



KENTUCKY PEST NEWS

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ANNOUNCEMENTS

- **Category 1 - 1a confusion**
- **Federal label for phosphide bait**
TOBACCO
- **1998 Chemical options for disease control in tobacco greenhouses, float-systems, and traditional plant beds**
- **Plastic on ground - pests lurk around**
STORED GRAINS
- **The lesser grain borer**

TURF

- **Earthworm castings**
- **Pink patch on golf turf**

FRUIT

- **San Jose scale**

MISCELLANEOUS

- **Will a mild winter cause severe insect problems this spring?**

LIVESTOCK

- **More about cattle lice**

ANNOUNCEMENTS

CATEGORY 1 - 1a CONFUSION

By Lee Townsend

When the categories of commercial pesticide applicators were established in the 1970's, Category 1 was divided into two subcategories - **1a** - Agricultural Plant Pest Control and **1b** - Animal Pest Control (for livestock and premises). These subcategories were combined several years ago because there was neither demand nor need for the specialized animal certification. The Category **1a** designation still shows up in some announcements of training meetings even though there is only Category 1 (Agricultural Plant and Animal Pest Control) now. Meetings designated as approved for Category 1a are good for Category 1 certification.

FEDERAL LABEL FOR PHOSPHIDE BAIT IN CONSERVATION TILLAGE CORN

2% Zinc Phosphide Pelleted Bait, previously available under a 24-c state label, was granted a Federal label by the EPA on October 30, 1997. The 1/8"-diameter bait pellets can be used in spot, perimeter, or entire field application in conservation tillage corn to control several small rodents that can

reduce plant stands significantly. Proper placement requires that the pellets be put beneath the surface of the ground to reduce exposure to non-target animals. The pellets should not be crushed during application because this would reduce their effectiveness as a rodenticide. Normal insecticide metering rotors will crush this formulation, a metering wheel has been developed for use with this product. (Loveland Industries, HACO, Inc.)

CATEGORY 7/8 WINTER TRAINING WORKSHOPS (RESIDENTIAL, COMMERCIAL, PUBLIC HEALTH PEST MANAGEMENT)

To help you better serve your clients, a series of 3 training workshops on residential, commercial, institutional, and public health pest management will be offered.

Consider these facts:

* According to a recent statewide poll of Kentucky households, 93 percent expressed concern over finding insects in their home.

* More than three-fourths also expressed concern about using pesticides to control pests in their home.

* Typically, the 10 most common specimens sent to the Entomology Department for identification originate in and around the home.

* More than 90 percent of all consumer complaints received by the Kentucky Department of Agriculture involve termite treatments and real estate transactions.

Ants, fleas, termites, cockroaches, wasps, spiders, rodents, and similar pests, affect the quality of life of all Kentuckians, both urban and rural. Each workshop will be an intensive, full-day session, packed with practical advice on how to correctly diagnose and prescribe solutions to pest problems. While the workshops have traditionally been attended by pest control operators (PCOs), health department, public housing, schools, and food processing personnel, they're also a valuable learning experience for agents and specialists.

All workshops run from 8:15 AM - 4:00 PM. Dates and locations are as follows:

**Feb. 11 - Lexington, Hyatt Regency Hotel
(Downtown) (606)-253-1234**

**Feb. 12 - Elizabethtown, Pritchard Community
Center (502)-765-5551**

**Feb. 13 - Princeton, UK Research & Education
Center (502)- 365-7541**

There is no charge for agents or specialists wishing to attend the workshop in your area, other than the investment of your time.

TOBACCO

1998 CHEMICAL OPTIONS FOR DISEASE CONTROL IN TOBACCO GREENHOUSES, FLOAT-SYSTEMS, AND TRADITIONAL PLANT BEDS by William Nesmith

Diseases can be a limiting factor in the production of tobacco transplants and transplant diseases have become increasingly important with adoption of the float systems. Furthermore, infected seedlings can serve as a source of diseases for the field. These facts have been well illustrated in the last three crops seasons. Last year many crops were not planted because the seedlings died from diseases or the crops that dies from damping-off soon after setting and replacement plants were not available. In 1995 and 1996 the blue mold epidemics were

driven by using infested transplants to rapidly increase and spread the disease about the state.

