figure C1. Screenshot of Site Collection



A69 | Iceni House, Ickleton Road

	Site	Label	Latitude	Longitude	Site Type:	Wheat	Barley	Rye	Oat	W.Oat/Brome	Millet	Pea	Beans	Pulses (uni.)	Lentil	Wild Pulses	Flax	Grape	Plum	Cherry	Fig	Ma
69	Iceni House, Ickleton Road	E70	52.062025	0.18954434	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
70	St. Peter's School, Coggeshall	E71	51.873643	0.69297023	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
71	East Street Site, Coggeshall	E72	51.871501	0.69226107	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
72	Rayne	E73	51.873424	0.48650446	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
73	Bulls Lodge Farm, Boreham	E74	51.767789	0.53003252	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
74	Braintree (84-90)	E75	51.878773	0.54821585	Nucleated Settlement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
75	29-39 Head Street, Colchester	E76	51.888614	0.89559977	Nucleated Settlement	1	1	1	0	1	0	1	0	1	0	1	1	0	1	0	1	
76	Culver Street, Colchester	E77	51.888614	0.8974311	Nucleated Settlement	1	1	1	1	0	0	1	1	0	1	0	0	1	1	1	1	
77	Lion Walk (1971-74)	E78	51.888612	0.9005059	Nucleated Settlement	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
78	Balkerne Lane (1973-76)	E79	51.892288	0.8935076	Nucleated Settlement	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	
79	The Gilbert School	E80	51.914626	0.9180673	Nucleated Settlement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
80	Middleborough	E81	51.892503	0.8947016	Nucleated Settlement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
81	Nazeingbury	E82	51.740971	0.0059907	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
82	Maltings Lane, Witham	E83	51.788011	0.63014922	Essex Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
83	Ospringe (a), Syndale Park Motel	K1	51.313706	0.86041465	Nucleated Settlement	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	
84	Nonington	K2	51.218186	1.2511173	Kent Rural	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
85	Kingsborough Farm, Eastchurch	K3	51.413359	0.84239853	Kent Rural	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
86	Land at Old Park	K4	51.151513	1.294553	Kent Rural	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	
87	Puma Power Plant, Ash	K5	51.278084	1.2861823	Kent Rural	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	
88	Market Way, St. Stephen's, Canterbury	K6	51.28818	1.0821344	Kent Rural	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
89	Saltwood Tunnel	K7	51.091325	1.0738047	Kent Rural	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	
90	Bramble Lane, Wye	K8	51.187128	0.9294953	Kent Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
91	Oakleigh Farm, Higham	K9	51.439507	0.48631572	Industrial	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
92	Castle Road, Sittingbourne	K10	51.350431	0.75610026	Kent Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
93	Bredgar, Sittingbourne	K11	51.310379	0.69672812	Kent Rural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Site Data | Foods Full- 2 | Foods Full | Rural | Villas and Nucleated | Other | Site Numbers | Final Numbers

