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NAME OF AUTHOR/*NOM DE L'AUTEUR* Paul G. Pilley

TITLE OF THESIS/*TITRE DE LA THÈSE* Pesticide Applicator Training: A New College Program

UNIVERSITY/*UNIVERSITÉ* Simon Fraser University

DEGREE FOR WHICH THESIS WAS PRESENTED/ *GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* Master of Pest Management

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE GRADE* 1984

NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* Dr. P.C. Oloffs

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PESTICIDE APPLICATOR TRAINING:

A NEW COLLEGE PROGRAM

by

Paul Geoffrey Pilley

B.Sc. (Hons.), Trent University, 1978

A PROFESSIONAL PAPER SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PEST MANAGEMENT

in the Department

of

Biological Sciences

SIMON FRASER UNIVERSITY

September 1984

APPROVAL

NAME: Paul G. Pilley

DEGREE: Master of Pest Management

TITLE OF PROFESSIONAL PAPER: Pesticide Applicator Training: A New College Program

EXAMINING COMMITTEE:

Chairman: Dr. P. Belton

Dr. P.C. Oloffs, Senior Supervisor

Dr J.E. Rahe

Dr. M. Mackauer, Public Examiner

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ABSTRACT

The structural pest control industry has never been promoted as a viable career path for post-secondary graduates. The application of pesticides in urban structures is being performed by people hired off the street who are given minimum training, usually barely enough to satisfy the regulatory agency. Certification standards for pesticide applicators in Canada and the United States are reviewed to illustrate that the training required to pass the examinations is inadequate for such an environmentally sensitive, yet socially important, function.

Factors responsible for problems existing in the structural pest control industry are examined and are largely attributed to the lack of appropriate career preparation by service personnel.

To address the industry's needs, the author designed a 2-year Pest Control Technician program which was implemented at Sir Sandford Fleming College in Lindsay, Ontario, in September 1981. An historical account of the program's development, the structure of the program including course descriptions, and the results after three years of operation are presented. It is too early to quantitatively assess the impact of the program on industry practices. However, the criteria for evaluation are defined and qualitative appraisals are offered.

The industry's interest in the program is demonstrated by the fact that more than 20 companies in Ontario have offered field placements, summer work experience and/or continuous employment for 45 students and graduates. One national company has used the services of students and/or graduates in 11 different urban areas. As of September 1984, after two graduating classes, 24 graduates and non-graduates have obtained full-time employment in the industry and the 10 returning 2nd-year students received related work experi-

ence in the summer. The average starting salary for 1984 graduates was $325 per week, compared to the leading rate of $280 per week for an inexperienced person.

Representative course outlines, and the objectives and operational details of four types of field placements, as well as a copy of the original proposal submitted to obtain government funding, are appended (App. 1-3).

ACKNOWLEDGEMENTS

My sincerest gratitude is extended to Dr. Peter C. Oloffs, my senior supervisor, and to Dr. James E. Rahe, the other member of my committee, for their patient support over the past four years while the Pest Control Technician (PCT) program was being developed.

I would also like to thank Mr. Gary C. Cronkwright, Principal of Frost Campus, Sir Sandford Fleming College, for giving me a free rein to develop the PCT program.

My wife, Gloria, and my three children also deserve very special acknowledgement for their loving support through the demanding time of my studies and the development of the program.

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INTRODUCTION

Steady employment in a chosen career is a realistic expectation of individuals with specific preparation. Job prospects, however, for post-secondary graduates have been diminishing in traditional occupations. This has forced educators to search for areas that have the potential to provide career opportunities, but where formal training standards are undeveloped. The key is to recognize an occupation that is in transition from the semi-skilled ranks to one with increasing demands for technical skills. The structural pest control industry is an excellent example. Employment in this field has never been promoted as a viable career option, even though the nature of the work virtually guarantees continuous employment and the industry pays competitive salaries. The average weekly earnings for Ontario Exterminators were $264 in 1978, as reported by Statistics Canada (19). Nevertheless, new recruits are hired off the street with no specific preparation, and are given minimum on-the-job training. Any that is provided, is to meet the nominal standards of government regulatory agencies for pesticide applicator (=exterminator) certification.

CERTIFICATION OF PESTICIDE APPLICATORS IN CANADA

Federal Legislation

The Pest Control Products Act (11) is the primary statute in Canada regulating pesticides. Section 3 of this Act states that no person shall use any control product under unsafe conditions, but does not govern the certification of pesticide applicators. Section 27 of the Act's Regulations (12, 22)

recognizes three main product class designations - Domestic (home or garden), Commercial (agricultural or industrial), and Restricted (includes forest pest control products). For the latter two categories the label may also set forth the qualifications of persons who can use the product. This is expressed by such general statements as "for use by pest control operators only" (e.g., Dow Dursban 2E, PCP Act # 10636); or "should be used only by properly trained and qualified personnel" (e.g., KemSan Riddex DDVP 350 ULV Insecticide, PCP Act # 15745); or "product must be used under direct supervision of personnel trained in pest control" (e.g., Degesch Phostoxin for control of groundhogs, PCP Act # 16351). Further, Section 45(1) of the Regulations (12) states that no person can use a control product in a manner that is inconsistent with its labelling. The foregoing is as close as the federal legislation comes to the regulation of who may apply pesticides.

Provincial Legislation

Training and certification of pesticide applicators is a provincial responsibility in Canada. Thus, there is no uniformity across the country in licence categories or basic qualifications. A selective review of four provinces, viz., Ontario, British Columbia, Alberta and New Brunswick, will serve to illustrate this point, and also to show the low standards that prevail. For a nationwide overview the reader is referred to Franklin and Muir's (20) paper.

Ontario. Regulation 751 under the Ontario Pesticides Act (41) requires that an applicant for an Exterminator's licence be at least 16 years of age, have a Grade 10 education, be physically fit (but the medical does not require any cholinesterase testing), and successfully pass a written and/or oral examination. Following private study of printed materials provided, the candidate is examined on the Act and its Regulations, general knowledge of pesticides

(use, safety and application), and pest identification, biology and control. Three broad categories of exterminator's licence are recognized: structural, land and water. Within each category there are different levels, or classes, which are delimited by the type (i.e., schedule) of pesticide products that can be used. Scheduling is based on toxicity and persistence of the active ingredient, the concentration and usage of the formulation, and the environmental and/or public health hazard (42). Using these criteria, pesticide formulations are classified into one or more of six groups. The most toxic or hazardous pesticides are in Schedules 1 and 5 (the latter for agricultural land application only), and the least toxic in Schedules 4 and 6 (which differ only in container size).

This writer considers that Ontario has the most advanced system in North America for licensing structural exterminators (see details in the following paragraph). The reason for this is because it is based on the schedules of pesticides that can be used, whereas most other licensing systems are based on the type of abatement that can be performed. The following example is used to show why this is considered a better approach. The application of a contact insecticide as a suspension of fine droplets in air within an enclosed space is referred to as space treatment, or fogging. There are many pesticide formulations, varying in toxicity and concentration of the active ingredient, registered for this use. In Ontario, the Pesticides Advisory Committee would assign these pesticides to different schedules so that the more toxic or concentrated ones could be used only by more experienced exterminators. In comparison, the structural pest control category of other licensing systems allows the use of all products registered for this purpose, regardless of the applicator's personal experience with them.

In the Ontario system there is a progressive sequence of classes within the structural category, each step allowing the use of more toxic or hazardous

pesticides (i.e., higher schedules). An exterminator advances to the next higher class by examination after having assisted in the respective level of exterminations over a stipulated minimum period of time. The starting point is the Class 4 licence, for which there is a written examination. It is the assistant or 'apprentice' level and allows the commercial use of a limited range of scheduled products under the supervision of a higher-licensed exterminator. The Class 3 licence covers general pest control and can be considered the 'journeyman' level. A Class 2 licensee is allowed to use spot (=machinery) fumigants most of which contain ethylene dibromide and/or carbon tetrachloride, bird control products such as Avitrol and Rid-A-Bird 1100 Perch Solution, and acute ('hard') rodenticides such as zinc phosphide and strychnine. S/he can also handle more concentrated formulations, such as dichlorvos 35% which is used as a concentrated fog, or ultra low dosage (ULD) application. A Class 1 structural exterminator (the 'master craftsman' level) is allowed to use pesticides in all 6 schedules for any registered application (except termite control), including such space fumigants as methyl bromide, aluminum phosphide, calcium cyanide, chloropicrin and Carboxide (CO_2 and ethylene oxide mixture). A special licence, Class 5, is for control of termites and other wood-destroying insects. As outlined in the regulations, a minimum of two years of related experience is normally required to advance through the levels from Class 4 to 1. In practice this often takes longer. Conversely, the progression may be accelerated if the applicant is considered to have sufficient knowledge and experience for the particular class of licence. The merit of this classification system is that it encourages individual career development, while restricting the different schedules of pesticides to those most qualified and experienced to use them - at least in theory, if not in practice. The disadvantage of the Ontario system is that the licenses are valid forever

with annual renewal being virtually automatic upon payment of the required fee. Recertification does not exist in Ontario. Thus exterminators lack the extrinsic motivation to keep abreast of new techniques.

Another weakness of the Ontario system is that a licensed exterminator (except Structural Class 4) may "supervise" up to three employees performing exterminations, or up to three pieces of application equipment. In actual practice, supervision is usually limited to telephone/radio contact or, rarely, an onsite visit. An unlicensed individual can assist in structural exterminations for only 6 months.

British Columbia. The Pesticide Control Act Regulation (9, 10) of this province prohibits applicator certification of persons under the age of 16 years. Although a medical report may be required, no minimum educational level is stipulated. The candidate must successfully pass a written and/or oral examination. Nine main pest control categories are recognized. Two of these - Structural and Product Fumigation - cover services provided by the structural pest control industry. Preparation for the various category examinations may consist of intensive short courses (1 to 4 days) sponsored by the Ministry of Environment; evening courses held at community colleges, e.g., the B.C. Institute of Technology (Burnaby) held six 3-hour sessions for the Landscape & Garden Pest Abatement Category in the winter of 1980 (8); and/or home study of the literature provided. The candidate is examined on the same basic topics as outlined for Ontario. An applicator's certificate is valid for up to 5 years after which re-examination (and, hence, recertification) is required. A licensed pesticide applicator must be in continuous attendance at every extermination.

Alberta. Regulation 214/80 under this province's Agricultural Chemicals Act (1, 3) governs the licensing of pesticide applicators. Such a licence also allows a person to operate a pest control business (providing insurance

requirements are met), unlike Ontario and British Columbia both of which have a separate licence for Operators. Candidates must be at least 18 years old, be medically fit (a blood test is required if handling cholinesterase inhibiting pesticides), and possess adequate knowledge (i.e., training and experience) for the class of licence being sought. No basic educational requirement is indicated. Twelve categories of licences (Classes A to M) are outlined in the regulation. Certification requirements vary according to the category.

A licensing kit (4) is provided to applicants for the structural pest control (Class F) category. To qualify for this particular licence a candidate must (1) pass an examination based on pesticide legislation, safety and handling, following private study of the literature provided in the kit; (2) successfully complete the Pest Control Technology Correspondence Course offered by Purdue University (West Lafayette, Indiana); and (3) provide an Experience Checklist signed by a licensed Class F applicator, certifying the applicant's competency in the use of application equipment and pesticides, in pest identification, and in control procedures by having assisted in various structural exterminations. The checklist was developed in conjunction with the provincial structural pest control association. To perform commodity fumigations in food processing plants and warehouses, the Class F licensee must also pass a special fumigation exam and have practical experience.

For all other licence categories (except Class M which is an endorsed, or special purpose, licence), new applicants must now complete a Homestudy Course for Pesticide Applicators offered by Lakeland College (Vermilion, Alberta). Candidates must also have one season of practical experience. Alternatively, depending on the licence category, a candidate either has to attend a 1 or 2 day training course staged by the Department of Environment, or attend a 1 to 5 day "practical" course at Olds Agricultural College (Olds, Alberta) where the emphasis is on pest recognition and application techniques.

There is also a written licensing examination for each category that must be passed.

Annually, the applicator is required to submit a medical report and a summary of pesticide applications. An applicator's licence expires after three years. Presently, there are no plans for re-examination if a renewer has met the training standards mentioned above (J. McLean-Mueller [1], pers. comm.). Some individuals may, however, be required to take one of the correspondence courses if they have not done so on their own.

A licensed applicator may supervise any number of assistants. Supervision is defined in the Regulations (3) as attendance at least once daily at every different type of extermination. For example, a serviceperson for a structural pest control company performing basically the same routine with the same pesticides throughout the day would only need to meet with his/her licensed supervisor once a day (J. McLean-Mueller, pers. comm.).

An applicant with insufficient qualifications for an applicator's licence may be issued an interim licence, valid for one year only, to gain the necessary practical experience and skills. Exterminations, however, must be performed under the supervision of a licensed applicator. A "permanent assistant" need never be licensed, but must provide a yearly medical report (3).

Different legislation, namely Regulation 213/80 (2), is responsible for the scheduling of pesticides, fumigation and fogging procedures, the use of certain baits (e.g. strychnine and zinc phosphide) in structural exterminations, and vendor licensing.

New Brunswick. Regulation 83-57 under this province's Pesticides Control Act (35, 36) specifies nine categories of Pesticide Applier's certficates.

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[1] Training & Extension Officer, Pesticides Chemicals Branch, Alberta Dept. of the Environment, Edmonton, Alberta.

Services provided by the structural pest control industry require Classes E and G licences. The latter class is for indoor fogging and fumigation. No age limit or minimum educational level is given in the legislation. Applicants for a certificate are required to give details and documentary evidence of related practical experience and training. If this satisfies the Pesticides Advisory Board a certificate is issued. The Board may require an applicant to complete courses of study or receive supervised training appropriate to the class of certificate being sought. Every person applying a pesticide for an Operator must hold a valid certificate which is subject to annual renewal.

CERTIFICATION OF PESTICIDE APPLICATORS IN U.S.A.

Federal Legislation

The United States of America has the advantage of peremptory federal legislation to provide uniformity in pesticide applicator certfication. It is the Federal Environmental Pesticide Control Act of 1972 [2] (FEPCA) and its Regulations (54, 56), which are administered by the Environmental Protection Agency (EPA).

Pesticides are classified in the Act (56) as General use or Restricted use (or both), based on use and not by the chemical per se (25). Restricted use products can only be applied by or under the "direct supervision" of a certified applicator - either private or commercial. A private applicator can only use (or supervise the use of) restricted pesticides for the production of

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[2] This act is better known as the Federal Insecticide, Fungicide and Rodenticide Act (=FIFRA Amended 1972). The act was further amended in 1975, 1978, 1980, and 1981. The reader seeking an historical (1964) perspective on FIFRA administration and on the pesticide registration process is referred to Harris and Cummings' (21) review.

an agricultural commodity on private property or without compensation on the property of another person. A commercial applicator is one who uses (or supervises the use of) restricted pesticides for any purpose or on any property other than as above.

Restricted use pesticides can be applied by non-certified persons if under the "direct supervision" of a certified applicator. This means that an application may be performed by a "competent person" acting under the "verifiable instructions" of a certified applicator who is available if and when needed (54, 55, 56). In many situations the physical presence of the latter is not required. Several criticisms of this type of supervision can be made. Unless instructions are given in writing how are they verifiable? Also, the assumption must be made that the instructions cannot be misinterpreted. Further, the competency of the uncertified individual is a subjective determination made by the certified applicator who is also the employer or supervisor. If a mishap occurs, is the uncertified person to be blamed? However, the gravest concern has to be the unlimited number of competent persons that the certified applicator may supervise. It is the usual practice in American structural pest control companies that only the owner/operator and, in larger concerns, the supervisors are certified. The failing of this method of supervision is evidenced by the changes now occurring in pesticide legislation. In Massachusetts, as of March 1983, only licenced commercial applicators are permitted to use chlordane (32). New York passed emergency regulations, in February 1984, that require all termiticide applicators to be certified (33). These changes are being prompted by an ongoing termiticide controversy resulting from misapplications, associated health problems, and contamination of private residences.

The individual states are permitted under FIFRA to administer their own

applicator certification, provided they submitted a plan which was approved by the EPA Administrator (16, 56). By 1978, all states had approved plans, passed the enabling legislation, and had active certification programs (17, 43). Each State has designated a Lead Agency, which has regulatory responsibility to ensure that standards for certification conform with those prescribed by the EPA. The Lead Agency is usually a state department of agriculture or environment. Training courses for applicators are offered through the Cooperative Extension Service located at each state university.

Part 171 of EPA Regulations (54), made under the authority of FIFRA, established ten certification categories for commercial applicators. Category 7 is designated as Industrial, Structural and Health-Related Pest Control. State plans are allowed to adopt these categories as needed, and may establish appropriate subcategories as are necessary. Although terminology may vary, most state laws have at least three subcategories (under the purview of FIFRA's Category 7) in common, namely, general pest control, termites and other wood-destroying organisms, and fumigation. The control of mosquitoes and other arthropod pests of public health importance is usually another subcategory or a separate category.

Standards for certification of commercial applicators are also established by Part 171 of EPA Regulations (25, 54). Competence is determined by written examination, and may also involve performance testing. The general standards of competency, upon which the core exam is based, for all categories of commercial applicators cover eight subject areas, namely, pesticide label comprehension, safety, environmental consequences of use/misuse, basic pest development and recognition, fundamentals of pesticide use including dilution procedures, equipment use, application techniques, and laws and regulations. The specific standards of competency for the various category exams require a practical knowledge of pest problems, environmental and health concerns, and

application techniques and precautions. The knowledge standard prescribed by EPA Regulations (54) for Category 7 (structural pest control) is given below as an example:

"Applicators must demonstrate a practical knowledge of a wide variety of pests, including their life cycles, types of formulations appropriate for their control, and methods of application that avoid contamination of food, damage and contamination of habitat, and exposure of people and pets. Since human exposure, including babies, pregnant women and elderly people, is frequently a potential problem, applicators must demonstrate practical knowledge of the specific factors which may lead to a hazardous condition, including continuous exposure in the various situations encountered in this category. Because health related pest control may involve outdoor applications, applicators must also demonstrate practical knowledge of environmental conditions, particularly related to this activity."

The EPA based its certification standards on an "operational" level of knowledge (i.e., practical knowledge), rather than on an "academic" level which requires a comprehension of the principles and practices of pest control in addition to practical knowledge (25). The objective of this approach was to increase competency in the safe use and handling of pesticides, while minimizing health and environmental hazards. In practice, however, pesticides are usually applied in a rote manner by unlicensed personnel under the "direct supervision" of a certified applicator who is rarely in attendance. Furthermore, the shortfall of this expedient approach is evidenced by the many persistent pest problems in urban structures and the unnecessary environmental contamination, both of which may be attributed to improper pesticide placement or ineffective application techniques. Treatment procedures requiring the use of a basic understanding of pest ecology would mitigate these factors.

State Legislation

About 30% of the states have specific Structural Pest Control Acts (5). Among them are Illinois, Colorado, Arizona, North Carolina, Texas and California. A much higher level of skill and competence is required in those states with this type of legislation, than in those without it (7). The

latter states have pesticide laws that are broad in scope because they set the requirements for all categories of commercial applicators, including Category 7 (structural pest control). The author has reviewed the legislation of more than 40 states and presents the following synopsis of certification requirements for 16 of them to show the variation. It is important to note that these requirements are for those who supervise pesticide applications.

New York. To be eligible as a certified commercial applicator in this state an individual must be at least 16 years of age, have 3 years of full-time related experience (within the last five years), and must pass the written core and category examinations (37). If, however, the candidate has successfully completed a College-level vocational course that covers the topics listed in the above description for Category 7, s/he may be permitted to take the examination and be provisionally certified for at least one year until the experience requirements have been met. Licensed applicators must be recertified after 5 years. Attendance of a minimum of three approved refresher courses (or equivalent number of continuing certification units) within this period, combined with a history of satisfactory performance, fulfills the recertification requirements.

Colorado. This state has a Structural Pest Control Act (14). To obtain a licence, 2 years of related experience (one of which must have been in the last five years) are required. Each year of university- or college-level training in structural pest control is considered the equivalent of 3 months' practical experience. A degree with a major in Entomology (or equivalent) and "sufficient" practical experience also meets the requirement. Candidates must pass an oral and written examination.

Illinois. This state also has a Structural Pest Control Act that is administered by the Department of Public Health (6). To be certified, an applicant must be at least 21 years of age, have a minimum of 1 year's related

experience, and be successful in the core and category examinations. Licence renewal every 3 years is contingent on attendance at one or more approved training seminars during this period.

Minnesota. This state's legislation is unique in its treatment of structural exterminators. Following the nomenclature of skilled (indentured) trades, three levels of Structural Pest Control Applicator are recognized, viz., Master, Journeyman and Apprentice (30). A person cannot serve in the apprentice category for more than 4 months. Certification is by written examination based on EPA standards outlined above. Applicants for the Master's level must have the "...technical knowledge to properly plan, determine, and supervise..." pesticide use, whereas the Journeyman requires a "...working knowledge in the practical selection and application of pesticides...," also familiarity with pesticide toxicity. The annual licence renewal is conditional upon attending at least one approved continuing education program in structural pest control. Holders of a Master's or Journeyman's licence may also be qualified by examination as a Fumigator.