Control of transplant diseases is achieved through careful management of the production environment, excellent sanitation, and timely application of pesticides. Both the incidence and severity of diseases in seedling production can be greatly reduced through chemicals involved with fumigation, sanitation and preventive spray programs. Unfortunately, adequate labeled materials are not available for most disease problems. Especially critical is the absence of labeled materials for use in the greenhouse and float systems, where the environment, under current production approaches, is highly conducive to disease development due to the roots systems setting constantly in water. For example, no materials that are highly effective are labeled for use in these systems against the following major diseases: Pythium root rot, Rhizoctonia root rot and soreshin, Sclerotinia collar rot and blight, and bacterial soft rot and leaf spots.

The following chemical control options are labeled for disease control in Kentucky tobacco transplant production:

GREENHOUSE AND/OR FLOAT-BEDS - EPA has ruled that outdoor floats systems are not the same site for pesticide use as are traditional beds. Instead, at this time float beds are considered as modified greenhouses for pesticide application considerations. Before a pesticide can be used legally in a greenhouse or float-beds production system on tobacco, the chemical must be specifically labeled for greenhouse use on tobacco with specific instruction to either avoid contamination of the float water or guidelines on proper disposal of treated water. Although there is considerable disagreement on this issue, EPA's Regional Office in Atlanta, GA., continues to advise that this requirement remains in effect.

As a result of this position, only Ferbam and Dithane are labeled for disease control use in greenhouse and float systems in Kentucky. The label on Ridomil 2E specifically prohibits greenhouse and float water applications. Streptomycin is not labeled for greenhouse use on tobacco.

For use against: Anthracnose, Blue Mold, and Damping off due to Rhizoctonia and Fusarium -

DITHANE DF at 0.5 lbs/100 gallons of water (one-two teaspoon/gallon). Spray preventively on a 5-7 day schedule starting when plants are about the size of a dime and continue until transplanting to the field. [Note the rate is lower for greenhouse and floats than in the outdoor soil plant beds.] Use 3 gallons of spray material per 1000 sq. ft. while plants are small, but increase gradually to 6 to 12 gallons as plant size and canopy increase. Be sure sufficient water is used to wet the base of the stems with run-off to increase the control potential of damping off. Avoid contamination of the float-water during applications.

For use against: Blue mold and Botrytis Suppression-

FERBAM GRANUFLO at 1.5 - 3.0 lbs/100 gallons of water. Spray preventively twice weekly starting when seedlings have the first true leaf or immediately after plugging with the plug-and-transfer system. Apply as a fine spray to the point of run-off, using 3 gallons of spray material per 1000 sq ft when seedlings are small increasing gradually to 6 to 12 gallons as plants increase in size and the canopy increases. The label has a specific restriction to avoid contamination of the float-water. This use is labeled under a 24-C in Kentucky, which expires June 16, 1998.

In Kentucky tests, Dithane DF has caused damage to seedlings under certain conditions (especially if the float-water becomes contaminated), but it clearly has provided superior control of blue mold in the outdoor float-beds compared to Carbamate. In greenhouse plantings, significant difference have not been observed in the control of blue mold given by Carbamate and Dithane, but Carbamate was superior to Dithane in Botrytis control at the concentrations labeled.

For control of Tobacco Mosaic Virus-

MILK (Whole or skim at 5 gals /100 gallons water or dried milk at 5 lbs/100 gallons water per 100 sq. yds. of plants). Spray plants 1 to 24 hrs before handling them. This treatment has also been used successfully prior to clipping of large plants, but it can be very messy unless the system dries well following the application. It should combined with washing the hands at 15 minute intervals either in the clean milk solution or a phosphate detergent. This treatment is warranted if TMV susceptible varieties are being used or mixed houses with resistant and susceptible varieties.

