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COOPERATIVE EXTENSION SERVICE

KENTUCKY PEST NEWS

ENTOMOLOGY • PLANT PATHOLOGY • AGRONOMY

IN THIS ISSUE

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ANNOUNCEMENTS

1998 COMMERCIAL PESTICIDE APPLICATOR TRAINING CATEGORIES, DATES, SITES AND TIMES

CATEGORIES 1, 2a, 3, 4, 10 & 12 (Cat. 2a: 8:30 am - 12:20 PM, testing at 1:00 pm; Cat. 3, 10. 12: 8:30 am - Noon, testing at 1:00 pm; Cat. 1, 4, 10, 12: 9:45 am - 2:00 pm, testing at 2:00.

2/3/98 - UK REC, Princeton
2/4/98 - English Park Center, Owensboro
2/5/98 - Brown Exposition Center, Western KY Univ.
Bowling Green
2/6/98 - Hardin Co. Extension Office, Elizabethtown
2/17/98 - Boyle Co. Extension Office, Danville
2/19/98 - Boone Co. Ext. Office, Burlington
2/24/98 - Fayette Co. Extension Office, Lexington
2/26/98 - Pulaski Co. Extension Office, Somerset

CATEGORIES 7 & 8 WORKSHOPS - 8:15 am - 4:00 pm; testing after sessions.

2/11/98 - Lexington, Hyatt Regency Hotel
2/12/98 - Elizabethtown, Pritchart Community Center
2/13/98 - Princeton, UK REC

Please Note that All 8 Sessions are approved for CCA credits - 3 hours for IPM
KFACA PESTICIDE APPLICATOR WORKSHOP

2/10/98 - Executive Inn East, Louisville, 9 am - 3:00 pm. Continuing education credit for Categories 1, 10 and 12; ***no*** testing

REFERENCES TO WWW SITES
by Lee Townsend

A significant amount of information is now available on World Wide Web sites. They are places to find in-depth information on topics that are covered in many of our KPN newsletter articles. (In fact this occurs in a gypsy moth article in this issue of the newsletter.) The "addresses" of these sites will appear more frequently as references for those of you who want more background or detail. They must be entered into your web browser using capital, lower case letters, and punctuation exactly as they appear. It's a good idea to bookmark those sites that you may want to visit regularly.

TOBACCO

ARE COMBINATION INSECTICIDE TRANSPLANT WATER TREATMENTS WORTH THE ADDED $$?
by Lee Townsend

A recent joint letter from Bayer and Valent marketing managers recommends a tank mixture of Admire 2F and Orthene 75S as a tank mix for the 1998 growing season. The following benefits are attributed by the marketing divisions to this approach-

Good plant response
Control of cutworms, aphids, flea beetles, and wireworms
Greater residual control than provided by either product alone - reducing the need for early season foliar spray
Resistance management through the use of two different chemistries
Good handling characteristics- both are general use pesticides

It is worth while to look at the claims while considering whether or not to follow this tank mix recommendation. The following comments are based on use of the 1 pound per acre Orthene rate and the 1 fluid ounce per 1,000 plant rate for Admire. These appear to be optimum rates for Kentucky burley based upon many field trials.

Good plant response- This is a general and somewhat vague statement. However, differences between plants receiving transplant water applications of either Admire or Orthene and those receiving plain water are quite apparent for some time after transplant. The treated plants do get off to a good start. However, if no insect infestations develop, it is unlikely that a significant difference will carry through to harvest.

Early season insect control- Admire and Orthene, as individual treatments, provide excellent flea beetle control. Protection lasts for 4 to 5 weeks and covers the time that overwintering flea beetles are feeding and laying eggs. Flea beetles are present in every field and can do some serious leaf feeding. A preventive control measure for them is a good investment, especially following moderate or mild winters. Any differences between flea beetle control by these products is very minor. Orthene may be taken up a little more quickly by the plant than is Admire but there is no obvious difference in plant damage. Consider flea beetle control dead even between the two. The major difference comes in the excellent long-term aphid control provided by Admire.

