Rhizoctonia diseases can be very common and cause great damage in tobacco transplant production during wet weather. This is especially true with float systems operated with poor sanitation, because such sites provide near ideal environment for this pathogen most of the time. Unfortunately, no highly effective fungicide is labeled for use in controlling Rhizoctonia diseases of tobacco. Consequently, management of the disease rests with understanding the pathogens and attempting to disrupt its activity through management of the environment, plant production, and sanitation measures.

Several strains of *Rhizoctonia solani* (sexual stage of some strains is called *Thanatephorus cucumeris*) are involved in Rhizoctonia diseases of tobacco. This fungus is widespread in nature as a soil inhabitant. This fungus has moderate to high levels of competitive saprophytic ability on organic matter and is also a weak parasite. Most stages of its development are favored by high moisture conditions. It is an early colonizer of soil and soilless media and it can cause a number of diseases in tobacco transplant production, especially on tender or weak plants. It causes seedling damping off, root rot, soreshin, and target leaf spot.

The vegetative thallus (think of this as the “root and vining” stage) of the fungus quickly colonizes the media and moves into roots and stem, if the plant is not able to resist it. This activity accounts for the damping off, root rot and lower stem rot phases of the disease. However, under certain conditions that include moisture-saturated soils and air, the fungus reproduces sexually (fruiting stage) and releases spores (“seeds”) into the air that can result in the target spot phase. Infection of the leaf and upper stem by these spores is highly dependant upon wet conditions, and usually does not occur unless the leaf is also in a weakened stage—such as overly tender, under fertilized, or old.

Rhizoctonia is present in most all soil and is an early colonizer of soil and soil mixes used in the float and greenhouse systems. The fungus subsist on organic matter until it finds weakened or dead tissues to colonize. It uses the energy obtained from these tissues to infect (spread to) nearby healthier tissues. The fungus requires high humidity to sustain its growth, and it can grow well at temperatures above 70 F, but most rapid growth occurs between 70 and 85 F.

We have isolated it from the soil mixes the day of transplanting, so it gets into the system early. It is readily present on old trays and just washing/dipping in bleach is not effective in control. We see less problems with Rhizoctonia where the trays are fumigated or steamed or where the bleached trays are tarped and allowed to remain wet overnight.

The float and greenhouse transplant production systems provide near ideal conditions for this disease to develop due to wet medium, high humidity, poor ventilation, poor tray sanitation, and weakened or dead tissues from other biotic and abiotic causes. No highly effective fungicides are labeled for control of this pathogen, even though we have attempted to get several labeled. To my knowledge none of the more effective materials have passed the critical smoke tests, so emergency labels are also not possible. Fungicide sprays of Dithane used for blue mold and anthracnose control aid in control at certain stages in the development, but are not highly effective. Cultural controls to help reduce losses center around rigorous sanitation, drying out the system, and reducing the amount of weak and dead tissues.

Tray sanitation is very important. In most cases of serious problems that I have evaluated, tray sanitation has been poorly managed. Moisture and humidity control are critical to slowing disease development, but they are especially difficult to achieve in the float system. Follow the recommended ventilation...
guidelines for the system being used. Areas of greatest damage are often associated with those areas where poorest ventilation is occurring, so correcting these problems areas can greatly help in controlling the disease in an otherwise well managed system. We have also noticed major problems occur where the dibble-holes are deep, probably because this recess remains wet longer. Avoid over fertilization of the system, because overly succulent plants are more susceptible, but under-fertilized plants are also highly susceptible to target spot.

Clipping, which may be agronomically desirable, has both positive and negative impact on this disease. Positively, it aids in humidity control, but the negative aspects relate to wounding and the clipping debris favors fungus development on the surface. I have seen some major epidemics of soreshin resulting from the dropping of clippings into the trays. Take steps to insure all clippings are being removed.

Finally, growers need to recognize that colonization and mild infections of plants by R. solani as seedlings can lead to serious soreshin outbreaks in the field, from transplanting time through harvest. Presence of soreshin greatly increases the potential for black shank, too. Transplanting infected seedlings to the field can result in continuation of the disease, but field infections by Rhizoctonia are equally likely to come from field sources of the pathogen. The target spot strain can cause a serious leaf spot in the field, but the available data indicate that sources of inoculum other than transplants are more important in the field outbreaks of target spot.

**CORN**

**SOUTHWESTERN CORN BORER SPRING SURVEY**
Ric Bessin, Doug Johnson, Clint Hardy, Mike Smith, and Rod Grusey

Southwestern corn borer spends the winter as larvae in galleries at the base of corn stalks. Stubble in cornfields can be checked during early spring for damaged plants and surviving borers. This can provide an indication of what the first generation may be like for 2003. A survey of southwestern corn borer damage and larval survival was conducted in Caldwell, Daviess, Hardin and Henderson counties on March 13 and 14. These counties were selected because of the past infestation history. The purpose was to estimate the extent of SWCB damage, as evidenced by basal stalk girdling. In addition, we wanted to estimate the survival of the overwintering larvae in the crowns of these damaged plants. In each county, three to five non-Bt corn fields were evaluated. Within each field, 10 to 12 groups of 10 plants were examined for girdling. An additional minimum of 50 girdled plants were examined for the presence of live SWCB larvae.