FOR TRADITIONAL-TYPE OUTDOOR, SOIL PLANT BEDS -

1. Soil Fumigation for control of Soil-borne pathogens - Fumigant options include: gases, liquids, and granules.

Gases - include products containing methyl bromide or methyl bromide + chloropicrin. Methyl-bromide should be used under a plastic tarp at the rates of 9 to 18 lbs/ 1000 sq feet of bed (see labels for specific rates on each product). Methyl bromide + Chloropicrin should be applied at 9 - 13 lbs/1000 sq ft depending on the product used. Bed sites should be prepared as if ready to seed then fumigated for best results. Expose the site to fumigant for at least 24 hrs, plus 24-48 hrs of aeration prior to seeding. Soil temperatures should be above 55 F during the fumigation period and soil moisture should be sufficient to support germination. **Gases fumigants are extremely poisonous, so follow safety precautions statements.**

Liquid-fumigants - include products containing SMDC (metham sodium) and marketed under such names as Vapam and Sectagon, but other products may also be available in some areas. They should be used at the rate of 1.5 gallons/1000 sq ft of bed, injected into the soil to a depth of at least 4 inches or more, or drenched into the soil with at least 40 gallons of water/1000 sq ft of bed area, then covered immediately with plastic tarp. The tarp should be left in place at least 24-48 hrs, but a long aeration period of 21 days is needed prior to seeding. Light tillage of the soil during the aeration period may be helpful to speed escape to the fumigant. Be sure that tillage equipment is very clean to avoid re-contamination of the soil.

Granule fumigant - are available as dazomet, sold as Basamid, and used at 7.5 lbs/1000 sq ft of bed. The availability of this product is limited in Kentucky currently, but it is an effective fumigant when used correctly. Since it has a very long aeration requirement (14-50 days), its use in the spring in Kentucky is greatly limited. Granules should be spread evenly over the bed site and incorporated to a depth of 8 inches, then the site sealed completely with plastic. Leave the plastic in place at least 5 - 7 days, then aerate the site until it is safe to seed, as determined by use of a germination test.

2. Apply Ridomil 2E (Check to be sure your container is labeled for this use, because Ridomil

Gold is not labeled.) prior to seeding the bed, using 4 teaspoons per 1000 sq ft of bed, applied either as a drench or spray. Additional applications are NOT approved as the state label expired and was not renewed. This should give control of metalaxyl-sensitive strains of blue mold and Pythium, and assist in black shank control.

3. Use Bordeaux mixture (bluestone-lime mixture) as a drench to the soil when the plants have emerged and again 10 days later. This treatment will control algae and aid in the control of diseases caused by bacteria (wild fire, angular leaf spot, and blackleg). Following the label EXACTLY as to mixing instructions, because bordeaux mixture can be toxic to tobacco seedlings. Do not apply this mixture to large seedlings. The target is actually the soil and not the tobacco plant.

4. Sprays of Streptomycin are highly effective in control of most bacterial diseases of the bed, especially angular leaf spot, but streptomycin-resistant strains are present in Kentucky. Sprays can begin as early as the two-leaf stage and should be repeated weekly until transplanting for control of bacterial leaf spots, such as angular leaf spot. It may also slow or suppress blue mold under certain conditions, but cannot be relied on to control blue mold. The material should be applied as a 100 ppm solution (1 teaspoon of Streptomycin 17% WP to a gallon of water), using 3 to 5 gallons of material per 1000 sq ft of bed. On beds receiving bordeaux mixture, it is not necessary to start the streptomycin sprays at the two-leaf stage, rather they can be delayed until plants are about the size of a dime, unless bacterial leaf spots are observed earlier. Do not mix streptomycin with other spray materials. Since streptomycin is a local systemic, best results are achieved when it is applied under conditions of slow drying (such as just before dark).

