Pesticide Notes

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In This Issue

Emerald Ash Borer: A New Pest in Southeast Michigan[1]

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A new, exotic beetle from Asia was discovered feeding on ash (*Fraxinus* sp.) trees in southeastern Michigan. It was identified in July 2002 as *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae). Larvae feed in the phloem and outer sapwood, producing galleries that eventually girdle and kill branches and entire trees. Evidence suggests that *A. planipennis* has been established in Michigan for at least five years. Surveys to determine the extent of the infested area are underway.

Identification

Adults are larger and a brighter green than any of the native North American species of *Agrilus* (Figure 1). The slender, elongate adults are 7.5 to 13.5 mm long, and females are larger than males. The adult body is brassy or golden green overall, with darker, metallic, emerald green elytra. The top of the abdomen under the elytra is metallic coppery red (seen only when the wings are spread). The prothorax is slightly wider than the head but the same width as the base of the elytra. The back edges of the pronotum are sinuate or wavy, and the top is sculptured with tiny, transverse wavy ridges. The surfaces of the elytra are granularly roughened. Tips of the elytra are rounded with small teeth along the edge.

Figure 1. Adult beetle.

Larvae reach a length of 26 to 32 mm, are cream-colored and dorso-ventrally flattened (Figure 2). The brown head is mostly retracted into the prothorax and only the mouthparts are visible externally. The 10-segmented abdomen has a pair of brown, pincer-like appendages on the last segment.

Figure 2. Late stage larva

Biology

The Emerald Ash Borer appears to have a one year life cycle in southern Michigan but could require two years to complete a generation in colder regions. Adult emergence begins in mid to late May, peaks in early to mid June, and continues into late June. The adults are active during the day, particularly when conditions are warm and sunny. Most beetles remain in protected locations in bark crevices or on foliage during rain, heavy cloud cover, high winds or temperatures above 32°C (90°F). Chinese literature indicates that beetles usually fly within 2 meters of the ground. The likelihood of long distance flights is not known. Adults, which may be present into August, feed on up to 0.45 cm^2 of foliage per day, leaving irregularly shaped patches of leaf tissue with jagged edges.

Information from China indicates that male adults live an average of 13 days and females live about 21 to 22 days. Females can mate multiple times and oviposition begins 7 to 9 days after the initial mating. Females lay 65 to 90 eggs during their lifetime. Eggs are deposited individually on the bark surface or in bark crevices on the trunk or branches. In southeastern Michigan, the oviposition period likely extends into mid to late July.

Eggs hatch in 7 to 10 days. After hatching, first instar larvae chew through the bark and into the cambial region. Larvae feed on phloem and the outer

sapwood for several weeks.. The S-shaped feeding gallery winds back and forth, becoming progressively wider as the larva grows (Figure 3). Galleries are packed with fine frass. Individual galleries usually extend over an area that is 20 to 30 cm in length, though the length of the affected area can range from 10 to 50 cm. In some areas, woodpeckers feed heavily on larvae.

Figure 3. Larval gallery.

The insect overwinters as a full grown larva in a shallow chamber excavated in the sapwood. Pupation begins in late April or early May. Newly enclosed adults may remain in the pupal chamber for 1 to 2 weeks before emerging head-first through a D-shaped exit hole that is 3 to 4 mm in diameter (Figure 4).

Figure 4. D-shaped exit hole.

Distribution and Hosts

The emerald ash borer is indigenous to Asia and is known to occur in China, Korea, Japan, Mongolia, the Russian Far East and Taiwan. A Chinese report indicates high populations of the borer occur primarily in *Fraxinus chinensis* and *F. rhynchophylla* forests. Other reported hosts in Asia include *F. mandshurica* var. *japonica*, *Ulmus davidiana* var. *japonica, Juglans mandshurica* var. *sieboldiana* and *Pterocarya rhoifolia*. In Michigan, this borer has been observed only on ash trees. It has killed green ash (*F. pennsylvanica*), white ash (*F. americana*) and black ash (*F. nigra*), as well as several horticultural varieties of ash.