**2003 SWCB Spring Survey Results**

<table>
<thead>
<tr>
<th>Damaged plants</th>
<th>Live SWCB recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Daviess Co.</strong></td>
<td></td>
</tr>
<tr>
<td>Farm #1</td>
<td>66 / 100</td>
</tr>
<tr>
<td></td>
<td>0 / 50</td>
</tr>
<tr>
<td>Farm #2</td>
<td>41 / 100</td>
</tr>
<tr>
<td></td>
<td>0 / 50</td>
</tr>
<tr>
<td><strong>Henderson Co.</strong></td>
<td></td>
</tr>
<tr>
<td>Farm #1</td>
<td>27 / 100</td>
</tr>
<tr>
<td></td>
<td>2 / 60</td>
</tr>
<tr>
<td>Farm #2</td>
<td>28 / 100</td>
</tr>
<tr>
<td></td>
<td>6 / 50</td>
</tr>
</tbody>
</table>

| Farm #3   | 17 / 100 | 8 / 52 |
| Farm #4   | 21 / 100 | 1 / 50 |
| Farm #5   | 25 / 100 | 2 / 60 |

**Caldwell Co.**

| Farm #1 | 31 / 100 |
| Farm #2 | 36 / 100 |
| Farm #3 | 8 / 100  |
| Farm #4 | 17 / 100 |
| Farm #5 | 17 / 100 |

**Hardin Co.**

| Farm #1 | 26 / 100 |
| Farm #2 | 12 / 100 |

This is the fifth year that we have conducted such a survey. In comparison to the previous winters, we had moderate levels of girdled plants, but the lowest survival of overwintering larvae because of the long cold winter. Moderate levels of girdled stalks were to be expected, because wet soils delayed planting in 2002. Delayed harvest allows SWCB time to migrate to the bottom of the stalk and girdle the plant. Late planted corn is also more attractive for late-season egg laying.

Observed levels of survival in the girdled crowns was welcome news. Of the girdled crowns sampled this spring, a large proportion had evidence of bird activity with the larva having been removed. Relatively few crowns had dead larva remaining in the overwintering chamber. The survival was the lowest observed in the last five years. While the survival of the larvae was less than last year and because there were so many larvae, the number of live SWCB larvae per stalk is almost twice of what we estimated last year, but the numbers are still very low. This survey indicates that there are relatively few SWCB moths to begin the season as compared with the past years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Girdled Stalks (%)</th>
<th>Survival/Girdled Stalk (%)</th>
<th>Overall Survival/Stalk (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>26.57</td>
<td>4.25</td>
<td>1.13</td>
</tr>
<tr>
<td>2002</td>
<td>11.78</td>
<td>5.31</td>
<td>0.63</td>
</tr>
<tr>
<td>2001</td>
<td>40.58</td>
<td>9.66</td>
<td>3.92</td>
</tr>
<tr>
<td>2000</td>
<td>20.73</td>
<td>26.85</td>
<td>5.57</td>
</tr>
<tr>
<td>1999</td>
<td>35.89</td>
<td>10.14</td>
<td>3.64</td>
</tr>
</tbody>
</table>

Keep in mind that overwintering survival is just one of the variables that will, in part, determine the potential for SWCB problems in 2003. Historically, the date of planting of individual fields has been a key variable contributing to the potential for late season SWCB damage. Although early season numbers seem to be very low, favorable conditions, may allow SWCB numbers to rebound by the second and third generations. Typically, fields planted after May 10 have an increased potential for this type of
damage. Last year we had very low numbers of SWCB, but delayed planted made much of the crop more vulnerable to second and third generation borers.

What we can conclude:
- Thanks to the cold winter, we found low survival levels of SWCB larvae in each of the counties surveyed.
- Birds seem to feed heavily on SWCB larvae during the winter.
- Winter conditions were not sufficient to eliminate SWCB larvae.
- We expect low first generation SWCB pressure for those areas surveyed.
- Date of planting is still important. Corn planted after May 10 could be at risk to late season SWCB activity.

COOL WET SOILS + REDUCED TILLAGE CAN = SLUG DAMAGE
By Lee Townsend

Poor stand emergence or the mysterious disappearance of small corn or soybean seedlings in early-planted no-till or reduced tillage fields can be due to slugs. These slimy creatures use their file-like tongues to tear away plant tissue. Slugs may completely devour small seedlings or leave elongate thin windows in leaves of larger plants. The result can range from significant stand loss to slowed growth of plants that can survive and recover.

