MARYLAND

PESTICIDE DATA REPORT

FOR 2012

MARYLAND
DEPARTMENT OF AGRICULTURE

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Earl F. Hance
Secretary of Agriculture

Mary Ellen Setting
Deputy Secretary

MARYLAND PESTICIDE DATA REPORT FOR 2012

I. INTRODUCTION

The Maryland Pesticide Registration and Labeling Law (Title 5, Subtitle 1, Agriculture Article, Ann. Code Md.), Section 5-102(D), requires the Secretary of Agriculture to develop a comprehensive pesticide data program and to provide the General Assembly, in accordance with Section 2-1246 of the State Government Article, a report on pesticide data. The annual data program is to include the number and types of enforcement actions taken and figures for the number, types, and uses of pesticides in Maryland.

A pesticide, as defined generally by state and federal law, is any substance, or mixture of substances, intended to prevent, destroy, repel, or mitigate any pest. There are at least 21 different classes (types) of pesticides based on their target pests, including algicide = target pest is algae; avicide = birds; bactericide = bacteria; fungicide = fungi; growth regulator = insect or plant growth; herbicide = weeds; insecticide = insects; rodenticide = rodents; and slimicide = slime molds.

II. BACKGROUND

The Maryland Department of Agriculture (MDA) is the State agency responsible for regulating the distribution, sale, storage, use and disposal of pesticides in Maryland. The Department cooperates with other State agencies and institutions and federal agencies to conduct pesticide education, regulatory and enforcement programs. Departmental activities and responsibilities are described briefly, as follows:

A. Pesticide Regulation Section

1. Enforcement Program

The Pesticide Regulation Section of the Maryland Department of Agriculture enforces federal (Federal Insecticide, Fungicide, and Rodenticide Act or FIFRA) and state (Pesticide Applicators Law) pesticide use laws and regulations. Under the enforcement program, MDA conducts routine inspections of licensed pesticide businesses, public agencies and restricted use pesticide dealers. Inspections include review of pesticide application records, restricted use pesticide sales records, safety equipment, storage areas, application equipment and vehicles and anti-siphon devices. Use observations are conducted to observe actual pesticide applications to field crops, structures, lawns and ornamentals to ensure compliance with label directions and state and federal regulations.

Pesticide misuse, incidents, and consumer complaints are investigated. In the event of a violation, the Department has the authority to suspend, revoke or deny a license or certificate and to assess a civil penalty. As part of a Cooperative Agreement with the U. S. Environmental Protection Agency (EPA), the Pesticide Regulation Section conducts

pesticide producer establishment, marketplace and import inspections. EPA also refers various complaint investigations and special initiative inspections to the Department for action.

2. Applicator Certification and Training Program

The Pesticide Regulation Section certifies private and commercial pesticide applicators to verify the competence of the applicator. Private applicators (farmers) are given closed-book written exams to become certified for a three year period. Certification authorizes them to purchase and apply restricted use pesticides on their own property for the purpose of producing agricultural commodities. Certificates are renewed by MDA after submission of proof of update training. MDA certifies commercial applicators (employees of pest control businesses and public agencies) who meet minimum standards of experience or education requirements and who have passed written exams in specific pest control categories. Commercial applicator certificates are renewed annually, after required training has been obtained in order to maintain their level of competency. MDA approves and monitors applicator recertification training courses and sets minimum standards for approval of courses for recertification purposes. Private and commercial applicator training sessions are coordinated with county extension agents who are provided training materials such as slide sets, videos and educational brochures by MDA. In addition, MDA registers employees who work under the supervision of certified commercial applicators. Prior to registration with the Department, and within 30 days of employment, the employee must be trained according to standards developed by MDA.

MDA issues licenses and permits to pesticide businesses or public agencies that apply general or restricted use pesticides. Dealers who sell restricted use pesticides must obtain a permit issued by MDA to do so. MDA issues licenses to pest control consultants who either identify pests or recommend pesticides or other techniques for the purpose of controlling pests.