Ready 100%

Figure C2. Screenshot of Data Collection

Appendix D. Site-Type Taxonomic Richness Figures

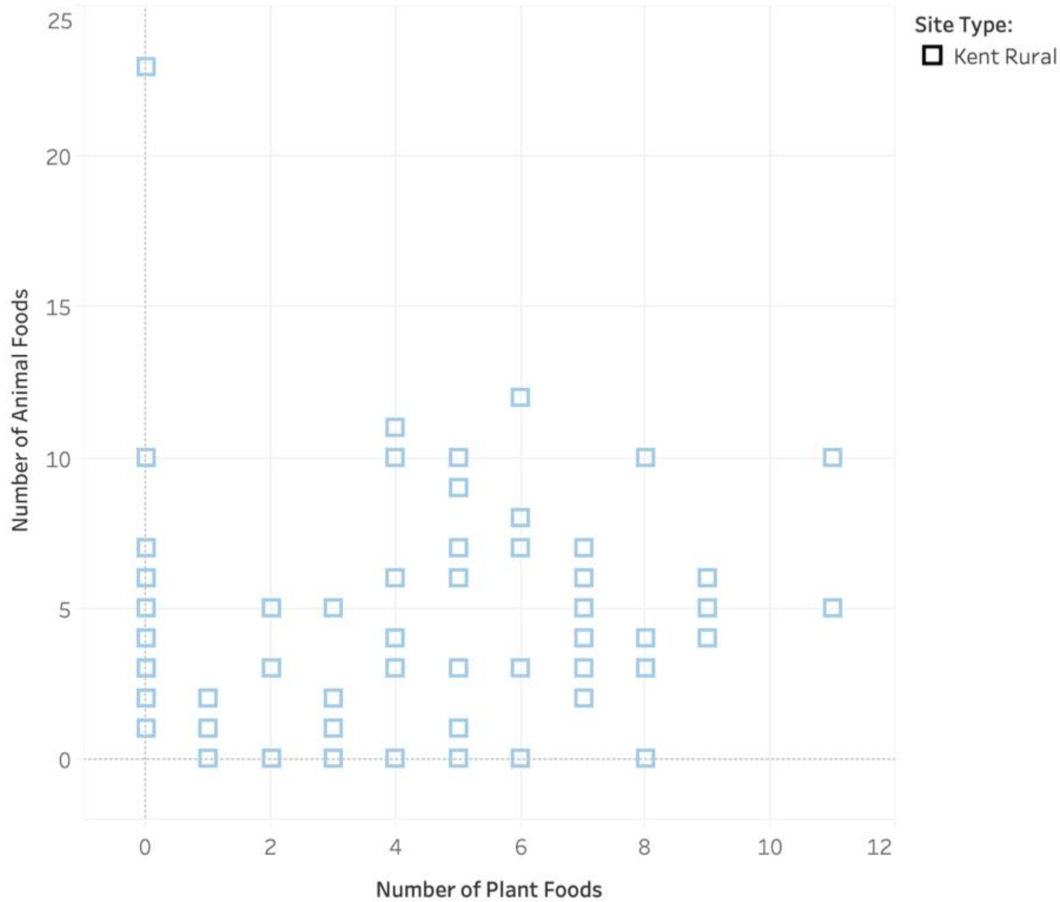