Since slugs usually hide during the day, they are easy to overlook as the culprit. Silver slime trails over the ground or plant foliage can be a clue in diagnosing infestations. If present, they may be found under surface residue, such as old corn stalks, or hiding in partially closed seed furrows. To catch them on the plant, you need to look around dusk or on very overcast days. Injury may be limited to specific areas of the field or relatively evenly scattered over it.

The amount of damage depends upon the numbers of slugs present and their size and environmental conditions. Slugs like temperatures in the 60's and high humidity. High amounts of surface residue provide food, shelter, and moisture so most severe slug injury occurs in fields where no-till or minimum tillage cropping practices have been in place for several years. Dense weed cover or application of animal manure also favor slug populations, as do heavy, coarse soils and cool, wet weather.

The occasional use of reduced tillage can help to decrease slug damage in fields that have been in no-till for long periods of time. Also, mechanical sweeps that move crop residue away from the seed furrow can reduce slug damage to plants.

When it comes to slug control, the prospects of chemical intervention are not good. Slug baits, containing metaldehyde or iron phosphate are labeled for slug control but may not be readily available, require specific application equipment, and are very expensive for grain crop use.

FORECASTING FOR SPRAYING CONDITIONS
James R. Martin, Dept. of Agronomy and Tom Priddy, Dept. of Biosystems/Ag Engineering

Many herbicide labels caution against spraying when wind exceeds 10 mph. This can make it a challenge for pesticide applicators, particularly for those who are responsible for managing several acres and very little time to get the job done.

Weather records for the 1994 spring season bring back painful memories for some folks who were involved in spray drift problems. The wind during that spring appeared to be greater than normal. The number of days wind exceeded 10 miles per hour between 6:00 AM and 6:00 PM during April was 21 for 1994 compared to eight for the 5-year average. The wet weather in the first part of April had an indirect affect by limiting the opportunities for planting and spraying corn fields. Because of these limited opportunities, some growers were forced to take risks of spraying fields during windy conditions.

Based on weather records for Paducah for April of the last five years, the windows of opportunities for spraying were somewhat limited. The period between 6 AM and 6 PM had the greatest likelihood for excessive wind. The approximate amount of time per day where wind did NOT exceed 10 mph during 6 AM to 6 PM ranged from a low of 6 hours in 2001 to a high of 7.5 hours in 1998 and 2002.

Having realtime forecasts on spraying conditions can be a great benefit to pesticide applicators. The College of Agriculture has a web site that provides this type of information. It forecasts spraying conditions in three hour segments over a 48-hour period. The fact that this provides “county specific” information makes it a precise forecast tool for Kentucky applicators. The web site can be accessed by using the following directions:

- Go to the UK Agricultural Weather Web site: www.agwx.ca.uky.edu
- Page down to Kentucky Forecast Shortcuts along the blue section of the left of the page.
  a. Select your county
  b. Click on “KY County Cast” button.
- Page down to blue table and click on box titled “Precision Ag. Forecast”

Consult the table with two-day forecast in 3 hour segments for spraying conditions as well as weather parameters such as wind speed, temperature, humidity, cloud cover, precipitation, etc.

MUSK THISTLE IN KENTUCKY PASTURES AND HAY FIELDS
by J. D. Green

One of the most troublesome weed problems in Kentucky pastures and hayfields are thistles. Thistle plants can interfere with livestock grazing and limit the amount of available forage. The spring and early summer months is when thistles become a major problem for land owners and livestock producers who graze cattle or produce hay.

Musk thistle, also called nodding thistle, is the most common type of thistle plant found in Kentucky. It is considered a noxious weed because of its ability to reproduce rapidly and limit pasture production. Musk thistle only reproduces by seed. Therefore, the major aspect of any control efforts is to prevent or limit seed production.

The primary growth period of the plant is generally in the spring through the early summer months. However, most seed germinate in the fall and form a rosette which grows close to the ground, often growing unnoticed until the spring months. The leaf surface is waxy in appearance and contain spines along the leaf margins. Flower stalks develop in the spring followed by bright purple to reddish flowers, which bloom in late May to early June. The seed, which are produced for the next generation, develop soon after flowering and are easily carried by wind and spread to other areas as well.
The most important step in long-term control of musk thistle is to prevent flowering, and the production and spread of new seed. This can be accomplished by using various mechanical, biological, or chemical control methods.

For mechanical control efforts mowing, clipping pastures, or even hand-grubbing can be used. These control methods should be initiated before flowers begin to open. Some regrowth and production of flowers can occur after mowing, but seed production will be notably less than if a mechanical control method had not been used. Thistle plants mowed or removed by hand after flowers have bloomed contain enough energy reserves that these plants will still produce viable seed.