3. Technical Information Collection and Dissemination Program

The Pesticide Regulation Section provides information to pesticide applicators, dealers, federal, state and local agencies and the general public on issues concerning pesticide use and pesticide regulation. Training materials, informational brochures and fact sheets are developed for pesticide applicators in order to provide compliance assistance when new guidelines or regulations are implemented. A series of "Pesticide Information Sheets" was developed to provide information on pesticide issues and regulations to consumers and pesticide applicators. The Pesticide Regulation Section developed a Consumer Information Bulletin for use by licensed lawn and landscape firms for distribution to their customers. In addition, the Section has compiled pesticide product label information that must be given to all pest control customers to inform them of any safety precautions or environmental hazards associated with each pesticide used. A listing of pesticide sensitive individuals is available so that these listed individuals can receive advance notification prior to lawn and ornamental pesticide

applications being made to adjacent properties by licensed pest control businesses or public agencies. Maryland is one of only twelve (12) states that have a mandated pesticide sensitive individual notification program.

The Department provides information to applicants on where and how to obtain study materials for certification and conducts certification examination sessions every other month in three regional locations. Private applicators (farmers applying restricted use pesticides) receive exam study materials provided by the Department and are offered certification examinations in county extension offices on an as-needed basis.

Homeowners are given information on licensing requirements for pest control firms, as well as information on termite inspections and control, proper pesticide handling and alternatives to chemical pest control. Table top displays, brochures, and "Pesticide Information Sheets" have been developed for use at various trade shows, grower meetings, and State and county fairs.

During 2012, MDA continued to expand the Pesticide Regulation Section's Homepage so that information on pesticide business licensing requirements, certification exam dates, recertification training sessions, pesticide container recycling dates, Pesticide Information Sheets, and Integrated Pest Management in Schools is available on the Internet. Consumers can now electronically file complaints, report pesticide incidents, download application forms to apply for certification, request employee I.D. cards and request additional information about pesticide regulations and management programs. An added feature to the Section's website is a searchable database of registered pesticide products, licensed pesticide businesses and pesticide applicators. Pesticide dealers can verify an applicator's certification, applicators can search for pesticide products by brand name, active ingredient, use site or pests controlled and homeowners can locate licensed pest control businesses in their area.

4. Water Quality Protection, Endangered Species Protection and Worker Protection Programs

MDA is involved in four Federal (EPA) regulatory programs that are being implemented through the states. The Department has developed a State water quality management plan for managing the use of pesticides to protect water resources as part of its Water Quality Protection Program. The Department monitors EPA's "Pesticides of Interest" list annually to maintain a list of "Pesticides of Concern" within Maryland. Under the Endangered Species Protection Program, the Department is responsible for programs to protect federally listed endangered species that may be harmed by the use of certain pesticides. The Department has implemented and conducts the federal Worker Protection Standard Program to protect certain pesticide users, handlers and farm workers from exposure to pesticides. The Department also inspects agricultural facilities to ensure bulk pesticide storage tanks, containment structures and mixing/loading pads meet state and federal requirements. The Department has been coordinating these efforts with appropriate state and federal agencies that have certain other responsibilities in these areas.

5. Special Programs

The Pesticide Regulation Section conducts special programs relating to pesticide management, when funding is available. These special programs address specific pesticide issues, environmental concerns or regional situations that require additional focus and attention beyond routine programs. Special programs may include development of informational materials and pesticide educational programs, participation in pesticide monitoring programs, and coordination of pesticide container and unusable pesticide disposal programs.

6. Chesapeake Bay Programs

MDA is an active participant in efforts to restore the Chesapeake Bay. Pesticide management commitments have been incorporated into the Toxics 2000 Strategy as part of the Chesapeake 2000 Agreement and include commitments for adoption of integrated pest management, development of programs for pesticide container recycling and unusable pesticide disposal, and implementation of agricultural best management practices. These pesticide management programs conducted by the Pesticide Regulation Section have placed Maryland in a leadership role and have given MDA recognition as one of the key Bay agencies in toxics reduction. Future toxics programs will be shaped by MDA and implemented through the Section's regulatory and educational programs.

