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LAWN & TURF

New Research Affects Dew Removal Recommendations for Fairways

By Paul Vincelli, Extension Plant Pathologist
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During the 1990's, some very interesting UK research showed that practices for removing dew accumulation at sunrise—such as mowing, syringing, dragging a hose, etc.—can speed leaf surface drying and therefore reduce dollar spot on creeping bentgrass. The results of this work were so exciting that many golf course superintendents implemented a sunrise dew-removal program on their fairways on those mornings when they don't mow, often by dragging coupled hoses across the fairway. Since that time, we have become interested in seeing just how much fungicide savings (if any) superintendents might be able to achieve on creeping bentgrass fairways by instituting a dew removal program.

Last year, two field experiments were conducted on creeping bentgrass fairways, comparing a normal mowing program (3 mornings per week) with a combination program (mowing three mornings per week combined with dragging by hose the remaining four mornings per week). Dollar spot was allowed to develop from natural inoculum, and disease was monitored regularly.

In both tests, the combination treatment (mowing and hosing) never provided a statistically significant reduction in dollar spot severity over the normal mowing treatment (Figure 1). We were quite surprised by these results and fully expected the combination treatment to reduce disease pressure, thus reducing the need for fungicide applications. Nevertheless, these are the results we obtained in two trials with significant disease pressure.

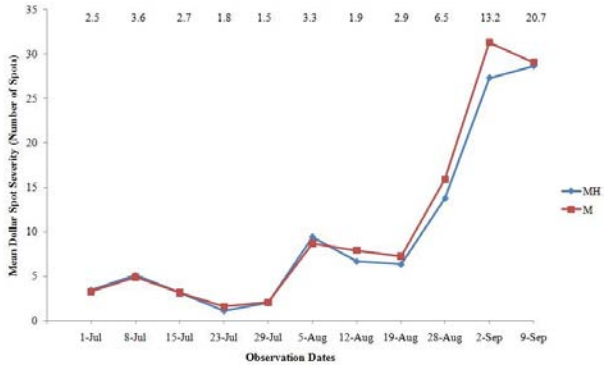

Figure 1. Disease progress in the combination treatment (MH, mowing plus hosing to remove dew) vs. mowing only (M). Data provided here are means across several treatments. LSD values (0.05) are given along top of figure.

We have pondered these results and we have concluded that a blanket recommendation for dew removal on creeping bentgrass fairways for disease management is less defensible than we once thought. While our studies in the 1990's clearly showed that dragging creeping bentgrass seven mornings per week significantly reduced dollar spot, our current studies were designed to answer a different question: Does dragging on the mornings when the fairway is not being mowed provide any additional disease control over and above that provided by mowing alone? And our data indicate that the answer seems to be "No."

We know from our earlier studies that mowing is the most effective dew-removal practice for reducing disease pressure. Mowing while the dew and dollar spot mycelium are still on the leaves is probably very disruptive to disease development, both by speeding leaf drying and by tearing apart fungal mycelium (which may reduce its vigor, maybe sometimes even kill it). While dragging every day at sunrise is useful as a stand-alone dew removal practice, our data indicate that mowing three days a week provides all the dollar spot suppression on fairway-height creeping bentgrass that a combination mowing/dragging program provides.

Of course, based on our studies in the previous decade, dragging in the morning will likely reduce disease if mowing is not done until after the leaves have dried. Furthermore, some superintendents drag in order to make the turf stand more erect, and that advantage may be a good enough reason to drag fairways. However, our results suggest that dragging fairways at sunrise in order to reduce disease pressure is not beneficial, if one is already mowing at sunrise three days a week.

SHADE TREES & ORNAMENTALS

Aphids – A Familiar Sight on Spring Foliage

By Lee Townsend

Aphids are soft-bodied insects that use their piercing sucking mouthparts to feed on plant sap. They usually occur in colonies on the undersides of tender terminal growth. Heavily-infested leaves can wilt or turn yellow because of excessive sap removal. While the plant may look bad, aphid feeding generally will not seriously harm healthy, established trees and shrubs.

However, some plants are very sensitive to feeding by certain aphid species. Saliva injected into plants by these aphids may cause leaves to pucker or to become severely distorted, even if only a few aphids are present. Also, aphid feeding on flower buds and fruit can cause malformed flowers or fruit.