Kentucky. The pest control legislation (27) for this state requires that applicants for a commercial structural applicator's licence be 18 years of age, have at least 2 years of related experience, and pass a written examination. A person with a university degree in Entomology qualifies without experience. New employees must work under the full-time supervision of a certified applicator for at least thirty days.

New Hampshire. Legislation (49, 50) of this state recognizes two levels of commercial applicators, namely, supervisory and operational. The latter type of applicator must meet FIFRA competency standards which form the basis for the written core and category examinations. Candidates must be at least 18 years of age. Operational applicators have to be physically present at

each pesticide application. The state imposes additional requirements on the supervisory applicator whose category examination is "...more in-depth, specific, and reflective of the experience needed at the supervisory level" (49). An oral examination is also part of the process. To qualify for admittance to the supervisory examination an applicant must either have been licensed at the operational level for 5 years; or have a degree with a major in Entomology (or equivalent) and one year's experience at the operational level; or have graduated from a two-year technical program related to the applicator category and have been licensed at the operational level for 3 years (50). Recertification every 5 years is based on attendance at approved seminars or by re-examination (49).

Connecticut. This state also certifies commercial applicators at the supervisory and operational levels (15). The latter is for employees "... who actively use pesticides in other than a supervisory capacity". To operate a business requires a supervisory licence, the examination for which is both written and oral.

Ohio. Commercial applicators in Ohio are certified by written core and category examinations either as a Custom Applicator who owns or operates the business, or as a Custom Operator who is employed or directly supervised by the former (38). The custom operator may in turn supervise activities in the field, including control recommendations. A "trained serviceman" is a non-certified applicator who has been instructed in the proper use of equipment and materials, but performs only repetitive and routine operations under direct supervision of a certified applicator (38). Recertification of applicators every 3 years is by attendance at one or more approved training sessions within the past two years, or by re-examination (39).

Idaho. This state uses the certification categories of Commercial Applicator and Commercial Operator for the person who owns or operates a pest control business and for his employees, respectively (23). Only the applicator, however, can make recommendations concerning the use of pesticides; the operator cannot. Qualification is obtained by passing written core and category examinations. Recertification after 5 years is by attendance at two approved training sessions within that period, or by re-examination.

Tennessee. To be licensed as a Commercial Pest Control Operator in this state an applicant must have 2 years of related service experience; or have a Bachelor's degree in Entomology (or equivalent); or hold the recognized designation of Registered Professional Entomologist or Registered Sanitarian (52). Applicants must also be successful on the written core and category examinations. Recertification every 5 years is based on attendance at an approved updating workshop, or by re-examination.

Missouri. Applicants from this state seeking certification as a commercial applicator in structural pest control must be 18 years or older, and have either an Associate (2-year) degree with appropriate subjects; or 1 year (within the past three) of related working experience; or have successfully completed a university extension course in pest control plus 6 months of experience (31). Competence is determined by written core and category examinations.

Other States: SC, IA, KS, MI, SD. The South Carolina Pesticide Control Act (18) requires that licensed commercial applicators be at least 18 years old and pass both the core and category examinations. Provision is made for recertification, but no details are given (18). Iowa, Kansas, Michigan and South Dakota have essentially the same requirements (24, 26, 29, 48). Recertification after 3 years (2 for SD) is based on attending one or more approved training sessions, or by re-examination.

Notwithstanding the merits of the various certification systems outlined above, state laws still allow the application of pesticides by non-certified persons! Granted they are acting under the "direct supervision" of a certified applicator, but s/he is rarely in attendance. This writer fails to see how this approach meets the objective of certification which is to increase competency in the safe use and handling of pesticides, while minimizing health and environmental hazards.

Structural Pest Control Training

Specific training in structural pest control at the post-secondary level is offered at very few institutions in the United States (34, 47). While employment opportunities for graduates continue to be excellent, student enrolments are traditionally low. For the latter reason some programs have been dropped.

Purdue University (West Lafayette, Indiana) offers, what is advertised as, the nation's only degree program in Urban and Industrial Pest Control. This Bachelor of Science program was established in 1946. Although well recognized academically, there has only been an average of 3 to 4 graduates per year over the past decade (G.W. Bennett [3], pers. comm.). Purdue also offers a unique Pest Control Technology correspondence course, consisting of 19 lessons based on Truman et al. (53). Upon satisfactory completion of the lessons and a final examination, a certificate is awarded by the university. This non-credit course is excellent preparation for applicator certification, or to simply increase knowledge.

The Entomology department at Pennsylvania State University (University Park, Pennsylvania) has "...an informal structural pest control track in the

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[3] Professor of Entomology, Purdue University, West Lafayette, Indiana

undergraduate major", and gives academic credit for a work period in the industry (47). Penn State also offered a one-year technical (non-degree) program in Pest Control Technology from 1964 to 1975. Of the 90 graduates during this period, 50 were placed in structural and 40 in agricultural pest control. The program was dropped because enrolment was about half that required to cover the cost of instruction (47).

The most successful two-year Associate degree program in Pest Control Technology was offered at the State University of New York (SUNY), Agricultural and Technical College (Farmingdale, New York) (47, 51). This program was in operation from 1967 to 1980. During this period, annual enrolments ranged from 10 to 24 students (A.M. Frishman [4], pers. comm.), with a peak of 18 graduates per year from 1975 to 1977 (34). Formerly in the department of Biological Sciences, the program was renamed the Integrated Pest Management option and placed in the Agriculture department. No students have been admitted to the revised program (M. Smiles [5], pers. comm.).

Delgado College (New Orleans, Louisiana) has a program in Urban Pests Management, organized in 1976, which leads to either a one-year certificate or a two-year Associate degree (34)

A two-year program in Pest Control Technology was implemented in 1971 at Broward Community College (Fort Lauderdale, Florida) (34).

Pinto (44) estimated that the structural pest control industry in the United States had 50,000 service personnel who generated $2.2 billion worth of business in 1980. Kerr (28) reports that 54% of service technicians have a

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[4] President, AMF Pest Management Services, Inc., Farmingdale, New York, and former Professor of Biology, SUNY, Farmingdale.

[5] Chairman, Department of Biological Sciences, SUNY, Farmingdale.

high school diploma, and 30% are certified applicators. Twelve percent are college graduates (28), but it is this writer's observation that these people are the owners of the businesses. According to Snetsinger (47), fewer than 100 people in the industry are graduates of Associate degree programs in pest control technology. It is evident from the above discussion that the structural pest control industry is not attracting people with career preparation for such an environmentally sensitive and socially important function.

THE NEED FOR COLLEGE TRAINING

Structural pest control is perhaps the only skilled occupation for which no formal career preparation is required. The novice pest controller is hired first and trained later. Police work is the only other similarly skilled occupation, that comes to mind, where this is also the usual practice. Although, now, many new constables have post-secondary preparation in law enforcement.

Institutes offering post-secondary career-oriented training proliferated in Canada in the late 1960's. Colloquially referred to as community colleges, they are designated in the various provinces as institutes of technology, colleges of applied arts and technology (Ontario's CAATs), and collèges d' enseignement général et professionnel (Quebec's CEGEPs). Now, secretaries, jail guards, and even nannies go to college for two years to obtain a diploma which is often a prerequisite for employment. Also, government-regulated skilled trades have apprenticeship training programs that require in-college sessions of varying lengths. Some examples from Ontario include: Baker - 30 weeks, Motor Vehicle Mechanic - 24 weeks, Brick and Stone Mason - 22 weeks, Barber - 16 weeks, and Service Station Attendant - 8 weeks (40). The point is that virtually every conceivable vocation has a post-secondary training requirement, and yet none pose a greater potential risk to society and the

environment than the application of toxic chemicals in and around human habitations.

Pesticide usage in a rote manner by inadequately-trained structural exterminators results in unnecessary environmental contamination and health hazards. Some routine service practices that contribute to this situation are offered as examples. It is a widespread practice to fill the sprayer in the client's sink. Proper dilution procedures are rarely understood and often not followed, the 'glug-glug' (i.e., eyeing it) technique being preferred by many. Broadcast applications of insecticides are routinely made without regard to the habitat of the pest organism, and with little or no awareness of non-target effects. Proper safety equipment is rarely worn, especially gloves and goggles. Label precautions for the use of a pesticide product are often ignored, such as not turning off the gas pilot lights when a restaurant is being fogged. Disposal is another problem area. Often surplus pesticide, remaining in the sprayer after a job, is simply poured down the sink drain. These disparaging comments are based on the personal observations of this writer and of students and graduates working in the industry.

The lack of applicator training is reflected in the continued use of outdated, and proven ineffective, methods of pesticide treatment such as baseboard spraying for cockroach control. Ineffective treatment techniques contribute to the many persistent pest problems that occur in commercial buildings. There are many new pest control technologies now available, such as ultra low dosage applications, pulsed baiting with single feeding anticoagulants, ultrasonics in rodent management, and pheromone monitoring in food processing plants. An understanding of the underlying principles is required in order to effectively use these new technologies. The applicator must also have a knowledge of pest ecology to select the appropriate treatment procedure. The breadth and complexity of skills and knowledge required to do structural

pest control strongly suggests the need for formal career preparation.

Most of the training in the industry is strictly on the job. The average pest control company is a small business [annual earnings $170,000 US/annum (28)], and cannot afford the time or money to properly train new employees. Typically, the instruction is barely enough to satisfy the regulatory agency. The large companies do, however, hire training directors and spend considerable sums of money on audiovisual aids and books, but much of the in-house training is ad hoc. Thus, the services provided by the different companies are extremely variable.

The structural pest control industry is not guided by formal performance standards (=job specifications). Much to clients' dismay, great disparities occur in the pricing and in the servicing provided. As more people enter the industry with appropriate career preparation, treatment procedures should become more uniform (but continually improve as new technology is incorporated). This writer is aware of a few progressive companies that have developed job specifications for clients who, in turn, have used the specifications as a basis for calling tenders. Thus the industry will develop service standards, and gradually assume other self-regulating functions, as the number of technically trained people increases.

The structural pest control industry does have a poor public image. The very nature of the work no doubt contributes in some measure to this perception. A major factor, however, is the way in which the service is marketed and performed. Pest control servicemen/women are paid only for what they do, and not for what they know. That is, the technician will spray the baseboards in a restaurant or apartment service areas so that s/he is seen by the client to be performing the service. [Notwithstanding the recognized fact that this practice serves no useful purpose, at least for cockroach control!] Alternatively, there must be at least a slight pesticide odour in the air after the

technician has left the premises. This approach contrasts sharply with the repair service industries that charge the client for a 'trip call'. For example, a washer-dryer repairman/woman charges a flat fee ($25, 1983 rate in Lindsay, Ontario) to cross the customer's threshold in response to a service call. Up to this point the serviceperson is paid for what s/he knows. There is an additional charge for whatever service is performed on the appliance; i.e., the serviceperson is paid for what s/he does. Thus, the pest control industry must change from a periodic ('automatic') preventive-treatment service to a preventive-inspection/monitoring service which includes integrated pest management (IPM) recommendations. The management prescription may or may not include chemical treatment for which an extra fee may be required. This change in emphasis from treatment-oriented to inspection-oriented is contingent on personnel who have the technical skills to perform the service and, equally important, who can communicate their observations and recommendations to clients.

So it is that the structural pest control industry is beset by a cycle of inadequate training, underpricing, unsatisfactory service, and poor public image. The three changes discussed above must occur if the industry is to be acknowledged by the public as a professional service industry, i.e., there must be (1) recognized post-secondary career preparation; (2) development of performance standards (=job specifications); and (3) emphasis on inspections and monitoring with IPM recommendations, rather than a treatment-oriented approach.

It is possible for a pest control serviceman/woman to develop a high level of proficiency without the benefit of post-secondary training. Given the three optima of a varied work experience, an ongoing in-service training program, and directed private study, the complete technician will be able to diagnose and define typical pest problems in urban situations; recommend

control strategies compatible with existing environmental constraints; determine the cost of treatment; apply pesticides in a safe and efficient manner; and respond to public enquiries on these matters. To accomplish these tasks the technician must have developed skills that enable him/her to:

(1) identify/recognize common structural and landscape pests and be familiar with their behaviour and habitat requirements;

(2) define the extent and severity of infestations and locate their origin;

(3) provide estimates to clients for routine pest control services;

(4) select and use pesticides to effect control based on knowledge of the chemical's efficacy, mammalian toxicity and persistence in the environment;

(5) operate, calibrate and maintain pesticide application equipment;

(6) recommend practices to prevent re-infestation by pests, e.g., sanitation, barriers, harborage reduction and habitat management; and

(7) communicate orally with clients and write technical reports for company supervisors on pest situations.

The three optima for skill development occur rarely, or inconsistently, in the industry so that technicians have widely varying levels of proficiency. The above performance objectives (adopted for the college program presented herein) are more likely to be realized through a structured curriculum of studies, than on a piecemeal or ad hoc basis.

PROFILE OF A PROVEN COLLEGE PROGRAM

Establishment of the Program

The purpose of this section is to provide an historical account of the program's development, which may serve as a guide for those contemplating to establish a similar training program. Several enquiries in this regard have already been received.

The owners and managers of several structural pest control companies in the Toronto area were contacted by telephone, in September and October 1980, to determine if there was an interest in college-level career preparation for service personnel. If their reaction was favorable, individuals were asked to serve on the Program Advisory Committee. It was suggested by one owner that a presentation should be made to the Ontario Pest Control Association (OPCA).

The OPCA invited this writer to their monthly meeting in Woodbridge, Ontario, on October 14, 1980 to explain the proposed program. After presenting the need for career preparation in structural pest control, the objectives of the program and a suggested curriculum were outlined. The length of the program would be either one or two years, leading to a certificate or a technician diploma, respectively, depending on industry feedback. Vigorous discussion, with numerous questions and concerns being raised, followed for almost two hours. The 15 to 20 members in attendance were keenly interested, although there was some skepticism.

Funding for new programs in Ontario's CAATs was very tight in the Fall of 1980. Only a well-documented need with a show of strong support from industry would receive consideration from the colleges' governing body, the Council of Regents.

The Program Advisory Committee was composed of representatives from industry, government and Sir Sandford Fleming College. The Committee held meetings on October 22 and November 25, 1980 and January 13, 1981 in Lindsay, Toronto and Woodbridge, respectively. Ten people (including 3 from industry) were in attendance at the first meeting. The increasing interest was evidenced by the 23 people attending the third meeting and representing 12 pest control companies and 4 government agencies. The purpose of these meetings was to discuss the need for training, curriculum content, safety and health

concerns, field placement, and summer and graduate employment. The reader is referred to Appendices 3,A and 3,B (pp. 60 - 80) for a more detailed account of the above.

It was decided at the first meeting to conduct a survey of the Ontario structural pest control industry to get data on employment prospects for graduates, and to get comment on the proposed curriculum from as many people as possible. This writer designed a survey package consisting of a questionnaire on the need for such a program including estimated manpower requirements for the 1981-86 period, a 5-page detailed program description, and a covering letter soliciting industry input (see Appendix 3,K on pp. 101 - 110). This package was mailed on November 10, 1980 to the 125 companies comprising the industry in Ontario. A follow-up letter was sent to the same companies on November 14, encouraging their input and a return of the questionnaires as soon as possible. Personal telephone calls were made to 15% of the companies on November 19. Thirty-six questionnaires had been returned by November 24, and 42 by December 19. It was noticed that no questionnaires had been received from two broad geographical areas in southern Ontario which suggested they were lost in the mail. A second survey package was mailed to 20 companies in January 1981. The final tally of the employment survey was made on February 10. A total of 46 questionnaires were returned from the 125 companies canvassed for a return rate of 37%. This is considered high for a mail survey.

The results of the employment survey are summarized in Appendix 3,C (p. 82). It was estimated that a total of 188 Route Servicemen/women (Technicians) would be needed by the respondents over the five-year period from 1981 to 1986. This figure includes both replacements due to attrition and promotion, and possible new positions resulting from increased business. There was also an indicated need for experienced personnel, e.g., 'Specials' men/women (Senior

Technicians who specialize in one-time treatments, usually in private residences, for pests such as carpenter ants, fleas and wasps) and Supervisors. This provides opportunities for career advancement. Summer employment prospects also appeared excellent because of the demand for seasonal workers during the May to August period. In addition, letters were received from several pest control companies and the Ontario Pesticides Advisory Committee supporting the proposed program. These are also presented in Appendix 3,C (pp. 83 to 88), as are comments excerpted from the questionnaires (see p. 89).

The proposal for the Pest Control Technician program was submitted to the Council of Regents in March 1981, after receiving endorsement from the College President and the Board of Governors. The Council approved the program on April 22, 1981. The submitted proposal constitutes Appendix 3 of this paper. Further to the abovementioned sections of this appendix, other sections provide detailed information on program and course objectives, capital and operating costs, and other pertinent aspects.

A fourth meeting of the Program Advisory Committee was held in September 1981, during the program's inaugural month of operation. The purpose was to finalize details on the industrial work period (=field placement) for 1st-year students in February 1982. It also provided an opportunity to promote the benefits accruing to industry from the facilities acquired for the full-time program, viz., proposed short courses and workshops for the following winter. A fifth meeting to assess the program's effectiveness after three years of operation is scheduled for the winter of 1985.

Structure of the Program

Curriculum. The Pest Control Technician (PCT) program at Sir Sandford Fleming College is the only one of its kind in Canada. The program's curriculum is also more specialized in pest control than any similar Associate degree program in the United States. The higher technical content in this

curriculum is typical of diploma training which is terminal in nature, whereas Associate degree curricula have to be more general so that graduates can continue their studies towards a Bachelor's degree, if they wish.

The PCT program is one of nine 2-year technician diploma programs in resource management offered at the College's School of Natural Resources in Lindsay, Ontario. All (600 or so) students admitted to the campus each fall begin their studies in a common first semester. In addition to compulsory courses in Communications and Mathematics, they must take at least 6 of the eight introductory courses in the major areas of study to give them a broad background in natural resources before specializing in a particular program. Eight courses are required for full credit in Semester One. Students wishing to enter the PCT program must complete the introductory Pest Management course (# 400190). They are also expected to take the 1st-semester courses in Forestry, Agriculture, Fish & Wildlife, and Heavy Equipment.

The PCT program was designed to provide the pest control industry with service technicians who have practical training in pest recognition and in the safe application of pesticides in the urban environment. Although greater emphasis is placed on structural pests, the objective is to give a broad enough exposure to meet the 'full service concept' which is increasingly being demanded of the industry. Students receive 'hands on' experience with pesticide application equipment and they assist in actual exterminations and fumigations under the personal supervision of college instructors who are also licensed exterminators.

The performance objectives of the PCT program, given in Appendix 3,D (p. 90), remain as originally proposed. The program of studies and detailed course descriptions, developed by the author, follow on pages 28 to 32, and are quoted directly from the College's calendar (45). Three years of teaching the curriculum have given a better perspective to program direction and added

more substance to the subject areas. Essentially, however, the curriculum has not undergone any major changes from the original proposal. This can be verified by the reader referring to Appendix 3,E, F and K (pp. 91 to 94, and 101 to 110). Representative course outlines for seven courses taught in 1983-84 are presented as Appendix 1 (pp. 41 to 48). These outlines include major lecture and laboratory topics by week, evaluation schedules, and text titles.

PROGRAM OF STUDIES

COURSE NO.	COURSE NAME	PERIODS/WEEK
FIRST YEAR		
First Semester		
400101/103	Developmental Reading & Communications	4
400110	Mathematics	3
400120	Cartography	3
400130	Agriculture	3
400140	Fish & Wildlife	3
400150	Geology	3
400160	Heavy Equipment	3
400170	Forestry	3
400180	Resources Drilling	2
400190	Pest Management	2
	8 Courses are required for full credit in Semester One	
Second Semester		
400202/204	Developmental Reading & Communications	3
431290	Chemistry for Pest Control I	4
431291	Mathematics for Pest Control	3
431292	Pesticides	5
431293	Pesticide Application Techniques I	5
431294	Urban Entomology I	5
431295	Field Placement	-
431296	Spring Camp	-
SECOND YEAR		
Third Semester		
-	General Studies	2
431302	Business Communications	3
431390	Chemistry for Pest Control II	3
431393	Pesticide Application Techniques II	5
431394	Urban Entomology II	4
431395	Field Placement	-
431396	Vertebrate Pest Control	4
431397	Vegetation Control	5
Fourth Semester		
-	General Studies	2
431492	Spring Camp	-
431493	Landscape Pest Control	5
431494	Urban Entomology III	4
431495	Field Placement	-
431496	Principles of Integrated Control	3
431497	Urban Tree Pest Control	5
431498	Business Practice	4
431499	Management for Supervisors	3

PEST CONTROL TECHNICIAN PROGRAM

COURSE DESCRIPTIONS

400190
PEST MANAGEMENT
Definition of pest and types. Their role in shaping man's history and their socioeconomic impact on the modern world. Pesticide legislation, labels and terminology. Kinds and uses of common pesticides. Application equipment. Effect of pesticides on wildlife. Causes of pest outbreaks. Principles of integrated pest management (IPM). Examples of IPM in fruit orchards, forestry and commercial structures. Careers in pest control.

431290
CHEMISTRY FOR PEST CONTROL I
This lecture course covers the basic concepts of organic chemistry using pesticides as examples wherever possible. Atomic structure and chemical bonding. Structural formulae, nomenclature, properties and reactions of the various groups of organic compounds. Classification of the organophosphate insecticides. Gas laws.