7. Integrated Pest Management in Schools

The Pesticide Regulation Section has been conducting an Integrated Pest Management in Public Schools Program since 1995, in cooperation with the Maryland State Department of Education, Maryland Association of Boards of Education, county school systems, University of Maryland, Maryland State Pest Control Association, and EPA. The purpose of the program is to review each school system's pest management practices and to provide technical assistance to Maryland public school systems to facilitate the implementation of IPM programs in order to reduce the risk of exposing students and staff members to pesticides. Mandatory IPM programs have been required in Maryland public schools and on school grounds since 2000.

B. State Chemist Section

1. Registration

The State Chemist Section (SCS) is responsible for registration of all pesticide products distributed, sold, or transported in Maryland. The purpose of pesticide product registration is to ensure the sale and distribution of commodities that are effective and safe for humans and the environment. In 2012, the Section registered 13,467 (pesticide-12,785 and fertilizer-pesticide mixtures-682) products for sale and distribution within the State, as compared to 13,200 products registered in 2011.

2. Inspection

Product quality and safety are determined by chemical analysis of pesticide products sampled by the Section's inspection staff which, on a regular schedule, inspects pesticide warehouses and retail outlets. During 2012, the inspection staff collected 122 pesticide formulation products for chemical analysis. The section also collected 729 samples of fruit juice, produce, fruit and processed food for analysis by USDA/EPA in order to obtain pesticide residue data for establishing appropriate pesticide tolerances for foods consumed by children and babies.

3. Chemical Analyses

In 2012, the Section analyzed forty-six (46) MDA/EPA pesticide investigation samples and seven (7) EPA/MDA formulations for MDA's Pesticide Regulation Section.

4. Special Project

The Section continued to generate pesticide data relative to determining the safeness of Maryland-grown vegetables/fruit sold at roadside stands and farmer markets. In 2012, State Chemist inspectors collected from Maryland roadside vegetable and fruit stands ninety-four (94) samples. No residues above EPA tolerances were detected. The data will be sent to EPA and U. S. Department of Agriculture (USDA) for incorporation in national data banks. This project will continue and probably expand in response to monitoring Maryland grown agricultural produce for toxic materials relative to potential chemical terrorist attacks on the food supply. This project continues to indicate that produce and fruit grown in Maryland do not contain toxic levels of pesticides.

Maryland Department of Agriculture Contacts:

Carol Holko
Assistant Secretary
Office of Plant Industries and Pest Management
(410) 841-5870
settingm@mda.state.md.us

Dennis W. Howard
Chief, Pesticide Regulation Section
(410) 841-5710
howardd@mda.state.md.us

Warren R. Bontoyan
State Chemist
State Chemist Section
(410) 841-2721
bontoywr@mda.state.md.us

III. PESTICIDE REGISTRATION DATA AND ENFORCEMENT

The Pesticide Registration and Labeling Law requires a distributor of pesticide products to annually register the products with MDA's State Chemist Section (SCS) before distribution in the State. The State Chemist Section utilizes a computerized registration process, which has expedited and improved the accuracy of the registration process and has enabled the Section to compile more information about registered products.

During 2012, pesticide product registration data include:

1. Number of registrants = 1,085
2. Number of pesticide products registered = 13,467

As a result of the State Chemist Section's enforcement and registration program (pesticide dealer inspections, product sample collection, chemical analysis and label review), the following regulatory actions were taken against pesticide products violating the State Pesticide Registration and Labeling Law:

* Market place samples collected and analyzed = 142
* Total chemical analyses = 51,120
* Non-registered products (product offered for sale but not registered with the Department) stop sale orders = 4

In support of the Pesticide Regulation Section's enforcement activities, and for other State agencies, the SCS laboratory analyzed samples (soil, water, tissue, swabs, product, etc.) for pesticide residues. The following is a summary of the analyses:

Investigational Samples (pesticide misuse, accidents):

Samples analyzed = 55 (includes 8-W.VA., 1-AZ.)