A definite edge goes to Orthene in cutworm control. The transplant water treatment has provided about 70% control under moderate to heavy cutworm pressure. Expect no real activity on any "worms" from Admire - that is just not its strength. Cutworm infestations are sporadic and difficult to predict. A future article will discuss assessing potential for cutworm damage.

Orthene should provide better wireworm protection than would Admire. Fortunately, wireworms are a rare problem for us. The only real situation where the potential for severe wireworm infestation would be following a 4-year plus bluegrass sod. In that case, application of a preplant incorporated soil insecticide would be a better choice than an insecticide in the transplant water. The hypothetical edge goes to Orthene but this is mostly a non-issue.

Greater residual effect in combination. As more chemicals are absorbed into a plant, there can be a slow down in the rate that they are metabolized by the plant. This could result in detection of the residues of one or both over a longer time. In practical terms, it is unlikely that this has a meaningful impact on managing insect levels.

Resistance management through the use of two chemistries. Admire and Orthene have very different modes of action against target pests; they attack different sites in the nervous system. This is very good in terms of insecticide resistance. Continued use of a particular class of insecticides based upon mode of action can lead to insecticide resistance. A frequent approach to resistance management is to rotate among classes of insecticides so that a single target site not continually under attack. Under the tank mix recommendation, two sites are attacked at the same time. Conceivably, resistance to both classes is being forced by this strategy. While there are differences in opinion as to management strategies to forestall resistance, it would seem logical to expose the insect to one challenge at a time.

The potential for insecticide resistance is greatest with the tobacco aphid. Fortunately, there has been no indication the development of resistance from the tobacco-growing states.

Good handling characteristics. Neither are restricted use pesticides so private applicator record keeping is not required. However, a complete record of pesticide applications is a sound practice and this does not relate to the tank mix issue.

Summary

Orthene provides excellent early season flea beetle control and should provide good cutworm control unless numbers are extremely high. While Admire will provide similar flea beetle control, its strong suit is long term aphid control- essentially up to topping time. It is difficult to imagine any gain to the tobacco farmer from a tank mix of the two that would result in a reliable return.

Regardless of the strategy- tank mix or use of a single product- it is likely that at least one foliar spray will be needed to deal with hornworms or budworms sometime during the season. At least one foliar spray for aphids will be needed in most fields where a preventive approach is not used.

REDUCTION OF DISEASE POTENTIAL IN FLOAT AND GREENHOUSE TRANSPLANT PRODUCTION SYSTEMS
by William C. Nesmith

The greenhouse and float transplant production systems offer many advantages to tobacco transplant producers. However, a disadvantage of the float systems is that it provides a ideal habitat for the development and spread of transplant diseases due to the constant presence of water. Therefore, a key to sustained success with these production systems is keeping the pathogens causing diseases out of the systems. If the pathogens are not also present, infectious diseases will not develop, regardless of how wet the system is operated.

Infectious diseases in float production systems are becoming more common and serious with repeated use of the system. Likewise, the value of keeping the pathogens out of the system is also much more obvious. In a recent meeting, a Casey County grower commented: "I was fooled by two years of great success with the float system into believing diseases were not a problem. Unfortunately, last year my eyes were opened when one disease outbreak after another went through my systems, plus they continued to plague my crop in the field."

A diligent sanitation program is a must! The media and water being used should be pathogen-free. All equipment and tools that come in contact with the system should be pathogen-free. That means either new trays must be used or re-used trays must be properly washed and sanitized.

What is available to disinfect trays? Steam, methyl-bromide fumigation, chlorine-bleach, and quaternary ammonium chloride salts are available in Kentucky. None of these materials have been totally effective in killing all the pathogens and exactly how to best use them at the farm-level is not fully understood. Each has positive and negative points, which have been addressed in several previous Ky Pest News articles.

STEAMING TRAYS: In our studies, steam has been the most effective disinfectant - does the best job of killing the range of pathogens we are facing in Kentucky. But its cost is high and some items are damaged by steaming. Most studies indicate that the trays need to reach at least 160F for 30 minutes, but lower temperatures have been effective in others. Some commercial transplant producers are successfully using steam, the temperature/times being used mainly depends upon the assessment of risk potential.