431291
MATHEMATICS FOR PEST CONTROL
Calculations used in pest control - spray tank capacity, dilution of concentrates, equipment calibration and application rates (broadcast and row crops), and volumetric for fumigation. Descriptive statistics, types of distribution, the regression line, confidence intervals and chi-square test of goodness of fit.

431292
PESTICIDES
Legislation - Pest Control Products Act (Canada), Pesticides Act (Ontario), OPAC and pesticide schedules, and FIFRA (USA). Cholinesterase inhibition, symptoms of pesticide poisoning and first aid. Types of formulations including slow-release such as microencapsulated and lacquer-based products. Use of adjuvants. A survey of insecticides, rodenticides, herbicides and fungicides considering properties, mode of action, LD50, hazard, registered uses and residual effect. Pesticide interactions - synergism, antagonism and potentiation. Pesticides in the environment - degradability, persistence and residues, and pest resistance. Students will perform practical experiments on pesticide solubility, the effect of different substrates and aging of deposits on the residual efficacy of structural insecticides, blatticide repellency and the effect of water pH on insecticide efficacy.

431293
PESTICIDE APPLICATION TECHNIQUES I
Use and care of safety equipment - gloves, goggles, cartridge respirator, canister gas mask and self-contained breathing apparatus. Procedure for preparing finished sprays - calculating proper dilution, use of transfer container and triple rinsing. Storage, transportation and disposal of pesticides. Decontamination of spills and application equipment. Operation, calibration and maintenance of hand-operated compressed-air sprayer, knapsack sprayers, hand and power dusters, mist blower, thermal and mechanical aerosol

generators, ULV applicators, truck-mounted hydraulic sprayer with handgun and PTO field sprayer with boom. Use of bait stations, mechanical rodent traps, glueboards, electrocuting light traps and automatic aerosol dispensers. Practice specific application techniques - crack & crevice, ULVing and fogging.

431294/431394
URBAN ENTOMOLOGY I & II
Identification/recognition, life history, behaviour and habitat requirements of public health, nuisance, stored food, wood-destroying, and other structural pests including cockroaches, fleas and bed bugs, silverfish, food pests, flies, termites and carpenter ants, mosquitoes, wasps and bees. Techniques for monitoring/surveying pest populations and locating the sources of infestation. Sanitation/harborage reduction, equipment design and structural pestproofing as essential aspects of pest management. Control strategies appropriate to commercial/industrial buildings and single/multiple family dwellings. Post-treatment assessment.

431295/431395/431495
FIELD PLACEMENT I, II & III
The student's first placement (for 2 weeks early in semester 2) will be with a route serviceman to give a broad exposure to pest control work and to help determine personal suitability. Subsequent placements are of a more specialized nature. In semester 3 the student is offered a choice of termite treatment, small animal control or indoor plant maintenance (includes greenhouse spraying). The field placement in spot fumigation is handled differently. The machinery in a food-processing mill is treated monthly on weekends by pest control students under the direct supervision of licensed exterminators. The objective is to become familiar with milling equipment, measure the mill to determine the volume for space treatment with an insecticide, determine the dosage of fumigant required for treating machinery, and assist in the injection of fumigant. Each student must participate in a prescribed number of visits for credit. Thus, placements are for a total of 5 weeks over 3 semesters. The student will be required to submit reports on these experiences. S/he will also be assessed by the placement agency.

431296/431492
SPRING CAMP
The objective is to give pest control students practical activities and field trips in areas which can not be covered adequately during the regular academic year. Licence preparation short courses will also be given. Students will write the provincial licensing exams for Structural Exterminator classes 4 and 3, and Land Exterminator classes 1 and 3 during these two periods.

431302
BUSINESS COMMUNICATIONS
This course is designed to meet the high degree of oral and written communication skills needed in the structural pest control industry to document pest problems for clients, to generate sales and service accounts, and to deal with inquiries of concern about the use of pesticides. Writing techniques and styles will be examined and considerable practice given to preparing reports (technical, information and inspection), proposals (project and service/sales) and business letters. Oral presentations will be made and techniques of telephone communication studied. The student will be required to submit a project proposal on some aspect of pest control technology. The

project is to be undertaken in semester 4 as part of the Urban Entomology III course (see 431494).

431390
CHEMISTRY FOR PEST CONTROL II
This laboratory course emphasizes the physical and chemical properties of pesticide solvents, emulsifiers and formulations. Students will perform practical experiments on specific gravity, flash point, pH and hydrolysis, emulsification, vapor pressure and the simple formulation of a botanical insecticide. Demonstration of pesticide residue analysis using gas chromatography and involving sample collection and extraction.

431393
PESTICIDE APPLICATION TECHNIQUES II
Types of fumigations. Properties of fumigants, products and schedules. Respiratory protective equipment. TLVs and detection methods for concentrations of fumigants in the air - halide leak detector, gas detector tubes and thermal conductivity analyser. Spot (machinery) fumigation - methods of application and calibration of dosage. Procedures for tarp fumigation. Space fumigation - inspection, licence/permit requirements, calculation of dosage, sealing techniques and gas release. Hard rodenticides - types, uses, licence/permit requirements, prebaiting, deployment and mapping of bait stations. Assist in actual exterminations and fumigations.

431396
VERTEBRATE PEST CONTROL
Biology and behaviour of rodents, bats, birds and other vertebrate pests. Techniques for detecting rat/mouse infestations, for deployment of traps, glueboards and poison bait stations, and for use of ultrasonic devices. Sanitation and ratproofing in conjunction with rodenticides. Bird control using habitat modification, live trapping, exclusion (e.g. netting), sticky repellents, treated baits and toxic perches. Bat control emphasizing exclusion. Use of live traps for control of raccoons, squirrels and other small mammals. Animal repellents. Use of aluminum phosphide and calcium cyanide (with foot pump) for ground-burrowing rodents.

431397
VEGETATION CONTROL
Hydraulic sprayer components and types of pumps (centrifugal, gear, roller, diaphragm and piston). Effect of different nozzle orifices on spray patterns and droplet size. Factors affecting spray deposit and drift. Calibration of PTO field sprayer with boom. Weed identification and biology. Herbicide classification by mode of action and by chemical properties (herbicide families). Timing of application. Herbicide placement and selectivity. Application techniques - broadcast, directed, band and spot. Spray drift, volatility and vapor drift. Soil sterilants and total vegetation control, soil fumigation and growth regulators. Soil colloids and herbicide inactivation. Aquatic plant and algae control. Other methods of weed control - cultural, machanical and biological.

431493
LANDSCAPE PEST CONTROL
Recognition and control of turf pests - chinch bugs, sod webworms, white grubs, cutworms, snow molds, Helminthosporium diseases, dollar spot, brown patch, Fusarium and Pythium blights, fairy ring and powdery mildew. Recog-

nition and control of pests on herbaceous plants - defoliators, leaf miners, borers, aphids, earwigs, slugs and leaf spots. Indoor plant maintenance - growth requirements, diagnosis of disorders, control of pests with chemical sprays and cultural practices. Biological control of greenhouse insects.

431494
URBAN ENTOMOLOGY III
Sanitation and pest inspections. Principles of fumigation - boiling point and molecular weight, sorption and desorption, dosage and concentration, conversion of concentration values (wt/vol to ppm and %), CT products, TLV-TWAs and properties of specific fumigants. Detailed planning of a space fumigation. A major portion (50%) of the evaluation in this course is based on a student project dealing with some aspect of pest control technology. Both a written report and seminar presentation are required. The project proposal must be developed and submitted in the third semester as part of the Business Communications course (see 431302). Suggested topics include saturation vs. pulsed baiting, pesticide efficacy testing, the use of ultrasonics in rodent management or for other pests, the effect of structural insecticides on different carpet dyes and fabrics, bird control, and the use of a patternator to show factors affecting spray deposit and drift.

431496
PRINCIPLES OF INTEGRATED CONTROL
IPM principles are reinforced through assigned readings in trade/scientific journals. Students are examined on their comprehension of the selected topics and are encouraged to engage in critical discussion. Some examples are anticoagulant rodenticides and secondary poisoning, pulsed baiting, new application techniques, carpet staining, biomonitoring with pheromones, ultrasonic rodent management, boric acid as a pesticide, insect-disease relationships, public health legislation and managing pesticide resistance.

431497
URBAN TREE PEST CONTROL
Tree growth and nutrient requirements, site selection. Identification and control of common shade tree insects and diseases - defoliators, leaf miners, leaf beetles, borers, sucking insects, gall makers, leaf spots, wilts, cankers and diebacks. Diagnosis of non-infectious diseases. Dormant spraying. Tree injection for pest control. Tree decay concepts - heartrot vs. compartmentalization. Recognition of hazard trees. Detection of decay in standing trees by symptoms/signs and by instrumentation (i.e. Shigometer). Treatment of decay - pruning and surgery.

431498
BUSINESS PRACTICE
Fundamentals of accounting, cost control and profit margins, contract law, insurance and liability, guaranties and warranties. Application of computers in the pest control industry. Marketing - advertising and sales techniques.

431499
MANAGEMENT FOR SUPERVISORS
Planning, organizational goals and MBO. Problem solving and decision making. Delegation of tasks, motivation and discipline. Types of leadership. Problems of communication within the company and with the client. Personal attitude toward the job, craftsmanship and professional development. The student will be required to organize a service route detailing the schedule of calls, type of service, fees, overhead and profit.

Field Placements. Industrial work periods, for a total of 5 weeks over three semesters, are an integral part of the PCT program. There are three field placements, and they are treated as academic subjects for which credit must be obtained. The student's first placement (for 2 weeks early in semester 2) is with a route serviceman to give a broad exposure to pest control work and to help determine personal suitability. Subsequent placements are of a more specialized nature. In semester 3, the student is offered a choice of indoor plant maintenance (includes greenhouse spraying), termite treatment, or small animal control for a 2-week period. The student is required to submit a report on his/her experiences and is assessed by the placement agency. The operational details of these field placements can be obtained by referring to the agreement forms presented in Appendix 2 (pp. 49 to 53). The field placement in spot fumigation is handled differently because of the shutdown requirement and the periodical nature of the service. The machinery in a food processing mill is treated monthly on a weekend (throughout the second year) by pest control students under the direct supervision of licensed exterminators. The objective is to become familiar with milling equipment, measure the mill to determine the volume for space treatment with an insecticide, determine the dosage of fumigant required for treating machinery, and assist in the injection of fumigant. Each student must participate in a prescribed number of visits for credit. This particular field placement will have to be changed to one in space fumigation because of the suspension of ethylene dibromide registrations by Agriculture Canada on February 28, 1984 (13).

Summer Work Period. This is required of students between the first and second years.

Field Trips and Operations. Trips to food-processing and other industrial plants, the Agriculture Canada fumigation laboratory, and pest control seminars are another important aspect of the training. In semester 3, about 1.5 days

per week are spent performing actual exterminations and fumigations both on the campus and in the community. Second-year students are also responsible for the pest control service at the College.

Spring Camp. This is a 2.5 week period, after the final examinations in semesters 2 and 4, set aside for practical exercises and extended field trips which cannot be done during the regular academic year. Licence preparation courses are also given and students take provincial licensing examinations at this time.

Licensing. First-year students are given the opportunity to obtain an Ontario Structural Exterminator Class 4 ('apprentice') Licence in Spring Camp (after semester 2) to prepare them for summer employment. Sometime during semesters 3 or 4, 2nd-year students take their Structural Exterminator Class 3 ('journeyman') Licence. They also sit the Land Exterminator Classes 1 (herbicides) and 3 (insecticides/fungicides) Licences during Spring Camp (after semester 4).

Results

The success of the PCT program is contingent on its acceptance by students as a viable career path. The College's common first semester is unique in that it gives students a broadened perspective of the less glamorized areas in resource management. As a result, about 60% of them change their program choice before starting semester 2 (N.L. Cooper [6], pers. comm.). This has proved an important source of students, and will probably continue to be so. Aggressive marketing and promotion are also starting to pay off, as evidenced by the steady increase in admission applications indicating the PCT program as first choice. One application was received in 1981, 3 in 1982, 4 in 1983, and 15 in 1984.

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[6] Director of Admissions, Sir Sandford Fleming College, Lindsay, Ontario.

The disposition of students in the PCT program over the three-year period from 1982 to 1984 is summarized in Table 1.

TABLE 1

Disposition of Students in the Pest Control Technician Program

SCHEDULE	NUMBER OF STUDENTS		
	1982	1983	1984
January Enrolment (Semester 2)	14	18	17
Field Placement (Late February)	14	17	14
Summer Employment	12	12	13
September Enrolment (Semester 3)	12	12	10
Graduates (May)	0	11	9
Employed in Industry (September)*	1	11	12

* These figures include both graduates and students who either did not return to college after summer employment, or did not graduate (i.e., dropped out or failed), but are employed full time in the pest control industry.

Excellent results have been achieved by PCT students and graduates on government licensing examinations and in job placement.

In the three-year period from 1982 to 1984, 42 of 44 (95%) 1st-year students were successful in obtaining their Ontario Structural Exterminator Class 4 ('apprentice') Licence. All licensed students have found employment in structural pest control for the summer. The 20 graduates had a minimum of a Structural Exterminator Class 3 ('journeyman') Licence by semester 4. Just prior to graduation, 4 of the 1983 class passed their Structural Class 2 examination which permits the use of spot fumigants, bird control products and

acute rodenticides. Five of the 1984 graduates obtained their Class 2 within three months of leaving College. Most (95%) graduates also hold Land Exterminator Classes 1 (herbicides) and 3 (insecticides/fungicides) Licences, two of them have Water Exterminator Licences, and another two have Structural Exterminator Class 6 Licences endorsed for Indoor Plant Maintenance.

More than 20 structural pest control companies in Ontario (and also in Manitoba and Alberta) have provided field placements, summer work experience and/or continuous employment for 45 students and graduates. One national company has used the services of students and/or graduates in 11 different urban areas. As of September 1984, after two graduating classes, 24 graduates and non-graduates have obtained full-time employment in the industry and the 10 returning 2nd-year students received related work experience in the summer.

The PCT program facilities have been used to give in-service training to pest controllers, food processors and health inspectors. Eight short courses have been offered since the spring of 1982. Most were 2-day licence preparation courses followed by the written or oral government examination on the third day. This type of course has proven immensely popular with industry. Examination success rates are substantially higher than those for which private study is the basis for preparation. A computer workshop (1982) and an ultrasonic rodent management seminar (1983) were also well received. The ultrasonic seminar, with an equipment show, was the first of its kind in North America, bringing together researchers, manufacturers and end-users (pest controllers and food processors). About 55 participants from all over the continent were in attendance.

Conclusions

It is not possible to quantitatively assess the impact of the program's graduates on industry practices at this early date. There are only 20 graduates, the first of whom have only been working full time since May 1983. However, the criteria for this type of evaluation should be defined now, for use after more graduates have entered the industry and some have become supervisors. The criteria selected should be compatible with the objectives of pest management, while recognizing the economic realities of service production.

If PCT graduates use their knowledge of pest ecology, pesticides and application techniques to determine appropriate treatment procedures, then they should achieve better control (if not elimination), using less pesticides, than servicepeople who have only on-the-job training. The level of control can be quantified by the incidence of product damage or contamination; by monitoring for pests in regularly-serviced accounts; by the frequency of 'call-backs' (i.e., repeat treatments because of poor control); and by client response. The production records for contract services and 'specials' (i.e., one-time treatments, usually in private residences, for pests such as carpenter ants, fleas and wasps) can be analyzed for the frequency of 'call-backs' and contract renewals or cancellations (=client response). In those jurisdictions where pesticide usage reports for each structural application are required by law, it should be a simple matter to compare the volumes of pesticide used by college-trained versus industry-trained technicians.

Presently, only qualitative observations from the regulatory agency, employers and graduates are available on the impact of college-trained technicians on the industry.

The Ontario Ministry of the Environment, which is responsible under the Pesticides Act for licensing Structural Exterminators, recognizes the time

spent in studying pest control at college as the equivalent of related work experience. A Structural Exterminator Class 4 ('apprentice') licensee must have at least 1 year of on-the-job experience before being permitted to take the Class 3 ('journeyman') examination (41). Second-year PCT students have, however, been allowed to take this examination within 7 months of their Class 4 examination, having only a 2-week field placement and a summer work experience in the structural industry.

Ministry recognition of the PCT program is further extended for the next higher category of Structural Exterminator. An applicant for the Class 2 licensing examination must have verifiable experience in spot (=machinery) fumigation, in addition to holding the Class 3 licence for 6 months. However, most small companies rarely perform spot fumigations. Thus, exterminators in their employ have little opportunity to advance to Class 2, and yet the licence is needed to handle the other products restricted to this category. Fortunately for the 2nd-year PCT students, the experience gained on the fumigation field placement (see page 33) has enabled them to immediately sit the Class 2 examination after holding the Class 3 licence for the required period. Forty-five percent of the 20 PCT graduates successfully obtained their Class 2 licence just prior to graduation or a few months later, depending on the date of their Class 3 examination. The success rate of PCT students on government licensing examinations is over 90%, compared to the industry average of about 60% (N.L. Bazinet [7], pers. comm.). Notwithstanding that the oral examinations for PCT students are more rigorous than those for industry people.

Salaries for exterminators in the Ontario structural pest control industry are based primarily on the class of licence held. PCT graduates, thus,

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[7] Structural Pest Control Specialist, Ontario Ministry of the Environment, Toronto, Ontario

receive immediate financial recognition for their technical training because it has allowed them to progress more rapidly than usual through the different licensing levels. This can be illustrated by using the 1984 salary schedule for the largest Canadian pest control company which sets the pace for the industry. This company has five grades of service technician that are based on the licensing system for structural exterminators in Ontario. The initial hiring level (Grade 5) starts at $280 per week for an inexperienced and unlicensed person. To move through the other grades the employee must have the appropriate work experience, pass a company training course, and obtain the corresponding government licence for that grade. A Grade 4 service technician with a Class 4 licence can receive up to $320 per week, a Grade/Class 3 up to $350, and a Grade/Class 2 up to $375 (G. Muldoon [8], pers. comm.). PCT graduates hired by this company have been assigned to the salary grade that corresponds to their government licence without having to take the company training course. The average starting salary for 1984 PCT graduates was $325 per week (46), compared to the above leading rate of $280 per week for an inexperienced person. It should be noted that about 30% of the 24 PCT graduates and non-graduates working full time are employed by this company, the remainder being with smaller companies which usually pay smaller salaries. In addition to salary, most companies also offer a production bonus and/or commission on new contract sales and 'specials'. A vehicle is also provided.

There is anecdotal evidence that PCT graduates are having an impact on industry practices. The graduates, themselves, report that they use less pesticides. By performing an inspection first to try to find the source of pest activity, they are often able to pinpoint pesticide treatments. Further, the

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[8] General Sales Manager, PCO Services Limited, Toronto, Ontario.

graduates will discontinue treating those areas in an account where the problem has been resolved. PCT graduates have also found that regular clients are more receptive to sanitation and pestproofing recommendations when their technical skills are recognized.

Even as a new employee, PCT graduates are often given tasks that are usually handled by an experienced serviceperson. Typically, an inexperienced and unlicensed person assists a licensed exterminator for a varying period, from a few days to a few weeks, then is assigned to a simple route. Only after suitable experience and demonstrated competency would the serviceperson be given a larger route, or be permitted to service important (i.e., corporate) accounts and handle 'specials'. These duties require greater technical skills, generate greater revenue for the company and higher wages for the employee than does normal route work. Newly-hired PCT graduates are expected to be reasonably experienced and competent. They have been asked by employers to show unskilled hirees how to use and service application equipment.

From the early evidence it appears that the PCT program is providing the type of career preparation needed by the pest control industry.

