



KENTUCKY PEST NEWS

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ANNOUNCEMENTS

PESTICIDE LICENSE RENEWALS ARE IN THE MAIL

by Ken Franks, Agricultural Branch Manager

As a result of the changes to KRS217B, the license renewals were late being mailed this year. In December, we mailed the Dealer registration forms to all companies currently licensed. We included in the registration packet a copy of the new law. It is very important that you read and understand the new definition of a dealer. A dealer as defined in KRS 217B.040(26) is any person that engages in the storage of bulk fertilizer or restricted use pesticide for the purpose of redistribution or direct resale, or engages in the business of applying pesticides to the lands of another. This does not include manufacturers of restricted use pesticides or fertilizers who distribute their product to dealers. You must complete this registration form and remit the proper fees to the Division of Pesticides as soon as possible. We can not issue a license until the registration form has been processed.

Beginning January 8, 2001 we will be sending out the license renewal forms. There will be a change in the renewal packet this year. You will need to complete and return these as soon as possible. We hope to be able to send out the licenses within two weeks of receiving your renewal forms.

If you or one of your employees is not certified we will not be able to renew that license. We will have a letter in the packet that explains the reason that a license can not be renewed. The major reason a

license will not be renewable is lack of certification. Anyone that is not certified must pass the certification exam before they can be licensed. This is another major change in KRS 217B. The schedule and location of test centers is on the Department's web page at <http://www.kyagr.com>. You may also contact this office by phone at (502)564-7274 for a copy of the testing schedule.

This is a new process for the division. We realize that there is a lot of confusion regarding these changes. We have staff available in the office to answer any questions that you may have. Please let us know if we can assist you with this process.

2001 IPM TRAINING SCHOOL

Mark your calendar now for the 2001 IPM Training School! Scheduled for March 21, the meeting will be held at the UK Research Center in Princeton. Registration will open at 8:30 AM with the meeting starting at 9:00AM and ending at 3:30 PM.

The program will feature a session on "Advanced Scouting" for those who have attended previous IPM Training Schools and are experienced scouts. An "Introduction to Scouting" session will be offered for those who have never scouted a field. The "Introduction to Scouting" session will teach site selection and the basic techniques for scouting corn, soybeans, alfalfa and small grains.

Pest identification will be a major part of the training school. Weed, insect and disease problems of corn, soybeans, small grains and alfalfa will be covered. An update of pest problems in Kentucky will also be discussed.



Advance registration is not needed and the meeting is open to the public free of charge. The program has applied for 5.5 CEU's for Certified Crop Advisors. For additional information contact Patty Lucas at 270 - 365-7541 extension 218 or plucas@ca.uky.edu.

TOBACCO

MESSENGER FAILED TO CONTROL BLUE MOLD IN BURLEY TEST PLOT

By William Nesmith

The biochemical pesticide Messenger, marketed by Eden Bioscience Corporation, has been labeled for use on burley tobacco for about a year. The label suggest that Messenger, which contains 3% harpin protein as the active ingredient, will boost the overall growth and production of tobacco, and aid in the management of diseases and pests, including blue mold, Fusarium wilt, cyst nematode, and tobacco mosaic virus.

I did not include Messenger in my disease control guidelines for 2000, because I was unable to obtain any data from field studies to support the claims of efficacy in tobacco disease control. Frankly, I was very surprised to learn that Messenger had become labeled on tobacco for blue mold control without evaluation by plant pathologists at the University of Kentucky or North Carolina State University - the leading laboratories in researching controls for tobacco blue mold.