5. When plants are about the size of a dime, begin weekly sprays with fungicides: Ferbam is available in several formulations with a national labels for outdoor beds, but Dithane DF use is supported by a 24C label that expires June 16, 1998. Ferbam should be used at 1.5-3.0 lbs/100 gallons of water (3 to 5 tablespoons per gallon) and Dithane DF at 0.5-1.0 lbs/100 gallons (1 Tablespoon per gallon). Use 3 gallons of spray mixture per 1000 sq ft of bed while plants are dime-size, increasing to 6 gallons on large plants nearing transplanting size. Thorough coverage of the seedlings is very important. These fungicides are broad-spectrum and will control or suppress a range of fungal diseases associated with

the bed, including metalaxyl-insensitive strains of blue mold. This weekly sprays should continue until transplanting time. Should a broad-spectrum fungicide be needed prior to the plants reaching dime size, use Carbamate. Dithane DF can cause serious damage to small seedlings, but it has the better efficacy once seedlings are larger and the canopy is dense.

6. On Tobacco Mosaic susceptible varieties, sprays of milk within 24 hours of pulling plants can greatly reduce spread of TMV during pulling of plants. Use 5 gallons of milk (whole or skim) of 5 lbs (dry) per 1000 sq ft of bed. Good sanitation practices are also needed, including washing hands frequently during pulling in a phosphate detergent and avoiding tobacco products by those handling plants. This is not needed with TMV resistant varieties.

SPECIAL NOTICE: Acrobat MZ is not labeled for used in any system at this time. The Special Exemption expired on Sept. 30, 1997. A request to use it in 1998 will be made should circumstances warrant, but it is unlikely that approval will be granted prior to May 1, 1998. Use of carry-over Acrobat MZ is not authorized unless new approval is granted.

PLASTIC ON GROUND - PESTS LURK AROUND

By Lee Townsend

Plastic liners for float beds, in fact any objects laying on the ground, provide a shelter for the accumulation of pillbugs, slugs, millipedes, and other scavenger creatures that could damage developing transplants in a few months. Moisture accumulates under them and this makes an excellent habitat for the pests. Get the materials moved so that the sunlight and wind can help to dry out the area if it is to be used again this year. Slug bait can be applied and Sevin bait can be used to control millipedes and pillbugs if they are already active. Pillbugs were serious pests in some float systems where they dug into the media and uprooted plants. There are no real good control measures to treat infested sites, prevention is a better strategy.

New sites for outdoor floats should be cleaned now. Close mowing and removal of grass and weeds will allow the area to dry and force potential pests to move away. Baits can be used as clean-out treatments before the plastic is put in place.

LIVESTOCK

MORE ABOUT CATTLE LICE

By Lee Townsend

Cattle grubs are still migrating through untreated cattle at this time of year. This is important to consider when treating animals that were not treated this fall for cattle grubs, or where the grub treatment history is unknown. In these cases, non-systemic pour-on insecticides with active ingredients such as permethrin (Atroban, Brute, DeLice, Expar, and Permethrin); lambda-cyhalothrin (Saber); or cyfluthrin (CyLence) are good choices to reduce louse numbers in a herd. However, these products have little effect on nits or louse eggs glued to the hair. A second treatment, applied 2 to 3 weeks after the first, will kill newly-hatched lice. Read the label directions carefully before application. Dust bags, backrubbers, ear tags and other self-application devices tend to miss lower portions of the animals so infestations can remain active at a low to moderate level.

Animals that are rubbing themselves against fences, trees, etc. may have lice. To confirm this as the problem, examine the animal in several places—neck, withers, brisket, shoulders, mid-back and tailhead. Sucking lice, with very narrow heads, may congregate in dense patches that look like black to blue-brown spots the size of a quarter or 50-cent piece. A close look will show the individual lice and nits. These lice spend most of their time attached to the animal and sucking blood. They are slow to move around. Chewing lice are less likely to be found in clusters unless the infestation is very heavy. They are brownish yellow and have a wide, flat head. Biting lice are easily disturbed and can be very active.