Aphids produce large amounts of a sugary liquid waste called "honeydew". The honeydew that drops from these insects can spot the windows and finish of cars parked under infested trees. A fungus called sooty mold can grow on honeydew deposits that accumulate on leaves and branches, turning them black. The appearance of sooty mold on plants may be the first time that an aphid infestation is noticed. The drops can attract other insects such as ants, which will feed on the sticky deposits.

Early detection is the key to reducing aphid infestations. The flight of winged colonizers cannot be predicted, so weekly examination of plants will help to determine the need for control. Examine the bud area and undersides of the new leaves for clusters or colonies of small aphids. The presence of these colonies indicates that the aphids are established on the plants and their numbers will begin to increase rapidly. Small numbers of individual colonies on small plants can be crushed

by hand or removed by pruning as they are found. In some cases, this may provide adequate control.

If aphid colonies can be found on about 5% or more of foliage tips of a plant or planting, then a control measure should be considered. Most products used for aphid control work as contact insecticides. This means that the aphids must be hit directly with spray droplets so that they can be absorbed into the insect's body. Since aphids tend to remain on the lower leaf surface, they are protected by plant foliage. Thorough coverage, directed at growing points and protected areas, is important. It is difficult to treat large trees because of the high spray pressure necessary to penetrate the foliage and to reach the tallest portions of the tree. Hose-end sprayers can be used on 15 foot to 20 foot trees but they need to produce a stream rather than an even pattern to reach these levels. Skips in coverage are common and there is a significant potential for applicator exposure through drift and runoff. Commercial applicators may have the necessary equipment but these treatments may be very expensive. Aphid control is rarely feasible in these situations.

Summer oils can be used against aphids on some types of trees and ornamental plantings. They kill by suffocating the insects and/or disrupting their membranes. Check the label for cautions on sensitive plants; oils can injure the foliage of some plants. Weather conditions, especially high temperatures, can increase the potential for foliage burn. Do not spray dormant oils during the growing season. There is no residual effect so additional applications may be necessary.

Fatty acid salts or insecticidal soaps are very good against aphids. As with summer oils, they apparently work to disrupt insect cell membranes. They require direct contact with the insects and leave no residual effect.

Annuals and Perennials Are Susceptible to Powdery Mildew

By John Hartman

Powdery mildew fungi attack many different kinds of herbaceous annual and perennial plants in the landscape. The white, dusty appearance which indicates the presence of powdery mildew on these plants results from fungal hyphae growing on the surface of infected leaves, shoots, and flowers while producing massive amounts of spores, or conidia. In addition to these fungal signs, powdery mildew can cause infected leaves to turn yellow, wither and die, or it may cause leaves and shoots to be abnormally curled and distorted. Powdery mildews generally do not kill their hosts, but infected plants are less productive and not aesthetically pleasing.

Although all powdery mildew fungi growing on plant surfaces tend to look alike, many are fairly host specific i.e., dogwood powdery mildew does not affect zinnia, or phlox powdery mildew does not affect rose. However, some powdery mildew species affect several herbaceous ornamentals and some plants are attacked by more than one species of powdery mildew. Examples of the powdery mildew fungi that attack flowering and foliage plants in the garden include *Erysiphe cichoracearum, E. polygoni, Microsphaera begoniae, Oidium begoniae, O. cyclaminis, O. spp., O. verbenae, Sphaerotheca fuliginea,* and many other species.

Conditions favoring infection. Powdery mildew fungi are obligate parasites and thus require a living plant host to complete their life cycle. Spores are wind dispersed and when they land on a plant they can germinate and cause infection. Powdery mildew infections are favored by moderate to cool temperatures and high relative humidity. Powdery mildew spores rarely germinate when leaves are wet. As the disease develops on the plant, large numbers of spores can be produced in a matter of a few days, quickly resulting in secondary infections. Continued infections are favored by a humid or almost moist microclimate at the plant surface. Shaded leaves are sometimes more heavily infected because the microclimate favors disease development. Vigorously growing plants tend to be more susceptible to powdery mildew infection than plants growing under stressful conditions. Powdery mildew-infected weeds may be a source of inoculum for garden annuals and perennials.