Total number of analyses = 460 (for 427 different

Food Safety Program: Monitoring of Maryland produce offered for sale from June – September (1997-2012)

Number of samples containing pesticides:

1997 (51 samples collected) = 25 positive
1998 (50 samples collected) = 19 positive
1999 (51 samples collected) = 15 positive
2000 (75 samples collected) = 19 positive
2001 (75 samples collected) = 52 positive
2003 (60 samples collected) = 1 positive
2004 (72 samples collected) = None detected above EPA tolerances
2005 (89 samples collected) = None detected above EPA tolerances
2006 (56 samples collected) = 24 positive
2007 (48 samples collected) = No pesticides above EPA tolerances

2008 (645 samples collected)	= No pesticides above EPA tolerances
2009 (64 samples collected)	= No pesticides above EPA tolerances
2010 (70 samples collected, discarded 8)	= 62 samples to be analyzed in 2012-2013
2011 (92 samples collected, discarded 8)	= 84 will be completed in 2012-2013

*It would appear that samples of produce grown in Maryland are free of pesticides, e.g., none detected at levels equal to or greater than the tolerance levels established by the U. S. Environmental Protection Agency.

IV. PESTICIDE USE ENFORCEMENT INSPECTIONS AND ACTIONS

During 2012, inspections of licensed pest control businesses and public agencies were conducted as follows:

1. Routine business inspections	=	619
2. Routine public agency inspections	=	131
3. Pesticide dealer inspection	=	89
4. Pesticide use observations	=	86
5. Pesticide samples collected for analysis	=	63
6. Application records reviewed	=	858

Violations detected during pest control business inspections are summarized in Table 1 and included:

1. Number of businesses and public agencies with violations	=	222
2. Unregistered employee violations	=	19
3. Records incomplete or inaccurate	=	143
4. Vehicles not properly identified	=	51
5. No anti-siphon device	=	11
6. No First Aid/Safety Equipment	=	5
6. No customer information	=	18

During 2012, regulatory or enforcement actions were taken against individuals or firms violating the Maryland Pesticide Applicators Law. The actions taken or penalties assessed for specific violations of the law or regulations are summarized, as follows:

1. Consumer Complaint Investigations = 43 (Investigations initiated as a result of written complaints from consumer regarding pest inspection or pesticide misuse.) (See attached Table 2.)
2. Investigational Conferences = 2 (Informal meeting held with licensee and/or complainant to gather additional information about an ongoing investigation or to alert licensee to situation requiring immediate attention.)

3. Administrative Hearing = 0 (Formal hearing conducted because magnitude of violation warrants it or because of repeat violations by firm or individual.)
4. Penalties Assessed:
    a. Notices of Warning = 467 (Certified letter notifying licensee that a violation has occurred and/or a situation needs to be corrected.)
    b. Field Notices = 24 (Violation noted by a field inspector during a routine inspection. Licensee or permittee is informed of infraction and given a compliance period to correct the infraction.)
    c. Criminal Action = 0 (Action taken against individual or company operating without a pesticide business license or one who has repeatedly violated pesticide laws. Individual is prosecuted through county court system; violation is a misdemeanor and subject to a fine up to $1,000, 60 days in jail, or both.)
    d. Civil Penalties = 11 (A civil penalty may be assessed in lieu of or in addition to a suspension or revocation of a license, permit or certificate. The Secretary may impose up to a $2,500 penalty per violation.) Licensees were assessed a total of $13,950 in civil penalties.