FUMIGANTS: Methyl bromide with 1% chloropicrin has been almost as effective as steam in some of the tests. It provides excellent control of Rhizoctonia and other fungi on the surface of the tray. It will greatly reduce the level of Pythium, but has not been as effective as steam or proper bleaching in reducing Pythium, probably because a significant amount of Pythium is found embedded in the tray. We find great variation in the amount of control provided within the lot of trays, also. It is important to us an air-tight plastic seal, to pre-wet the trays, and to avoid large stacks of trays. Methyl-bromide is heavier than air, so it sinks, therefore best results occur with long, short stacks rather than tall, deep stacks. We have found little control is provided at the low rates, so use the maximum labeled rates (3 lbs/1000 cubic feet). Certain types of styrofoam trays appear to be more easily damaged with this chemical. Pay special attention to ALL label precautions related to safety.

CHLORINE BLEACH: Chlorine bleach solutions have given a high level of control, but, over-all, are not as effective as either steam or properly conducted fumigation. Just dipping the trays in the solution and allowing them to dry is not highly beneficial. We have found little benefit to using more than 10% solution. Without proper aeration and post-washes, salt residues can cause serious problems, especially with older trays that tend to soak up more material. Bleaches work best when the trays are washed with soapy water, then dipped

several times into clean 10% solution, followed by covering them with a tarp to keep them wet over-night with the bleaching solution. Afterwards, the bleach solution should be washed from the trays with clean water or water plus a Q-salt listed below, followed by aeration - to eliminate the chlorine and salts. Worker safety issues are also important with bleach. It is important that the bleach solution remain below pH 6.8 and that new solutions be made-up every 2 hrs or whenever it becomes dirty, which ever comes first. Organic matter will remove the active ingredients quickly.

Q-SALTS (Quaternary ammonium chloride salts): These are marketed under such names as Greenshield, Physan, and Prevent as solutions containing 20% ammonium chloride. Many growers are using them, but the effects are not as positive as some believe, based on our testing. I believe the greatest benefit is in the final wash and on exposed surfaces in the greenhouse. In all our tests, Q-salts have always provided some control, as compared to using soap washes only, but have always been inferior to any of the above mentioned methods.

CORN

"REGENT" RECEIVES REGISTRATION AS A NEW FIELD CORN INSECTICIDE
by Ric Bessin

Rhône-Poulenc announced the registration of its field corn insecticide, REGENT (it is not registered for use on popcorn or sweet corn). This soil-applied, liquid insecticide targets both corn rootworm beetle larvae and European corn borer. Regent is formulated as an 80% WG of the active ingredient *fipronil*. Regent is a Restricted Use Insecticide due to toxicity to estuarine invertebrates and birds. To prevent
possible contamination with aquatic sites, do not apply Regent within 20 yards of lakes, streams, or ponds. The label carries the signal word "Warning." The Restricted Entry Interval after application is 24 hours. There is a 90 day preharvest interval. Only a single infurrow, at-planting application is permitted.

Fipronil is the first member of a new class of insecticides called *phenylpyrazols*. Fipronil acts on the nervous system of insects. It interferes with gamma amino butyric acid (GABA) regulated chloride channel. Its mode of action is different from that of pyrethroid, organophosphate, carbamate, and chloronictinyl insecticides. Only very low rates of this insecticide are used.

There are several methods in which Regent can be applied, but all methods require specialized application equipment and basically provide a solid stream directed into the open seed furrow at planting. Application methods include using a microtube or flat fan nozzle directed over the open seed furrow, or mixing Regent with an infurrow, liquid fertilizer. Regent must be applied using a minimum of 1 gallon of water or water and fertilizer per acre.

Regent provides control of corn rootworm larvae through contact activity and control of European corn borer through systemic action. Studies at the University of Kentucky would characterize control of corn rootworm larvae with Regent as average. Systemic activity for control of European corn borer has been good with approximately a 70% reduction in tunneling.

There are some important rotational restrictions for fields receiving Regent. Producers cannot plant small grains or other rotational crops within 12 months following Regent application.