LAWN AND TURF

EARTHWORM CASTINGS RARELY WARRANT CONCERN

By Lee Townsend

Earthworms literally eat their way through the soil. They create channels for aeration and water penetration, in addition to bringing up deep soil to mix with that near the surface. Species that burrow deeply usually leave “casts”, piles of fecal matter, on the surface at or near the entrance to their burrows. Casts are small, lumpy pellets or paste-like slurries that can form irregular mud-like

shapes, heaps, or columns. Casts can cover significant portions of lawns or turf areas, creating a lumpy or crunchy feeling and giving a muddy appearance. They can be raked down or picked up during mowing. Lumpy lawns can be smoothed with a heavy lawn roller. No insecticides are registered for earthworm control.

PINK PATCH ON GOLF TURF

by Paul Vincelli

Prior to the heavy snowfalls, we had diagnosed several cases of pink patch on bermudagrass and creeping bentgrass. The generally moderate temperatures and humid conditions this winter have been favorable for disease activity.

On creeping bentgrass, this disease appears somewhat similar to red thread. It produces patches several inches in size with tan blades and whitish to pinkish-white mycelium (cottony fungal growth). Generally, the disease is not a significant threat to plant health, since infections move slowly and are confined to the blades. Treatment with fungicides is probably not necessary for most circumstances. However, if considering use of a fungicide, be aware that testing indicates that Prostar (active ingredient flutolanil), which is highly active against red thread, is ineffective against pink patch. Fungicides with the greatest activity against pink patch include azoxystrobin (Heritage), fenarimol (Rubigan), iprodione (Chipco 26019 and related products), mancozeb (Fore and related products), myclobutanil (Eagle), propiconazole (Banner), and thiophanate-methyl (Cleary's 3336 and related products).

There is the possibility of activity of pink snow mold under the recent heavy snow cover in central and northern Kentucky. If fungicide treatment is considered, accurate diagnosis of which disease has been active is important once the snow melts. Contact the Extension Agent in your county for information on diagnosis of diseases on golf turfs.

On bermudagrass, we've seen several cases on golf courses planted to 'Quickstand' bermudagrass, our new recommended variety for Kentucky. The disease appears as circular patches where the dormant foliage appears a lighter color than the surrounding foliage, commonly a pinkish tan color. These patches are most easily seen when viewed at a low angle than when standing over top of them. Sometimes concern is raised that the patches may be patches of spring dead spot. They are not. They

are simply patches where the fungus is colonizing dormant bermudagrass foliage. Crowns remain healthy, since this fungus is a very weak pathogen on bermudagrass. Fungicide treatment of fairways and athletic fields is not recommended.

FRUIT

SAN JOSE SCALE, BECOMING MORE OF A PROBLEM AGAIN

By Ric Bessin

San Jose scale appeared more often at apple harvest last year than it had in the last few years. In the late 1980's, San Jose scale had been considered one of the more difficult to control apple insect pests in Kentucky. Adoption of IPM practices by growers in the late 80's quickly brought this insect under control. This article reviews strategies for San Jose scale control in apples.

The presence of reddish blemishes on fruit at harvest indicates potentially damaging numbers of San Jose scale on the trees. Left uncontrolled, this scale can kill trees in a couple years. If such damage is noted, inspect trees for scale, especially one year-old wood. Purplish-red halos on young bark are indications of scale infestation. Often this very small insect goes unnoticed until large populations have developed.

Timing is very critical to effective scale control. Protected underneath a waxy cover, scale nymphs and adults are resistant to the insecticide cover sprays used in commercial orchards. However, in abandoned orchards and unsprayed trees, San Jose scale is rare. While it is tolerant of the insecticides we commonly use, its predators are not.