Consequently, a major effort of my field research program during the 2000 crop season was to evaluate the efficacy of Messenger for blue mold control of burley tobacco, so that I could better advise County Extension Offices and regional tobacco growers about Messenger. Test plots were established with the burley variety NC-3 in a creek bottom field at the Robinson Substation, Kentucky Agricultural Experiment Station, Quicksand, KY, through funding provided by the Kentucky Agricultural Experiment Station, Kentucky Cooperative Extension Service, and Council for Burley Tobacco. The crop was produced, harvested and graded under the protocols recommended by the Agronomy Department, University of Kentucky, except for blue mold control and the imposed experimental treatments. Forty experimental treatments were evaluated in the tests, but only the 11 treatments involving Messenger and the experimental controls are presented here. Plots were single rows, 25 ft long (about 18 plants) with an unsprayed row on each side. The plots were arranged into a randomized complete block design with five replications. Distilled water was used for mixing the pesticides containing Messenger and the

two experimental controls to avoid the chemical degradation from chlorine or acid, as per the warning on the Messenger label. I personally made all applications of the test chemicals, using a backpack CO₂ -pressurized sprayer operating at 80 psi and equipped with hollow-cone nozzles on a vertical boom. The number of nozzles and spray volume increased as the season progressed to achieve excellent coverage, with initial sprays involving 3 nozzles delivering 25 gallons/acre and the final applications involving nine nozzles and delivering 100 gallons/acre. Initial applications were made three days post-transplanting, with subsequent applications at 14 day intervals, except as indicated in the table below. The final applications were made two days prior to topping with harvest 24 days after topping. The crop was harvested in mid September, air-cured during the fall, and in December prepared for marketing into three stalk positions.

Blue mold started in the plots about three weeks after transplanting and developed into a strong and persistent epidemic from mid-season until about 10 days post topping. Crop damage was severe from the foliar blighting and systemic phases, reducing yields by over 1200 lbs per acre and resulting in about \$4000 reduction in leaf value, as indicated by the differences obtained between the 0-rate (check) and the standard recommended treatment (Acrobat MZ at labeled rates and volumes). Weekly applications of Acrobat MZ significantly reduced leaf area diseased and systemic stem infections, while none of the treatments containing Messenger significantly reduced blue mold as compared to the check. Furthermore, there was no change in the blue mold activity with increasing rate of Messenger - strong evidence of the lack of efficacy of this product in blue mold control. However, some Messenger treatments did significantly impact yield, compared to the check, and market value slightly, but significantly. Note particularly the 18 oz rate, which is 2x the maximum labeled rate, which reduced yield significantly; and the 6 oz rate which increased yield and market value significantly compared to the check. The reasons for the increased yield at the 6 oz rate are not understood, because it did not correspond to disease control.

As a result of this test, Messenger will also not be included in our blue mold control guidelines for 2001, because we have experimental data that demonstrate clearly that it was not effective in controlling blue mold under the damaging levels of blue mold experienced in this test. Moreover, the disease levels that developed in this test are typical of those experienced often in blue mold-conducive fields in eastern and central Kentucky. Although all treatments evaluated are not shown here, several other materials (labeled and unlabeled) provided a

high level of blue mold control in this tests, including the labeled materials Acrobat MZ and Actigard that will be recommended in 2001.

There are several lessons that could be learned from this situation. But one in particular is that all should be aware that efficacy data are not necessary to label a pesticide in the US; instead the focus is on

environmental and safety issues. In other words, just because a product is labeled for blue mold control does not mean it is effective in blue mold control. EPA assumes that the market place and lawyers will resolve issues related to poor efficacy. I urge growers to always ask for experimental data when considering disease control decisions.

Fungicide	(oz/A)/interval¹	% LAD²	% Systemic³	Yield (lbs/A)	Crop value (\$/A)
Check	0/14-day	44a ⁴	76a	1793cde	4662c
Messenger	1/14-day	47a	85a	1910c	4759c
Messenger	2/14-day	36a	85a	1834cd	4588c
Messenger	3/14-day	47a	85a	1662e	3938d
Messenger	3/10-day	49a	77a	1841cd	4716c
Messenger	3/7-day	48a	88a	1796cde	4606c
Messenger	4/14-day	47a	89a	1848cd	4695c
Messenger	6/14-day	46a	77a	2074b	5453b
Messenger	9/14-day	45a	80a	1755de	4384cd
Messenger	18/14-day	46a	77a	1374f	3217e
Acrobat MZ	40/7-day	6b	4b	3063a	8736a