APPENDIX 1

REPRESENTATIVE COURSE OUTLINES

SIR SANDFORD FLEMING COLLEGE
SCHOOL OF NATURAL RESOURCES

Course: PEST MANAGEMENT (#400190) Instructors: PILLEY/RIDOUT/QURESHI/LEAN Semester: Fall 1983 Weekly Hours: 1 LEC 1 LAB

	WEEK	LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
1	Sept. 7- 9	Introduction: course outline and evaluation, technical report	TEXT: Biological Control and Insect Pest Management OR Are pesticides really necessary?	SUPPLEMENTAL EXAM: 40% (Recoverable: 2 film quizzes and end-semester exam only)
2	12-16	Pests in Man's History (Pilley)	LAB: Pesticide application equipment	
3	19-23	Pesticide legislation, labels and terminology (Pilley)	LAB: Pesticide application equipment	
4	26-30	Insecticides: kinds and uses (Pilley)	FILM: Pesticides - Fundamentals of Proper Application	EQUIPMENT QUIZ: 10% (in lab)
5	Oct. 3- 7	Fumigants and Rodenticides: kinds and uses (Ridout)	LAB: Pesticide labels	
6	10-14	Effect of pesticides on wildlife (Ridout)	LAB: Pesticide labels	Report topic due in lab
7	17-21	Herbicides: kinds and uses (Pilley)	FILM: A Gift of Harvest FILM: IPM - How It Works	PESTICIDE CHART: 10% (in lab) FILM QUIZZES (2): 10% (in lab from Oct 17 to Nov. 4)
8	24-28	IPM principles: causes of pest outbreaks, pesticide resistance, methods of control, pest bionomics (Pilley)	FILM: Purely Coincidental FILM: Conquering the Third Great Pest	
9	Nov. 1- 4	IPM principles: monitoring, economic thresholds, selective use of pesticides (Ridout)	FILM: Ratopolis	
10	7-11	Careers in pest control (guests)	Student presentations	WRITTEN REPORT: 30% (in lab) ORAL PRESENTATIONS: 10% (in lab from Nov. 7 to Dec. 9)
11	14-18	IPM in agriculture: fruit orchards (Lean)	Student presentations	
12	21-25	IPM in commercial structures (Ridout)	Student presentations	
13	28- 2 Dec.	IPM in forestry (Pilley)	Student presentations	
14	5- 9	The spruce budworm controversy FILMS: Budworks and The Budworm Story	Student presentations FILM: The Gypsy Moth	
15	12-16	End-Semester Exam		MULTIPLE-CHOICE EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: PESTICIDES (#431292) Instructor: PILLEY Semester: Winter 1984 Weekly Hours: 2 LEC, 3 LAB

	WEEK	LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
1	Jan. 2- 6	Introduction: course outline and evaluation. PCP Act, Pesticides Act, FIFRA. Pesticide scheduling. Cholinesterase inhibition	TEXTS: Ware, Pesticides: theory and application Spencer, Guide to the chemicals used in crop protection	NO SUPPLEMENTAL EXAM!
2	9-13	Effect of surfaces and aging on residual efficacy	Pesticide scheduling exercise Pesticide solubility exercise	
3	16-20	Types of formulations	Residual Efficacy Test - spray test panels. Day 1 (Jan. 19) exposure	
4	23-27	Chlorinated Hydrocarbons: properties, mode of action, LD50, registered uses, residual effect, first aid and antidote	Day 7 (Jan. 25) exposure to aged deposits	
5	30- 3 Feb.	Botanicals & synthetic pyrethroids. Organophosphates	Day 14 (Feb. 1) exposure to aged deposits	
6	6-10	Organophosphates	Day 21 (Feb. 8) exposure to aged deposits. ULV application exercise	MID-TERM EXAM: 20% (Feb. 9)
7	13-17	FIELD PLACEMENT		
8	20-24	FIELD PLACEMENT		
9	27- 2 Mar.	WINTER BREAK		
10	5- 9	Land Pest Control Seminar (Toronto, March 8)	Day 49 (Mar. 7) exposure to aged deposits. Blatticide Repellency Test	
11	12-16	Carbamates	TOUR: IPM practices in a food plant (Peterborough, March 14)	
12	19-23	Rodenticides	Blatticide Repellency Test - stress situation	FIELD TRIP (IPM) REPORT: 20% (March 22)
13	26-30	Miticides. Microbial insecticides	Water pH & Pesticide Efficacy Test Pooling of data from experiments	
14	Apr. 2- 6	Insecticidal soap, IGRs, and pheromones		LAB REPORTS: 30% (April 6)
15	9-13	Exam Week		END-SEMESTER EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: PESTICIDE APPLICATION TECHNIQUES I (#431293) Instructor: RIDOUT Semester: Winter 1984 Weekly Hours: 2 LEC 3 LAB

WEEK		LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
	Jan.			
1	2- 6	Safety equipment. Dilution calculations. Preparing finished sprays. Decontamination of spills and application equipment	TEXT: Truman et al., Scientific guide to pest control operations	NO SUPPLEMENTAL EXAM!
2	9-13	Pesticide storage, handling and disposal. Professionalism and the PCT	Use of cartridge respirator, industrial gas mask, and self-contained breathing apparatus	
3	16-20	Terminology of structural pest control	Fitting students with respirators. Use of B & G compressed-air sprayer	
4	23-27	Application equipment and treatment techniques	Inspection techniques. Crack & crevice treatment techniques	
5	30- 3 Feb.	Use of dusts in pest control	Use of hand and power dusters	
6	6-10	Fine droplet dispensers	Operation and maintenance of mechanical & thermal aerosol generators	MID-TERM EXAM: 20% (Feb. 10)
7	13-17	FIELD PLACEMENT		
8	20-24	FIELD PLACEMENT		
9	27- 2 Mar.	WINTER BREAK		
10	5- 9	Cockroach treatment procedures	Fogging vs. ULVing	
11	12-16	Rat and mouse biology and behaviour	TOUR: IPM practices in a food plant (Peterborough, March 14)	FIELD PLACEMENT REPORT: 20% (March 16)
12	19-23	Rodent treatment procedures	Use of bait stations, mechanical traps, and glueboards	
13	26-30	Fly treatment procedures. Electrocuting light traps & automatic aerosol dispensers	Use of Whitmire PT System III. Use of mist blower & knapsack sprayer	
14	Apr. 2- 6	Other structural pests: treatment procedures		EQUIPMENT PROFICIENCY TEST: 30% (April 4)
15	9-13	Exam Week		END-SEMESTER EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: URBAN ENTOMOLOGY I (#431294) Instructor: RIDOUT Semester: Winter 1984 Weekly Hours: 2 LEC 3 LAB

	WEEK	LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
1	Jan. 2- 6	External anatomy. Types of mouthparts.	TEXT: Ebeling, Urban Entomology Introduction: course outline and evaluation, field placement, exterminator licensing & medical	NO SUPPLEMENTAL EXAM!
2	9-13	Digestive, circulatory and respiratory systems	Structural Pest Control Seminar (Toronto, Jan. 9-10)	
3	16-20	Excretory, nervous and reproductive systems	Insect anatomy - microslides	
4	23-27	Animal Kingdom. Classes of Arthropoda.	Grasshopper dissection	
5	30- 3 Feb.	Insect classification: Ametabola, Paurometabola and Hemimetabola	Cockroach dissection	
6	6-10	Insect classification: Holometabola	Identification of cockroaches	MID-TERM EXAM: 20% (Feb. 7)
7	13-17	FIELD PLACEMENT		
8	20-24	FIELD PLACEMENT		
9	27- 2 Mar.	WINTER BREAK		
10	5- 9	Cockroach biology & behaviour	Orders of insects - Ametabola, Hemimetabola, Paurometabola	
11	12-16	Fleas, lice and bed bugs: biology and treatment	Orders of insects - Holometabola	FIELD PLACEMENT REPORT: 20% (Mar. 16)
12	19-23	Wasps and ants: biology and treatment	Insect larvae	
13	26-30	Stored-products insects: internal & external feeders, scavengers, secondary pests	Stored-products insects - recognition of common species	
14	Apr. 2- 6	Miscellaneous pests: silverfish, flies		LAB TEST: 30% (April 2)
15	9-13	Exam Week		END-SEMESTER EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: PESTICIDE APPLICATION TECHNIQUES II (#431393) Instructors: PILLEY/RIDOUT Semester: Fall 1983 Weekly Hours: 2 LEC 3 LAB

	WEEK	LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
	Sept.			
1	7- 9	Introduction: course outline and evaluation; field placement	TEXTS: Fumigation Handbook Monro, Manual of fumigation for insect control	NO SUPPLEMENTAL EXAM!
2	12-16	Types of milling equipment. Spot fumigants: properties, products and schedules	LAB: Fumigants - respiratory protection and gas detection	NOTE: mill fumigation on Saturday Sept. 17
3	19-23	Spot fumigation: application techniques	LAB: Spot fumigation - calibration of equipment	Mill floor plan, vol. & dosage calculations: 10% (Sept. 23)
4	26-30	Pest control in sensitive areas: computers, hospitals and supermarkets	LAB: Spot fumigation - calibration of equipment	Calibration Exercise: 10% (Sept. 30)
	Oct.			
5	3- 7	Control strategy in multiple-family dwellings	FIELD: Bird Control Seminar (Ohio)	SALES PROPOSAL - campus: 20% (Oct. 3)
6	10-14	Properties of tarp/space fumigants	FIELD: US Rodent Mgmt. Seminar (Tor.)	
		FIELD PLACEMENT (GROUP A)		
7	17-21	Tarp fumigation: treatment procedures	LAB: Tarp fumigation with MeBr & AlP	
8	24-28	Aircraft fumigation with carboxide	LAB: Tarp fumigation with MeBr & AlP	
	Nov.	FIELD PLACEMENT (GROUP B)		
9	1- 4	Tarp fumigation: treatment procedures	LAB: Tarp fumigation with MeBr & AlP	
10	7-11	Aircraft fumigation with carboxide	LAB: Tarp fumigation with MeBr & AlP	
11	14-18	Space fumigation: inspection, permit, dosage and sealing techniques	LAB: Space fumigation with carboxide and methyl bromide	
12	21-25	Termite inspection and treatment procedures	FIELD: Termite inspection and treatment (Toronto)	
13	28- 2	Hard rodenticides: uses, types, licence/ permit, techniques	LAB: Use of the Silver Skunk,	
	Dec.			
14	5- 9	Review		FUMIGATION PROFICIENCY TEST: 30% (Dec. 5,6 and 8)
15	12-16	Exam Week		END-SEMESTER EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: URBAN ENTOMOLOGY II (#431394) Instructor: PILLEY Semester: Fall 1983 Weekly Hours: 1 LEC 3 LAB

WEEK		LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
	Sept.			
1	7- 9	Introduction: course outline and evaluation	TEXT: Ebeling, Urban Entomology	NO SUPPLEMENTAL EXAM!
2	12-16	Fleas: biology and control (preparation by client and servicing techniques)	FIELD: Flea extermination Inspection of college campus for a pest control service contract	
3	19-23	Carpenter ants: biology and control	FIELD: Carpenter ant inspection and treatment	
4	26-30	Bees & Wasps: biology and identification; nest elimination techniques	FIELD: Wasp extermination	
	Oct.			
5	3- 7	Ants: biology and control of Ontario species	FIELD: Bird Control Seminar (Ohio)	
6	10-14	Stored products insects: dermestids, weevils	LAB: Identification of ants and wasps	
		FIELD PLACEMENT (GROUP A)		
7	17-21	Stored products insects: other beetles	LAB: Identification of food pests I	
8	24-28	Stored products insects: moths, psocids, springtails	LAB: Identification of food pests II	
	Nov.	FIELD PLACEMENT (GROUP B)		
9	1- 4	Stored products insects: other beetles	LAB: Identification of food pests I	
10	7-11	Stored products insects: moths, psocids, springtails	LAB: Identification of food pests II	
11	14-18	Termites: biology and control	LAB: Ident. of student specimens	LAB TEST: 20% (Nov. 15)
12	21-25	Other WDO: powderpost beetles et al.	LAB: Ident. of student specimens	FIELD PLACEMENT REPORT: 20% (Nov. 25)
13	28- 2 Dec.	Flies and mosquitoes: biology and control	LAB: Ident. of flies and mosquitoes	
14	5- 9	Preparation for Structural Class 3 exam	ORAL EXAM: Thursday, December 8	STRUCTURAL PEST COLLECTION: 30% (Dec. 9)
15	12-16	Exam Week		END-SEMESTER EXAM: 30%

SIR SANDFORD FLEMING COLLEGE
PEST CONTROL PROGRAM

Course: VERTEBRATE PEST CONTROL (#431396) Instructors: PILLEY/RIDOUT Semester: Fall 1983 Weekly Hours: 2 LEC 2 LAB

	WEEK	LECTURE TOPIC	PRACTICAL EXERCISE	EVALUATION
1	Sept. 7- 9	Introduction: course outline and evaluation; reports and proposals for semester	TEXTS: Frishman, Rats and Mice Marsh & Howard, Vertebrate Pests + 4 other booklets	NO SUPPLEMENTAL EXAM!
2	12-16	Bats: biology, seasonal activity and management	FIELD: Inspection for access holes, batproofing, repellents	
3	19-23	Groundhogs: biology and control	FIELD: Use of AlP & CaCN (foot pump)	
4	26-30	Rats & Mice: biology, behavior & management	FIELD: Mouse control program (Ennismore)	
5	Oct. 3- 7	Birds: biology, damage & health hazards of pigeons, gulls, starlings & sparrows	FIELD: Bird Control Seminar (Ohio)	
6	10-14	Use of sound in pest control	FIELD: US Rodent Mgmt. Seminar (Tor.)	MID-TERM EXAM: 20% (Oct. 14)
		FIELD PLACEMENT (GROUP A)		
7	17-21	Service sales presentation	Service sales presentation	SERVICE SALES PRESENTATION - hotel or processing plant: 30%
8	24-28	Service sales presentation	Service sales presentation	
	Nov.	FIELD PLACEMENT (GROUP B)		
9	1- 4	Service sales presentation	Service sales presentation	SERVICE SALES PRESENTATION - hotel or processing plant: 30%
10	7-11	Service sales presenation	Service sales presentation	
11	14-18	Management techniques for birds	LAB: Use of live trapping, netting, sonic devices, sticky repellents, treated baits and toxic perches	
12	21-25	Raccoons, skunks, squirrels & moles: biology and trapping techniques	LAB: Installation and monitoring an ultrasonic service	
13	28- 2	Practical solutions to vertebrate pest problems (guest from industry)	LAB: Single- vs. multiple-feeding anticoagulants	PROJECT PROPOSAL: 10% (Dec. 2)
14	Dec. 5- 9	Review: use of IPM in vertebrate pest pest control		EQUIPMENT PROFICIENCY TEST: 10% (Dec. 5)
15	12-16	Exam Week		END-SEMESTER EXAM: 30%

APPENDIX 2

FIELD PLACEMENT AGREEMENT FORMS

sir sandford fleming college

PEST CONTROL TECHNICIAN (PCT) PROGRAM

FIELD PLACEMENT AGREEMENT

The undersigned company agrees to accept _____, who is a first-year student in the PCT program, for a field placement from February 13 to 24, 1984. We understand that the basic purpose is to give the student a useful and practical exposure to the various facets of pest control work. In this particular placement the student will receive initial experience in route servicing to help determine his/her personal suitability for this vocation. We agree to assign tasks and exercise supervision commensurate with the student's ability and experience, while ensuring that proper safety procedures are followed. Further, student-assisted exterminations will be carried out in accordance with the Ontario Pesticides Act. We recognize that the student is not an employee of our firm since his/her work is performed without monetary compensation, and also that we are not responsible for living expenses. It is our understanding that the College will hold the undersigned company harmless if a negligence suit by a third party results from any actions of the above student. We expect that the student will observe the same working rules and the same regulations of confidentiality as set out for our regular employees. Further, we assume that he/she is aware of, and accepts, the irregular hours - early morning, evening and weekend - which may be occasioned by specific assignments. We agree to submit a written evaluation of the student's work performance and general suitability.

This agreement serves as a memorandum of understanding, and is not a legal contract.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

_____

TELEPHONE ( ) _____

Location (street and city) of placement if other than company address shown:

_____

sir sandford fleming college

PEST CONTROL TECHNICIAN (PCT) PROGRAM

FIELD PLACEMENT AGREEMENT

The undersigned company agrees to accept _____, who is a second-year student in the PCT program, for a field placement from October 1 to 12, OR October 15 to 26, 1984. We are aware that this student has completed a 2-week field placement and/or summer work period in the structural pest control industry, and holds a valid Ontario Structural Exterminator's Class 4 Licence. We also know that he/she is not trained in horticulture.

We understand that the purpose of this field placement is to give the student practical experience in indoor plant maintenance and/or greenhouse spraying. By assisting in the installation and/or maintenance of interior plantscapes, or working in a greenhouse, the student will acquire a basic knowledge of plant culture requirements; learn to recognize pest damage and symptoms of environmental disorders of tropical plants; and practise techniques used to control pests in an interior setting (e.g. office, shopping mall, greenhouse). Thus, the student should be able to make an informed decision regarding the placement of pesticides on or near ornamental plantings when he/she is attempting to control domiciliary pests within commercial buildings.

We agree to assign tasks and exercise supervision commensurate with the student's ability and experience, while ensuring that proper safety procedures are followed. Further, student-assisted exterminations will be carried out in accordance with the Ontario Pesticides Act. We recognize that the student is not an employee of our firm since his/her work is performed without monetary compensation, and also that we are not responsible for living expenses. It is our understanding that the College will hold the undersigned company harmless if a negligence suit by a third party results from any actions of the above student. We expect that the student will observe the same working rules and the same regulations of confidentiality as set out for our regular employees. Further, we assume that he/she is aware of, and accepts, the irregular hours - early morning, evening and weekend - which may be occasioned by specific assignments. We agree to submit a written evaluation of the student's work performance and general suitability.

This agreement serves as a memorandum of understanding, and is not a legal contract.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

_____

TELEPHONE ( ) _____

sir sandford fleming college

PEST CONTROL TECHNICIAN (PCT) PROGRAM

FIELD PLACEMENT AGREEMENT

The undersigned company agrees to accept _____, who is a second-year student in the PCT program, for a field placement from October 17 to 28, OR October 31 to November 11, 1983. We are aware that this student has completed a 2-week field placement and a summer work period in the structural pest control industry, and holds a valid Ontario Structural Exterminator's Class 4 Licence.

We understand that the purpose of this field placement is to give the student practical experience in termite inspection and treatment techniques. We agree to assign tasks and exercise supervision commensurate with the student's ability and experience, while ensuring that proper safety procedures are followed. Further, student-assisted exterminations will be carried out in accordance with the Ontario Pesticides Act. We recognize that the student is not an employee of our firm since his/her work is performed without monetary compensation, and also that we are not responsible for living expenses. It is our understanding that the College will hold the undersigned company harmless if a negligence suit by a third party results from any actions of the above student. We expect that the student will observe the same working rules and the same regulations of confidentiality as set out for our regular employees. Further, we assume that he/she is aware of, and accepts, the irregular hours - early morning, evening and weekend - which may be occasioned by specific assignments. We agree to submit a written evaluation of the student's work performance and general suitability.

This agreement serves as a memorandum of understanding, and is not a legal contract.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

_____

TELEPHONE ( ) _____

sir sandford fleming college

PEST CONTROL TECHNICIAN (PCT) PROGRAM

FIELD PLACEMENT AGREEMENT

The undersigned company agrees to accept _____, who is a second-year student in the PCT program, for a field placement from October 31 to November 11, 1983. We are aware that this student has completed a 2-week field placement and a summer work period in the structural pest control industry, and holds a valid Ontario Structural Exterminator's Class 4 Licence. We also know that he/she is not trained in the management of small animals occurring in an urban environment.

We understand that the purpose of this field placement is to give the student practical experience in small animal control. By assisting an animal control officer the student will acquire a better understanding of animal welfare; learn about animal habits and livetrapping procedures (placement and baiting), and how to handle small animals under stress (including those in traps). Thus, the student should develop a more humane approach to resolving animal problems that may arise when employed as a service technician in the structural pest control industry.

We agree to assign tasks and exercise supervision commensurate with the student's ability and experience, while ensuring that proper safety procedures are followed. We recognize that the student is not an employee of our firm since his/her work is performed without monetary compensation, and also that we are not responsible for living expenses. It is our understanding that the College will hold the undersigned company harmless if a negligence suit by a third party results from any actions of the above student. We expect that the student will observe the same working rules and the same regulations of confidentiality as set out for our regular employees. Further, we assume that he/she is aware of, and accepts, the irregular hours - early morning, evening and weekend - which may be occasioned by specific assignments. We agree to submit a written evaluation of the student's work performance and general suitability.

This agreement serves as a memorandum of understanding, and is not a legal contract.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

_____

TELEPHONE ( ) _____

APPENDIX 3

PROGRAM PROPOSAL

MINISTRY OF COLLEGES AND UNIVERSITIES

POST-SECONDARY PROGRAM PROPOSAL

(Certificate, Diploma, and Post-Diploma Programs)

PART A - GENERAL INFORMATION

1. College Sir Sandford Fleming Campus Frost

2. Nature of approval requested:

(a) New program [X]

*.Title (i) English: PEST CONTROL TECHNICIAN
(ii) French: _____

*.Options (if applicable) _____

(b) Revision of existing program [ ]

.Title _____

.Revisions

*(i) New title _____
*(ii) New options(s) [ ]
*(iii) Duration of program [ ]
*(iv) Objectives [ ]
*(v) Other _____

*Information as it would appear on the certificate or diploma and in the college calendar.

3. Language(s) of instruction: English [X] French [ ] Bilingual (i.e. both English and French are used in instruction) [ ]

4. Duration of the program:

One year (2 semesters) [ ] Three years (6 semesters) [ ]
Two years (4 semesters) [X] Other _____

5. Proposed commencement date: September 1981

6. Format of program:

Full-time [X]
Cooperative [ ]
Part-time [ ]

Length: 1800 hours and 60 weeks

7. Entrance requirement(s): Ontario Secondary School Graduation Diploma with year 4 standing in Mathematics and English. Two upper sciences (especially Chemistry) are desirable.

8. State kinds of employment opportunities in the occupational categories toward which the program is directed:

'Specials' man (Senior Technician), Termite Technician, Sales & Promotion, Supervisor, and Branch Manager.

9. Anticipated employment entry level: Route Serviceman (Technician)

10. Advisory Committee - state names and positions of members and their area of responsibility (Ref. Memorandum 76-A-14).
Attach as Appendix A

11. Provide a copy of the minutes of the meeting(s) of the Advisory Committee at which the program as outlined in this proposal was debated and approved.
3 meetings were held: Oct. 22, Nov. 25,1980 and Jan. 13, 1981 Attach as Appendix B

12. College contact person:

Name Paul G. Pilley

Position Teaching Master - Pestology

Telephone 705-324-9144 (ext. 65)

13. Ministry contact person (person in Senior and Continuing Education Branch contacted regarding development of this program):

Name E.W. Gordius, Sr. Program Consultant

PART B - PROGRAM NEED

14. State how the need for the program was identified:

A mail survey of all structural pest control businesses in Ontario (N=125) was conducted in November 1980 to determine their manpower requirements for the five-year period 1981-1986.