The strategy we use to control San Jose scale is to target its most vulnerable stage, the newly emerged crawler, with a long-residual insecticide. Crawlers emerge from underneath female scale in late May and early June. These tiny yellow insects move around randomly on bark and foliage before settling down permanently. A few days after settling down, crawlers will produce a waxy covering over their body that will protect them from pesticides. The key to effective scale control is knowing when crawler emergence begins and applying the correct insecticide before the young scale have produced this protective cap.

There are two commonly used methods to monitor for crawler activity and both methods work well.

The first is the use of San Jose scale pheromone traps. The traps capture adult male scale and a degree day model is used to predict scale emergence (See ENTFACT-204). The second method which has become popular among apple IPM growers, is the use of double-sided, black tape. This is applied with the sticky-surface facing outward, wrapped around a scaffold limb that has an active infestation. The tape is applied in by the 15th of May and checked daily with a hand lens for the presence of the scale crawlers along its edge. When crawlers are active, apple growers should apply either PennCap-M, Lorsban 50 W, or Diazinon 50 W.

In orchards where scale have been a problem on the fruit, growers should also try to apply a dormant oil application in January or February when temperatures will permit an oil application. Dormant oil applications are more effective against San Jose scale than delayed dormant oil applications. However, the opposite is true for European red mite control.

SHADE TREES AND ORNAMENTALS

SELECT DISEASE RESISTANT TREES FOR THE LANDSCAPE

by John Hartman

Many Kentucky landscapers and homeowners are selecting trees for the landscape to replace others that have died, often from diseases. Some of these diseases are caused by microbes that remain in the soil for long periods of time. Thus, it is prudent to make replacements that are disease resistant.

Verticillium wilt is caused by the soilborne fungus *Verticillium dahliae*. When replacing landscape plants that have died from this disease, it is necessary to use wilt-resistant types. The following species are not susceptible to Verticillium wilt disease:

Beech, *Fagus* spp.; birch, *Betula* spp.; boxwood, *Buxus* spp.; crabapple and apple, *Malus* spp.; dogwood, *Cornus* spp.; fir, *Abies* spp.; ginkgo, *Ginkgo*; hawthorn, *Crataegus* spp.; holly, *Ilex* spp.; honey locust, *Gleditsia* spp.; hornbeam, *Carpinus* spp.; juniper, *Juniperus* spp.; katsura tree, *Cercidiphyllum*; larch, *Larix* spp.; linden, *Tilia* spp.; mulberry, *Morus* spp.; oak, *Quercus* spp.; pear, *Pyrus* spp.; pine, *Pinus* spp.; plane and sycamore, *Platanus* spp.; spruce, *Picea* spp.; sweetgum, *Liquidambar*; walnut, *Juglans* spp.; willow, *Salix* spp.; and yew, *Taxus* spp.

Phytophthora root rot is caused by several different species of the soilborne fungus *Phytophthora*, and include *P. cinnamomi*, *P. cactorum*, *P. cryptogea*, and *P. parasitica*. These fungi are most active when soils in the landscape remain wet for brief periods of time. The following trees are reported to not be susceptible to *Phytophthora* root rot diseases:

Alder, *Alnus* spp.; ash, *Fraxinus* spp.; boxwood, *Buxus* spp.; elm, *Ulmus* spp.; ginkgo, *Ginkgo*; honey locust *Gleditsia* spp.; linden, *Tilia* spp.; magnolia, *Magnolia* spp.; mimosa, *Albizia*; poplar, *Populus* spp.; sweetgum, *Liquidambar*; tuliptree, *Liriodendron*; and zelkova, *Zelkova*.

Crown gall is caused by the soilborne bacterium *Agrobacterium tumefaciens*. When replacing landscape plants that have died from this disease is necessary to use gall resistant types. The following species are not susceptible to crown gall disease:

Bald cypress, *Taxodium*; beech, *Fagus* spp.; boxwood, *Buxus* spp.; ginkgo, *Ginkgo*; golden-rain tree, *Koelreuteria*; holly, *Ilex* spp.; hornbeam, *Carpinus* spp.; larch, *Larix* spp.; littleleaf linden, *Tilia cordata*; magnolia, *Magnolia* spp.; pine, *Pinus* spp.; serviceberry, *Amelanchier* sp.; spruce, *Picea* spp.; tuliptree, *Liriodendron*; yellowwood, *Cladrastis*; yew, Japanese, *Taxus cuspidata*; and zelkova, *Zelkova* spp.