STORED GRAIN

"WHAT DA YA MEAN, THERE'S 'BRAN BUGS' IN MY GRAIN!!"
by Doug Johnson

In Kentucky Pest News # 798 (of 15 Dec 1997) we talked about the Indian Meal moth (IMM) and how it was the most common pest of stored grain in Kentucky. Remember that IMM is LIMITED to the SURFACE of the grain. Perhaps the next most common pests are what we often call 'bran bugs'. In fact, 'bran bugs' are not one species of insect but rather a group of small beetles that generally look alike and feed on fines, and broken or damaged kernels. Two of the most common of this group are the Confused Flour Beetle--Tribolium confusum and the Red Flour Beetle--Tribolium castaneum. You may also have seen these insects in the home especially in stored wheat products (like pasta) or spices.

There are two very important points to remember about these pests: 1. They are NOT LIMITED to the surface and 2. they are not primary feeders. That is they do not feed on whole, sound kernels in good condition. If your grain is in good condition, is cooled to outside temperatures and you are not selling, you probably only need to know if they are present or not so you can do something in the spring. Remember, below about 50 F they are not going to do much. However, if your grain is warm, not in good condition, and especially if you are delivering grain for sale, it could benefit you to know about this infestation. A correct identification is very important as treatment will depend upon whether or not the insect is a primary (attacks or feeds inside

sound kernels) or secondary pest (feeds on fines and damaged kernels).

Damage--Flour beetles are secondary pests of whole, undamaged grain; they are, however, often found among dust, fines and dockage. Flour beetles cause damage by feeding but contamination of the grain is probably a bigger concern Large numbers of dead bodies, cast skins and fecal pellets, as well as liquids (quinones), can produce extremely pungent odors in the grain.

Description--Flour beetles are red-brown and about 0.1 inch long. The two species are very similar in appearance but can be distinguished by the shape of their antennae. The antennae segments of the confused flour beetle gradually enlarge toward the tip. The last few segments of the red flour beetle's antennae are abruptly much larger forming enlarged tips. In addition, the head margins of the confused flour beetle are enlarged and notched at the eye with a ridge over the eye. The red flour beetle head margins are nearly continuous with no ridge.

Full grown larvae are less than 0.3 inch long, yellow-white worms. The head and a pair of projections on the tip of the abdomen are dark.

Biology--Under favorable conditions, a female may lay 400 or more eggs at a rate of six to twelve eggs per day. Eggs are covered with a sticky fluid allowing particles of debris to adhere to them resulting in almost perfect camouflage. There are generally four larval instars (growth stages); the egg to adult life cycle takes about 30 days.

FRUIT CROPS

MANAGING BLACK KNOT OF PLUMS

by John Hartman

The most destructive disease of plums in Kentucky is black knot, caused by the fungus *Apiosporina morbosa*. Unlike fruit rots and leaf spots which affect the crop during any given season, black knot, by girdling the affected limbs, destroys the trees themselves, affecting the crop and the plum orchard investment for many years. Black knot symptoms appear as elongated swellings or knots which may extend a foot or more along the limbs of susceptible prune and plum. These black corky outgrowths predominate on small twigs and branches but may also be located on larger scaffold branches and on the trunk.

*How plums become infected. In spring, black knot fungus ascospores are ejected from fruiting structures called perithecia embedded in the black knots on limbs of infected plums or wild cherries growing in landscapes or fencerows nearby. Spore release occurs during rainy periods and the spores are then moved by wind currents. A period of free moisture at temperatures between 55 and 70 F is required to cause infection. Long wetting periods are required at the lower temperatures, but only a few hr of wetting are needed at warmer temperatures. Infections occur almost entirely on the young green twigs, but they often remain undetected during the first year. Typical swollen knots start becoming obvious the following season, then turn hard and black, and begin producing new inoculum 2 yr after infection.

*Black knot management. Cultivars of plum vary in their susceptibility to black knot with Stanley, Bluefree, Damson, and Shropshire being most susceptible; and Fellenburg, Methley, Milton, Bradshaw, and Early Italian also being quite susceptible. Growers should use cultivars such as President (resistant), or Formosa, Shiro, or Santa Rosa (slightly susceptible) for best results where black knot is nearby.