Figure D1. Rural Sites in Kent

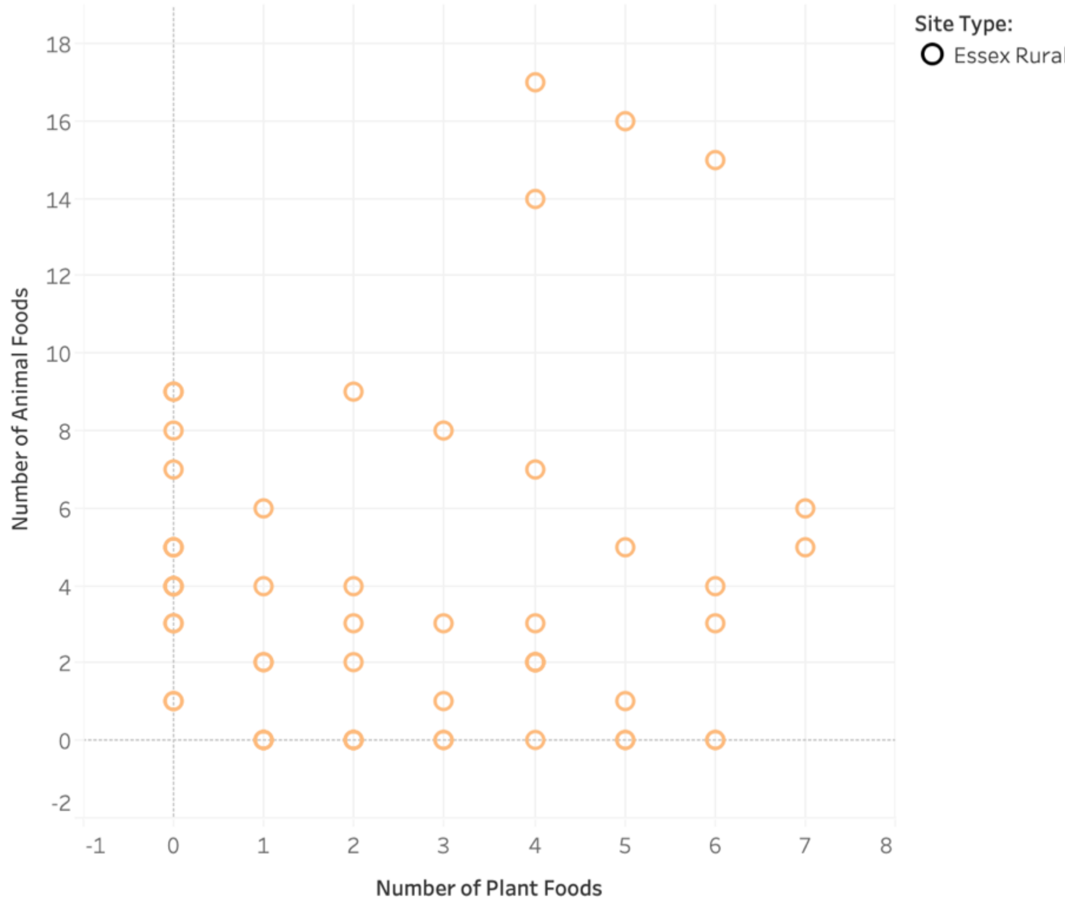


Figure D2. **Rural Sites in Essex**

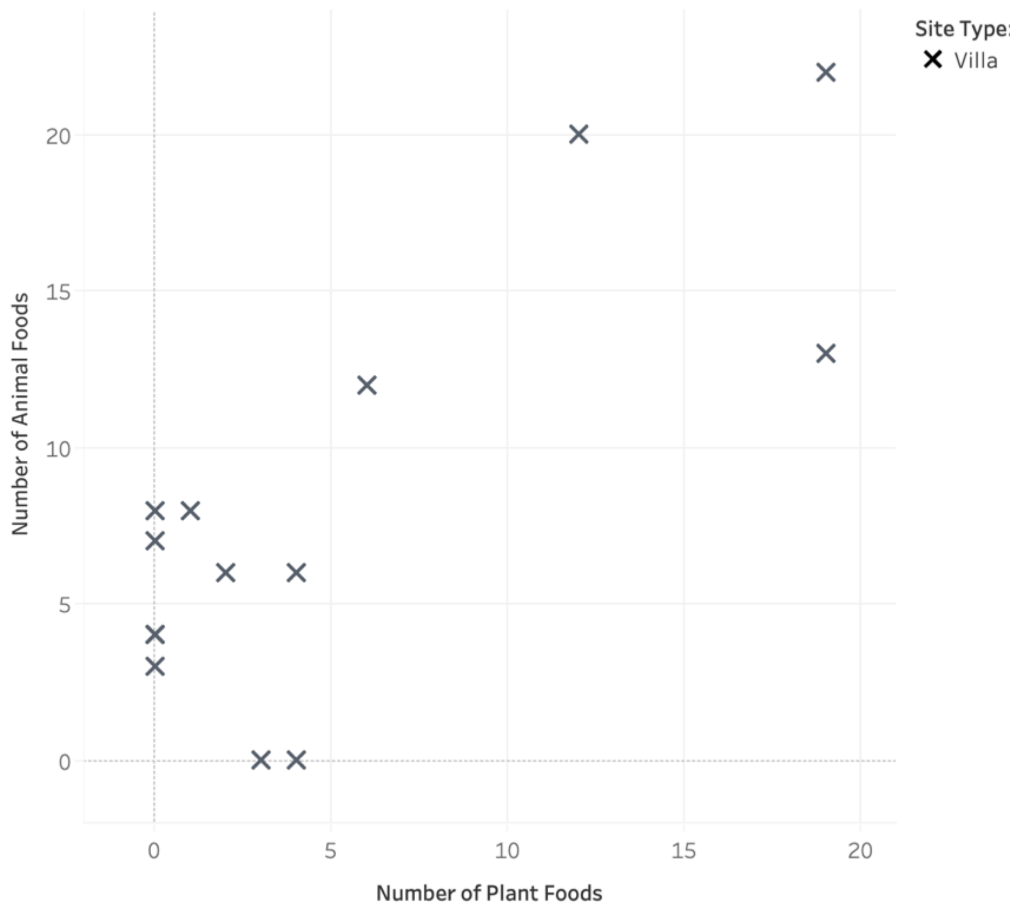