Under the federal pesticide enforcement cooperative agreement, the following inspections were conducted by Section staff:

1. Pesticide producer establishment inspections	=	27
2. Pesticide market place inspections	=	25
3. Pesticide import inspections	=	N/A
4. EPA referrals for inspection/investigations	=	1

V. PESTICIDE APPLICATOR CERTIFICATION AND TRAINING PROGRAM

During 2012, the following licensing and certification activities were conducted, and are summarized in attached Table 3:

1. Pesticide businesses licensed	=	1,522
2. Public agencies permitted	=	325
3. Pesticide dealers permitted	=	141
4. Pest control applicators certified	=	3,481
5. Public agency applicators certified	=	1,102
6. Private applicators certified	=	3,354
7. Commercial applicators examined	=	824
8. Total examinations administered	=	2,158

In order to maintain applicator certification, private applicators must participate in Departmental-approved training once every three years. Commercial applicators of

pesticides must attend an annual recertification training session. The following data indicate training held in 2012:

1. Commercial applicator training sessions held	=	454
2. Private applicator training sessions held	=	130
3. Commercial applicators recertified	=	3,768
4. Private applicators recertified	=	1,407

VI. PESTICIDE USE DATA

The Pesticide Regulation Section regulates the use of pesticides in Maryland (See Section II). An essential factor in conducting effective regulatory or educational programs on pesticides is data relating to quantity and distribution of pesticide product usage in the State. It is a costly and complicated process to collect pesticide usage data. Therefore, the Department conducted use surveys on a 3-year cycle, beginning in 1982 and followed by annual use surveys for 1985, 1988, 1991, 1994, 1997, and for 2000. Due to limited resources (funds and personnel), pesticide usage data for the 2004 calendar year was collected in early 2005 and was published in September 2006.

The use data was compiled by the Maryland Agricultural Statistics Service (MASS), an agency of the U.S. Department of Agriculture, in cooperation with MDA. The Department contracts with MASS to conduct the surveys and to provide final data, but MDA has no access to the raw data in order to protect the confidentiality of the data and privacy of the respondents.

Survey data are estimates of specific pesticide usage in Maryland for a calendar year, i.e., 1982, 1985, 1988, 1991, 1994, 1997, 2000 or 2004. These estimates represent the combined pesticide use by agricultural producers (farmers using "general use" pesticides), certified private applicators or farmers using restricted use pesticides, commercially licensed pest control businesses, and public agencies. Pesticide use by homeowners is not included in the reports. However, the data represent the amounts of pesticides used in agricultural sites and in urban sites, including lawn care, ornamental plants or trees, forests, rights-of-way, and structures.

Maryland is unique in having such extensive pesticide use data, as no neighboring state has similar data. These data meet the commitment made by Maryland as part of the Chesapeake Bay Agreement of 1987 and are vital to the revised Maryland Toxics Reduction and Prevention Strategy of 1994. In addition, the data are being used in a variety of ways, including as a basis for conducting surface water surveys or ground water surveys, and as a basis for developing state pesticide management plans to deal with pesticides with a potential to be a problem in water sources. Information contained in the 2000 survey report has been included as part of the Chesapeake Bay Toxics Loading Inventory (TLI), as well as in developing projects to reduce chemical contaminant loads.

MDA has contracted with the MASS to conduct a pesticide usage survey for the 2011 calendar year. MASS mailed out surveys to commercial pest control businesses, public agencies, certified private applicators and farmers in January 2012. This usage survey report will be published in June 2013.

VII. WATER QUALITY PROTECTION, ENDANGERED SPECIES PROTECTION AND WORKER PROTECTION PROGRAMS

MDA, as lead agency for pesticide management, is responsible for developing a Pesticide Management Plan (PMP) to protect water quality resources. The Pesticide Regulation Section has participated in EPA sponsored ground water protection training courses on pesticide monitoring and wellhead protection in order to obtain information and guidance on developing Maryland's PMP. The PMP is one facet of an overall Comprehensive State Ground Water Protection Program (CSGWPP) which includes all state programs affecting ground water resources of the State.