Sanitation is the primary defense against black knot of existing trees. Plum and prune trees should be pruned for black knot during the dormant season because they are easier to see then. All infected branches and limbs should be cut 6-8" below any visible swelling, since the fungus spreads out beyond the knot itself. All black knot infections must be removed from orchard trees and from adjacent wild
cherry trees. The knots must be collected and burned or buried because knots left in the trees or on the orchard floor will liberate thousands of ascospores.

Fungicide sprays are effective in reducing the number of new black knot infections if the inoculum load is light. In orchards with an established black knot problem, fungicide programs ideally should start after green tip once rainy periods with temperatures above 55 F are expected, and continue according to weather and crop economics until one week after shuck split. Concentrate on the peak danger period between flower bud appearance and shuck split, integrating these sprays with those for brown rot. Captan, Benlate, Topsin-M, and Bravo have all been shown to provide some protection against black knot and are labeled on plums. Consult the *Commercial Tree Fruit Spray Guide (ID-92)*, available in County Extension Offices statewide.

GRAPE DISEASE MANAGEMENT WITH

ABOUND, A NEW FUNGICIDE
by John Hartman

Abound fungicide, manufactured by Zeneca Ag Products, is listed in our "Kentucky Commercial Small Fruit and Grape Spray Guide" (ID-94) for 1998. It is formulated as a flowable fungicide containing 22.9% of the active ingredient azoxystrobin which is derived from a new class of chemical compounds extracted from the wood decaying fungus *Strobilurus tenacellus*,

An integrated pest management (IPM) program for grapes is essential for success with Abound. The IPM program should include practices known to reduce disease development such as a) selection of varieties with disease tolerance or resistance, b) canopy management through pruning and thinning, c) proper timing and placement of irrigation, d) removal of plant debris where inoculum overwinters, and e) use of fungicides only when required.

Abound is useful for management of four different fungal pathogens of grape causing the following diseases: black rot (*Guignardia bidwellii*), downy mildew (*Plasmopara viticola*), Phomopsis cane and leaf spot (*Phomopsis viticola*), and powdery mildew (*Uncinula necator*). Abound has been tested experimentally in Tennessee and shown to provide downy mildew control equal to that of captan.

**A note of caution: Abound fungicide is very phytotoxic to certain varieties of apples. Do not use the same spray equipment for grapes and apples if Abound is used on grapes. Although the Abound label lists peaches as a legal site for application, we have chosen to omit Abound from our tree fruit spray guides because in Kentucky, it is likely that the same spray equipment would be used for both apples and peaches.

SHADE TREE AND ORNAMENTALS

GYPSY MOTH UPDATE
by Joe Collins, Nursery Inspector and Lee Townsend

A joint program between the USDA's Animal Plant Health Inspection Service (APHIS) and the UK Entomology Department has resulted in a close watch for the development of gypsy moth infestations in Kentucky for several years. Some idea of gypsy moth activity can be detected by setting out pheromone-baited traps that attract and capture males. The presence of a few males does not mean that the insect is established but may warrant extra investigation.

A total of 91 moths were captured in the following counties during the 1997 program: Boone, Boyd, Bracken, Bullitt, Carter, Fleming, Gallatin, Grant, Greenup, Hardin, Harrison, Henry, Jefferson, Kenton, Lawrence, Lewis, Madison, Mason, Montgomery, Nicholas, Robertson, and Rowan. Only a few moths were caught in most of the "positive" counties. They probably were accidentally transported from infested states or blown in on storm fronts. However, 22 moths were caught in Greenup county and 8 in Madison county. This may mean that small infestations of gypsy moths have become established in those areas. Mass trapping will get underway in 1998. Placement of large numbers of pheromone traps in areas that are suspected of being infested with low populations in specific areas has worked well in other parts of the state where large numbers of moths have been caught. The males are trapped before they are able to find and mate with the flightless females.

More information on the 1997 survey can be found on the Kentucky nursery inspection home page http://www.uky.edu/Agriculture/NurseryInspection/toc.htm and a fact sheet that can be found at http://www.uky.edu/Agriculture/Entomology/entfacts/trees/ef425.htm.