Figure D3. Villas

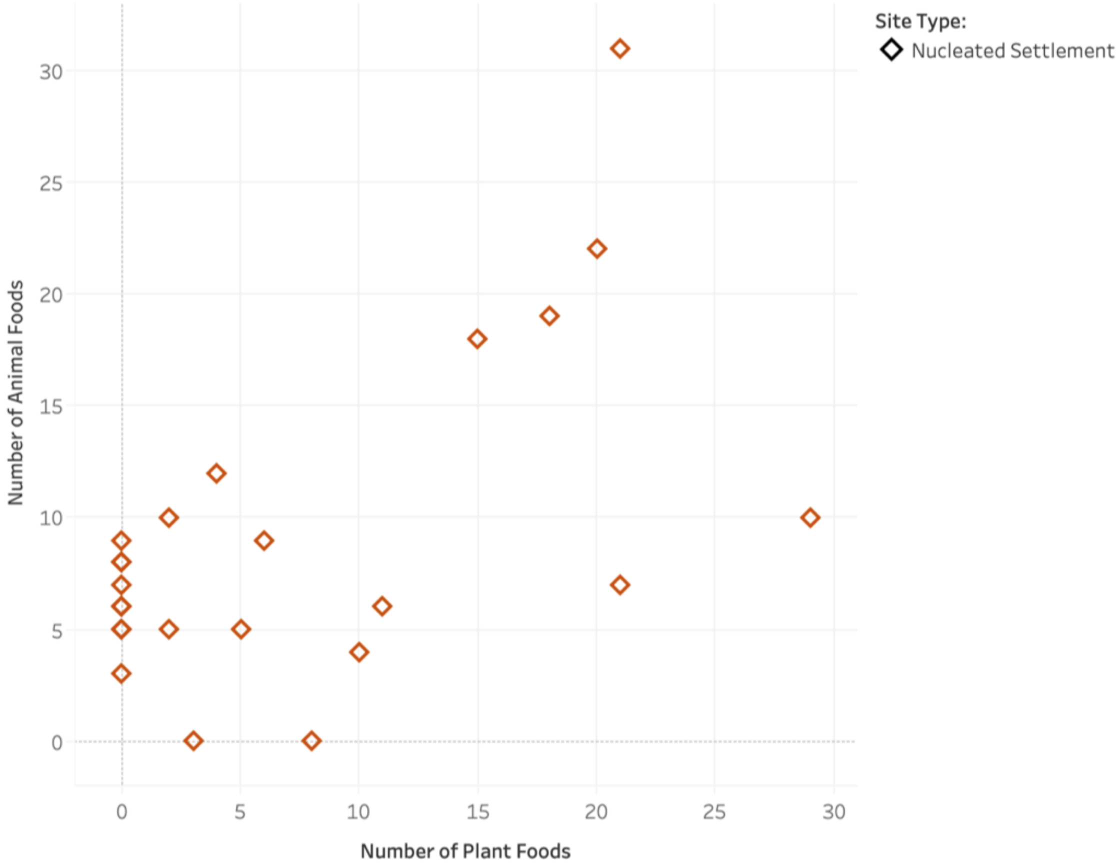


Figure D4. **Nucleated Settlements**

Appendix E. Supplementary Networks