Powdery mildew diseases may begin early in the season on many flowering plants in the garden. By mid-season many of these plants are practically

defoliated by the disease. Reduced photosynthesis by infected or lost leaves reduces flower production. Annuals and perennials that often suffer from powdery mildew in Kentucky gardens include begonia, chrysanthemum, cosmos, crape myrtle, dahlia, delphinium, hollyhock, hydrangea, impatiens, monarda (bee balm), ornamental pepper, primrose, pansy, petunia, phlox (Figure 1), snapdragon, rose (Figures 2, 3, & 4), rudbeckia, verbena, viola and zinnia (Figure 5).

Disease management. Powdery mildew management typically involves an integrated approach to reduce the effects of the disease.

- Choose powdery mildew resistant or tolerant types. Sometimes seed and nursery catalogs will list plants with powdery mildew resistance or tolerance. There are powdery mildew resistant cultivars of crape myrtle, monarda (bee balm), pansy, viola, and zinnia, for example.
- Use optimal plant spacing so that plant crowding in the beds doesn't result in humid conditions favoring powdery mildew.
- Provide ventilation and sunlight penetration into the foliage by pruning out shading vegetation from nearby plants or from within the mildew-susceptible plants.
- For some kinds of plants, fungicide applications may be needed. Fungicides for powdery mildew which contain ingredients such as myclobutanil, triforine, thiophanate-methyl, sulfur, chlorothalonil, or bicarbonate of soda are sold at garden stores and are available for home landscape use on many annuals and perennials.

Figure legends:

Figure 1. Phlox leaves with signs of powdery mildew (*Erysiphe cichoracearum*).

Figure 2. Rose bud with powdery mildew (*Sphaerotheca* sp., likely to be *S. pannosa*).

Figure 3. Distorted rose leaves and powdery mildew signs (*Sphaerotheca* sp.).

Figure 4. Rose stem with signs of powdery mildew (*Sphaerotheca* sp.).

Figure 5. Zinnia foliage with signs of powdery mildew (E. cichoracearum).

TOBACCO

Disease Update

By Kenny Seebold

Current situation. Diseases on tobacco seedlings have been relatively low-key this spring, despite earlier bouts of weather that created disease-favorable conditions. Our biggest issues on tobacco transplants at the moment are linked more to abiotic stresses (heat, cold, chemical & fertilizer injury, etc.) than a particular plant pathogen. Prior to the onset of warm weather, scattered cases of collar rot, Rhizoctonia damping-off, and Pythium root rot were observed. However, warmer weather has elevated water temperatures in float beds, increasing the likelihood that we'll start to see a spike in cases of Pythium root rot around the state. We know that *Pythium* can be an aggressive pathogen in the float system when water temperatures in the float bed rise above 70 °F, so it's important to keep a close watch on water beds as we head into the month of May. Beyond good sanitation to keep *Pythium* at bay, the best preventive practice that can be employed at this point in the season is treatment with Terramaster EC. I'd urge any grower who faces risk from Pythium, and hasn't applied Terramaster to date, to consider making an application of the product at a rate of between 0.7 to 1.0 fl oz per 100 gallons of float water. Refer to Kentucky Pest News No. 1190 (.uky.edu/Ag/kpn/kpn_09/pn_090407.html) for more information on using Terramaster in the production of tobacco seedlings.

Blue mold status. Blue mold appeared in the U.S. quite early last season, with the first report coming in around the end of March. This year, we have no indications of active blue mold anywhere in the country or in areas that have served traditionally as sources of inoculum for outbreaks in the U.S. This means there is no imminent threat to producers in KY at the moment, but it's never a bad idea to keep an eye out for 'old blue'! We do the best we can to monitor the blue mold pathogen in the U.S., thanks to the network of observers associated with the North American Plant Disease Forecast Center at North Carolina State University. However, the truth is that there are fewer observers now than in the past and there's always the chance that blue mold could slip through. The following are a few tips to consider in the event that blue mold appears late in the transplant production cycle:

1. Practice good hygiene and sanitation in the greenhouse or outdoor beds.
2. Manage humidity and leaf wetness. Take steps to ensure adequate ventilation so that foliage does not stay wet for excessively long periods of time; this means proper use of fans and side-curtains, or removing / opening covers on outdoor beds (as weather permits) to allow foliage to dry quickly. Manage temperatures to minimize humidity and buildup of condensation.
3. Clip properly, following a timely schedule. Proper clipping opens up the plant canopy, permitting better light penetration and air movement (and thus faster drying).
4. Use a preventive fungicide program. For KY producers, this means applications of Dithane DF (also Manzate ProStick or Penncozeb 75DF) at 0.5 lb of product per 100 gallons of finished spray (equivalent to 1 tsp of product per gallon of water). Apply 3-5 gallons per 1000 square feet as a fine spray (to ensure good coverage) on younger plants, and increase to 6-12 gallons on older plants. Ferbam, or Carbamate, cannot be used in float systems but is allowed on plants grown in conventional beds. The use rate is 2-3 lb of product per 100 gallons of water (2-3 tbsp per gallon of water). Continue fungicide applications until plants are set in the field.
5. Destroy any un-used transplants as quickly as possible to remove potential sources of blue mold later in the season.
6. Destroy transplants if blue mold is found on seedlings. All plants in the system must be destroyed, even those that don't show symptoms because of the risk of exposure and latent disease.
7. Do not set plants that have been exposed to blue mold. These plants are often infected systemically and will not thrive in the field, and those that develop symptoms in the field will be a source of inoculum for epidemics of blue mold later in the season.
8. Grow your own plants, or purchase them from sources in KY (or states north of KY)

– think “Kentucky Proud” to minimize the threat of importing blue mold from outside the Commonwealth.

9. Monitor the weather and status of blue mold regularly to help guide management decisions.

Fortunately, there are easy-to-access resources available to help us track the occurrence and movement of blue mold (and other diseases) in the tobacco producing regions of the U.S., and to assess the level of risk to tobacco around the country. The status of blue mold in Kentucky and surrounding states is updated regularly during the production season and can be found at the Kentucky Blue Mold Warning System page, .uky.edu/Agriculture/kpn/kyblue/kyblue.htm, and in the Kentucky Pest News. Breaking information will be published on the Kentucky Blue Mold Warning System web page and through a mailing list, the KY Blue Mold Alert. Subscribe to the KY Blue Mold Alert mailing list by sending a message to: @lsv.uky.edu. The message body must contain, verbatim, the line ***subscribe ky-bluem-alert***, followed by a blank line. You will receive, by return mail, a message requiring confirmation of your subscription.

The North American Plant Disease Forecast Center (NAPDFC), located at North Carolina State University, is an important source of information that is relied upon to generate forecasts posted on the KY Blue Mold Warning System. The NAPDFC documents the presence of blue mold in locations where inoculum is produced and poses a threat to cultivated tobacco in the U.S. These locations include Cuba, Mexico, and southern Texas. During the growing season, outbreaks of blue mold across the country are confirmed by local coordinators from each of the tobacco producing states and forwarded to the NAPDFC. This information is used to track the spread of blue mold and is also used, in conjunction with weather models, to predict the future movement of the disease. Status and forecast information are summarized on the NAPDFC Blue Mold page (://www.ces.ncsu.edu/depts/pp/bluemold/), which is updated on Tuesday, Thursday, and Saturday from March until the end of August.

The Kentucky Blue Mold Warning System has been successful in the past because of input at the local level. We depend on growers and agents to let us know when and where blue mold crops up in Kentucky to complement the information provided by the NAPDFC and provide the most accurate forecast possible. Growers should report outbreaks of blue mold to their local county extension agent as soon as the disease is found so that he or she can pass this information to U.K. extension specialists. We use this information to update the KY Blue Mold Warning System and to develop area-specific advisories. The faster we learn about blue mold at the local level, the quicker we can issue an alert, and the sooner our growers can begin to protect their crops from the disease. Let’s hope that blue mold won’t be an issue in 2009, but let’s be prepared to work together and spread the word if and when it shows up.

SOYBEAN

Managing Weeds in Non-GMO Soybeans

By Jim Martin and J.D. Green

While Roundup Ready technology continues to dominate the soybean acreage in Kentucky, there are areas where premiums for Non-GMO soybeans have attracted growers. The non-GMO approach to weed management in soybeans requires a higher level of management skills compared with those used for Roundup Ready soybeans. Growers who are accustom to using glyphosate solely for ‘in-season’ control of weeds will have to get reacquainted with some of the old and newer herbicide chemistries. Extension publication “Weed Control Recommendations for Kentucky Grain Crops” (AGR-6) is a good source to comparing specific products.