- 1/ All sprays containing Messenger were started 3 days post-transplanting (on June 30) with subsequent sprays on July 14, July 27, Aug 10, and Aug 30. All other spray treatments were initiated on July 14, with subsequent weekly applications made on July 20, July 27, Aug 3, Aug 10, Aug 16, Aug 23, and Aug 30. The 0 rate was also sprayed with distilled water at the same volume and pressure used in all fungicide treatments with the first two application at 25 gallons/A, 3rd and 4th at 50 gallons/A, and 5th and 6th at 100 gallons/A. Standard fungicide treatment was Acrobat MZ at 2.5 lbs/100 gallons with the spray volume adjusted as with Messenger.
- 2/ %LAD = % Leaf Area Diseased from Blue Mold rated on 9/27. Ratings were also collected on 7/21, 8/04, and 8/25 but the statistical groupings among treatments were the same for all rating dates.
- 3/ % Systemic = The percentage of lower stems showing evidence of systemic blue mold infections at harvest time.
- 4/ Values within the same column not sharing a letter are significantly different at P = 0.05 as determined by the Tukey's Test for Honestly Significant Differences.

HOUSEHOLD

HEAD LICE by Mike Potter

Head lice outbreaks are especially common this time of year, especially on children. Schools bring large numbers of children together in close, personal contact. Hats and coats are often shared or hung together in the same closet, permitting transfer of lice from one child to another. Transfer of head lice can also occur by using infested combs and brushes, or resting one's head on upholstered furniture or pillows recently used by an infested individual.

Diagnosing the Problem- Head lice are bloodsucking insects that live exclusively on humans. They usually infest only the head, preferring the nape of the neck and the area behind the ears. The first indication of head lice is itching and scratching caused by the bloodsucking habits of the louse. Examination of the hair and scalp will usually reveal the white or grayish crawling forms (about

the size of a sesame seed) and yellowish white eggs (nits) attached to the hair shafts close to the scalp. The nits are sometimes mistaken for dandruff or residues of shampoo but will not wash off or be flicked off with a finger. Usually all life stages can be seen with the naked eye, although a flashlight and hand lens are helpful. Red bite marks or scratch marks are often seen on the scalp or neck.

People should be aware that there are many factors (other than lice) that may cause itching and irritation during the winter. Dry air alone can cause irritation, producing a condition known as "winter itch". As skin loses moisture, itching results. A skin moisturizer or home humidifier is often helpful in these situations. See ENT-50 *Invisible Itches: Insect and Non-Insect Causes*.

Elimination and Prevention- There are four key steps to eliminating head lice and preventing their return. Steps 1-3 should be performed at the same time in order to avoid reinfestation.

1. The child or infected person(s) should be treated with a pediculicide shampoo formulated

specifically to control lice. Several different products, most containing permethrin or pyrethrins, are available through pharmacists and physicians. Follow the directions on the package. If one family member is infested, all others should be examined. More than half of lice-infested children have another infested family member at home.

2. Remove all nits using a fine-tooth louse comb. Although this step can be quite time-consuming, nit removal is critical to eradication. Louse control shampoos often do not kill all the nits, and surviving eggs will hatch within 7 to 10 days, continuing the cycle of reinfestation. Dead nits also tend to remain attached to the hair, causing uncertainty about reinfestation. Nits are most easily removed by combing while the hair is slightly damp; adding conditioner may make combing easier. Nits can also be picked out with fingernails or cut out with small safety scissors.

3. All personal articles that have been in contact with the patients's head should be deloused. Normal laundering with hot, soapy water (125 degrees F for 10 minutes), or dry cleaning will kill lice and nits on pillowcases, sheets, night clothes, towels, hats, and stuffed animals. Combs and brushes should be soaked for 10 minutes in a pan of very hot water.