MDA coordinated efforts with the Maryland Department of the Environment (MDE) and the Maryland Department of Natural Resources (DNR) to initiate development of Maryland's CSGWPP and PMP. Data collected from pesticide monitoring special programs have been used to develop the generic Pesticide Management Plan. Ground water protection educational materials were developed for farmers, commercial applicators and pesticide dealers and incorporated into applicator recertification training programs.

MDA continues to support the endangered species protection program, initiated in 1992, to protect the Maryland darter from adverse effects due to pesticide use. Informational bulletins were distributed to growers, commercial applicators and pesticide dealers that outlined the program and listed measures recommended to protect the federal-listed endangered species located in Harford County. Pesticide applicators were encouraged to adopt protective measures on a voluntary basis prior to implementation of federal regulations. A display depicting Maryland's endangered species was developed for homeowners and growers, as well as two "Pesticide Information Sheets".

The federal worker protection standard (WPS) became effective in August, 1992. MDA continued to disseminate information on the federal program in pesticide applicator training sessions throughout 2012. Several WPS-Compliance Review presentations were conducted for more than 1,000 growers throughout Maryland. The Department has conducted on-farm compliance assistance inspections to help producers comply with the WPS requirements. MDA entered into a contract with Telamon Corporation, an Americorps project participant, to provide pesticide safety training to 427 farm workers, 8 handlers, 22 non-farm workers (health care providers), and 340 farm worker children.

VIII. SPECIAL PROGRAMS

MDA continued to conduct an empty pesticide container recycling program in Maryland during 2012. The plastic container recycling program was available to farmers and commercial pesticide application businesses. A total of 42,242 containers weighing 18.25 tons were collected during 24 collection days from June to September from 137 participants. Twenty-one collection sites were established in Caroline, Carroll, Frederick, Harford, Howard, Kent, Prince George's, Queen Anne's, Talbot, Washington and Wicomico Counties. In addition, fifteen pesticide dealers participated in inspection and collection of containers at their own facilities. The containers were inspected by MDA personnel and certified to be residue-free. Containers were chipped and bagged for processing to be recycled back into pesticide containers.

In 1995, MDA began conducting a pesticide disposal program. Due to budget constraints, MDA has not been able to conduct the program since 2007. However, MDA was able to conduct a pesticide disposal program during 2012. The section collected unwanted or unusable pesticides from 54 participants (farmers and growers) in 16 counties throughout the State. This program collected 17,866 pounds of pesticides. The program has collected and properly disposed of more than 185,000 pounds of unusable or unwanted pesticides.