LIVESTOCK- POULTRY

WINTER CLEAN OUT GOOD FOR LITTER BEETLE MANAGEMENT
by Lee Townsend

The lesser mealworm (litter beetle and darkling beetles - some of the kinder alternative names) can build to overwhelming numbers in broiler house litter. The insect is relatively intolerant of temperatures below freezing and a winter litter clean out can expose and kill large numbers of them with minimal chance of invasions of nearby buildings or home.

The dark brown to black, ½-inch long adults and the light yellow to brown wireworm-like larvae tend to congregate in the older, deeper litter. They accumulate under anything lying on or just below the litter surface, such as floor feeders or caked litter. They tend to avoid very wet or very dry situations. Spot litter removal can be helpful if the whole house cannot be cleaned. Spread the litter on fields where it (and the beetle adults and larvae) is exposed to freezing temperatures.

Spread of beetle-infested litter when temperatures are above about 50° F can result in some spectacular movement of the adults to lights and invasions of homes or buildings.

PESTICIDE NEWS AND VIEWS
by Monte P. Johnson

ILLINOIS MAN CHARGED WITH ILLEGAL PESTICIDE SALES

On Nov. 19, 1997, James Allen of Chicago, Ill. was charged in U.S. District Court for the Southern District of Mississippi in Jackson with the illegal purchase and transport of pesticides in violation of the Federal Insecticide, Fungicide, and Rodenticide Act. Allen allegedly conspired with other individuals between 1993 and early 1997 to purchase the pesticide methyl parathion for the purpose of illegally applying it in residences. Methyl parathion is a highly toxic pesticide which is approved for use only in open uninhabited fields. Exposure to it can cause death, coma, nausea, headaches, vomiting, cramps and muscle spasms in humans and domestic animals. The charges state that Allen obtained 485 gallons of the pesticide illegally and transported it to Reuben Brown, an exterminator in Chicago, who sprayed it in approximately 1,000 homes. Allen is also accused of spraying a Braxton, Miss. residence with methyl parathion. If convicted, Allen faces a maximum sentence of two years in prison, a fine of up to $200,000 or both. The case was investigated by EPA's Criminal Investigation Division and the FBI with the assistance of EPA's National Enforcement Investigations Center. (EPA Press Release, Dec. 12, 1997)

CHICAGO MAN SENTENCED FOR PESTICIDE MISUSE

On Dec. 9, Ruben Brown, an unlicensed pesticide applicator from Bellwood, Ill., who plead guilty to the illegal application of an outdoor pesticide commonly known as "cotton poison" inside homes in the Chicago area, was sentenced to serve two years in federal prison by the U.S. District Court for the Northern District of Illinois in Chicago. Brown previously admitted to applying the pesticide methyl parathion inside two homes in the Chicago area in June and July of 1996. Methyl parathion is highly toxic to the nervous system and can be absorbed through the skin. Exposure can result in vomiting, diarrhea, convulsions, and death. It is approved only for outdoor agricultural uses. The case was investigated by EPA's Criminal Investigation Division and the FBI with the assistance of EPA's National Enforcement Investigations Center. (EPA Press Release, Dec. 12, 1997)

EPA ISSUES COMPLAINT FOR ILLEGAL CLAIMS THAT PESTICIDE PRODUCT PROTECTS CHILDREN FROM BACTERIAL INFECTIONS

On Dec. 5, 1997, EPA fined Microban Products Company of Huntersville, North Carolina, $160,500 for making unsubstantiated public health claims for its pesticide, Microban Plastic Additive "B." The complaint charges Microban with making claims that certain consumer products treated with the pesticide protect children from infectious diseases caused by bacteria such as E. Coli, Staph. and Strep., when in fact the treatment was approved only to protect the plastic in the products from deterioration. With this action against Microban, EPA is assuring that registrants limit their claims to those permitted by the product's registration. The use of unapproved public health claims in conjunction with the sale of consumer goods such as sponges, toys and cutting boards may lead the public to use less hygiene than they normally would. The net result may be that children's health is less protected. No public health-related claims have ever been accepted for this pesticide. Under the Federal Insecticide, Fungicide, and Rodenticide Act, it is illegal to make claims for any pesticide which differ from those claims approved in connection with the pesticide's registration. (EPA Press Release, Dec. 12, 1997)

Lee H. Townsend
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