In order to ensure success in non-GMO soybeans, avoid fields with a high population of weeds. Fields with a history of poor control associated with resistance to ALS inhibitors (Acetolactate Synthase) or PPO (Protox) inhibitors should also be avoided.

Soybean injury can occur with certain herbicides, particularly when stressed from adverse

environmental conditions. Also, be aware that certain additives can enhance injury from postemergence herbicides. Designated soybean varieties should be planted to avoid injury with some herbicides. For example, use STS-soybean varieties in fields to be treated with Synchrony XP herbicide.
Another factor to consider with a few soybean herbicides is their persistence in soil and potential injury to rotational crops. Rotational crop injury is generally not a problem in Kentucky; however it can occur with herbicides containing chlorimuron (e.g. Classic or Canopy), imazaquin (Scepter), imazethapyr (Pursuit), and clomazone (Command).

BURNDOWN HERBICIDES FOR NO-TILL PLANTINGS:
Start with clean fields at planting. Therefore, use a burndown herbicide that controls a broad spectrum of weeds such as glyphosate, paraquat, or glufosinate (Ignite 280 SL) before or at planting. The addition of 2,4-D Ester at 0.5 to 1 lb ae/A will improve control of problem broadleaf weeds, such as marestail (horseweed). Observe label precautions for minimizing risk of injury to soybean, especially the minimum number of days between application and planting. Do not use 2,4-D ester if sensitive crops such as seedling tobacco occur in nearby greenhouses or float beds. Where it is not feasible to use 2,4-D ester, the addition of products containing chlorimuron or cloransulam helps in the burndown control of seedling marestail plants (providing marestail plants are not resistant to ALS- type herbicides).

SOIL - RESIDUAL HERBICIDES:
Soil-residual herbicides help control weeds over a period of time following application. In some instances soil-residual herbicides allow flexibility in the timing for applying a postemergence treatment. Furthermore, in some cases season-long weed control is provided without the need of a postemergence treatment. Many soil-residual herbicides also have foliar activity that provides burndown control of small weed seedlings, but will not control a broad spectrum of weeds.

When selecting a soil-residual herbicide, consider the mode or site of action and its potential to control problem weeds. Many of the soil-residual products used to control problem broadleaf weeds contain either an ALS inhibitor, PPO inhibitor, or both. Resistance of weeds to ALS and PPO inhibitors is a significant problem in a number of states. The fact Kentucky has not documented any cases of PPO resistance and only a few cases of ALS - resistant smooth pigweed, is good news for utilizing ALS and PPO inhibitor herbicides. However, it is important not to overlook the potential for developing ALS or PPO resistance which could severely limit options for managing problem broadleaf weeds that commonly occur in Kentucky. Growers need to observe and manage problems early before they spread on a large scale basis.

Soil - residual herbicides that are typically used to manage grasses in soybeans can be effective for controlling annual grasses such crabgrass, foxtails, and fall panicum but are not effective on controlling volunteer corn or johnsongrass.

POSTEMERGENCE HERBICIDES:
Post treatments used to control broadleaf weeds in non-GMO soybeans need to be timely and in most instances should be applied when weeds are approximately 4 to 6 inches in height. This may require some advanced planning, particularly if custom applicators are hired.

Many postemergence herbicides used for broadleaf weeds are also ALS or PPO inhibitors; therefore, use caution to minimize use of these modes of herbicidal activity in both soil-residual and postemergence programs. Alternating herbicide with different modes of action, even when planting RR-soybeans, should be a long-term goal to help limit the development of herbicide resistant weeds.

Assure II, Fusion, Poast, and Select MAX are examples of postemergence herbicides that control a broad spectrum of grasses including such problem weeds as volunteer corn and johnsongrass. Grass control is often reduced when these herbicides are applied as a tank mix partner with postemergence broadleaf herbicides. Consult product labels to determine if application rates for postemergence grass herbicides should be adjusted when tank mixed with other products.