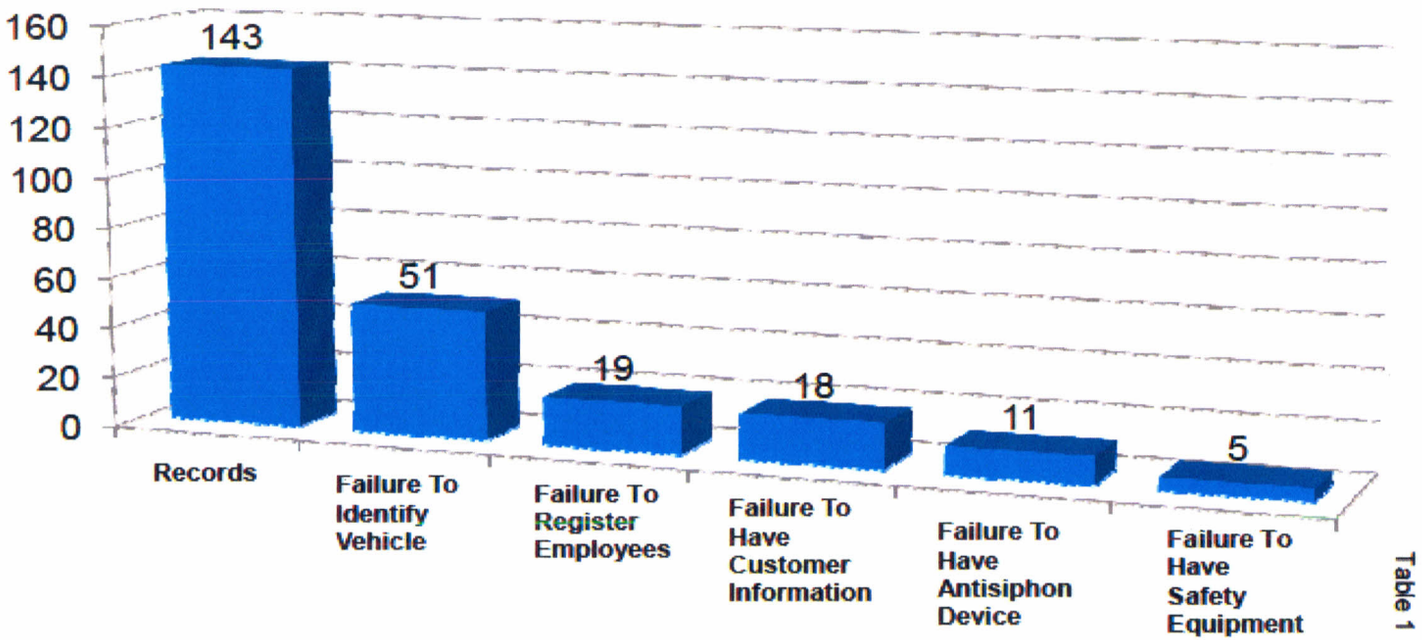
IX. INTEGRATED PEST MANAGEMENT IN SCHOOLS

MDA continues to promote and implement the Integrated Pest Management (IPM) Program in Maryland Public Schools. Legislation passed in 1999 that expanded the 1998 law to include pesticide use on school grounds. Schools were required to provide notification to parents, students, and staff of pesticide applications to school grounds by the 2000-2001 school years. Regulations became effective January 2002 that require schools to develop and implement IPM plans for school grounds. Staff reviewed and approved revised IPM plans that incorporated programs for managing pest problems on school grounds, and provided technical assistance in the development of the plans. Now that public school systems have fully implemented their IPM programs, MDA staff ensures continued compliance with regulations by conducting inspections of pest management records, notifications and pesticide records. A total of 83 public schools were inspected in 2012

X. PESTICIDE REGULATION SECTION ACTIVITIES 2010 - 2012

A summary and comparison of program activities conducted by the Pesticide Regulation Section are provided in Appendix A.