A reduction in musk thistle populations can also be obtained through biological control methods. Two different insects are known to inhibit thistle growth and development, the Thistle-Head Weevil and the Thistle Rosette Weevil. The Thistle-Head Weevil can be found during the spring in many counties throughout central Kentucky. These insects feed on the maturing seed inside the developing flower head. The impact of the Thistle-Head Weevil will not eliminate all seed production, but can significantly reduce the amount of seed produced by individual plants in areas where the insect has become established.

Broadleaf herbicides labeled for use in pastures can be applied in grass pastures and non-cropland areas for control of musk thistle rosettes. However, for herbicides to be effective the timing of the application is critical. Best results can be obtained if herbicides are applied to plants that are in the early rosette stage of growth and actively growing. Therefore, the best times for herbicide application is in the early spring or in the fall. Application of herbicides in the spring should be made during March and April when thistle plants are actively growing. In the fall, apply herbicides in October or early November following new seed germination. When plants are in the rosette stage they are more susceptible to herbicide applications.

Herbicides which can be used in pastures include 2,4-D, Banvel, Crossbow, Redeem R&P, and Weedmaster. For spring herbicide applications apply when air temperatures are above 55 F for 2 to 3 days. Complete spray coverage of the plant is also important. When herbicides are applied after flower stalks elongate, control will be less effective and inconsistent. When using herbicides for control, consult the waiting period on the product label for livestock grazing restrictions following herbicide application. Avoid spraying near crops such as tobacco, vegetables, or ornamental plantings. Also, avoid spray drift by not spraying on windy days or days with extremely high temperature and high humidity.

**SCLEROTINIA DAMAGE ON FALL-SEEDED FORAGE LEGUMES**

by Paul Vincelli

Sustained wet weather for much of last autumn was conducive for Sclerotinia crown and stem rot activity. Fall-seeded alfalfa, red clover, and white clover all have been observed with the disease, with substantial stand loss occurring in some situations. Damage from the disease, in the form of dead and wilting plants, is very apparent now.

For confirmation of the disease, one must find the survival bodies, called “sclerotia,” in association with dead plants. Sclerotia are black, irregular to somewhat rounded structures; the interior is white when dry or gray when moist. Sclerotia are fungal survival bodies that are typically 1/16" to 1/8" in size, lumpy and irregular in shape, with a black rind and a gray (when moist) or white (when mature and dry) interior. They are sometimes attached to the stem, but are commonly found only 1/8" to 3/8" below ground, especially on small plants. It takes careful inspection to find sclerotia below ground; dig up dead plants carefully are gently remove soil from around the crown and taproot, and inspect at a depth of 1/8 to 3/8 inches. Once the infected alfalfa plant has rotted away, the sclerotia can still be found scattered about on the soil surface, but don't confuse sclerotia with manganese concretions. Manganese concretions can be distinguished from sclerotia because these concretions are round, brown to black on the outside as well as the inside, and as you cut through them with a pocket knife, it feels and sounds like you are cutting through stone (which you are).

There is no curative management practice that can be applied to stop disease activity. Fortunately for producers, the recent warm, dry weather slowed disease activity greatly, and the forecasted warm, dry weather will continue this trend. It may resume activity if we get into another long period of cool, wet weather, but for now, continued disease activity seems minimal.

If the disease resumes activity and reseeding is necessary, producers may wish to wait until a seeding window in late-April to seed. The fungus can resume activity during extended periods of cool, wet weather, and seedlings are very susceptible to the disease. Re-seeding in mid-May or beyond, however, runs the risk of drought stress on the young plants with the onset of summer

**SOYBEAN**

**QUADRIS FOLIAR FUNGICIDE ON SOYBEAN**

by Don Hershman

While attending producer meetings this winter, I began to hear talk that up to 20,000 acres of soybean in west Kentucky may get sprayed this summer with the foliar fungicide Quadris. Quadris is a strobilurin fungicide labeled for use on barley, corn, soybean, wheat and a variety of other crops, mostly vegetable. The active ingredient in Quadris is azoxystrobin (22.9%). The Quadris label indicates that it may be used to control the following foliar fungal diseases in soybean: aerial web blight, Alternaria leaf spot, brown spot, Cercospora blight and leaf spot, and frogeye leaf spot. Additionally, I have seen two printed Syngenta presentations which indicate that Quadris will also control anthracnose, pod and stem blight and soybean rust. Note, however, that these diseases are not listed on the most recent Quadris label.

By way of background, many years of field research and observations, beginning in the early 1970's and extending into the mid 1980's, found that foliar fungicides were best reserved for use in seed production fields, and then, only to protect seed quality in very specific situations (e.g., fields planted early to early-maturity varieties; non-rotated crops; prior history of seed quality problems, etc.). It was also determined that application of foliar fungicides for the purposes of protecting yield was rarely an economical practice. This was because yield-reducing levels of soybean foliar, pod, and stem fungal diseases in Kentucky tended to be “hit or miss”. Thus, the need to protect yield was unpredictable and often unnecessary. Also, when yield-reducing levels of disease did exist, two fungicide applications were usually needed to achieve desired yield results; this situation was unacceptable to most producers. To my knowledge, only a handful of Kentucky soybean producers have applied any fungicides to soybeans since the mid-1980's. This trend has been encouraged by limited profitability associated with soybean production in the south.