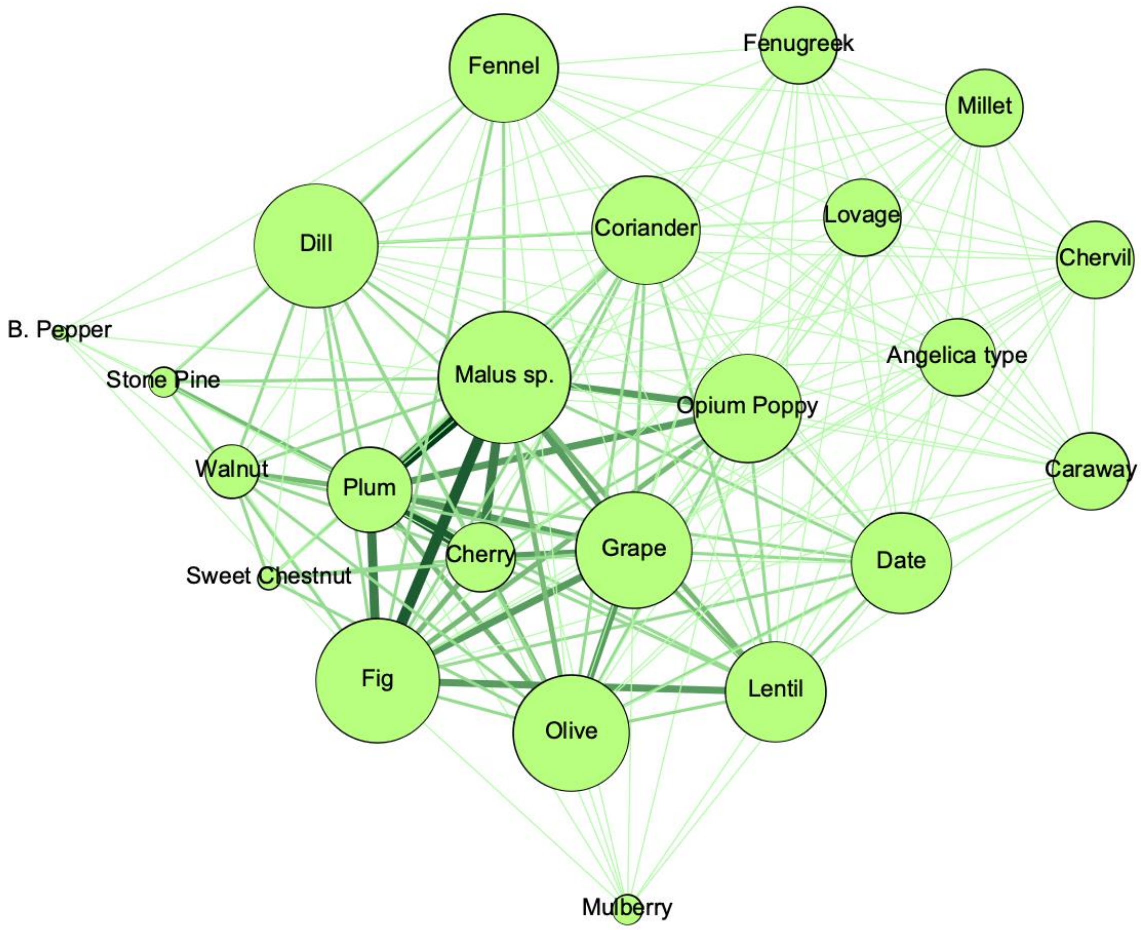


Figure E1. **Food-to-Food Projected Network (Force-Spatialized), No Edge Cutoff**