Symptoms

Infestations of emerald ash borer can be difficult to detect until canopy dieback begins. Evidence of infestation includes D-shaped exit holes on branches and the trunk. Callus tissue produced by the tree in response to larval feeding may cause 5 to 10 cm long vertical splits to occur in the bark above the gallery. Distinct, frass-filled larval tunnels etch the outer sapwood and phloem of the trunk and branches (Figure 5). An elliptical area of discolored sapwood, likely a result of secondary infection by fungal pathogens, sometimes surrounds larval feeding galleries in live trees.

Figure 5. Green ash killed by emerald ash borer showing D-shaped exit holes.

Infested branches in the canopy die when they are girdled by the serpentine tunnels excavated by feeding larvae. Many trees appear to lose about 30 to 50% of the canopy in one year and the tree is often killed after 2 to 3 years of infestation. Frequently a profusion of epicormic shoots arises at the margin of live and dead tissue on the trunk. When trees die, dense root sprouting occurs.

Emerald ash borer has killed trees of various sizes and conditions in Michigan. Larvae have successfully developed on trees as small as 5 cm in diameter, but pole-sized and sawtimber-sized trees have also been killed. Stress likely contributes to vulnerability of ash trees and recent summer droughts may have contributed to high emerald ash borer populations in southeastern Michigan. However, emerald ash borer has attacked and killed apparently vigorous trees in woodlots and urban trees under regular irrigation and fertilization regimes.

Meetings are now going on with various state and federal agencies as well as MSU to develop management strategies and efforts to contain the infestation and decrease beetle density.

References

Yu, Chengming 1992. *Agrilus marcopoli* Obenberger, pp 400-401. In G. Xiao[ed.], *Forest Insects of China* (2nd edition). China Forestry Publishing House, Beijing, China. 1362 pp.

Jendek, E. 2002. *Agrilus planipennis* fact sheet. Information provided by Eduardo Jendek, Institute of Zoology, Slovak Academy of Sciences. Bratislava. Slovak Republic.

(Photos by Howard Russell, Andrew Storer, Dave Roberts, and author)

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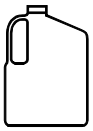
[1]Most of this information comes from the USDA Forest Service Northeastern Area State and Private Forestry Pest Alert NA-PR-07-02, August 2002.

Chemical Update

The following information provides registration status of particular pesticides and should not be considered as pesticide recommendations by MSU Extension.



Products are listed by trade name with active ingredient name and manufacturer following. Please note that multiple manufacturers may make the same product. A change in the registration, formulation, or label of a product from one manufacturer ***may not apply*** *to the same product made by another manufacturer. If you have any doubts about the status of a pesticide, please read a current label and/or check with the manufacturer directly.*

New Registrations/Formulations:

Insecticides

- Flonicamid—(ISK BioSciences/FMC)—a new systemic insecticide for use on greenhouse ornamentals to control sucking insects.
- Floramite (bifenazate: Uniroyal/Compton)—now available in a new SC formulation.

Herbicides

- Blade (metsulfuron: PBI Gordon)—a new formulation for use on warm season turf to control bahiagrass, ryegrass, foxtails, and many broadleaf weeds.
- Brox 2EC (bromoxynil: Albaugh)—a new formulation for use on corn, sorghum, cereals, alfalfa, flax, garlic, onions, mint, grasses grown for seed, and non-residential turf grasses.

Fungicides

- Gem (trifloxystrobin: Bayer)—registered for use on potatoes and sugarbeets to control early blight, powdery mildew, and leaf spot.
- Omega (fluazinam: Syngenta)—registered for use on potatoes to control white mold and late blight.

- Propimax EC (propiconazole: Dow AgroSciences)—a new formulation for use on cereals and other crops.