Treatment of the premises or clothing with insecticides is generally not required or recommended for the control and prevention of head lice. This is because the lice cannot survive for more than a day or so off of their human host; nits lose viability within a week. As an added precaution, carpeting and furniture contacted by infested individuals may be vacuumed.

4. To reduce the chance of reinfestation, children should be instructed not to share hats, clothing or brushes with their classmates. Each child should have a separate storage space for their hats and other clothing at home and school to prevent contact with other garments. If this is not possible, coats should be hung on hooks so they do not touch, or on the backs of students' chairs.

Managing Persistent Infestations- Despite all of the above efforts, there are times when a head lice infestation seems to persist indefinitely. Persistent infestation may be due to various causes, one of the most likely being improper use of the pediculicide (e.g. insufficient time shampoo left on the hair, or failure to reapply after 7 to 10 days). Other times, not enough time was spent combing out the nits or no effort was made to concurrently treat other infested family members.

In rare, but increasing instances, the product in use may have lost its effectiveness. Head lice resistance to pediculicides has been documented recently in certain areas of the world, especially to permethrin. Resistance to pyrethrin/piperonyl butoxide formulations appears to be less common. If resistance is suspected to the pediculicide you have been using, consult with your physician.

Elimination of a head lice outbreak in a school, nursing home, or similar shared facility requires prompt, coordinated action and administrative support to prevent the spread of lice to uninfected individuals. Unless all affected persons are treated, the condition will continue.

FUNGICIDE NEWS & VIEWS

MANAGING STROBILURIN FUNGICIDE RESISTANCE IN HORTICULTURAL CROPS by John Hartman

Growers of fruits, vegetables, and ornamentals in Kentucky are beginning to use a new class of fungicides to manage a variety of fungal diseases. These fungicides, called strobilurins can be effective tools for crop production provided fungal pathogens do not develop resistance to the fungicides.

Origin and impact of strobilurin fungicides: Strobilurins are derived from a natural anti-fungal compound that occurs in a small mushroom, *Strobilurus tenacellus*, which grows on fallen pine cones in Europe. The original compound has been modified in different ways to make it more stable and more effective as a fungicide. They have very low toxicity to birds, earthworms, beneficial insects, predaceous mites, and mammals (including humans). They break down quickly in soil but have good residual activity on foliage and fruit. Consequently, strobilurins are considered reduced-risk fungicides.

Examples of strobilurin fungicides. There are three strobilurins labeled for horticultural crop use, azoxystrobin, trifloxystrobin, and kresoxym-methyl. Many of the strobilurin products are listed in the U.K. commercial spray guides for fruits and for vegetables.

Chemical	Trade Names	Crop Usage	Diseases Managed
azoxystrobin	Abound	grapes	several fungi, see spray guide
	Heritage	turf and ornamentals (greenhouse, outdoors)	downy and powdery mildews, Botrytis, several root rots
	Quadris	tomatoes, potatoes, selected cucurbits	several fungi, see spray guide
trifloxystrobin	Compass	ornamentals (greenhouse, interiorscapes, nurseries)	rust, scab, powdery and downy mildews, Botrytis
	Flint	selected cucurbits, apples, grapes	multiple fungi, see spray guide
kresoxym-methyl	Cygnus	ornamentals (greenhouse)	powdery mildew
	Sovran	apples, grapes	multiple fungi, see spray guide

Strobilurin crop uses are expanding, so this list will likely grow by the next growing season. More strobilurins (e.g., pyraclostrobin) are being developed. Growers need to be aware that the efficacy of strobilurin fungicides against certain fungi varies from one crop to another. Sometimes, different species of the same fungus, or related fungi are insensitive to strobilurins; this should not be confused with fungicide resistance.

Mode of action of strobilurin fungicides.