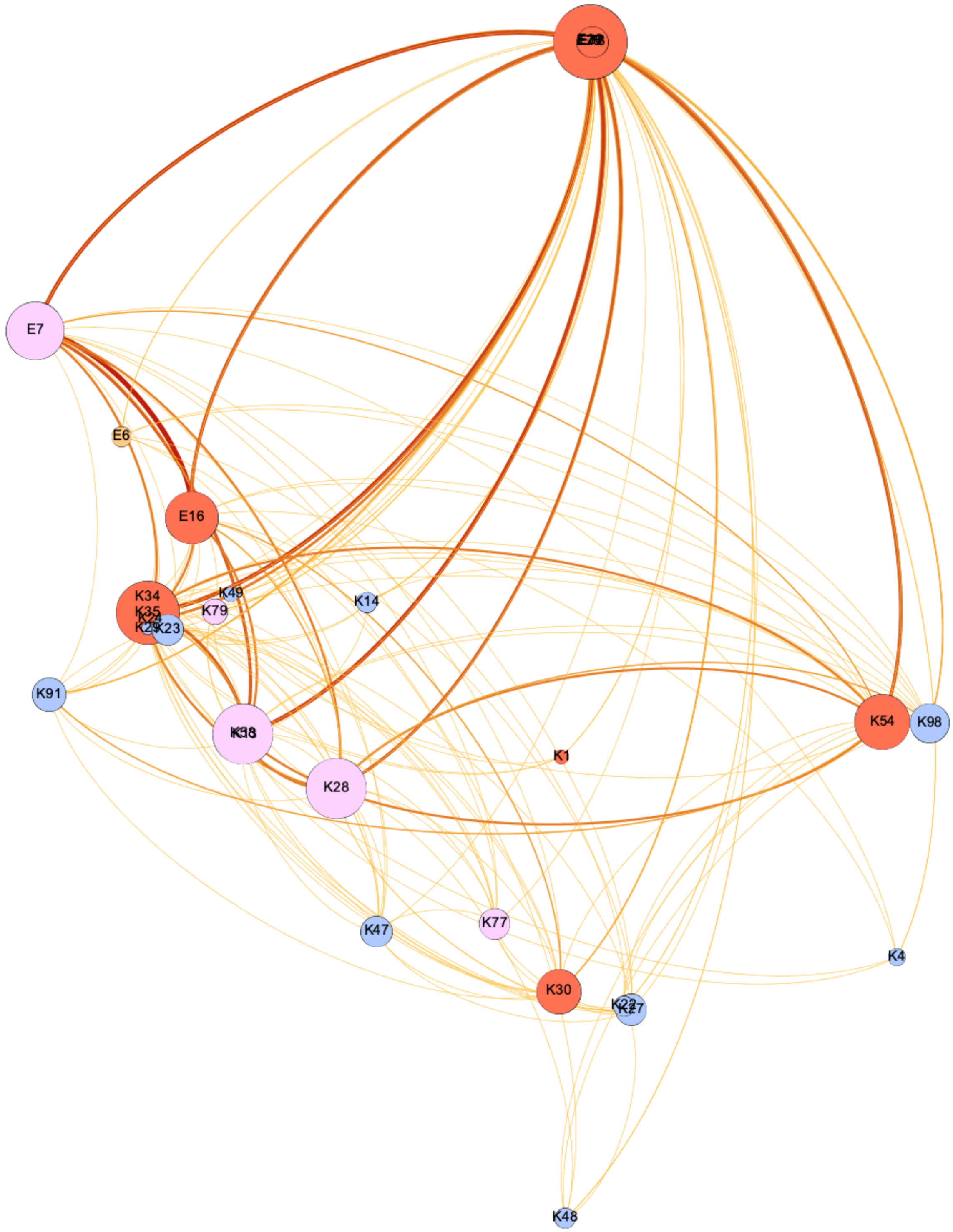


Figure E2. **Site-to-Site Projected Network Visualized Using Gephi's GeoLayout Algorithm**