15. Provide comprehensive evidence of present, continuing, and/or future need for graduates, including statistics relating to employment possibilities in the field.
Attach as Appendix C

16. Identify programs with the same, or similar, objectives in Colleges of Applied Arts and Technology:

. Number None

. Location

. Ways in which proposed program differs from others presently offered

17. Identify alternative programs, having the same or similar objectives, offered in other educational settings:

. Location None

. Ways in which proposed program differs

No other institution in Canada offers a similar program.

18. For each of the first five years of the program, forecast the number of first-year students who will be enrolled and the number of graduates in the year:

	1981/82	1982/83	1983/84	1984/85	1985/86
first year students	20	40	40	40	40
graduates	-	15	30	30	30

PART C - PROGRAM CONTENT

19. Program purpose: To provide the pest control industry with service technicians trained in pest recognition and in the proper application of pesticides in the urban environment. Exposure will be broad enough to meet the 'full service concept' which is increasingly being demanded of the industry. Graduates will be fully licensed to perform both structural and land exterminations.

20. Program objectives (Competencies/Terminal Performance Objectives).
Attach as Appendix D

21. (a) For the total program, identify the time to be allocated to theory and to practice, and to field training if applicable:

Of the total 1800 hours, theory accounts for 915 hours, practice 735 and field placement 150.

(b) List proposed courses for each year or semester with the time allocation for each.
Attach as Appendix E

(c) Outline course objectives (indicating how they relate to program objectives), content, teaching-learning approaches.
Attach as Appendix F

22. Where provincial or national standards or guidelines exist, indicate how these will be met and maintained.

Attach as Appendix G, along with comments or recommendations from association(s), or other relevant bodies. See attached letter from the Ontario Pest Control Association re. intent to consider accreditation of pest control technicians.

23. Physical resources for the program:

. available on site classrooms, pestology laboratory, and sufficient outdoor areas for spray exercises

. available elsewhere (note location) field placement will make use of facilities in the pest control industry

. needed pesticide spray laboratory

24. If clinical experience or field placement facilities are required (e.g. Health Sciences, Early Childhood Education), identify the facilities to be used, the financial and contractual obligations involved, the nature of the supervision. Provide letters of confirmation. Identify any other college utilizing the same field resources. See minutes of 81-01-13 meeting and Appendix H re. safety. Attach as Appendix H

25. Outline the methods to be used to evaluate the effectiveness of the program.

As a 3-year pilot project the program will be critically reviewed at the end of this period. Attach as Appendix I

PART D - FUNDING

26. Will additional resources (i.e. beyond current college resource levels) be required to mount this program?

Yes [X] No [ ]

If response is "yes", complete item 27

27. Estimate of resources required for the first three years of operation of the program.

NOTE: Program approval does not indicate Ministry commitment to provide additional funds.

A. CAPITAL	1981/82 Year 1	1982/83 Year 2	1983/84 Year 3
(i) Renovations to facilities	$ 5000	$ --	$ --
(ii) Equipment purchases	15000	10000	3000
TOTAL CAPITAL	$ 20000	$ 10000	$ 3000

Attach Detailed Outline of Costs as Appendix J.

B. OPERATING	1981/82	1982/83	1983/84
(i) Additional Teaching staff Number and salaries	1.5 $ 30000	2.5 $ 55000	3.5 $ 80000
(ii) Academic and educational resources, excluding salaries	$ 5000	$ 4000	$ 4000
(iii) Clinical or field-work costs, excluding salaries	$ 4000.	$ 9500	$ 11000
(iv) Premise rental costs (non-service costs)	--	--	--
(v) Plant costs	--	--	--
TOTAL OPERATING	$ 39000	$ 68500	$ 95000

Signatures

College President	Chairperson of the Board of Governors*
Date	Date March 13/81

Mail six (6) copies of the proposal (twenty (20) for Health Sciences programs) to: The Director
College Affairs Branch
Ministry of Colleges and Universities
10th Floor, Mowat Block
Queen's Park
Toronto, Ontario
M7A 1L2

*Copy of minutes of the Board meeting recommending approval of the program may be used in place of the chairperson's signature.

(Form revised Nov. 1979)

NOTE: This program was first included in the 1977 Multi-Year Plan for Frost Campus, Sir Sandford Fleming College.

APPROVED BY THE COUNCIL OF REGENTS ON APRIL 22, 1981

AD HOC ADVISORY COMMITTEE MEMBERS

PEST CONTROL TECHNICIAN PROGRAM

Mr. Norm Bazinet, Co-ordinator
Education, Training & Examination
Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-2401

Mr. A. Geoffrey Carpentier
District Pesticide Specialist
Ontario Ministry of the Environment
139 George St. N.
PETERBOROUGH, Ontario
K9J 3G6
Telephone: 705-743-2972

Mr. Richard J. Murphy, President
Ontario Pest Control Association
c/o Aetna Pest Control Limited
1828 Danforth Avenue
TORONTO, Ontario
M4C 1H8
Telephone: 416-469-4111

Mr. Art Bossio, Vice-President
Ontario Pest Control Association
c/o A & A Pest Control Limited
478 McNicoll Avenue
WILLOWDALE, Ontario
M2H 2E1
Telephone: 416-494-6908

Mr. Michael Lustgarten, Manager
Pestco Company of Canada Limited
134 Doncaster Avenue, Unit 10
THORNHILL, Ontario
L3T 1L3
Telephone: 416-226-5880

Mr. Karl Smith, Service Manager
Reliable Exterminators Limited
1730 McPherson Court
PICKERING, Ontario
L1W 3E6
Telephone: 416-686-1020

Mr. Robt. Cameron
Training Director
PCO Services Limited
232 Norseman Street
TORONTO, Ontario
M8Z 2R4
Telephone: 416-231-7276

Mr. Stephen A. Nicholson
Application Specialist
Pest Control Section
Ontario Ministry of Natural Resources
MAPLE, Ontario
L0J 1E0
Telephone: 416-832-2761

Mr. Casey Van Maris, Representative
Landscape Ontario
c/o Parklane Nurseries Limited
R.R. # 1
GORMLEY, Ontario
L0H 1G0
Telephone: 416-887-5851

Dr. George S. Cooper, Chairman
Ontario Pesticides Advisory Committee
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-7048

Members from Sir Sandford Fleming College, Frost Campus, Lindsay, Ontario:

Mr. Gary R. Cronkwright, Principal
Frost Campus

Mr. Gaile E. Fleming, Chairman
Natural Resources Division

Mr. Paul G. Pilley
Teaching Master - Pestology

Mr. Larry P. Lenhardt, Co-ordinator
Farm Management Program

APPENDIX 3,B

PEST CONTROL TECHNICIAN PROGRAM

MINUTES OF

ADVISORY COMMITTEE MEETINGS

October 22, 1980
November 25, 1980
January 13, 1981

MINUTES OF THE FIRST MEETING OF THE AD HOC ADVISORY COMMITTEE
FOR THE
PEST CONTROL TECHNICIAN PROGRAM
HELD IN LINDSAY AT 10:00 A.M., WEDNESDAY, OCTOBER 22, 1980

Present:
Mr. N. Bazinet
Mr. A. Bossio
Mr. G. Carpentier
Mr. G. Cronkwright
Mr. G. Fleming
Mr. L. Lenhardt
Mr. R. Murphy
Mr. S. Nicholson
Mr. P. Pilley
Mr. C. Van Maris

Regrets:
Mr. A. Gartner
Mr. A. Moncton
Mr. C. Murphy
Mr. J. McConnell
Mr. K. Smith

1. Introduction of the Members

The meeting began with a short informal gathering to permit the members to meet each other.

2. Tour of the Frost Campus

Mr. Pilley took the Committee on a tour of some of the facilities on campus which included the Forest Entomology Lab, Herbarium, Fish Hatchery, Fish & Wildlife Lab, Greenhouse, Nursery, and the Heavy Equipment Shop. The tour was approximately one hour long and gave the Committee an idea of the type of hands-on training we offer.

3. Campus Overview

Mr. Cronkwright, Principal of the Frost Campus, gave a brief overview of the community college system. The community colleges were established in 1967 and were patterned after Ryerson Institute of Technology. The programs offered at the Frost Campus are concerned with areas of natural resources and establish a broad background in those areas by applying a practical hands-on approach.

Mr. Nicholson asked if the College has residence facilities. Mr. Cronkwright indicated that we do not have residence facilities but that a privately owned residence is located close to the campus. He pointed out that most students find accommodation in private homes.

Mr. Bazinet asked if the Pest Control Program would be held on the Frost Campus. Mr. Cronkwright answered that it would be.

Mr. Cronkwright then outlined the procedure for approval of new programs. The Council of Regents, an advisory body to the Minister of Education, approves all new programs. A preliminary proposal, which is essentially a statement of intent, is submitted to the Council of Regents. If approval to proceed is received then a final proposal is prepared. Each new program must have an Advisory Committee who attest to the need for such a program. A survey is circulated to other people in the field in the province and a recommendation is made regarding the curriculum content.

Mr. Cronkwright pointed out that the role of the Committee today is to identify if the need for such a program exists and, if so, look at the proposed curriculum and discuss how to go about further determining the need.

Several questions were asked regarding the length of time involved in receiving approval for programs. General discussion was held regarding the time involved.

4. Need for Training

Mr. Pilley opened the discussion by stating that the pest control industry in Canada is the only occupational area which does not require any post-secondary training, nor is any available. There are programs in Ontario's community colleges for every conceivable job from baker, to correctional worker, to nanny - none of which involve a greater societal risk than the handling of toxic chemicals in urban structures.

Continuing, Mr. Pilley said that in many jurisdictions in North Ameria (including Ontario) it is possible to obtain a pesticide applicator's licence without even having to demonstrate competency in the use of application equipment. He posed the question, "Can you imagine getting a driver's licence without a road test?"

Traditionally, new employees enter the pest control industry directly from the street, without any previous interest or commitment. In small Exterminating firms training is time consuming and therefore costly, and is often haphazard. The employee often receives just enough training to pass the Ontario Ministry of the Environment licensing exam, and there it may end. These candidates are tutored on the material that is required to pass an examination.

Ontario's community colleges specialize in 'hands-on' career training for young people. In addition to the skills acquired, graduates from the various programs have demonstrated a commitment to their chosen field. This is a plus for prospective employers.

Mr. Pilley has visited and had discussions with people involved in pest control training in New York, Ontario, Alberta, British Columbia, and Washington. While employment prospects are good in the structural area, formal post-secondary training was unavailable except in New York where the State College of Agriculture at Farmingdale offers a 2-year Pest Control Technology Program.

Mr. Pilley also mentioned that the pest control industry has an image problem, and that two major trade magazines (Pest Control and Pest Control Technology) strive to promote professional standards and attitudes in service technicians. A formal post-secondary Pest Control program would do much to upgrade the industry.

Mr. Murphy pointed that in recent years there had been two fatalities in the field and it is only a matter of time before it happens again.

Mr. Bazinet mentioned that an applicant for an exterminator's licence must be physically fit, have Grade 10 standing, and be at least 16 years of age. He also reviewed the difference between an Operator and an Exterminator (=Pesticide Applicator). In reply to a question from Mr. Pilley, he indicated that there are about 1000 licensed structural exterminators in Ontario.

Mr. Pilley understands that the Ministry of the Environment will be changing the regulation which allows a licenced exterminator to supervise up to four separate exterminations. He stated that in Alberta and British Columbia, ~~one~~ licensed exterminator is required by law to be present full time at each extermination.

Mr. Bazinet indicated that there is a desperate need for training in all three categories of exterminators - land, structural and aquatic. In the future, pesticide vendors will likely have to be licenced and trained which the Ministry of the Environment can't see themselves doing at the present time.

Mr. Pilley pointed out that the establishment of a post-secondary program would provide facilities for shorter courses (e.g. for vendors). At the present time, retraining of licensed exterminators is not required but is a definite possibility in the future when the Ministry undertakes recertification. Sir Sandford Fleming College could assist in this if its technician program was in operation.

Mr. Bossio stated that there is a definite need for some type of training for staff rather than recruiting from the street. The small companies can't afford to hire a training director.

Mr. Murphy said that training protects the industry from inadequacies and potential problems. At the present time, there is not enough broad experience in the industry. He pointed out that credibility with the public is a major concern. At the present time, one problem which exists is improper storage of pesticides, i.e. basements and apartments. As new needs arise, new methods of application and training are required. Providing technical training would help improve the public's image regarding pest control. "Good competition hurts nobody".

Mr. Van Maris indicated that a college program should cover all categories, as few companies specialize. For example, at the present time, he feels that there would be no market for employment in land alone.

Mr. Murphy stated that as far as he was concerned there would be no problem placing 25 to 30 technicians per year in the structural field, and that training is definitely needed.

Mr. Pilley posed the following question - "Does the lack of employment opportunities in the area of land mean it should be eliminated from the program"? It was the consensus of all attending that the program should follow the 'full service concept'.

Mr. Murphy stated that most students could find summer employment in the field because of the busy season. Mr. Pilley pointed out that in addition to practical hands-on experience, field placement and related summer work were an absolute necessity of the program.

After a discussion regarding the length of the program, Mr. Bossio moved that a two-year Pest Control Technician Program be established. Seconded by Mr. Murphy. Carried unanimously.

5. Proposed Program and Curriculum Content

Mr. Pilley asked each member of the Committee to turn to the proposed curriculum which had been prepared for the meeting. A discussion of the topics covered in each course was held with suggested additions and changes made. Due to the length of the meeting, it was decided to continue the discussion at the next meeting, after members have had a better opportunity to examine the proposal.

Mr. Murphy agreed to assist the College in determining the need for a program and with Mr. Pilley's help, a letter, questionnaire and program proposal will be sent out as soon as possible so that the data is available before the next meeting. Mr. Bazinet kindly offered to provide a list (on gummed labels) of all structural pest control businesses (Operator's licences 1, 2, and 5) in the province.

Mr. Murphy agreed to be the Chairman of the Ad Hoc Advisory Committee.

6. Further Meetings

The Committee agreed to meet again on Tuesday, November 25 at 10:00 a.m. to discuss the results of the employment survey and curriculum recommendations. This meeting will be held in the Board Room, Ministry of the Environment (Foster Building), Pesticides Control Section, 7th Floor, 40 St. Clair Avenue West, Toronto, Ontario.

7. Adjournment

The meeting adjourned at 4:30 p.m.

AD HOC ADVISORY COMMITTEE MEMBERS

PEST CONTROL TECHNICIAN PROGRAM

FIRST MEETING 80-10-22

Mr. Norm Bazinet, Co-Ordinator
Education, Training & Examination
Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-2401

Mr. Art Bossio, Vice-President
Ontario Pest Control Association
c/o A & A Pest Control Limited
478 McNicoll Avenue
WILLOWDALE, Ontario
M2H 2E1
Telephone: 416-494-6908

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District Pesticide Officer
Ontario Ministry of the Environment
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PETERBOROUGH, Ontario
K9J 3G6
Telephone: 705-743-2972

Mr. Casey Van Maris, Representative
Landscape Ontario
c/o Parklane Nurseries Limited
R.R.#1
GORMLEY, Ontario
LOH 1GO
Telephone: 416-887-5851

Mr. Richard J. Murphy, President
Ontario Pest Control Association
c/o Aetna Pest Control Limited
1828 Danforth Avenue
TORONTO, Ontario
M4C 1H8
Telephone: 416-469-4111

Mr. Stephen A. Nicholson
Application Specialist
Pest Control Section
Ontario Ministry of Natural Resources
MAPLE, Ontario
LOJ 1EO
Telephone: 416-832-2761

Members from Sir Sandford Fleming College, Frost Campus, Lindsay, Ontario:

Mr. Gary R. Cronkwright, Principal
Frost Campus

Mr. Gaile E. Fleming, Chairman
Resource Technology Division

Mr. Paul G. Pilley
Teaching Master - Pestology

Mr. Larry P. Lenhardt, Co-Ordinator
Farm Management Program
President Elect, Ontario Institute
of Agrologists

MINUTES OF THE SECOND MEETING OF THE AD HOC/ADVISORY COMMITTEE FOR THE PEST CONTROL TECHNICIAN (PCT) PROGRAM HELD IN TORONTO AT 10:30 A.M., TUESDAY, NOVEMBER 25, 1980

Present:
Mr. N. Bazinet
Mr. A. Bossio
Mr. S. Bryck
Mr. B. Cameron
Mr. G. Carpentier
Dr. G. Cooper
Mr. G. Cronkwright
Mr. G. Fleming
Mr. M. Lustgarten
Mr. A. Moncton
Mr. R. Murphy
Mr. P. Pilley
Mr. K. Smith
Mr. C. Van Maris

Guests:
Ms. D. MacKenzie
Mr. G. Cutten
Mr. E. Gordius

1. Introductions

The meeting began with a short informal gathering to permit new members and guests to get acquainted.

2. Minutes of the first meeting were approved as circulated.

3. Employment Survey

All licensed structural pest control firms operating in Ontario were sent an employment questionnaire, covering letter and program proposal. Preliminary results of the survey conducted by Messrs. Pilley and Murphy were distributed. Of 125 questionnaires sent out on November 10, 36 had been returned (28.8%). The survey indicated a need for 278 full-time pest control personnel (in various categories) over the 5-year period 1981-1986. Of these, 152 positions are for Route Servicemen (=Technicians) which is the basic hiring level. 77 similar seasonal positions would provide summer employment opportunities for students.

4. Concerns

Dr. Cooper asked about the entrance requirements for the PCT program. Mr. Cronkwright replied that the typical admission requirement for other programs at Frost Campus is an Ontario Secondary School Graduation Diploma with level 4 standing in both Mathematics and English. Two upper sciences are also desirable. Alternatively, a person over 19 years of age with at least one year of work experience could be admitted as a mature student after passing a qualifying test.

Dr. Cooper then asked how many students would be in the PCT program at any one time. Mr. Pilley commented that enrollments would initially be limited to 20 or so per year for two reasons: to ensure student placement during and between semesters and upon graduation; and to minimize the effect of errors in the curriculum which are likely to occur at the outset. By the second year of operation there would be about 40 students in the program with about 20 graduating.

Ms. MacKenzie asked how the graduates would be recognized by the industry and in other jurisdictions (i.e. certification and reciprocity). Mr. Cronkwright replied that recognition would be based on the reputation of the College. Mr. Carpentier noted that PCT graduates would have an Ontario Exterminator's Licence (Structural Class 3) which also has the necessary recognition.

Mr. Moncton asked if small companies would also have an opportunity to obtain summer students and graduates. Mr. Pilley assured him that they would definitely not be ignored and, in fact, would be encouraged to participate in field placement of students. This would give a company the opportunity to screen potential employees.

Mr. Cutten asked if graduates would compete with Operators (i.e. set up their own business and go into competition). Mr. Murphy mentioned that the Ontario Pest Control Association (OPCA) is striving to have the Ontario Pesticides Act changed so that Operators' licences would be restricted to individuals holding a Structural Exterminator Class 1 or 2 Licence. [This issue was also raised when Mr. Pilley first approached the OPCA with his program proposal at their meeting on October 14.] This recommendation is presently being considered by the Pesticides Control Section of the Ministry of the Environment (OME).

Mr. Smith pointed out that graduates of the PCT program would upgrade the pest control industry which will be to everyone's benefit in the long run.

Mr. Bryck recounted a situation that occurred when he first started in the industry. The serviceman he accompanied had suggested to a client that a particular pest problem could only be resolved by sanitation. But the service technician was thought of simply as a 'spray jockey' and this broader aspect of pest control was ignored. However, when the public health inspector ordered a clean-up or face closure, the request was immediately complied with. The point Mr. Bryck wanted to make was that the 'professional earns respect'.

Mr. Moncton feels that if route servicemen have sufficient knowledge the Operator won't have to be as involved.

Mr. Smith stated that companies should get a better price for better quality work.

Mr. Murphy considered that the industry should be able to absorb at least 20 PCT graduates a year. He also felt that starting salaries would be comparable to the $13000/annum figure that had been quoted as an average for community college graduates. But Mr. Van Maris' opinion was that graduates won't work for this figure, at least not for long. Mr. Cronkwright said that there would have to be room for the employee to expand in 3-5 years. Mr. Bossio stated that a good serviceman should be able to earn $18-20000/annum plus vehicle use.

Mr. Lustgarten stated that 20 graduates a year would not be enough.

Mr. Bossio asked how students would be attracted into the program. Mr. Cronkwright acknowledged that the industry's image problem may interfere with recruitment. However, Mr. Lustgarten made the point that one very good advantage of the pest control industry was job security, i.e. year-round employment. Mr. Cronkwright asked committee members if they knew of anyone interested in taking PCT training. Mr. Moncton was aware of some potential candidates who were considering going back to school for this type of training.

Referring to the 4 1/2-page program proposal with its course descriptions, Dr. Cooper asked if all the material could be covered in two years. Mr. Pilley stated that the original proposal was only 1 1/4 pages in length and people reviewing it picked up on the smallest details. So he decided to prepare the descriptions in depth and challenge reviewers to spot deficiencies. Mr. Pilley also wanted to show that training at the technician level was truly needed. The descriptions could even be used as course outlines by an instructor.