Strobilurins are active against a wide array of plant pathogenic fungi, generally at fairly low rates. They work by inhibiting a single biochemical pathway involved in mitochondrial respiration in fungal cells. Mitochondria are the energy-producing units within cells, so disrupting mitochondrial function results in death of the fungal cells as they run out of energy.

Strobilurins are excellent protectant fungicides because they inhibit spore germination. The strobilurins are powerful antispore germinants. If applied too late to protect, they allow lesions to develop but few secondary spores form on these lesions. This is significant for diseases such as scab and powdery mildew where the most damage is caused by infections from secondary spores that develop from previously infected leaves. They have strong protectant and antispore germinant activities because they are primarily retained in the waxy plant surface cuticle. This means that they are more rainfast than traditional protectants and, although they don't redistribute very well from leaf to leaf in rainwater, they do redistribute well within the waxy layers of a given leaf (or fruit).

Strobilurins have trans-laminar activity. A few days after spraying, enough fungicide diffuses from the sprayed leaf to the unsprayed side to provide

protection against fungal plant pathogens. This pattern of fungicide movement is unique to the strobilurins, and different manufacturers have devised their own trademarked names to describe it, e.g., "surface systemic" and "mesosystemic." Nevertheless, in the early season, as new growth is developing, repeated fungicide applications are still required because of the need to cover new tissues as they emerge.

The strobilurins generally are not as effective in a "kickback" or "curative" mode as are compounds with a higher degree of systemic activity, such as the sterol inhibitors. Apple scab, however, may be an exception to this general rule because the apple scab fungus grows just beneath the cuticle. Just enough fungicide may actually "leak through" the underside of the cuticle to do the job.

Managing strobilurin fungicide resistance. Because strobilurins inhibit a single biochemical step, resistant pathogen strains will develop when the fungi use a new pathway that bypasses the step blocked by strobilurins. Resistance to strobilurins already exists in powdery mildew in Europe and Asia, as well as in Botrytis of greenhouse crops. When fungi develop resistance, resistant isolates are virtually immune to the strobilurins. They multiply rapidly unless stopped by another fungicide. A strain resistant to one strobilurin will be resistant to all. Growers must incorporate resistance management into plans for using strobilurin fungicides.

Fungicide use directions printed on the manufacturers' labels incorporate fungicide resistance management principles. For example, for most crops, no more than four sprays of any strobilurin may be used per season. A strobilurin fungicide can be used no more than three times in a

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row (two would be better). If two or three sequential applications are made, an unrelated fungicide must be used in the next two applications before strobilurin use can resume. Note that tank-mix combinations are not part of the anti-resistance strategy. Use of reduced rates, common in tank mixes, increases the possibility of fungicide resistance. The recommended resistance management strategy minimizes the selection of resistant strains by limiting the number of selection events (sprays) and it limits the opportunity for resistant strains to multiply by using unrelated fungicides in rotation. It is important that growers and advisors pay heed to the possible buildup of resistant fungus strains.

Be aware of potential phytotoxicity. Strobilurin fungicides can be phytotoxic to some fruit crops. For example, azoxystrobin is phytotoxic to certain apple varieties (e.g., MacIntosh, those with MacIntosh parentage, and Gala), even at very low concentrations resulting from drift or spray tank residue. But azoxystrobin does not appear to be phytotoxic to flowering crabapples (based on tests on a couple of dozen cultivars). Kresoxym-methyl

is phytotoxic to a few sweet cherry varieties i.e., all of the foliage on some varieties can be killed if trees are sprayed directly with the chemical. Trifloxystrobin is phytotoxic to Concord grapes when applied directly, and is specifically not labeled for use on that variety. Thus, each of these strobilurins has a problem with phytotoxicity to a few varieties of one specific crop. In Kentucky many of our vegetable growers and some ornamental growers also grow some fruit and may be using the same sprayers for both. Similarly, some landscape disease management professionals could expose sensitive backyard fruit crops to strobilurins when treating ornamentals. Growers and applicators need to be alert to potential phytotoxicity problems.


Lee Townsend, Extension Entomologist