More recently, I have observed data from 13 on-farm comparisons
conducted in southern Indiana, and Kentucky by Syngenta personnel in 2002. In these side-by-side comparisons, Quadris was applied at a rate of 6.2 fl oz/A at the R4 stage* and compared with non-treated soybean. The data from these comparisons were surprisingly favorable to Quadris application considering the dry conditions that existed last summer. Across all 13 comparisons, Quadris-treated soybean yielded an average of 6.8 bu/A higher than non-treated soybean. The range was 1-14 bu, but 10 locations had increases of 5 bu/A or higher. There were no disease ratings made, so there is nothing that can be said about which diseases, if any, were being controlled. Also, yield data were collected using combine yield monitors, and individual comparisons were not replicated; thus accuracy and/or statistical significance within each test is questionable. However, the rather large number of farm-scale field comparisons, the fairly consistent results, and the overall magnitude of the treatment differences make a pretty solid case for Quadris use on soybean.

Moreover, the above data are not unique. In fact, I have seen similar yield numbers from farm comparisons and replicated field tests conducted in other southern states. For example, Dr. Melvin Newman, University of Tennessee at Jackson, TN, conducted a replicated test last summer and found that plots treated at the R3* stage with 6.2 fl oz/A Quadris yielded 6 bu/A more than non-treated plots. In that test, the diseases being managed were severe anthracnose and frogeye leaf spot. In that same study, the same chemical and rate applied at the R6* stage was ineffective. In another replicated test conducted in Arkansas by Dr. Cliff Coker, University of Arkansas, the same Quadris treatment applied at the R3 stage yielded 19 bu/A (34%) more than the non-treated plots. Minor frogeye leaf spot was the only significant disease in that test.

Not all data indicate that Quadris significantly increases yield. For example, during 2000-2001, there was no significant increase in yield in two replicated tests in Alabama and three replicated tests in Louisiana, when 6 fl oz/A of Quadris was applied at the R3 stage in the presence of light to moderate disease conditions. In other words, Quadris applied to soybean is not a “silver bullet”. Syngenta recognizes this fact in that they do not recommend Quadris be used in all soybean production situations. According to the literature I have seen, they are targeting fields in one or more of the following categories: 1) “beans back on beans”; 2) irrigated fields; 3) river bottom fields; 4) seed bean fields; 5) fields where soybean is being rotated with other legumes or vegetable crops; 6) fields with poor drainage characteristics and/or “heavy” soil types; and/or 7) fields with “excellent yield potential”.

One interesting twist to the Quadris-soybean story is the observation from various quarters that soybean plants treated with Quadris look greener and hold their leaves longer than non-treated plants, even when significant disease does not exist. I have heard some individuals hypothesize that Quadris may have growth regulator activity when applied to soybean. Syngenta does not officially comment on this possibility other than to indicate that treated fields do “look healthier, stay green longer, mature beans look brighter, and have more pods per plant” than non-treated plants. Future research and observations will prove or disprove the possibility of growth regulator activity when Quadris is applied to soybean.

Our response to the many questions now being asked by farmers will be to conduct cooperative, farm-scale, replicated tests in Ballard, Fulton, Henderson and Hickman Counties this summer. The objective of our efforts will be to evaluate the impact of Quadris application on soybean disease symptoms, seed quality and crop yield. Other plant health factors will be evaluated where appropriate.

In any event, there appears to be justification for farmers to consider treating a block of soybean acres this year with Quadris. Before deciding to treat, however, make certain you have the means of measuring yields of treated and non-treated areas. Otherwise you will have no way of knowing exactly how the treatment performed. Visual differences, without yield data, may be very misleading!

*R3 = Pod 1/4-inch-long at one of the four uppermost nodes with one completely unrolled leaf.
*R4 = Pod 3/4-inch-long at one of four uppermost nodes with a completely expanded leaf.
*R5 = Beans beginning to develop (can be felt when the pod is squeezed) at one of four uppermost nodes with a completely unrolled leaf.
*R6 = Pod contains full-sized green beans at one of the four uppermost nodes with a completely unrolled leaf.

FORECASTING FOR SPRAYING CONDITIONS
(see CORN)

FRUIT

CONTROL SAN JOSE SCALE NOW OR WAIT FOR CRAWLERS
by Ric Bessin

With the advent of warm weather we are progressing very quickly through the early apple stages. San Jose scale is one insect that has become a serious threat in many commercial apple and peach orchards. This is partly due to the loss of the use of Lorsban post-bloom and Penncap-M for control of scale crawlers. San Jose scale numbers have been increasing in most orchards. This insect is particularly damaging, as it injects a toxic saliva into the trees. Left controlled in commercial orchards, this pest can kill trees in a matter of just a few years.