Dr. Cooper wondered, for example, if a student could learn, among other things, how to identify lawn diseases. Mr. Pilley pointed out that he had chosen his words carefully, and that the course description read 'recognition' and not identification - there being a difference.

Mr. Carpentier asked if the College would rely only on its faculty to teach the program. Mr. Cronkwright said no, guest lecturers and part-time instructors from the industry would also be used.

Mr. Cronkwright stated that he was not aware of any other College offering PCT training, and asked Mr. Gordius for his comments.

5. Comments from Ministry of Education representative

Mr. Gordius stated that the Ministry of Education can see there is a need. To obtain approval for a new program there must be a need for the training, employment opportunities for the graduates (=validity), and cooperation from the industry. He mentioned that SSFC has a good reputation, especially in Forestry. He would like to see a close relationship among the pest control industry, the College and OME so that students have an opportunity for field placement and summer work, and so that program costs can be kept down by making equipment and guest lecturers available.

In answer to Dr. Cooper's comments about the program proposal, Mr. Gordius said that most programs are on the rich side, and some on the lean. If it was a lean proposal, the need for 2 years would be questioned. He asked about Chemistry since it relates to pesticides. The program should also have a tie-in with agriculture and forestry. The $13000 salary referred to shouldn't be of too much concern. He would like to see the program shaped to industry's needs, so that the diploma issued is recognized by the industry.

Re. the employment survey, Mr. Gordius asked if the data referred to attrition only, or to needs as well. [PGP note: data obtained include both since they collectively create a demand for new technicians.] He also queried if this was a long range or short range need.

Mr. Gordius stated that he would recommend the PCT program to the Minister of Education as a pilot project.

Ms. MacKenzie asked if students go through the SSFC Forestry program with the promise of a job. Mr. Cronkwright said that the Ministry of Natural Resources does not give specific guarantees, but that it does employ the largest number of graduates.

Ms. MacKenzie asked if the PCT proposal will be treated as a special program or the same as other programs. Mr. Gordius replied that he will support the PCT proposal as a pilot project rather than as an independent program. This will give the program an opportunity to develop progressively for 3 years after which it will be reviewed.

6. Curriculum

Since most of the graduates will be employed in urban centers, Mr. Bryck wondered why the program is to be offered in Lindsay. Mr. Cronkwright replied that 19-20 year olds often go to College away from home. The Frost Campus in Lindsay offers unique programs in natural resources so that virtually all students are from out of town. Another aspect, the common first semester gives students 3 1/2 months to sort out their career options, and many do make a change from their initial program choice.

Mr. Cameron queried the logistics of field placement during the semester. One day/week does not seem practicable. Mr. Pilley pointed out that the course description reads the student will work an average of 1 da/wk so that this could also be a block of several days or 1-2 weeks. Mr. Bossio felt that this would be feasible only if small groups of students are involved.

Dr. Cooper wanted to know the length of a semester. Mr. Cronkwright explained that the academic year, consisting of 2 semesters, extended from September to early May. The semester change occurs at New Years.

Referring to the Business Management course description, Dr. Cooper queried job cost estimating, saying that 5 different companies have 5 different ideas. Mr. Murphy felt that this topic was a good idea because it gives the student an awareness of pricing structure. Mr. Bossio would like to see standardized job costing. Mr. Murphy suggested that reference could be made to National Pest Control Association (NPCA) literature on this topic. Mr. Van Maris said that job costing, which has to be based on production records, was the most neglected area of training. It has been his experience that most college students don't have a good enough idea.

Mr. Cameron asked how the College advertises its programs, and if there was a follow-up of its graduates. Mr. Cronkwright replied that SSFC mails information to 850 high schools throughout the province. Many schools are also visited, but this has had to be limited because of increasing requests. Relatively little advertising is done compared with other colleges which restrict advertising to their own region. Effectiveness of graduates is determined by feedback from the industry. A formal process known as the College and Program Review Instruments (CAPRI) is also used on a regular basis to evaluate programs.

Mr. Bossio wondered how students would be recruited for the PCT program if it starts as planned in September 1981. Mr. Cronkwright replied that a different approach from the one used for established programs would have to be taken. Mr. Carpentier suggested that the industry could help promote the new program and perhaps offer a scholarship. Mr. Bazinet said that when the PCT program is approved OME will act as an advertising medium through its field officers,

Mr. Moncton wondered if the crazy working hours of the pest control industry would deter potential students. Mr. Cronkwright replied that all jobs have disadvantages, e.g. black flies in forestry.

Mr. Lustgarten asked the age of graduates, and if older students enrolled at the College. Mr. Cronkwright stated that of the 1000 students on campus, 200 were under the age of 19 years. Mature students, while few in numbers, are a welcome addition to any class.

Mr. Cutten asked if the common first semester doesn't reduce a program to 3 semesters. Mr. Cronkwright mentioned that the common semester had been in practice for 6 years, but was presently being re-examined in light of new programs being added (i.e. a limit has been reached on the number of courses that can be taken). He clarified that all students take the common semester, and some do change their program choice. Mr. Pilley feels that there will be an immediate benefit from this semester for students in the PCT program. It provides background training in agriculture, forestry, fish & wildlife, and heavy equipment.

7. Motions

The committee members from industry and OME agreed in principle to hire PCT students for summer employment.

It was moved by Mr. Bossio, seconded by Mr. Bazinet as a spokesman for OME and by Mr. Murphy as President of OPCA, that the Pest Control Technician program be offered exclusively by SSFC as a pilot project for 3 years. Motion carried unanimously.

8. Next Meeting

The Committee agreed to meet again on Tuesday, January 13 at 2 p.m. for final discussions before submitting the PCT program proposal to the Ministry of Education. This meeting will be held in Woodbridge at the Board of Trade Country Club on Islington Avenue (north of highway 7), following the OPCA regular monthly meeting.

9. Adjournment

The meeting adjourned at 12:50 p.m.

AD HOC ADVISORY COMMITTEE MEMBERS
PEST CONTROL TECHNICIAN PROGRAM
SECOND MEETING 80-11-25

Mr. Norm Bazinet, Co-ordinator
Education, Training & Examination
Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-2401

Mr. Art Bossio, Vice-President
Ontario Pest Control Association
c/o A & A Pest Control Limited
478 McNicoll Avenue
WILLOWDALE, Ontario
M2H 2E1
Telephone: 416-494-6908

Mr. A. Geoffrey Carpentier,
District Pesticide Specialist
Ontario Ministry of the Environment
139 George St. N.
PETERBOROUGH, Ontario
K9J 3G6
Telephone: 705-743-2972

Mr. Bob Cameron, Training Director
PCO Services Limited
232 Norseman Street,
TORONTO, Ontario
M8Z 2R4
Telephone: 416-231-7276

Mr. Richard Murphy, President
Ontario Pest Control Association
c/o Aetna Pest Control Limited
1828 Danforth Avenue
TORONTO, Ontario
M4C 1H8
Telephone: 416-469-4111

Mr. Michael Lustgarten, Manager
Pestco Company of Canada Limited
134 Doncaster Avenue, Unit 10
THORNHILL, Ontario
L3T 1L3
Telephone: 416-226-5880

Dr. George S. Cooper, Chairman
Ontario Pesticides Advisory Committee
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-7048

Mr. Casey Van Maris, Representative
Landscape Ontario
c/o Parklane Nurseries Limited
R.R. # 1
GORMLEY, Ontario
L0H 1G0
Telephone: 416-887-5851

Mr. A.G. Moncton, Owner
Royal Pest Control Limited
992 Pape Avenue
TORONTO, Ontario
M4K 3V7
Telephone: 416-425-2659

Mr. Karl Smith, Service Manager
Reliable Exterminators Limited
1730 McPherson Court
PICKERING, Ontario
L1W 3E6
Telephone: 416-686-1020

Mr. Sam Bryck, Branch Co-ordinator
Abell Waco Limited
246 Attwell Drive
REXDALE, Ontario
M9W 5B4
Telephone: 416-675-6060

Members from Sir Sandford Fleming College, Frost Campus, Lindsay, Ontario:

Mr. Gary R. Cronkwright, Principal
Frost Campus

Mr. Gaile E. Fleming, Chairman
Resource Technology Division

Mr. Paul G. Pilley
Teaching Master - Pestology

Guests

Ms. Donna L. MacKenzie,
Aquatic Pest Control Specialist

Mr. Geoff Cutten,
Entomologist

Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario M4V 1P5

Mr. Ed Gordius, Curriculum Co-ordinator
Senior & Continuing Education Branch
Ontario Ministry of Education
Mowat Block, Queen's Park
TORONTO, Ontario
Telephone: 416-965-2665

Attendance: 17

MINUTES OF THE THIRD MEETING OF THE AD HOC ADVISORY COMMITTEE FOR THE PEST CONTROL TECHNICIAN (PCT) PROGRAM HELD IN WOODBRIDGE AT 2:00 P.M., TUESDAY, JANUARY 13, 1981

Present:	Mr. N. Bazinet	Mr. L. Lenhardt
	Mr. A. Bossio	Mr. M. Lustgarten
	Mr. G. Carpentier	Mr. R. Murphy
	Mr. G. Cronkwright	Mr. S. Nicholson
	Mr. G. Fleming	Mr. P. Pilley
	Ms. L. Jupp	Mr. K. Smith
Guests:	Mr. C. Acheson	Mr. B. Marshall
	Mr. G. Cutten	Mr. D. Mountjoy
	Mr. G. Gilroy	Mr. C. Murphy
	Mr. E. Gordius	Mr. R. Naylor
	Dr. D. Herne	Mr. E. Valder
	Mr. D. Jones	
Regrets:	Dr. G. Cooper	Mr. C. Van Maris

1. Introductions

This meeting was held in conjunction with the monthly meeting of the Ontario Pest Control Association (OPCA) so that its members could attend. It began with a welcome from Mr. Dick Murphy who is both the Chairman of the PCT Advisory Committee and President of the OPCA. A round of introductions was made to acquaint committee members and guests. It is worthy of note that 12 pest control companies and 4 government agencies were represented.

2. Minutes of the second meeting were approved as circulated.

3. Employment Survey

Mr. Pilley reported that no questionnaires had been returned from the Hamilton-Burlington area, nor from the Belleville-Cornwall region which suggests they were lost in the mail. To get some input from these and other areas, he sent out a second copy of the questionnaire to 16 companies between December 30 and January 7. Comments, or lack thereof, on those returned indicated that some companies did not receive the survey literature (i.e. questionnaire, program proposal and covering letter) sent out in November.

The final results of the survey were compiled on February 10. Of the 125 questionnaires sent out, 46 were returned (37%). These showed a need for 334 pest control personnel (in various categories) over the 5-year period 1981-1986. Of these, 188 are for Route Servicemen (=Technicians) which is the basic hiring level. 95 similar seasonal positions would provide summer employment opportunities for students.

4. Field Placement

Mr. Pilley explained that the basic purpose of field placement in the PCT program is to give the student useful and practical exposure to the various facets of pest control work. The placement agency (i.e. pest control company) is not under any contractual obligation to the College or to the student. The cooperating firm would assign tasks and exercise supervision commensurate with the student's ability and experience, while ensuring that proper safety procedures are followed - as it would with any new employee. Student-assisted exterminations must be carried out in accordance with the Ontario Pesticides Act. The student is not an employee of the firm since his/her work is performed without monetary compensation. The student will observe the same working rules and the same regulations of confidentiality as set out for regular employees. While on field placement, students are covered by the general liability insurance policy of the College. Proof of coverage can be provided to the placement agency upon request. Cooperating firms will be required to submit a written evaluation of the student's work performance and general suitability. The pest control industry and the College also benefit from field placements. Cooperators have an opportunity to assess prospective employees, while their feedback to the College enables any necessary changes in the curriculum content or training techniques.

Mr. Pilley then solicited the Committee and guests for their ideas on field placement. In particular he wanted to know how many days a student should spend on a particular training assignment, what type of duties s/he can perform, and when is the best time during the school year for these activities?

Mr. Smith asked how many days could be spared in a semester for field placement. As a starting point for discussion, Mr. Pilley suggested two weeks per semester [exclusive of the first semester which is common to all programs at the Frost Campus].

Mr. Naylor cautioned that students could be exploited as a source of cheap labor and be given only repetitive assignments, e.g. apartment 'cleanouts' [=systematic spraying of all units in an apartment building to rid a pest, especially cockroaches]. Mr. Pilley commented that this was contrary to the purpose of field placement.

Mr. Valder felt that it would be a good initial experience for students to accompany servicemen on their routes. Ms. Jupp concurred, and suggested a period of one week. For the first placement Mr. Bossio's suggestion was that 2 days be spent with a route serviceman, 2 days with a 'specials' man, and 1 day in the office. He also said that students should have a driver's licence (class G is all that is required). Mr. R. Murphy opined that 1st-year students should only be involved in route work, and that the best time for their placement would be in the January to March period.

Mr. Naylor indicated that the first or second weeks in the month are best because they are usually the slowest. On the other hand, Ms. Jupp pointed out, the busy time near the end of the month would be a more realistic exposure for 2nd-year students. Mr. Valder agreed, stating that an experienced student could be treated like any other class 4 structural exterminator.

Mr. Marshall expressed his acceptance of one-week placements at any time of the month. Mr. Bossio felt that field placements should be made when appropriate to the program's objectives, and not just when convenient for the industry. He would accept placements any time in the month, including the busy last week. Ms. Jupp stated that her company never had the problem of being overstaffed with technicians, and would not have any problem placing students even in busy periods. Mr. Acheson concurred and included summer employment.

Mr. Pilley mentioned that since PCT students will be required to have a summer work period in the pest control industry, field placements in the second year (i.e. semesters 3 and 4) can be of a more specialized nature, e.g. fumigations, termite treatments, small mammal control, greenhouse spraying and indoor plant maintenance.

In reply to Mr. Naylor's question about students' living expenses while on field placement, Mr. Fleming indicated that the College was responsible for accommodation.

5. Summer Employment

Mr. Cutten asked if a summer job in pest control in the food industry would fulfill the requirement for work experience. Mr. Pilley replied that he had canvassed a few large companies and no interest was shown in the PCT program [although they would like short courses in mid-winter]. He found that most of their pest control work is done 'in-plant', i.e. it is performed by personnel with other primary job responsibilities on a part-time basis (on weekends or in the evenings).

Mr. Carpentier wondered how an employer should handle the situation where a PCT student was not performing satisfactorily on a summer job. Mr. Cronkwright replied that the College could not guarantee its students, and if an individual is unsuitable s/he should be dismissed.

It was suggested by Mr. Pilley at the Association's December meeting that the OPCA act as a central agency for placing students in summer employment. Students would file their applications, and companies their manpower requirements, with the Association which would make the assignments.

Mr. Lustgarten again predicted, as he did at the previous meeting, that 20 PCT graduates a year would not be enough.

Mr. Mountjoy inquired about admission standards for mature students. These were explained by Mr. Cronkwright, and he was also referred to the minutes of the 80-11-25 meeting.

Mr. Valder asked if Manpower-funded short courses could be developed by the College. Mr. Cronkwright indicated this was possible once the PCT program was established.

6. Safety

Mr. Marshall asked if students would have their blood tested before applying pesticides. Dr. Herne agreed on the importance of establishing the base serum level of cholinesterase before exposure to organophosphates and carbamates, and also of recognizing the symptoms of pesticide poisoning. Mr. Pilley indicated that this test would be required of all students entering the PCT program. [It is worth noting that the 40 Forestry students taking the 2-week Land Exterminator's course at the College this spring had their base AChE levels determined in February.]

Mr. Smith pointed out that students should have their own personal protective equipment (i.e. face mask, goggles, gloves and coverall/smock). They should also learn how to clean the mask and change the filter. Dr. Herne and Mr. Valder also spoke on this.

After the meeting Mr. Gordius requested Mr. Pilley to contact the Occupational Health and Safety Division of the Ontario Ministry of Labour re. safety aspects of the PCT program. Information has been received from Mr. E.L. Trelford.

At the November 25 meeting, Mr. Van Maris said that students should be told about allergic reactions to pesticides, but that they not be used as a basis for exclusion from the program.

7. Support for the PCT program

Mr. Jones, directing his comments to Mr. Gordius of OMCU, stated that the pest control industry is enthusiastic about the PCT program and is right behind it but, quite naturally, is afraid of the potential competition. Mr. Gordius appreciated his comments.

Mr. Valder acknowledged that college-trained technicians will add prestige to the industry.

When asked by Mr. Bossio for his comments on the PCT program, Mr. Gordius said that he was pleased to see the cooperation between the industry and the College. He agreed there is a need for the program, and with the information and insight he has gained from the last two meetings he can recommend the program. Mr. Gordius congratulated the OPCA and the College for the work done. He suggested a courtesy membership in the OPCA for the Principal, or his designate, to maintain the good working relationship.

8. Next Meeting

The Committee will meet again after some word has been received from the Ministry of Colleges & Universities on the PCT program proposal. Members will be notified as to the date, time and place.

9. Adjournment

Mr. Murphy expressed his thanks to everyone present for their cooperation. The meeting adjourned at 4:10 p.m.

AD HOC ADVISORY COMMITTEE MEMBERS
PEST CONTROL TECHNICIAN PROGRAM
THIRD MEETING 81-01-13

Mr. Norm Bazinet, Co-ordinator
Education, Training & Examination
Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-2401

Mr. A. Geoffrey Carpentier,
District Pesticide Specialist
Ontario Ministry of the Environment
139 George St. N.
PETERBOROUGH, Ontario
K9J 3G6
Telephone: 705-743-2972

Mr. Richard J. Murphy, President
Ontario Pest Control Association
c/o Aetna Pest Control Limited
1828 Danforth Avenue
TORONTO, Ontario
M4C 1H8
Telephone: 416-469-4111

Mr. Art Bossio, Vice-President
Ontario Pest Control Association
c/o A & A Pest Control Limited
478 McNicoll Avenue
WILLOWDALE, Ontario
M2H 2E1
Telephone: 416-494-6908

Mr. Michael Lustgarten, Manager
Pestco Company of Canada Limited
134 Doncaster Avenue, Unit 10
THORNHILL, Ontario
L3T 1L3
Telephone: 416-226-5880

Ms. Linda Jupp, Vice-President
PCO Services Limited
232 Norseman Street,
TORONTO, Ontario
M8Z 2R4
Telephone: 416-231-7276

Mr. Karl Smith, Service Manager
Reliable Exterminators Limited
1730 McPherson Court
PICKERING, Ontario
L1W 3E6
Telephone: 416-686-1020

Mr. Stephen A. Nicholson
Application Specialist
Pest Control Section
Ontario Ministry of Natural Resources
MAPLE, Ontario L0J 1E0
Telephone: 416-832-2761

Members from Sir Sandford Fleming College, Frost Campus, Lindsay, Ontario:

Mr. Gary R. Cronkwright, Principal
Frost Campus

Mr. Gaile E. Fleming, Chairman
Natural Resources Division

Mr. Paul G. Pilley,
Teaching Master - Pestology

Mr. Larry P. Lenhardt, Co-ordinator
Farm Management Program

Guests

Mr. Chas. Acheson, District Manager
PCO Richardson's Extermination Ltd.
1472 Kingston Road
SCARBOROUGH, Ontario
M1N 1R6
Telephone: 416-699-9382

Mr. G.S. Gilroy, District Manager
PCO General Pest Control Limited
42 Easton Road
BRANTFORD, Ontario
N3P 1J5
Telephone: 519-759-3100

Mr. Derek G. Jones, General Manager
Guardian Exterminators Limited
2265 Jane St., TH 27
DOWNSVIEW, Ontario
M3M 1A6
Telephone: 416-247-7233

Mr. Brian Marshall, Owner
Marshalls Pest Control Limited
455 Trafalgar Road
OAKVILLE, Ontario
L6J 3H8
Telephone: 416-844-8717

Mr. D.J. Mountjoy, Owner
Presto Pest Control Limited
79 Burk Street
OSHAWA, Ontario
L1J 4C1
Telephone: 416-725-9871

Mr. Robt. D. Naylor, Owner
Central Fumigators & Exterminators Ltd.
202 Park Home Avenue
WILLOWDALE, Ontario
M2R 1A2
Telephone: 416-536-0955

Mr. Colin F. Murphy, Secretary
Ontario Pest Control Association
c/o Aardvark Pest Control Limited
533 Rathburn Road, Unit 46
ETOBICOKE, Ontario
M9C 3T2
Telephone: 416-626-5604

Mr. E.W. Gordius, Sr. Program Consultant
College Affairs Branch
Ont. Ministry of Colleges & Universities
Mowat Block, Queen's Park
TORONTO, Ontario
M7A 1L2
Telephone: 416-965-2664

Mr. E. Valder, Owner
Pestco Company of Canada Limited
134 Doncaster Avenue, Unit 10
THORNHILL, Ontario
L3T 1L3
Telephone: 416-226-5880

Dr. Donald C. Herne
Research Scientist
Canada Dept. of Agriculture
VINELAND STATION, Ontario
L0R 2E0
Telephone: 416-562-4113

Mr. Geoff Cutten, Entomologist
Pesticides Control Section
Ontario Ministry of the Environment
135 St. Clair Avenue West
TORONTO, Ontario
M4V 1P5
Telephone: 416-965-2401

Attendance: 23 (12 companies represented)

APPENDIX 3,C

NEED FOR PEST CONTROL TECHNICIAN PROGRAM:

Results of Employment Survey

Letters from the Ontario Pesticides Advisory Committee and from pest control companies

Comments excerpted from questionnaires

sir sandford fleming college

A SURVEY OF THE ONTARIO PEST CONTROL INDUSTRY FOR FULL-TIME TECHNICIAN REQUIREMENTS OVER THE FIVE-YEAR PERIOD 1981-1986*

MUNICIPAL AREA (no. of respondents)	Route Serviceman (Technician)	'Specials' man, (Senior Technician)	Termite Technician	Sales & promotion	Supervisor	Other
Windsor - Chatham - Sarnia (3)	13	5	0	5	2	0
London (1)	4	1	0	0	1	0
Kitchener - Cambridge - Brantford (6)	17	8	3	2	4	3
St. Catherines (3)	12	1	0	1	1	0
Hamilton - Burlington (2)	4	0	0	1	1	0
Mississauga - Brampton - Oakville (6)	16	4	0	2	2	1
Metro Toronto including Pickering & Thornhill (14)	80	17	8	14	11	0
Oshawa - Lindsay (3)	6	2	1	3	2	0
Kingston (2)	8	2	0	1	2	0
Ottawa - Hull, (6)	28	11	1	4	2	17
TOTALS	188	51	13	33	28	21 = 334

*The above data are from 46 returned questionnaires of 125 sent out on November 10, 1980 [return rate 37%]. The same survey also shows a need for 95 seasonal Route Servicemen which could provide summer employment for students.