Residue Tolerances:

Insecticides

- Actara (thiamethoxam: Syngenta)—residue tolerances proposed on corn forage at 0.1 ppm, corn stover at 0.05 ppm, popcorn, corn grain and sweet corn at 0.02 ppm. Comments were due by 7/29/02.
- Avaunt/Steward (indoxacarb: DuPont)—residue tolerances established on alfalfa forage at 10 ppm, alfalfa hay at 50 ppm, potatoes at 0.01 ppm, soybeans at 0.8 ppm, soybean aspirated grain fractions at 45 ppm, and soybean hulls at 4 ppm.
- Coumaphos (Bayer)—time-limited residue tolerances on beehives to control varroa mites and small hive mites have been extended to cover a specific exemption in several states including Michigan. They now expire on 12/31/04.

- Trigard (cyromazine: Syngenta)—proposed to establish residue tolerances on dry beans at 3 ppm based on IR-4 Project research. Comments due by 8/16/02.

Herbicides

- Command (clomazone: FMC)—proposed to establish residue tolerance on mint at 0.05 ppm based on IR-4 Project research.
- Dual Magnum (s-metolachlor: Syngenta)—time-limited residue tolerances for weed control in tomatoes extended in Michigan and a few other states. Expires 12/31/04.
- Select (clethodim: Valent)—residue tolerances established on alfalfa forage at 6 ppm; alfalfa hay at 10 ppm, dry beans at 2 ppm, brassica leafy green vegetables at 3 ppm, mint at 5 ppm, spinach at 2 ppm, and turnip greens at 3 ppm.

Fungicides

- Abound (azoxystrobin: Syngenta)—as a result of the IR-4 Project residue tolerances have been proposed on aspargus at 0.02 ppm. Comments were due by 5/31/02.
- Benlate (benomyl: Dupont)—residue tolerances will be revoked on broccoli, Brussels sprouts, cabbage, Chinese cabbage, cauliflower, collards, garlic, kale, kohlrabi and mustard greens by 1/1/06; on beans, sugarbeets, carrots, celery, cucumbers, melons, nut crops, pumpkins, rutabagas, soybeans, spinach, squash, sweet potatoes, turnips dandelion and watercress by 1/1/07; on apples, barley, caneberries, blueberries, cherries, corn, sweetcorn, currants, dewberries, grapes, mushrooms, nectarines, oats, peaches, pears, plums, prunes, rye, strawberries and wheat by 1/1/08; on eggplant, peppers, and tomatoes by 1/1/09.
- Reason (fenamidone: Aventis)—residue tolerances proposed on cucurbits, lettuce, potato, tomato, wheat and "bulb vegetables."

Label Additions/Changes:

Insecticides

- Apollo (clofentezine: Makhteshim Agan)—proposed to add grapes to the label for mite control.
- Avaunt (indoxacarb: DuPont)—added use on Brussels sprouts, Chinese cabbage, Chinese mustard, cabbage, eggplant, kohlrabi, and potatoes. Increased the use rate on lettuce.
- Steward (indoxacarb: DuPont)—use on alfalfa and soybeans added to the label.
- Success (spinosad: DuPont)—use on root and tuber vegetables added to the label.

Herbicides

- Goal 2XL (oxyfluorfen: Dow AgroSciences)—removed chemigation restrictions and added use on garbanzo beans, garlic, and non-crop areas.
- Matrix (rimsulfuron: Dupont)—aerial application to potato added to the label.
- Prism (Clethodim: Valent)—use on canola, flax, mustard seed, leaf lettuce, broccoli, cabbage, and cauliflower added to the label.
- Velpar (hexozinone: Dupont)—chemigation on dormant alfalfa added to the label.

Fungicides

- Acrobat (dimethomorph: BASF)—control of late blight on tomatoes added to the label.
- Elevate (fenhexamid: Arvesta)—added suppression of powdery mildew on grapes.

- Flint (trifloxystrobin: Bayer)—added use on stone fruits and tree nuts to the label and also control of botrytis bunch rot on grapes.
- Penncozeb (mancozeb: Cerexagri)—control of wheat scab added to the label.
- Plant Shield (*Trichoderma harzianum rafai* strain KRL-AG2: Bio Works Inc.)—use on flowers, bedding plants, ornamentals, berries, small fruits, pome fruits, stone fruits, nut crops, and hydroponic crops added to the label.
- Signature (fosetyl-Al: Aventis)—use for control of anthracnose and bentgrass dead spot on turf added to the label.