2012 Inspection Violations



750 Business and Public Agencies Inspected

2012 Complaint Investigations By Category

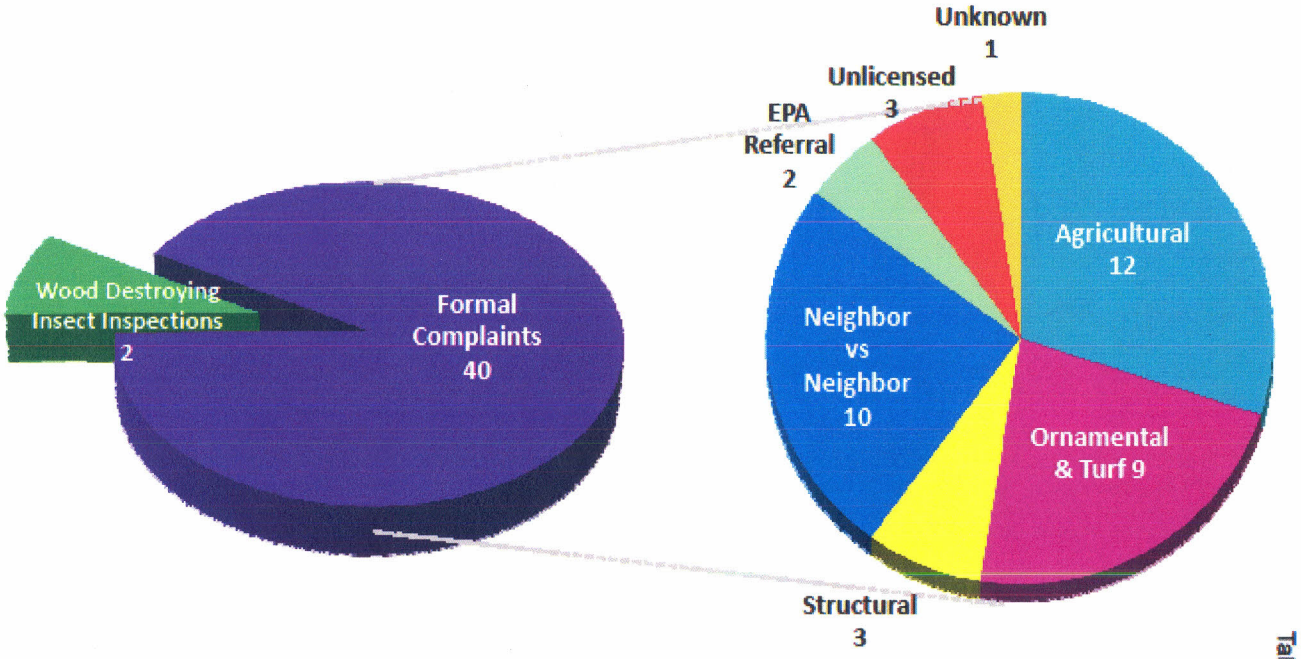


Table 2

July 1, 2011 thru June 30, 2012

TOTAL NUMBER OF APPLICATORS CERTIFIED

BY CATEGORY FOR FY 12

CATEGORY	TOTAL
Agricultural-Plant (1-A)	327
Agricultural-Animal (1-B)	18
Forest (2)	152
Ornamental & Turf (3)	1,934
Seed Treatment (4)	25
Aquatic (5)	250
Right of Way and Weed (6)	1,123
Structural (7)	1,550
Public Health (8)	202
Regulatory (9)	29
Demonstration & Research (10)	222
Miscellaneous (11)	45
Aerial (13)	42
Total Commercial and Public Agency Applicators	**4,372**
Total Private Applicators	**3,286**
Registered Technicians	**6,937**

PESTICIDE REGULATION SECTION ACTIVITIES 2010 – 2012

	2010	2011	2012
Pesticide Business Licensed	1,458	1,522	1,523
Not-For-Hire Businesses License	173	171	156
Commercial Pest Control Applicators certified in one or more Category	3,280	3,481	3,349
Registered Personnel Employed by Licensed Businesses and Public Agencies	11,372	10,266	6,937
Public Agency Permits Issued	319	325	312
Public Agency Applicators Certified in one or more category	1,051	1,102	1,023
Private Applicators Certified to Date	3,328	3,354	3,286
Dealer Permits Issued	120	141	150
Applicator Certification Examinations Sessions Held	18	18	18
Individuals Taking Certification Examinations	825	824	702
Examinations Administered in All Categories	2,130	2,158	1,838
Number of Businesses Inspected	1,050	1,099	750
Number of Businesses with Violations	276	324	222
Unregistered Employee Violations	16	24	19
Records Incomplete or Inaccurate Violations	184	110	143
Vehicles Not Properly Identified Violations	32	14	51
No Anti-siphon Device Violations	18	14	11
No First Aid/Safety Equipment Violations	8	14	5
Incomplete or No Customer Information Violations	24	49	18
Pesticide Dealer Inspections	98	89	89
Pesticide Application Records Reviewed	1,050	990	978
Hearings and Investigational Conferences	4	6	2
Consumer Complaint Investigations	37	53	108
Pesticide Use Observations	65	75	86
Pesticide Samples Collected for Analysis	35	81	63
Market Place Inspections	29	61	33
Pesticide Producer Establishment Inspections	26	30	28
*Container/Containment Inspections	N/A	8	8

*New inspection program for bulk pesticide storage facilities began in 2011.