Paul G. Pilley
10 February 1981

Ontario

G.S. Cooper, Ph.D.
Chairman

A.R. Chisholm
Executive
Secretary

Ministry
of the
Environment

Pesticides
Advisory
Committee

416/965-7048

Queen's Park
Toronto, Ontario
M7A 1A2

January 22, 1981

Mr. Paul G. Pilley
Teaching Master
Sir Sandford Fleming College
Frost Campus
P.O. Box 8000
LINDSAY, Ontario K9V 4S6

Dear Mr. Pilley:

Your letter of January 9, 1981, to Mr. A. H. Gartner, Member, Ontario Pesticides Advisory Committee, was presented to the Pesticides Committee at their January monthly meeting on January 15, 1981.

The Pesticides Advisory Committee is in full agreement that there is a need for more advanced training in the proper handling, application and use of pesticides. These is also a need for facilities that will provide such training for those entering the business of pest extermination.

Having studied the proposed program and curriculum content, it is my belief that it will achieve the goals desired. The fact that the survey carried out by the Ontario Pest Control Association indicates the expanding need for well trained applicators and the fact that the Ontario Pest Control Association members themselves are willing to provide summer employment and on-the-job training for students, indicates that facilities are needed to carry out the necessary training.

The two-year Pest Control Technician Program, as put forth by Sir Sandford Fleming College, is an excellent start in upgrading future pest control applicators.

Yours sincerely,

G. S. COOPER, Ph.D.
CHAIRMAN

GSC/gm

PCO Services Limited
232 Norseman Street
Toronto Ontario
Canada M8Z 2R4
Telephone (416) 231 7278

November 18, 1980

Mr. R. H. Murphy,
President,
Ontario Pest Control
Association,
1828 Danforth Ave.,
Toronto, Ontario
M4C 1H8

Dear Mr. Murphy:

I have studied the proposed Pest Control Technician program soon to be initiated at Sir Sandford Fleming College in Lindsay, Ontario. I wholeheartedly support this program.

The two year certificate program would serve our needs better than the one year program as the two year program would give us the opportunity to hire some students in the summer months and evaluate their performance prior to permanent positions.

I trust the Ontario Pest Control Association will back this endeavour.

Yours truly,

A. H. Gartner
President

AHG:jh

OFFICE 351-3141 HOME 354-9512

MAPLE CITY
PEST CONTROL CO.

Office and Retail Store:

CHATHAM, ONTARIO
276 McNaughton Ave. W.
N7L 1R7

GOV'T LICENSED EXTERMINATOR
BOB HOLLING
OWNER - MANAGER

Mr. R. J. Murphy
Ontario Pest Control Association
1821 Danforth Avenue,
Toronto, Ontario M4C 1H8

Dear Mr. Murphy:

Sir Sanford Fleming College's proposal for a pest control techician program is something that should have been done years ago.

I feel a course set up such as this one will not only benefit the industry but the general public as well.

The only regret I have is that it was not available when I was first starting out in the industry.

Yours Truly

Robert J Holling

NIAGARA PEST CONTROL LTD.
146 CHURCH ST.
ST. CATHARINES, ONT.
TELEPHONE 685-8212

Mr. R.J. Murphy, President
Ontario Pest Control Association
1828 Danforth Avenue
TORONTO, Ontario

Dear Dick

Upon reviewing the proposed curriculum content covering the pest control technician program, I have found the course to be quite comprehensive.

It is most gratifying to see the effort being put forth to establish the course. The course will not only benefit the pest control industry but the public itself.

Yours truly

(Signed) B. Delaney

Brian Delaney
President

JIM PAYNE

Pest Management Services

161½ WELLAND AVENUE
ST. CATHARINES, ONTARIO
L2R 2N8
Telephone: 685-4439

Dec. 1st, 1980

Mr. R. J. Murphy,
President,
Ontario Pest Control Association,
1828 Danforth Ave.,
TORONTO, Ontario,
M4C 1H8.

Dear Mr. Murphy:

Sorry for the delay in getting your questionaire back to you, as I have been very busy.

I hope this programme proceeds as planned, it is sure to be a big plus for the industry. I would also like more information regarding the O.P.C.A. as I would like to become a member.

Good luck in your effort,

Sincerely yours,

PEST MANAGEMENT SERVICE,

Mr. James Payne,
Owner-Operator.

JP:dlc

Encl.

ALI-CAT PEST CONTROL SERVICE
3045 Queen Frederica Dr. No.307, Mississauga, Ontario 272-1846

November 14, 1980

Mr. Dick Murphy
President
Ontario Pest Control Association
1828 Danforth Avenue
Toronto, Ontario
M4C 1H8

Dear Mr. Murphy:

Re: Proposal for a Pest Control Technician Programme

Personally I feel that a programme of this caliber is long overdue.

Please find attached the requested questionnaire.

I give my full support to such a programme.

Yours Truly

(Signed) Chris Rice

Chris Rice C.P.H.I. (C)
Owner

COMMENTS EXCERPTED FROM QUESTIONNAIRES

"I feel that this program would raise our professional image and project our business as more than just Exterminators."
Robert J. Holling, Maple City Pest Control Company Ltd., Chatham, Ontario

"In my experience in the pest control industry, there is a vital need for such a program. Even the larger companies have problems in recruiting the proper type of person who is interested in a pest control career."
Harvey Hackland, Kilpest Services Ltd., London, Ontario

"It [PCT program] would improve the quality of services to the consumer, as service has shown considerable decline over the past few years."
Colin C. Newman, Newman Pest Control Ltd., Kitchener, Ontario

"I think this is a terrific step in the field of education for pest control operators. We have never had anything to correspond to this in Canada."
Gilbert S. Gilroy, PCO General Pest Control Ltd., Brantford, Ontario

"I believe this program is necessary for the industry, and am confident that graduates will be well received. Look forward to cooperating any way I can."
James Payne, Pest Management Services Ltd., St. Catherines, Ontario

"There is an urgent need for this program!"
Richard J. Murphy, Aetna Pest Control Ltd., Toronto, Ontario

"This may be a minority view, but I feel that a full-spectrum program, such as this, should become mandatory for people entering the pest control business. At present training is strictly ad hoc, resulting in an inadequate end product."
Derek G. Jones, Guardian Exterminators Ltd., Toronto, Ontario

"We believe strongly that this is a very good idea. The pest control industry needs this kind of program very badly. It should have been implemented a long time ago. Hopefully we shall be able to get it going now."
Michael Lustgarten, Pestco Company of Canada Ltd., Thornhill, Ontario

"Pest control has long been an ignored area in the business environment. It is a service with an ever increasing market, and so should be recognized as such. This program will help accomplish this."
David McQuillan, Lloyd Pest Control Services Ltd., Oshawa, Ontario

"I believe that there is a need for this program, and the proposed curriculum seems quite intensive. Now that we are becoming more environment-conscious, it is necessary that we have highly qualified people to disseminate pesticides and to handle any public relations that may be required."
Martin Fine, Fine's Flowers Ltd., Ottawa, Ontario

APPENDIX 3,D

PROGRAM OBJECTIVES

Upon graduation a Pest Control Technician can diagnose and define pest problems in urban situations, recommend control strategies compatible with existing environmental constraints, determine the cost of treatment, apply pesticides in a safe and efficient manner, and communicate with the public on these matters.

He/She must be able to:

(1) identify/recognize common structural and landscape pests and be familiar with their behavior and habitat requirements;

(2) define the extent and severity of infestations and locate their origin;

(3) provide estimates to clients for routine pest control services;

(4) select and use pesticides to effect control based on knowledge of the chemical's efficacy, mammalian toxicity and persistence in the environment;

(5) operate, calibrate and maintain pesticide application equipment;

(6) recommend practices to prevent re-infestation by pests, e.g. sanitation, barriers, harborage reduction and habitat management; and

(7) communicate orally with clients and write technical reports for company supervisors on pest situations.

He/She could be able to:

(8) service 'specials' (i.e. one time jobs) such as flea, wasp and racoon control.

With appropriate work experience he/she could:

(9) perform specialized and highly skilled pest control services such as fumigations and termite treatments;

(10) inspect structures for termites and carpenter ants, pinpointing the source of infestation, evaluating the damage, and recommending structural alterations;

(11) promote and sell pest control services and supplies to commercial clients such as restaurants, hotels and groceterias;

(12) supervise the field operations of route servicemen; and, ultimately,

(13) manage a district/branch office; or

(14) own and operate his/her own pest control business.

APPENDIX 3,E

PEST CONTROL TECHNICIAN
PROGRAM OF STUDIES

Course Name	Periods/Wk	
FIRST SEMESTER (COMMON)		
Developmental Reading & Communications	4	
Mathematics	4	
Forestry	4	
Fish & Wildlife	3	
Pest Management	2	
Agriculture	3	
Geology	4	
Cartography	3	
Resources Drilling	2	
Heavy Equipment	4	(33)
SECOND SEMESTER		
Developmental Reading & Communications	4	
Chemistry for Pest Control	5	
Mathematics for Pest Control	3	
Pesticides	5	
Pesticide Application Techniques I	5	
Urban Entomology I	5	
Field Placement (2 weeks)	-	(27)
THIRD SEMESTER		
General Studies Elective	3	
Business Communications	3	
Pesticide Application Techniques II	5	
Urban Entomology II	5	
Vertebrate Pest Control	5	
Landscape Pest Control	5	
Field Placement (2 weeks)	-	(26)
FOURTH SEMESTER		
General Studies Elective	3	
Human Relations & Supervision	3	
Business Practice	4	
Urban Entomology III	4	
Vegetation Control	5	
Principles of Integrated Control	3	
Urban Tree Pest Control	5	
Field Placement (1 week)	-	(27)

APPENDIX 3,F

COURSE OBJECTIVES

The detailed course descriptions given on the last 5 pages of this proposal (see Addendum 1) are integral to this section.

COMMON FIRST SEMESTER

The curriculum for this semester is currently under review because of the increasing number of new courses being added as new programs are developed. Thus, there is likely to be some changes in the semester (i.e. fewer courses and hours) from what is proposed in Appendix E. The basic objective of this semester is to give students a broad background in natural resources, before they specialize in a particular resource-oriented program. This objective is compatible with the proposed PCT program since it is most desirable that pest control technicians be familiar with the fundamentals of such disciplines as Forestry, Agriculture, Fish & Wildlife, and Heavy Equipment.

All of the courses (with one exception) shown under the common first semester in Appendix E have been offered previously. Thus, it is not necessary to reiterate their individual objectives since these are a matter of public record - see SSFC 1981/82 calendar and course outlines available through Student Services.

The new PEST MANAGEMENT course in the common first semester will emphasize general concepts, using a lecture/demonstration format. Students will learn that a pest is anthropocentrically defined, and that pests have shaped man's history and continue to have a major socioeconomic impact on the modern world. They will gain an understanding of the causes of pest outbreaks, and a contextual appreciation of pesticides in the environment. They should be able to perspectively view the data emanating from the analysis of pesticide residues. Become aware of alternatives to chemical control, and be exposed to the philosophy of integrated pest management (IPM). Acquire a basic familiarity with some common pesticides and application equipment. Examine selected pests of field and forest crops, livestock and man. An overview of careers in pest control will also be given.

- -

In semesters 2,3, and 4 the courses listed below have also been offered before and their course outlines are available. To avoid redundancy their objectives will not be given here.

DEVELOPMENTAL READING & COMMUNICATIONS
HUMAN RELATIONS & SUPERVISION
GENERAL STUDIES ELECTIVES

In the following course objectives the number of hours for lectures and labs/week are shown thus (2-3). Courses more than one semester in length are indicated by roman numerals after the course title.

CHEMISTRY FOR PEST CONTROL (2-3)
Students will learn how organic compounds are named and how their molecules are structured. Perform simple experiments to demonstrate the chemical properties of solvents, oil diluents, emulsifiers, mineral diluents, and sorptive dusts used in pesticides. Synthesize and formulate a simple pesticide, and participate in the chromatographic determination of pesticide residues. Take field samples for residue analysis. Examine the properties of gases used as fumigants.

MATHEMATICS FOR PEST CONTROL (3-0)
Students will learn how to calculate spray tank capacity, dilution of concentrates, spray mixtures, application rates (broadcast and row crops), pump output and sprayer calibration, aircraft calibration, and gas law problems. Perform simple statistical tests used in pesticide efficacy trials.

PESTICIDES (2-3)
Students will become familiar with the PCP Act, pesticide registration and container labeling. Study the properties and uses of insecticides, rodenticides, herbicides and fungicides considering mode of action, LD50, persistence, and cholinesterase inhibition. Recognize the symptoms of pesticide poisoning and know first aid treatment. Perform simple experiments to show synergistic action in insecticides; antagonistic action in insecticide-herbicide combinations (resulting in phytotoxicity) and use of safeners; hydrolysis of pesticides in alkaline water; repellency/non-efficacy of, and resistance to, insecticides in the cockroach; insecticidal properties of soaps; and plant resistance and varietal sensitivity to herbicides.

PESTICIDE APPLICATION TECHNIQUES I & II (2-3)
Students will examine the basic components of a hydraulic sprayer. Demonstrate the effect of different nozzle orifices on spray patterns and droplet size. Simulate factors affecting spray deposit and drift. Operate, calibrate and maintain pesticide application equipment such as hand compression sprayers, back-pack sprayers, mist blowers, aerosol generators, ULV rotary-atomizers, handgun sprayer, boom sprayer, and dusters. Learn to use and maintain safety equipment, particularly respirators and gas masks, and how to test air for toxic concentrations of fumigants. Learn to make proper dilutions of concentrates and prepare spray mixes, how to decontaminate spills and application equipment, and how to store, transport and dispose of pesticides. Practice specific application techniques such as structural treatments, fumigation, field spraying, tree injections, and ground support for aerial control.

URBAN ENTOMOLOGY I, II & III (2-3)
Students will learn the identification/recognition, life history, behavior, and habitat requirements of public health, nuisance, stored food, wood-destroying, and other structural pests. Acquire techniques for monitoring/surveying pest populations and locating the source of infestations. Recognize equipment design, sanitation, and harborage as essential aspects of control. Select the control strategy appropriate to commercial/industrial buildings and single/multiple family dwellings. Conduct post-treatment assessments.

BUSINESS COMMUNICATIONS (3-0)
Students will review the rules of grammar, and study writing techniques and styles. Practice writing technical reports and business letters, and making oral presentations. Acquire techniques for telephone communication.

VERTEBRATE PEST CONTROL (2-3)
Students will study the biology and behavior of rodents, bats, birds and other vertebrate pests. Learn techniques for detecting rodent infestations, for deployment of traps, glueboards and poison bait stations, and for use of ultrasonic devices. Recognize sanitation and pestproofing as integral to control strategies. Use traps for control of raccoons, squirrels, and other small mammals. Examine bird control strategies.

LANDSCAPE PEST CONTROL (2-3)
Students will learn to diagnose disorders and recognize pests of turf, herbaceous garden/ornamental plants, and indoor tropical plants. Practice techniques for controlling pests in the greenhouse, shopping mall, and office. Demonstrate use of biological control agents in the greenhouse.

BUSINESS PRACTICE (4-0)
Students will become familiar with the fundamentals of book-keeping, cost control and profit margins, contract law, insurance and liability, guarantees, and data processing particularly as they relate to pest control. Practice estimating costs for pest control services. Study the potential application of computers in pest control businesses.

VEGETATION CONTROL (2-3)
Students will learn weed identification and biology, and herbicide classification. Perform simple experiments with herbicides to study efficacy in terms of the weed's development, and the placement and selectivity of the chemical used. Demonstrate the effects of sublethal applications of herbicides on various plants and trees, of growth retardants on turf, and of soil sterilants on vegetation. Practice herbicide application techniques in the field, including fumigation of nursery beds and aquatic weed control. Examine other methods of weed control - cultural, mechanical, and biological.

PRINCIPLES OF INTEGRATED CONTROL (3-0)
Students will study the principles of integrated pest management (IPM) and examine in depth the feasibility of alternatives to chemical control. Become familiar with legislation aimed at pest prevention, pesticide control, and environmental protection.

URBAN TREE PEST CONTROL (2-3)
Students will study tree growth and nutrient requirements, and understand the concept of tree decay. Learn to identify and control common insects and tree diseases. Practice application techniques such as dormant spraying and tree injection. Recognize hazard trees and detect decay using a Shigometer. Treat decay by pruning and surgery.

FIELD PLACEMENT I, II & III
The objectives and details are given in the minutes of the 3rd Advisory Committee meeting (see Appendix B) and on page 4 of the course descriptions in Addendum 1.

APPENDIX 3,G

ACCREDITATION OF PEST CONTROL TECHNICIANS

ONTARIO PEST CONTROL ASSOCIATION

1828 Danforth Avenue,
Toronto, Ontario M4C 1H8

13 January 1981

Mr. Paul G. Pilley,
Sir Sandford Fleming College,
P.O. Box 8000,
Lindsay, Ontario K9V 5E6

Dear Mr. Pilley:

In response to your recent inquiry, it is the intent of the Ontario Pest Control Association to consider accreditation of pest control technicians who have an acceptable combination of training and work experience.

Thank you for your interest in our attempt to upgrade the pest control industry.

Yours very truly,

R.J. (Dick) Murphy,
President

Ontario
Ministry of
Labour

APPENDIX 3,H - SAFETY ASPECTS

ALSO SEE MINUTES OF 81-01-13 MEETING

Occupational Health and Safety Division
Standards and Programs Branch
400 University Avenue, 9th Floor
Toronto, Ontario
M7A 1T7

February 5, 1981

Mr. P. G. Pilley, B.Sc.
Co-ordinator
Pest Control Program
Sir Sandford Fleming College
School of Natural Resources
P. O. Box 8000
Lindsay, Ontario
K9V 5E6

Dear Mr. Pilley:

Thank you for your memorandum of January 30, 1981, requesting my comments regarding the safety aspects of your proposed program for Pest Control Technicians.

The Occupational Health and Safety Division of the Ministry of Labour administers and enforces The Occupational Health and Safety Act, 1978, which applies to the protection of workers from occupational hazards in Ontario work places.

A worker, as defined in the Act, means a person who performs work or supplies services for monetary compensation. Students, therefore, are not addressed by the Act but the staff of Sir Sandford Fleming is covered under our legislation.

I was pleased to note the direct involvement of representatives of the Ministry of the Environment in the development of the program curriculum.

With regard to compliance with The Occupational Health and Safety Act, 1978, your attention is drawn to a number of sections of the Act and industrial regulations which may have relevance to your program and to the College as a whole.

Based on my superficial understanding of the courses you have proposed, the following are some of the provisions of the legislation with which you should become familiar. A copy of the Act and regulations for industrial establishments has been enclosed for your reference.

Section 1	-	Definitions
Section 2	-	Application
Section 8	-	Joint Health and Safety Committees
Section 14	-	Duties of Employers
Section 16	-	Duties of Supervisors
Section 17	-	Duties of Workers
Section 19	-	Duties of Suppliers
Section 20	-	Toxic Substances
Reg. 1	-	Interpretation
Reg. 71 et al	-	Confined Space
Reg. 83 et al	-	Protective Equipment
Reg. 128 et al	-	Industrial Hygiene

Upon reading the balance of the legislation, you may find additional provisions which have direct application to your situation. I would be pleased to discuss any further questions you may have regarding students or staff after you have had a chance to acquaint yourself with the provisions of the legislation.

By copy of this letter to Mr. Cronkwright, I am offering to provide the services of our staff to conduct an information seminar for the staff and the members of the joint health and safety committee of Sir Sandford Fleming College to outline the legislation and explain the Internal Responsibility System and the role of the Ministry inspector.

Please call me if you have any questions.

Sincerely,

Edward L. Trelford
Manager
Advisory Services

c.c. G. R. Cronkwright, Principal Frost Campus
G. E. Fleming, Chairman, Resource Technology Division
E. W. Gordius, Curriculum Co-ordinator, M.C.U.
J. J. Nelson, M.O.L.