Label Deletions/Cancellations:

Insecticides

- Chlorpyrifos-Methyl (Dow/Gustafson)—proposed voluntary cancellation for this product with allowances for existing stock to be used by 12/31/04. Comments were due by 5/24/02.
- DiSyston (disulfoton: Bayer)—use on barley, wheat, potatoes, and ornamentals will be phased out by June 2004.
- Lindane—the following uses will be deleted from the label by 1/13/03: broccoli, Brussels sprouts, cabbage, cauliflower, celery, collards, lettuce, kale, kohlrabi, mustard greens, radishes, spinach, and Swiss chard.
- Methoxychlor—all residue tolerances have been revoked for this product.
- Nemacur (fenamiphos: Bayer)—requested to cancel all uses over the next 3 to 5 years.
- Moorestan (oxythioquinox: Bayer)—all residue tolerances revoked.
- Phosphamidon—all residue tolerances on apples have been revoked.

Herbicides

- Atrazine—no longer registered on orchardgrass; all tolerances have been revoked.
- Diphenamid—all residue tolerances have been revoked.
- Milestone/Evolus (azafenidim: DuPont)—the company has stopped producing this product and all sales will be stopped by the end of the year.
- Vernam (vernolate: Drexel)—all residue tolerances have been revoked.

Fungicides

- Maneb (several manufacturers)—use on golf courses, plus all homeowner uses, will be removed from label.

In the Pipeline:

Insecticides

- Clutch (clothianidin: Tomen Agro)—being developed for control of aphids, leaf hoppers, apple maggots, leaf miners, leaf rollers, codling moth, and pear psylla on apples and pears.
- Dinotefuran (Mitsui Chemical)—being developed for control of ants in non-crop areas; for flea control on cats; fly control in agricultural and commercial areas, and as a premise spray for ants, flies, cockroaches; and as a fogger for control of various household insects.

- F-1785 (flonicamid: FMC)—applied to register this new active ingredient as an insecticide for greenhouse use. Comments were due by 8/9/02.
- Pedestal (novaluron: Compton/Uniroyal)—a new insect growth regulator for the control of insects on container-grown ornamentals in greenhouses.
- Secure (etoxazole: Valent)—a miticide being developed for use on pome fruits and strawberries.
- Tick-Ex (*Metarhizium* spp.: Taensa Inc.)—a new fungi-based biological control for deer ticks being tested to maintain a natural tick barrier around buildings and homes.

Fungicides

- BAS-505 (dimoxystrobin: BASF)—being developed for use on vegetables and turf.
- Green Releaf (*Bacillus licheniformis* strain SB 3086: Novozymes Biologicals)—applied to register this biological fungicide for use on ornamental turf, lawns, golf courses, turf farms, and ornamental plants. Comments were due by 7/26/02.
- Reason 500 EC (fenamidone: Aventis/Bayer)—proposed to register this new active ingredient for control of early and late blight

and downy mildew on potatoes, tomatoes, onions and other vegetable crops. Comments were due by 8/9/02.
- Wolmanit CX-10 (Cu-HDO: BASF)—proposed to register this new active ingredient for use as a wood preservative.

Other news:
- BASF has an agreement with Seeds 2000 in Breckenridge Minnesota to develop imidazolinon-tolerant Clearfield sunflower varieties for resistance to the herbicide Beyond (imazamox).
- Bayer has acquired Aventis and will now be known as Bayer Crop Science consisting of three business groups: Crop Protection, Bio Science, and Environmental Science.
- Dow and Dupont will be jointly marketing seed corn varieties with the *B.t.* gene under the Herculex label.
- Kaput (warfarin: Scimetrics) is a new gel formulation that is used as a rodenticide and for mole control. The gel simulates earthworms, making it attractive to the feeding mole.