Armillaria root rot, also known as shoestring root rot, is caused by the fungus *Armillaria mellea*. It is especially damaging to trees growing under stressful conditions such as winter injury and drought. The following trees are resistant to *Armillaria* root rot except when growing under extremely stressful conditions:

Bald cypress, *Taxodium*; boxwood, *Buxus sempervirens*; callery pear, *Pyrus calleryana*; catalpa, *Catalpa bignonioides*; Chinese elm, *Ulmus parvifolia*; cork tree, *Phellodendron* spp.; crabapple, *Malus floribunda* and *M. ioensis*; ginkgo, *Ginkgo*; hackberry, *Celtis* spp.; holly, *Ilex* spp.; honey locust, *Gleditsia triacanthos* 'Shademaster'; Japanese maple, *Acer palmatum*; magnolia, *Magnolia grandiflora*; mulberry, *Morus* spp.; pine, *Pinus nigra* and *P. sylvestris*; smoke tree, *Cotinus*; sumac, *Rhus* spp.; sweetgum, *Liquidambar*; sycamore, *Platanus* spp.; tree-of-heaven, *Ailanthus*; tuliptree, *Liriodendron*; white fir, *Abies concolor*.

Dutch elm disease (DED) is caused by the vascular wilt fungi, *Ophiostoma ulmi* and *O. novo-ulmi*. The fungus is readily spread from diseased trees to healthy ones nearby by bark beetles and by root

grafts. In general, except for the new releases, American elms are susceptible to DED and elms of European origin vary in their susceptibility. Asian elms such as Siberian elm (*Ulmus pumila*) and Chinese elm (*U. parvifolia*) are tolerant or resistant. They are often used in crosses to create DED resistant hybrids. DED resistance is complicated by the fact that some trees once thought to be resistant to DED are now susceptible to the new species of the fungus, *O. novo-ulmi*. Unless otherwise noted, DED-resistant elms are resistant to both *Ophiostoma* fungi.

European elms vary in susceptibility to DED and are generally derived from species such as Scotch elm (*U. glabra*), smoothleaf elm (*U. carpinifolia*), English elm (*U. procera*), and Dutch elm (*U. hollandica*). Several cultivars with good form have been selected from European elm improvement programs including 'Christine Buisman' (susceptible to Nectria canker), and 'Commelin' and 'Groeneveld' (both susceptible to *O. novo-ulmi*). The cultivars 'Lobel', 'Dodoens', 'Plantyn', 'Clusius', and 'Columella' have good form, are resistant to DED and should perform well in Kentucky although some are susceptible to elm leaf beetle.

Hybrid elm clones with some Asian or European parentage developed in the U.S. include: 'Cathedral', 'Dynasty', 'Frontier', 'Homestead', 'New Horizon', 'Ohio', 'Pathfinder', 'Pioneer', 'Prospector', 'Regal', 'Thompson', 'Sapporo Autumn Gold', and 'Urban'. Although these cultivars are tolerant to DED, some are susceptible to elm leaf beetle.

American elm (*U. americana*) selections tolerant to DED include the 'American Liberty' series, 'Independence', and 'Washington'. These selections have good American elm form and should survive DED, however, they are susceptible to elm yellows disease. By the turn of the century, three new DED resistant elms, 'New Harmony', 'Princeton', and 'Valley Forge' will be available. Consult nursery catalogs for a full account of the characteristics of disease resistant elms.

MISCELLANEOUS

WILL A MILD WINTER CAUSE SEVERE INSECT PROBLEMS THIS SPRING?