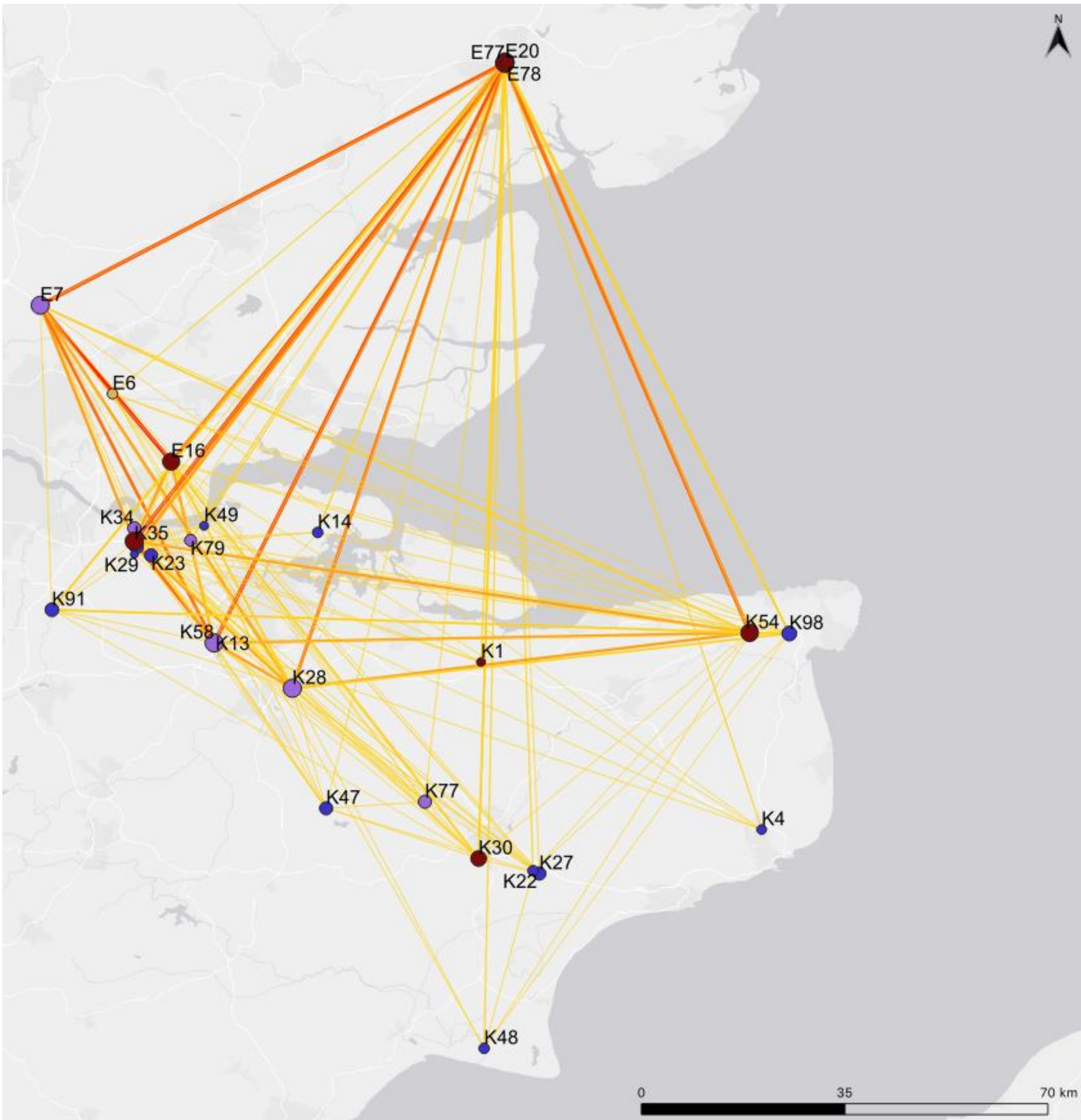


Figure E3. **Georeferenced Imported Plant Foods Network with Site Code Labels**