(Sources: *Ag Chem News*, June - August, 2002)

News Extras

Section 18 Reforms are on the Horizon

Sandy Perry, IR-4 National Outreach Specialist

Section 18 of FIFRA gives the Environmental Protection Agency (EPA) authority to help states deal with agricultural pest emergencies. If an emergency situation is properly documented and approved by EPA, the state is allowed to use a pesticide for an unregistered use for a limited time to treat the problem. It's a powerful tool for situations that could spell crop disaster if not addressed immediately. And immediate is the key word. Each section 18 application is a finely orchestrated cooperative effort between:

- Growers and/or commodity groups who identify the situations that registered pesticides will not alleviate,
- The state lead agricultural agency (usually the state Department of Agriculture), who prepares the paperwork for submission to EPA, and
- EPA who must perform a multi-disciplinary risk assessment within 50 days of receiving the request.

The risk assessment covers dietary, occupational, ecological, and environmental risks and an assessment of the emergency. If approved, the unregistered use is good for a limited period of time and only for the emergency situation. The Section 18 process has successfully averted crop disasters and saved American agriculture billions of dollars over the years.

Section 18 has been on the books since 1973 and was revised in 1986. The Food Quality Protection Act (1996) added yet another step to the process by requiring that maximum allowable residue levels be set for all Section 18s—a step that had previously applied only to products in the final stage before registration.

Successful programs stay that way because they are flexible and able to change with the times. Through the years the number of requests for emergency exemptions has increased and turn around time at EPA has actually decreased. In 2001, EPA received 542 requests (407 in 1996) and reached decisions within 34 days (53 days in 1996). Even though efficiency has increased at EPA, there was still the desire to streamline the regulation for the benefit of all stakeholders. Input has been solicited from state lead agencies, environmental and public groups, pesticide companies and academia. The discussions have resulted in three proposed reforms to Section 18: (1) renewable exemptions, (2) exemptions for resistance management, and (3) defining economic loss.

Renewable Exemptions

Currently, EPA authorizes Section 18s for no longer than one year. The new proposal would allow the Agency to "re-certify" the emergency situation for up to two years following initial authorization. A time-limited tolerance would be established for the

three-year period. The first year, EPA would do a complete review of the requested exemption. Each renewal request would then be assessed by EPA for risk, validation of emergency claim and qualification criteria such as documented resistance to alternatives, lack of available alternate products, a new pest and/or documented loss of efficacy of registered alternatives. Time and critical resources would be saved at both the national and state level because 70% of Section 18 requests are repeats.

Exemptions for Resistance Management

Currently, a Section 18 exemption can be authorized for resistance management only where there is documented pest resistance to the registered alternative and the resistance is expected to result in significant economic loss. The proposed reform allows exemptions for an alternative to be used in conjunction with the registered pesticide, where there is documented scientific evidence that resistance has or is developing even though the degree of resistance may not yet result in significant economic loss. Full criteria are being determined but will require that the requested pest control product must be a different chemical class or have a different mode of action from the currently registered pesticide(s).

Defining Economic Loss

All Section 18 requests must contain a determination of significant economic loss (SEL). The criteria currently used are based on normal profit variation over a typical period, usually 5 years, using production, price and cost data. Assembling this data becomes problematic in some cases because profits do not fluctuate the same for all crops (e.g., rain fed vs. irrigated crops), five year averages may be affected by the emergency condition especially if the Section 18 is a repeat request, and historical economic data may simply not be available for some specialty crops. The reform proposal is a tiered set of criteria to streamline the data requirements for determining SEL.

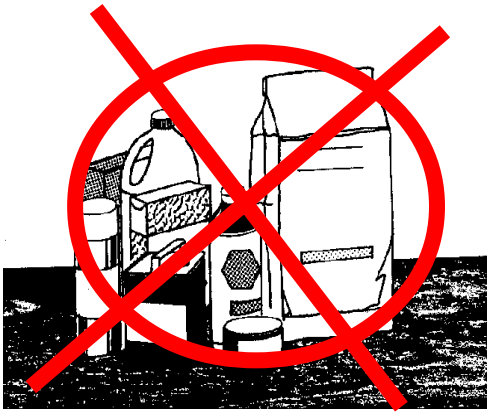
- Tier 1: Yield Based Loss Determination
  The presumption is that high yield losses lead to significant economic loss and no further economic data is required.
- Tier 2: Economic Loss as a Percent of Gross Profits
  A moderate yield loss could also lead to SEL. Because moderate yield loss may not capture all losses, Tier 2 factors price/quality effects and changes in pest control costs if the yield loss is not significant by itself.
- Tier 3: Economic Loss as a Percent of Operating Profits
  Because profit margins vary, EPA will also consider impacts on profit if revenue loss is not significant.