One indication of the problem was the noticeable scale on fruit harvested last fall. The scale cause a red halo around the site of feeding due to the toxin they inject. This is very apparent on light-colored apples.

Management of scale begins with a dormant application of oil. In addition to the oil, Esteem has been recently registered for both pome and stone fruits for application from green-tip through pink (pome fruits) and delayed-dormant (stone fruit). Another option with pome fruit is to wait to spray until crawler emergence. Generally crawlers emerge in late May and growers can use double-sided, black tape on infested limbs to signal crawler emergence.

LAWN & TURF

GROUND BEES MOURNING SOME LAWNS
by Lee Townsend

Ground bees, lawn bees, and mining bees are some of the terms that are used for the many species of solitary bees that dig approximately 1/4" burrows in areas where sandy or well-drained soil is exposed or has sparse grass cover. While each bee functions independently and faces life alone, large numbers of closely spaced burrows can develop in suitable locations. These bees do not aggressively defend their burrows and rarely, if ever, sting but may be very active buzzing over the lawn, especially during mating season.

The many species of ground bees vary widely in size and color.
Some are very dark and furry, while others are banded or metallic. Belowground, short side tunnels are dug from the main vertical shaft. The small bee grubs develop in these chambers, feeding on pollen and nectar brought back to them. During their pollen and nectar-gathering trips, these bees pollinate many flowers. These bees occur commonly throughout Kentucky and their numbers can vary considerably from year to year. Sudden appearances of these bees often can be attributed to a gradual, unnoticed buildup over time and a sparse grass stand in the area where they are active.

Ground bees are beneficial insects and in general do not pose any threat. However, many people are frightened by bees. If control is desired, here are a few things to keep in mind.

Consider why the bees are there and try to modify the site. Ground bees prefer to dig in bare soil. Long term management involves establishing a thicker grass cover over the area. This should make the site less attractive but will take some time to accomplish.

Application of an insecticide labeled for control of lawn and turf pests to areas where the burrows have been dug may provide some help. The area needs to be wetted thoroughly and the loose soil around the holes needs to be raked over to cover the openings. The bees will be exposed to the insecticides only when they move treated soil to repair the openings. This can mean additional applications until activity is reduced. It probably will take more than one treatment to see results.

### SHADE TREES & ORNAMENTALS

#### RHIZOSPHERA NEEDLE CAST AFFECTING SPRUCE

by John Hartman

Spruce trees are widely planted in Kentucky landscapes to provide year-round foliage, screening, and sometimes interesting color. Colorado blue, Norway, and white spruces are commonly used. Of these, Colorado blue spruce, *Picea pungens*, is most susceptible to diseases under Kentucky conditions. One of these diseases, spruce needle cast, is caused by the fungus *Rhizosphaera kalkhoffii*. The fungus infects trees in nurseries, Christmas tree plantations, and landscapes. Being noticed now in our plant disease diagnostic laboratory are symptoms and signs of needle cast disease.

**Symptoms and disease cycle.** Rhizosphaera needle cast disease causes premature loss of needles and consequent thinned out, bare, or dead branches. Normally, spruce trees retain their healthy needles 5 years or so, whereas a spruce infected with Rhizosphaera needle cast may hold only the current year’s needles. Rhizosphaera needle cast infects needles on the lower branches first and gradually progresses up the tree. Under epidemic conditions, lower branches may be killed by this fungus. Under extreme conditions, young trees might be killed by the pathogen, but more commonly loss of needles and branches results in missapen trees.

Needles on new growth become infected in spring while older and stressed needles may become infected anytime during the growing season. Symptoms are normally visible in late fall or the following spring, when infected needles turn purplish to brown and begin to drop. Above normal rainfall in Kentucky during April and May may contribute to higher infection levels. Signs of the fungus can be seen now as tiny fruiting bodies of the *Rhizosphaera* fungus protruding through the stomata of the infected needles. Under a hand lens, these stomata appear as tiny black dots in neat, even rows. During wet weather in late spring, spores are released from these fruiting bodies and are splashed by rain onto newly developing needles where infection occurs and the disease cycle is repeated. Branches which repeatedly lose their needles for several years will die.

Another cause of branch dieback. Branch death from Rhizosphaera needle cast can be mistaken for symptoms of Leucostoma (*Cytospora*) canker of spruce. This canker disease also kills lower branches in the tree and is most severe on trees growing under stressful conditions. Blue spruces are more susceptible to *Cytospora* canker than are Norway spruces. Where *Cytospora* canker occurs, trees will show excess resin production on the cankered branches and fungal fruiting structures may be found on the twigs and branches but not on the needles as occurs with *Rhizosphaera* needle cast.