By Ric Bessin

Many people have been asking about the effect that our mild winter has had on insect populations this winter. While it is true that we have had a very mild winter - so far, I would not expect that this

will result in an across the board up surge in pest problems.

There are some insect problems that are common following mild winters. In particular, flea beetles can be much more of a problem following a mild winter. If the weather remains mild, growers will need to monitor carefully for flea beetles and corn producers may need to use Stewart's Wilt resistant corn this spring.

Some of our most serious pests do not even pass the winter in Kentucky. Black cutworm and fall armyworm cannot tolerate even mild winters. These insects annually migrate to Kentucky each spring with weather fronts moving up from the Gulf. So our winter weather in Kentucky has little effect on these insect pests.

Winter weather has little effect on many insect pests that are well adapted to pass the winter in Kentucky. For example, with European corn borer, winter weather conditions have less to do with the magnitude of the problems we will see with this insect compared with to spring weather condition during moth emergence, mating and egg laying. High winds and heavy rain in the spring during moth emergence can greatly reduce egg laying. While some insects may be favored by the winter we have had, many of the natural enemies that help to reduce pest numbers also benefit from mild temperatures.

Many insects spend the winter in protected locations such as in the soil. Just a few inches of soil provides these insects with substantial insulation from fluctuating winter temperatures. Snow cover is also a very good insulator for insects that pass remain places that have only limited protection from the winter cold. Insects that are adapted to pass the winter in our state have resistant overwintering stages.

The only sure bet for predicting pest numbers in the spring is monitoring fields and the use of pheromone traps. So far, we haven't found a good substitute for regular field scouting.

STORED GRAINS

THE LESSER GRAIN BORER- *Rhyzopertha dominica* (Fabricius) by Doug Johnson

About a week ago, I was riding my bicycle down country roads in relative warmth. In fact, I was

wearing shorts. The weather was unseasonably mild and on several farms I passed, fans were running on the grain storage bins. Today as I write, there is snow on the ground and it is cold outside. Even though it was quite a bit warmer last week, the insects in most Kentucky storage bins could not have been doing much. However, as we move on into the year more and more of these mild days are going to occur and they are going to become milder (read warmer) as they pass. Don't let the average daily temperature slip up on you.

In the last two issues of KPN we talked about secondary feeders of stored grain. They damage the commodity mainly by making a mess and heat. However, if you are preparing to sell, you had best also look for primary feeders. The lesser grain borer is one of those primary feeders. If you are holding grain, you need only to know if you have the pest. They will do little in uniformly cool grain, and it is too cool to get good control any way. If you are selling, you may have to try some type of control but that will not be easy at this time. If you have this pest and plan to hold the grain long term, you had best take these cool days to learn how to fumigate. If you must sell infested grain now, you will likely have to take the dock for live insects, as fumigation at these temperatures is almost impossible 'on-farm'.

Lesser grain borers mainly attack wheat, corn, rice and millet. Both the larvae and adults are primary pests which mean they bore irregularly shaped holes into kernels and the larvae may develop inside the grain. Grain kernels may be reduced to dust and thin brown shells as a result of larval and adult feeding. A sweet, musty odor is often associated with infestations of this insect.

The adults are 0.1 inch long, brown to black beetles. They have cylindrical bodies with numerous small pits on the wing covers. The head is directed downward and covered by the prothorax so that it is not visible when the insect is viewed from above. The creamy white larvae are grubs. The small dark head is partially retracted into the thorax. The thorax has three pairs of small legs. The abdomen is more slender near the thorax and may be curved to give the grub a C-shaped appearance.

The female deposits eggs in clusters of two to about 30 outside the kernels. Most of the newly-hatched larvae chew their way into kernels and complete their entire development there. However, they can feed on fines and can develop as free-living insects the grain. There are four larval instars. Development from egg to adult requires about 25

days at 93°F and 12 percent moisture. Larvae and adults produce a large amount of frass. Larval fecal pellets are pushed out of the kernel and large amounts may accumulate in the grain. The adults are winged and may fly to spread infestations.

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