The tiered approach requires less data primarily where yield loss is large. Beyond yield estimates, additional economic data are only collected as needed if higher tier levels must be evaluated. Even going to higher tiers, much less historical data would be required. This reduces the burden on states and on the Agency for collecting and analyzing data.

A *Federal Register* Notice for public comment is due in summer, 2002. The proposed reforms will be implemented on an interim basis for the 2003 growing season with evaluation and revisions to follow.

Quebec Restricts Pesticide Use on Public Lands

Starting in September pesticide use in Quebec near day care centers, schools, and summer camps will be prohibited due to the vulnerability of children. Any pesticide use in these areas will require authorization and will be governed by specific regulations. The provincial government plans to expand pesticide restrictions to other non-agricultural lands including all provincial and municipally owned properties and to private lawns. Nearly 50 Quebec municipalities have imposed cosmetic pesticide bans. The lawn-care industry has fought back in some cities by attending municipal meetings where bans have been proposed.



Fee Changes for Pesticide Certification, Licenses, and Product Registration

The Michigan Department of Agriculture Pesticide and Plant Pest Management Division has upped the fees for pesticide applicator certification, business licenses, and product registration. The fee change for registration of pesticide products is in effect now and has been changed from $20/year to $40/year.

The fee changes for certification and licenses will take effect on October 1, 2002. They include:

- Commercial Applicator Certification from $50/3 years to $75/3 years.
- Commercial Registered Applicators from $25/3 years to $45/3 years.
- Commercial Pesticide Applicator Business License from $50/year to $100/year.
- Restricted Use Pesticide Dealer License from $50/year to $100/year.

Resources

New Publication from MSU Pesticide Education Program

Molds in the Home: What should you do?, E-2814—this is the fifth bulletin in the Community IPM Series. Like all bulletins in this series, this full-color brochure is aimed at homeowners and the general public. The brochure discusses what mold is and the possible health effects and provides mold prevention and control tips. The bulletin is now available through the MSU Extension bulletin system (517-355-0240, one copy free to Michigan residents) or can be found in pdf format at our website at http://www.pested.msu.edu/BulletinsSlideSetsNewsletters/Home&Garden/index.html.

EPA Education Resources for Kids

"Learn About Chemicals Around Your House" is an interactive web site (see: http://www.epa.gov/opptintr/kids/hometour/index.htm) designed to teach children and parents about household products, including pesticides that may contain harmful chemicals. The web site includes information about toxic substances stored in different rooms in the house, and answers commonly asked questions on safe use and storage of these products. The site also contains educational games and tells children what to do if an accident occurs.

"Read the Label First! Protect Your Kids," is a brochure that provides information on preventing children from being exposed to pesticides and household cleaners by reading and following product label instructions and precautions, keeping products in their original containers, and storing products out of the reach of children. This document is available online at http://www.epa.gov/opptintr/labeling/rtlf/kids.pdf.

"Ten Tips to Protect Children from Pesticide and Lead Poisonings Around the Home" is a brochure that provides simple steps to protect children from pesticide and lead poisonings around the home, and is available in both English and Spanish at http://www.epa.gov/oppfead1/cb/10_tips/.

"Pesticides and Child Safety" is a fact sheet that provides current household pesticide-related poisonings/exposure statistics from the American Association of Poison Control Centers, as well as recommendations for preventing poisonings and first aid guidelines. This document is available at http://epa.gov/pesticides/citizens/childsaf.htm.

"Help! It's A Roach" is a roach-prevention activity book for kids and parents. It teaches families what they can do to prevent and control roaches without using pesticides. An interactive Web site is also available at http://www.epa.gov/opp00001/kids/roaches/english/.

All of these resources are also available by calling 1-800-490-9198.

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