**Disease management.** Management of Rhizosphaera needle cast in home landscapes depends mainly on cultural practices which reduce the chances for disease occurrence. Christmas tree and Nursery growers may rely more on fungicides to prevent the disease.

- **Plant disease resistant spruce species.** Norway spruce (*Picea abies*) is relatively resistant. White spruce (*P. glauca*) is intermediate, and Colorado blue spruce (*Picea pungens*) is highly susceptible and can sustain severe damage.
- **Plant only healthy, disease-free nursery stock.** Before planting, examine the foliage of spruce trees for fruiting bodies of *Rhizosphaera* protruding through needle stomata. Infected trees should be rejected.
- **Maintain tree vigor.** Spruce trees growing under environmental stress are often more seriously attacked by this fungus. Avoid soil compaction, drought and shading by nearby trees or structures. Provide adequate plant spacing and mulch trees as needed.
- **To prevent disease spread while shearing the foliage, avoid working with spruce trees while they are wet.**
- **Chemical control in the nursery or Christmas tree plantation can be achieved by application of fungicides in the spring.** Fungicides containing chlorothalonil (*Bravo*, *Daconil* 2787 or others) or mancozeb (*Cleary’s Protect T/O*) are labeled for control of Rhizosphaera needle cast. Fungicides can prevent new growth from becoming infected. It is important to protect new growth as it emerges, therefore fungicides should be applied when the new needles are half elongated in May and again three to four weeks later. Application to large trees requires special equipment to ensure adequate coverage.

### ORNAMENTAL PEST ALERT

by Mike Potter

The recent warm weather has triggered emergence of two important early-season pests of ornamentals. Now is the time to inspect vulnerable plant material in the event control measures are warranted.

**Eastern tent caterpillars** are active on a variety of deciduous hosts, including wild cherry, apple and crabapple. This defoliator overwinters in brown egg masses encircling the smaller twigs of the host tree. Eggs (150-300 per egg mass) hatch about the time that the leaves begin to unfold. The newly-emerged larvae gather at a branch fork and construct a tent-like web from which they venture out during the day to feed on new foliage. The eastern tent caterpillar favors wild cherry, apple and crabapple but will also attack peach, pear, plum, Hawthorn and some shade trees. Trees sometimes contain several nests and smaller ones can be completely defoliated in 2-3 weeks.

Control is best accomplished when webs are first noticed and the larvae are small. If nests are within reach, they can be removed with a stick, broom, or pruning shears. Ideally this should be done in the evening, when the larvae are inside the nest. Insecticidal sprays are also effective. Registered products include Bt (*Bacillus*
When birds die or abandon the nest, people become aware of the birds or in their nests, but will sometimes disperse into buildings nesting materials to avoid inhaling fungal spores and other eaves, window ledges, and rafters, or in gutters or chimneys. Wear birds and their nests. Nests typically will be found in attics, around to be bitten. The first step in controlling bird mites is to remove the problem when they are attacked by mites searching for an alternate food source. The bites cause itching and irritation, but do not result in disease. Bird mites are tiny but can be seen with the naked eye. They are about the size of the period at the end of this sentence, and appear as slow-moving specs as they crawl about on walls and other surfaces.

**Bird mites** - These bloodsucking ectoparasites normally live on the birds or in their nests, but will sometimes disperse into buildings when birds die or abandon the nest. People become aware of the problem when they are attacked by mites searching for an alternate food source. The bites cause itching and irritation, but do not result in disease. Bird mites are tiny but can be seen with the naked eye. They are about the size of the period at the end of this sentence, and appear as slow-moving specs as they crawl about on walls and other surfaces.

Bird mites can survive several days without a host. Unless corrective measures are taken, the occupants will probably continue to be bitten. The first step in controlling bird mites is to remove the birds and their nests. Nests typically will be found in attics, around eaves, window ledges, and rafters, or in gutters or chimneys. Wear gloves when handling dead birds, and a respirator when removing nesting materials to avoid inhaling fungal spores and other potential disease-producing organisms associated with the droppings.

**Boxwood psyllids** soon will be emerging on American and Korean boxwood. Psyllids are tiny (1-2mm), green sucking insects that resemble aphids or miniature cicadas. Boxwood psyllids overwinter as eggs inserted between the bud scales. Eggs hatch as soon as the buds begin to open and the nymphs begin to feed on the expanding foliage, removing plant sap. Feeding injury produces cupping and curling of the leaves, enclosing several nymphs in the leaf pockets. The nymphs also produce white, waxy secretions. Adults emerge in late May and June, mate, and lay their eggs under the bud scales. There is one generation per year.