The following table illustrates there are significant herbicide costs associated with managing weeds in non-GMO soybeans. While the cost of non-GMO

soybean programs seems high, they are often comparable to those for Roundup Ready or Liberty Link soybeans when you factor in the additional cost of the seed trait royalties.

Table 1. Approximate Cost of Weed Management Programs for Non-GMO, Roundup Ready, and Liberty Link Soybeans
Non- GMO Preplant Burndown + Preemergence + Postemergence ($41 to $77/A)
Roundup Ready Royalty for Seed Trait + Burndown + Postemergence ($43 to $59/A) Royalty for Seed Trait + Burndown + Preemergence + Postemergence ($55 to $75/A)
Liberty Link Royalty for Seed Trait + Burndown + Postemergence ($42 to $50/A) Royalty for Seed Trait + Burndown + Preemergence + Postemergence ($54 to $66/A)

ALFALFA

Alfalfa Weevil Control

By Lee Townsend

Check fields closely for tip feeding and light green weevil larvae. Early harvest or application of an insecticide should be considered if 25% or more of the tips are being eaten and there are 2 or more live larvae per stem.

Early harvest can be an excellent option if alfalfa is in the 30% bud stage or greater. Many weevil larvae will die from exposure to the hot, dry air as alfalfa cures. If early harvest is used, then the field should be examined for damage to re-growth by surviving larvae or adults. An insecticide application is most beneficial when weevil numbers are high and harvest is several days away. These situations call for a quick knock down without need for long residual protection be sure to check the harvest interval on the label when picking a product and rate.

VEGETABLES

Addition of New Vegetable Crops to Bravo WeatherStik Label

By Kenny Seebold

Recently, Syngenta Crop Protection informed us that the U.S. Environmental Protection Agency granted approval for the addition of several vegetable crops to the label for Bravo WeatherStik. The added crops include: cavalo broccolo, chayote, Chinese cabbage (napa), Chinese mustard, cabbage, Chinese waxgourd, eggplant, ginseng, gourds, groundcherry, horseradish, kohlrabi, lentil, lupine, Momordica spp. (Bitter melon, Balsam apple), okra, pepino, peppers (includes bell pepper, chili pepper, cooking pepper, pimento, sweet pepper), rhubarb, tomatillo, and yam.

This is a welcome development that should help ease some of the pressure resulting from the cancellation of the maneb label (reported earlier). For more information on the new Bravo label, visit ://www.cdms.net/LDat/ld547041.pdf.

DIAGNOSTIC LAB HIGHLIGHTS

By Julie Beale and Paul Bachi

Recent agronomic samples in the PDDL have included symptoms of nitrogen deficiency and slow growth from wet soils in wheat; and Sclerotinia collar rot, Rhizoctonia damping off, Pythium root rot and chemical injury in tobacco seedlings.

Fruit and vegetable samples have included Phomopsis leaf blight and decline from previous drought stress on strawberry; winter injury on

loganberry; fireblight on apple (and ornamental pear); leaf curl on peach; black knot on plum; Pythium root rot on cantaloupe seedlings; Botrytis blight, Pythium root rot, cold injury and heat injury on tomato.

On greenhouse and landscape ornamentals, we have seen iron deficiency and Pythium root rot on geranium; cold injury on dahlia, melampodium and petunia; Rhizoctonia stem rot on vinca; Heterosporium leaf spot on iris; Botrytis blight on petunia; winter injury on arborvitae, holly, boxwood and viburnum; Pestalotia leaf spot on rhododendron; and Botryosphaeria and Cryptodiaporthe cankers on willow.

INSECT TRAP COUNT
April 17-24

Graphs of insect trap counts for the 2008 season are available on the IPM web site at -

Location	Princeton, KY	Lexington, KY
Black cutworm	6	8
Armyworm	129	335
Corn earworm	2	4
European corn borer	0	0
Southwestern corn borer	0	0
Fall armyworm	0	0

http://www.uky.edu/Ag/IPM/ipm.htm.
View trap counts for Fulton County, Kentucky at - http://ces2.ca.uky.edu/fulton/InsectTraps
For information on trap counts in southern Illinois visit the Hines Report at – http://www.ipm.uiuc.edu/pubs/hines_report/index.html

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