APPENDIX 3,I

EVALUATION OF PROGRAM EFFECTIVENESS

As a 3-year pilot project the program will be critically reviewed at the end of this period by the College and the Advisory Committee as to its continuation and any changes in curriculum.

APPENDIX 3,J

DETAILED OUTLINE OF COSTS

A. CAPITAL

(i) Renovations to facilities: $5000 in year 1 (1981/82) is required to refurbish one of the existing portables as a pesticide spray lab, which will also be used for application equipment demonstrations and pesticide mixing and storage.

(ii) Equipment purchases: $15000 in year 1 (1981/82) is required for the following -

Qty.	Item	Estimated Cost
1	Solo Port-423 applicator with booster pump and granular/ ULV kits	$ 600
1	Vapor-Gun 12 portable fog applicator	135
1	Sonitron Model CWP-104 (ultrasonic rodent control)	200
2	B & G Pres-to-blo Model 2100-D duster	300
2	B & G Mini-Dust-R	60
2	B & G Dust-R Model 1150-R	80
3	Time-Mist battery aerosol dispenser	90
1	Victor/Woodstream Tender Trap Model 0756	125
1	Fogmate Micro-3 fog applicator with turntable and timer	300
1	Silver Skunk portable high-pressure power sprayer with termite adaptor	995
2	Spray gun	180
1	Electron Capture Detector (for Pest Control Chemistry)	2500
2	Rodent detection UV lamp	80
4	Rubber suits	200
1	Self-contained breathing apparatus	1200
1	Dyna-Fog DH-90 portable thermal fogger	750
4	B & G sprayer Model N-124S with crack & crevice kit	700
1	Hudson Suburban power sprayer	700
1	Spraymate 425 knapsack sprayer	110
1	Tecnoma T16P knapsack sprayer	100
1	Flintrol Light Trap Interior Model 8288	500
1	Shigometer Model 7950 (pulse resistance meter)	1500
2	Cooper-Peglar Model CP-3 backpack sprayer	400
4	Tree Injectors (Jim Gem and pressurized)	400

2	Scott full-face mask with OV canister	$ 360
20	Comfo II respirator	700
2	MeBr halide-leak detector Model TX3A	70
1	Fogmaster 7401 Micro-jet ULV fogger	270
1	Tecnoma T1 ULV sprayer	90
1	Micron Herbi ULV rotary-atomizer	150
	TOTAL	$13845

In year 2 (1982/83) $10000 will be needed to purchase additional pesticide application equipment, e.g. Leco Model MD/ULV cold aerosol generator ($4500) or Roto-Mist, and more safety equipment, especially respirators. In the third year (1983/84) an estimated $3000 will be used to purchase outstanding items.

B. OPERATING

(i) Additional teaching staff: 1.5 teachers are required in the first year of the PCT program. An increase in faculty should occur as the program grows from 20 students in 1981/82, to 55 in 82/83, and 70 in 83/84. See page 3 in the proposal form re. forecast of student enrollments and page 5 re. teacher salaries.

(ii) Supplies: $5000 is required in year 1 (1981/82) for such expendable items as pesticides, spray deposit cards, dyes, bait stations, glueboards, mechanical mouse traps, rubber gloves, goggles, smocks, preserved insect specimens and prepared microslides. Unit costs for these items are less than $100. 35 mm instructional slide sets and reference books for the library will also be needed.

Approximately $4000/ann for the second and third years of operation will be needed to replace expendable items and to accommodate increasing student enrollments.

(iii) Field placement costs: the amounts of $4000, 9500, and 11000 shown for the first 3 years of the program's operation are for student accommodation while on out-of-town assignments. Bus rentals for local field trips are also included in these figures.

APPENDIX 3,K

SURVEY PACKAGE MAILED TO INDUSTRY:

Questionnaire on need for program

Covering letter

Program proposal

ONTARIO PEST CONTROL ASSOCIATION

QUESTIONNAIRE ON THE NEED FOR A PEST CONTROL TECHNICIAN PROGRAM

1. Do you feel that there is a need for a Pest Control Technician program such as outlined in the enclosed program?

   _____

2. Would your company consider hiring graduates of such a program?

   _____

3. MANPOWER REQUIREMENTS:
   Would you please give an estimate of the number of pest control personnel (including both replacements and possible new positions) that you will need over the next five year period (1981-1986). It should be noted that even a small company which averages only one retiring/resigning serviceman per year would require 5 replacements in the above-mentioned period, even if there was no increase in staff numbers. Further, even though senior positions may be filled by promotion within your company, they should be included in the table below as this also creates a need for junior staff, and shows the potential for career advancement. This information will be treated confidentially, and is not a commitment on your part to hire a specific number of graduates. The purpose of this data is to determine if a need exists for a Pest Control Technician program.

Position	Estimated number of new and replacement staff needed from 1981 to 1986	
	Steady (year-round)	Seasonal
Route Serviceman (Technician)		
'Specials' man (Senior Serviceman)		
Termite Technician		
Sales & promotion		
Supervisor		
Other (specify title)		

4. Are there any areas not mentioned in the course descriptions which you feel should be included?

_____

_____

_____

5. We would appreciate receiving any additional comments that you may have regarding the need for this program and/or the proposed curriculum.

_____

_____

_____

THANK YOU FOR YOUR COOPERATION.

NAME _____

POSITION _____

COMPANY _____

_____

ONTARIO PEST CONTROL ASSOCIATION
1828 Danforth Avenue,
Toronto, Ontario M4C 1H8

November 4, 1980

Sir Sandford Fleming College in Lindsay, Ontario is proposing to offer a two-year Pest Control Technician program. As Chairman of the Ad Hoc Advisory Committee, I would appreciate your assistance in providing the College with the training needs of the pest control industry, and advice on formulating and developing this program.

In order for Sir Sandford Fleming College to implement this program, approval of the Ontario Ministry of Colleges and Universities is required. This approval is dependent on a documented need for the program being expressed by the industry. Enclosed is a program proposal in which suggested courses are briefly described, and a short questionnaire which asks for an estimate of your manpower requirements, including both replacements and possible new positions, over the next five years. These figures are necessary to determine if a need exists for the program. A stamped return envelope is enclosed for your convenience.

In addition to completing the questionnaire (and if you can spare the time), we would appreciate your comments on company letterhead supporting the program, and also any constructive ideas on the curriculum. No doubt there are some areas not mentioned in the course descriptions which you feel are important.

It is essential that we have your completed questionnaire and comments on file not later than November 21, so that they can be compiled for the Ad Hoc Advisory Committee meeting which will be held in Toronto at the Pesticides Control Section on November 25.

To date no post-secondary training has been available for young people seeking employment as service technicians in the pest control industry. All of us have experienced the frustrations, not to mention the rising costs, of training people on-the-job who have not demonstrated any prior interest or commitment to our essential services. The technological advances in pesticide formulations (e.g. slow-release microencapsulated and paint-on insecticides, single-dose anticoagulants, etc.) and application

techniques (e.g. ultrasonic devices for rodent control), as well as an increasing demand for 'full service' (e.g. aircraft treatment, indoor plant maintenance), can only be effectively implemented by skilled technicians. The need for proper training in the reasonable and safe use of pesticides is recognized both by the industry and the public. The toxic nature of the chemicals we use, coupled with public concern about environmental contamination, make it essential that pest control technicians be adequately trained. In fact, future changes in pesticide legislation may require it. Just look back a few years to appreciate the increasingly restricted use of pesticides to only certain categories of exterminators' licences. As an added benefit, a post-secondary program will further enhance the professional image of our industry.

The Frost (Lindsay) Campus of Sir Sandford Fleming College specializes in training resource technicians and, when you think of it, Exterminators are engaged in resource protection! The campus is situated on a 90-acre tract of land only an hour's drive from Toronto. It offers a central location for a broad exposure to pest control, for simulating pest control problems, and has ready access to various field operations. The program is tentatively scheduled to start in September of 1981.

As a fellow PCO I know how busy you are, but please take some time <u>now</u> to consider my request for your help. This is an excellent opportunity for the pest control industry to take another step forward. Thank you for your interest in pest control training.

Yours very truly,

RJM/pgp
Encl. (3)

R.J. (Dick) Murphy,
President

<u>P.S.</u> The Ontario Pest Control Association was established to foster professionalism in the pest control industry, and to speak as one voice on issues that concern us. If your company would like more information on joining the OPCA, or having a chapter formed in your region, please contact me. We anticipate major changes in the Pesticides Act in 1981, this is your opportunity to have some input.

sir sandford fleming college

PROPOSAL FOR A PEST CONTROL TECHNICIAN PROGRAM

Program length: 2 years (four semesters)

Enrollment: 20/year

Starting date: 1 September 1981

Program purpose: To provide practical training in the recognition and control of pests in the urban environment. Although greater emphasis will be placed on structural pests, the objective is to give a broad enough exposure to meet the 'full service concept' which is increasingly being demanded of the pest control industry. Students will receive 'hands on' experience with pesticide application equipment, be exposed to simulated pest control situations, and be involved in actual field operations. Pest problem diagnosis, job cost estimating, client/company relations, proper use of pesticides and safety equipment, and relevant legislation will also be integral to the program. If approved by the Ontario Ministry of the Environment, graduates will be expected to obtain a Structural Exterminator's Class 3 Licence. Other licence categories are also possible, e.g. Land 1 and 3 classes.

Course descriptions:

PESTICIDES

PCP Act and pesticide labeling. Properties and uses of insecticides, rodenticides, herbicides and fungicides. Mode of action, cholinesterase inhibition, LD50. Symptoms of pesticide poisoning and first aid. Types of formulations including slow-release microencapsulated and paint-on insecticides, and electrostatically charged sprays and dusts. Solvents, adjuvants and synergists. Environmental concerns - phytotoxicity; biodegradability; pesticide residues in soil and air; pesticide resistance. Insecticidal soaps.

PESTICIDE APPLICATION TECHNIQUES I and II

Hydraulic sprayer components - tank, agitator (hydraulic or mechanical), strainer, pump (centrifugal, gear, roller, diaphragm, piston), pressure regulator and guage, by-pass, and shut-off valve. Spray patterns (pin stream, flat fan, solid cone, hollow cone) and droplet size (including VMD). Factors affecting deposit and drift. Operation and maintenance of hand-pumped compressed air sprayer, back-pack sprayer, mist blower, thermal aerosol generator (=fogger), ULV applicators (e.g. Herbi), boom sprayer, handgun sprayer, and dusters. Safety and protective equipment.

Decontamination of application equipment. Pesticide storage and disposal. Aerial application - principles; functions of ground support. Structural techniques - crack and crevice treatment; baiting and dusting; space sprays (fog, mist, ULV). Fumigation - principles and gas laws; types - structural, boxcar (including in-transit), spot, tarp, vault (with or without vacuum), soil; properties of fumigants and CT products; TLV and detection equipment; simulation exercise. Tree injections.

URBAN ENTOMOLOGY I, II AND III

Identification, biology and control of public health, nuisance, stored food, wood-destroying, and other structural pests. MOSQUITOES - flood water (Aedes) and standing water (Anopheles, Culex, Culiseta) species; role as vectors of St. Louis encephalitis. Control - habitat management (i.e. reduction of breeding areas); adulticiding with (thermal/ULV-aerosol) fogs, mists, or short-term residual treatments; larviciding with water-applied insecticides or growth regulators; biological control. Community abatement programs - survey of breeding sites; determination of species complex; larval population surveys; application equipment (ground/aerial); licence and permit requirements for water exterminations; assessment of treatment by adult counts (landing, biting, sweeping, light-trap); environmental concerns. Other biting flies - community control of black flies; discussion of biting midges and tabanids. MUSCOID FLIES - disease transmission and nuisance factor; industrial fly problems in food-handling areas; biology of pest species (house, face, cluster and blow flies); monitoring adult populations by fly grill, sweep net, bait trap and speck card. Other flies - fruit and drain flies. Fly control - sanitation; barriers (e.g. air curtain); space sprays (mist or fog); automatic aerosol dispensers; residual sprays on resting surfaces; baits with toxicant or chemosterilant; fly bands and light traps. WASPS, BEES and ANTS - recognition and life history of yellowjackets, hornets, honey bee, and thief, pharaoh and little black ants; control by sprays, cyanogas dust, bait stations or removal of living colony. COCKROACHES - food contamination and health hazard (e.g. salmonellosis); identification and biology of domiciliary species (German, brown-banded, Oriental and American); detection and flushing agents; control strategies in commercial/industrial buildings and multiple family dwellings. Control - equipment design; sanitation and harborage reduction; crack and crevice treatment with dusts or sprays; repellency/non-efficacy of and resistance to insecticides; poison baits and desiccants; biological control; post-treatment assessment. FLEAS and BED BUGS - biology; control by sanitation and sprays or dusts. FOOD PESTS - identification and biology of pests in stored grain, processed cereal products, meats and cheeses in granaries, warehouses, grocery stores and kitchens (e.g. granary weevil, flour beetles, grain beetles, grain moths, spider beetles, bean weevil, ham beetle, cheese skipper, dermestids, anobiids, cadelle, mealworms and mites). Grain heating. Methods for detecting food contamination - ocular, sieving, sampling and temperature probes, Berlese funnel, specific gravity and selective wetting, and radiography. Control - sanitation; dry storage; grain turning; space and residual sprays; grain protectants; fumigation by surface, grain stream, spot and probe applications. TERMITES and CARPENTER ANTS - identification, biology and behavior; recognition of

damage; termite distribution surveys (bait stakes and shelter tubes); site inspection, blueprint reading and inspection report. Control - elimination of wood-soil contact by sanitation and use of mechanical or chemical barriers (e.g. termite shield and pre-treatment); adequate drainage of property and ventilation of crawl spaces; rodding and injecting aldrin or chlordane around foundations, under concrete slabs and in wall voids; poison baits; desiccants in wall voids. Building code and termite pre-treatment - application of pesticide to ground under concrete footings and slabs before construction, in foundation wall voids, and to walls and back fill. Other wood pests - recognition and control of powder-post beetles, roundheaded and flatheaded borers, bark beetles, wood decay and dry rot. Miscellaneous pests - recognition and control of silverfish, booklice (psocids), spiders, sowbugs (=pillbugs), earwigs, carpet beetles, clothes moths, crickets, centipedes and millipedes.

VERTEBRATE PEST CONTROL

RODENTS - identification, biology and behavior (e.g. neophobia in rats and nibbling in mice). Disease transmission by rodents and their ecto-parasites. Detection - signs of activity (droppings, gnawing damage, greasy rub marks); tracking dust; urine tests (black light fluorescence, urease test paper). Control - sanitation and ratproofing; trapping; glue boards; prebaiting and poison baits. Rodenticides - single-dose (acute) and multiple-dose (anticoagulants); deployment of bait stations; odor control. Cross-resistance to anticoagulants. Ultrasonic devices for rodent control. BATS roosting in buildings - health hazards; rousting techniques (air pressure, electric prod); repellents; fumigation; tracking powder; batproofing (screening and caulking); germicide treatment and ectoparasite control after rousting. BIRD problems - roosting and defecation around human habitations, aircraft hazard, crop destruction, food contamination, disease transmission. Identification and behavior of bird pests (e.g. pigeon, starling, sparrow, crow, gull). Legislation protecting birds and control permits. Bird repellents - noise guns, automatic exploders, electronic noise devices, recorded alarm and distress calls, non-poisonous gluepastes. Bird control - sanitation and birdproofing (i.e. elimination of roosting sites by physical obstructions, structural changes and building design); live trapping; prebaiting and poison baits (e.g. Avitrol); chemosterilization (e.g. Ornitrol); bird perches with toxicants (e.g. Queletox). Control of raccoons, squirrels, moles, voles (=meadow mice), groundhogs, and other vertebrate pests. Animal repellents.

VEGETATION CONTROL

Weed identification and biology. Cultural control - crop rotation, competitive crops. Mechanical control - tillage. Herbicide classification - selective/non-selective, foliage-/ground-applied, contact/translocated, and by chemical properties (herbicide families). Timing of application - preplant, pre-emergence and post-emergence. Herbicide placement and selectivity. Application techniques - broadcast, directed, band and spot. Spray drift; volatility and vapor drift. Soil sterilants and total vegetation control; soil fumigation; growth regulators. Soil colloids and herbicide inactivation. Aquatic plant and algae control. Licence and permit requirements for water exterminations.

URBAN TREE PEST CONTROL

Tree growth and nutrient requirements; site selection. Identification and control of common shade tree insects and diseases - defoliators, leaf miners, borers, sucking insects, gall makers, leaf spots, cankers and diebacks. Dormant spraying. Tree injection for pest control. Tree decay concepts - heartrot vs. compartmentalization. Recognition of hazard trees. Detection of decay in standing trees by symptoms/signs and by instrumentation (e.g. Shigometer). Treatment of decay - pruning and surgery.

LANDSCAPE PEST CONTROL

Recognition and control of turf pests - chinch bugs, sod webworms, white grubs, cutworms, brown patch, dollar spot, fairy ring, snow mold and powdery mildew. Recognition and control of pests on herbaceous plants - defoliators, leaf miners, borers, aphids, earwigs and slugs. Indoor plant maintenance - culturing requirements; diagnosis of disorders and pests of tropical plants; control of pests by insecticides, miticides, smoke bombs and biological agents (e.g. Encarsia and predatory mites).

PRINCIPLES OF INTEGRATED CONTROL

Philosophy of pest management (=integrated control) based on complementary use of two or more control methods, rather than sole reliance on chemicals; pest monitoring and economic thresholds; limited use of selective insecticides and encouragement of natural enemies. Cultural control - sanitation/harborage reduction; habitat management; competitive crops. Mechanical control - design of structures and equipment; pestproofing during building construction (e.g. sealing off rodent entry points); use of mechanical and chemical barriers (e.g. termite pre-treatment). Physical control - use of physical phenomena to control pests (e.g. ultrasonic devices for rodent control, electrocuting black light traps for night-flying insects, desiccants). Biological control - manipulation of parasites, predators, diseases or other biological phenomena (e.g. release of parasitic wasps to control the brown-banded cockroach in buildings, use of IGRs to control mosquitoes, pheromone traps for tree fruit pests, and microbial insecticides like Thuricide for lepidopterous pests). Legislative control - Pesticide Control Act (Ontario), Plant Diseases Act (Ontario), Plant Quarantine Act (Canada), Pest Control Products Act (Canada), and other environmental acts.

FIELD PLACEMENT I, II and III

The student's first placement (semester 2) will be with a route serviceman to give a broad exposure to pest control work and to help determine the individual's suitablity. Subsequent placements (in semesters 3 and 4) will be of a more specialized nature, e.g. fumigations, termite treatment, small animal control, greenhouse spraying and indoor plant maintenance. Placements are for a total of 5 weeks over 3 semesters. The student will be required to submit reports on these experiences. A summer work period in the industry is also required. The student will be given an opportunity to obtain a Structural Exterminator's Class 4 Licence toward the end of the second semester to prepare him for summer employment.

MATHEMATICS FOR PEST CONTROL

Calculations used in pest control - spray tank capacity, dilution of concentrates, spray mixtures, application rates (broadcast and row crops), pump output and sprayer calibration, aircraft calibration, gas law problems. Simple statistical tests used in pesticide efficacy trials.

CHEMISTRY FOR PEST CONTROL

Atomic symbols, classification of elements (periodic table), electronic configuration and bonding. Molecular structure and nomenclature of organic compounds. Chemical properties of organic solvents, oil diluents, emulsifiers, mineral diluents and sorptive dusts - flash point, specific gravity, solubility, unsulfonatable contents, colloidal adsorption. Laboratory synthesis and formulation of a simple pesticide. Field sampling techniques for pesticide residues in soil, water and air. Demonstration of laboratory analysis of pesticide residues using gas chromatography. Properties of gases used as fumigants, and gas laws.

BUSINESS COMMUNICATIONS

Practice in writing technical reports and business letters. Oral presentations. Telephone communication. Study techniques. Using an actual pest situation, the student will be required to prepare and present a major report describing the problem, the methods used to quantify the pest, the control options or recommendations, the action taken, and the results.

BUSINESS PRACTICE

Personal organization. Fundamentals of book-keeping. Job estimating, cost control and profit margins. Contract law, insurance and liability, guarantees. Marketing - advertising and sales techniques. Basic data processing. Use of computers in pest control businesses.

HUMAN RELATIONS & SUPERVISION

Fundamentals of behavior, motivation, attitudes, communications and supervision. Interrelationships between employee/employer and client/company.

PEST MANAGEMENT

This lecture/demonstration course will be given in the first semester which is common to all programs at Frost campus. Since the objective of this semester is to give students a broad background in natural resources, the Pest Management course will emphasize general concepts under the following topics. Definition of pest and types - weeds, insects, plant diseases, nematodes and vertebrates. The role of pests in shaping man's history. Socioeconomic impact of pests in terms of food losses and human misery. Causes of pest outbreaks. Pesticides in the environment - effects on wildlife; analysis of residues and interpretation of data, e.g. safe levels. Pesticides and application equipment. Other methods of control. Biological control including microbial insecticides, insect growth regulators (IGR), pheromones, and competitive displacement. Principles of integrated pest management (IPM). Selected pests of field and forest crops, livestock and man. Careers in pest control.

80-11-09 (rev. 81-03-08)

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