Boxwood psyllids generally do not kill plants, but can affect aesthetics and overall plant vigor. Early detection is essential if leaf damage is to be avoided. Insecticides, including Orthene, Sevin, pyrethroids, or insecticidal soap are effective and should be applied as the leaves are expanding. Thorough spray coverage is essential. Treatments applied after leaves have fully expanded won’t alleviate this year’s damage, but may help to reduce psyllid numbers next season.

**Household**

**Birds, Bugs and Buildings**

by Mike Potter

Despite their beneficial role in nature, birds can become pests when they nest or roost around structures. In the coming weeks, clients will experience various problems stemming from birds on their premises.

**Significance as Pests** - Pigeons, starlings and sparrows cause millions of dollars in damage by defacing buildings, sidewalks and cars with their droppings. Gutters, down spouts and air vents may become obstructed by nesting materials, and the feathers, filth, and carcasses can lead to secondary problems by attracting carpet beetles, flies and other scavenger insects. Birds nesting around buildings may pose a health hazard to people and farm animals. Mites, lice and bedbugs can invade living areas and bite humans. The bites cause itching and irritation, but do not result in disease. Bird mites are tiny but can be seen with the naked eye. They are about the size of the period at the end of this sentence, and appear as slow-moving specs as they crawl about on walls and other surfaces.

Bird mites can survive several days without a host. Unless corrective measures are taken, the occupants will probably continue to be bitten. The first step in controlling bird mites is to remove the birds and their nests. Nests typically will be found in attics, around eaves, window ledges, and rafters, or in gutters or chimneys. Wear gloves when handling dead birds, and a respirator when removing nesting materials to avoid inhaling fungal spores and other potential disease-producing organisms associated with the droppings.

After nests are removed, the nest location and adjacent areas should be sprayed with an insecticide such as those labeled for flea control. Pyrethrins and carbaryl are examples of effective active ingredients. A vacuum cleaner or cloth moistened with alcohol or dilute ammonia solution can be used to eliminate mites crawling on walls, floors and other indoor surfaces. Laundering (hot or warm cycle) will kill any mites crawling on clothing or bedding.

**Bird Management** - The most effective way to avoid problems with pest birds around buildings is to deny them nesting and roosting sites. The best time to do this is before nests are well established. Vents and other small openings should be sealed with 1/4-inch hardware cloth or similar exclusion materials. Attic vents may need to be screened or netted on the exterior to prevent sparrow and nestling from nesting between the louvers. Nesting or roosting on ledges, eaves, window sills and other surfaces can be deterred by installing tightly strung, parallel strands of wire just above the surface of the ledge. Roosting can also be discouraged by changing the angle of the ledge to 45 degrees or more with sheet metal or wood boards. “Porcupine” wires, coils, repellent gels, or netting are effective provided they are correctly installed. Homeowners can purchase bird exclusion materials at hardware or farm supply stores, or may want to call a professional pest control firm.

Before installation, remove nests and droppings to avoid potential problems with scavenger insects and disease pathogens. Gloves and a respirator equipped with a HEPA (high efficiency particulate air) filter should be worn to avoid inhaling fungal and bacterial spores (a dust mask alone is insufficient). Lightly moistening droppings and nesting materials with water before removal reduces the tendency for dust and spores to become airborne.

Fake owls, rubber snakes, brightly colored balloons, etc. are sold as deterrents to nesting. These devices usually fail because birds soon become acclimated to their presence and ignore them. If these devices are tried, reposition them periodically or vary the pattern. Repeated disruption of nest-building activities, such as with loud sounds or the spray from a water hose, can be effective but require persistence. Such efforts should ideally begin before the birds have formed a strong attachment to the site. If frightening efforts are to be successful, they must continue for several days and may need to be repeated if the birds decide to rebuild. Toxic baits or shooting of birds should be avoided and in many areas is illegal. Large or complicated bird jobs usually require the expertise of a professional pest control or nuisance wildlife firm.

Finally, any leftover bird seed from winter feeding should be stored in tightfitting containers. Unsealed bags of seed left in the garage or basement are prime targets for meal moths, mice and other pests.

**Diagnostic Lab-Highlights**

by Julie Beale and Paul Bachi

Recent diagnostic samples have included tobacco seedlings with damping off from Rhizoctonia; nutritional problems on daylily; Pythium damping off on eucalyptus seedlings (greenhouse); bacterial wilt; Botrytis blight, Pythium root rot and fertilizer burn on geranium; Rhizoctonia root rot on inkberry; white pine decline; lacebug injury (old) on azalea; Rhizosphaera needle cast on spruce; black knot on plum; and distortion from ethylene exposure on greenhouse tomato.
INSECT TRAP COUNTS
UKREC, Princeton KY

March 24-28
Black Cutworm ..................................1
True Armyworm .................................2

NOTE: Trade names are used to simplify the information presented in this newsletter. No endorsement by the Cooperative Extension Service is intended, nor is criticism implied of similar products that are not named.