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ANNOUNCEMENTS

2000 IPM SCOUT TRAINING SCHOOL

Mark your calendar now for the 2000 IPM Training School! Scheduled for March 15, 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 new session this year. For the first hour participants can choose to attend a session on “Introduction to Scouting” or “Advanced Scouting”. The “Introduction to Scouting” session will teach site selection and the basic techniques for scouting corn, soybeans, alfalfa and small grains. This session is designed for those who have never scouted a field .

“Advanced Scouting” session is designed for those who have attended previous IPM Training Schools and are experienced scouts. This session will not cover the basics of scouting, but topics such as Using DGPS for Scouting and Soil Sampling.

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 (2.0 Pest Management, 2.0 Crop Production and 1.5 Soil Fertility). For additional information contact Patty Lucas at 270 - 365-7541 extension 218 or plucas@ca.uky.edu.

WWW 2000 Insecticide Recommendations

The 2000 Field Crops and Livestock Insecticide Recommendations are available as a link from the Kentucky Pest News site.
www.uky.edu/Agriculture/kpn/kpnhome.htm

You can select crop or livestock pests from appropriate menus. You will get graphics, scouting information, decision guides, and recommended pesticides. There are links to publications and fact sheets. Newly registered products will be placed here as appropriate.

TOBACCO

DROUGHT OF 1999
by William Nesmith

It is unlikely that the drought of 1999 will have major, direct effects on tobacco diseases during the 2000 crop. However, indirect impact on some diseases is probable, because production plans have been altered. There are few, if any, production decisions that are disease-neutral. Therefore, growers are urged to carefully assess their disease situations and control strategies for 2000. Be especially mindful to not underestimate the role of root diseases in the performance of your crops in 1999 and the role dry weather played in reducing foliar diseases. Below are some specific points that may have a drought connection.

FOLIAR DISEASES: Blue mold development in 2000 is not expected to be significantly impacted by the previous season's drought. Each year's development is mainly influenced by the timing and sequencing of key events during that season. One exception for increased leaf diseases could be in no-till situations where the 1999 crop was abandoned without harvest, and the site is replanted no-till into tobacco in 2000. Such fields could experience markedly higher carry-over levels of the foliar pathogens associated with angular leaf spot, frogeye leaf spot, and brown spot. Any steps taken this winter to break the tobacco residue into smaller pieces to encourage rotting should help reduce inoculum survival between cropping seasons.

ROOT AND STEM DISEASES: Significant increases are anticipated for the 2000 crop in root and stem diseases, especially for black shank, black root rot, and Fusarium wilt, although this expected increase is not due primarily to the drought. The greatest increase from these root diseases will be mainly in fields where crop rotation will not be practiced. These diseases were widespread and at high levels in 1999, so high levels of carry-over inoculum are expected to be present in replant sites having a history of these diseases. The drought connection relates to two areas.

1. Many have underestimated the role root diseases played in the low yields experience in 1999, especially on the farms without adequate rotation. This will set up situations where the disease potential will actually be high, but the grower has incorrectly judged it to be low.

2. The low yields in 1999 have resulted in carry-over quotas on many farms, which increased the demand for tobacco production sites, and thus reduces proper crop rotation. However, what actually happens will be influenced greatly by the official production quota and where the crop is actually produced after the referendum on leasing.

The soil-borne pathogens present in Kentucky possess excellent survival potential due to their asexual resting spores. These spores can survive the dry soil conditions experienced in 1999. Black shank will be the more sensitive disease if the drought persists into the winter. Should soils remain dry much of the winter and should some sharp cold spells be experienced while the soil is dry, then the black shank fungus could be killed deeper into the soil than would occur with normal winter moisture. However, even if overwintering populations fall sharply, the black shank fungus can produce a large amount of secondary spores from a very low population of surviving inoculum under warm, wet conditions the next season. So do not forget its ability to counterattack!

Growers should carefully assess this increased risk for root diseases in their 2000 crop plans. Increased consideration should be given to the merits of crop rotations, matching the variety (and its disease susceptibility / resistance) to the specific site (field) for a particular season, and the use of preventive fungicide / fumigation regimes.

VIRUS DISEASES: There may be increased pressure from the aphid-borne poty-viruses (tobacco etch, tobacco vein mottling, and potato virus Y) in 2000 due to the drought. This speculation is based on the observation that certain perennial weed-hosts have developed in the tobacco plantings. Horse nettle, which is an overwintering host for many of the viruses, was growing abundantly during dry conditions within fields, at field edges, and in over-grazed adjacent pastures in the late fall. Where higher populations of this perennial weed survive the winter, expecting greater virus pressure in 2000 is logical. This can be offset by using varieties with resistance to the poty-viruses. Consider using these resistant varieties even for early no-till plantings, or for any field where this weed was abundant in 1999 and its perennial nature will not be disrupted in 2000. Remember that these viruses will be over-wintering in the underground portions of this weed. Virus-infected weeds overwintering within or very near the 2000 tobacco patch are those to be most concerned about.

COMMERCIAL VEGETABLES

Like with tobacco, the major connections between disease events and the 1999 drought are associated with interpretation of outcomes and weighing priorities rather than the biology of disease events. This could be particularly true for growers with limited experience in vegetable production. Foliar disease activity was very low in 1999, because the leaves were dry. Two main concerns are: overestimating the merits of foliar fungicides and bactericides applied in 1999 and underestimating the importance of foliar diseases in vegetable production. The following example is given as a case-in-point because it is a clear example involving both concerns. At a recent vegetable grower's meeting, a new vegetable grower said: "I tried Quadris last year and it controlled all my diseases in tomatoes. So it is unnecessary to use all those copper sprays listed in UK's recommendations." It is predicted that he will learn another lesson about tomato production the next year his farm experiences a normal rainfall pattern and bacterial diseases strike. It will become obvious why Quadris, very effective for most fungal diseases, is not labeled for bacterial diseases, and why UK plant pathologists recommend that a sound production program should include preventive treatments for bacterial diseases.

WHEAT

APHIDS IN WHEAT - ANOTHER WARM WINTER
by Doug Johnson

It is clear, bright, and warm. Just what you wanted for winter, huh? Then you should go to Florida. This weather is not doing wheat pest management any good. This can be a dangerous time of year. Any temperature above 50ºF will allow movement and reproduction of aphids. This includes walking and flitting about for short distances. Walking, of course, will increase the spread of an existing aphid infestation. Flitting or short distance flying can start new colonies, and on a windy day allow the movement into a field of aphids from a more distant source. Of course we would really like temperatures below 30ºF to kill some of the wee beasties!

If this warm weather persists you had better check your fields. Though we have had some killing freezes, and even if you have sprayed (assuming this was done about or before Thanksgiving), you could have aphid movement into your fields. There is only one way to know for sure—go look. Pick a nice warm sunny afternoon and be sure to look right at the ground level. Most of the important aphid species will go to the ground in cold weather. Hopefully you will not find anything.

For more in-depth information check ENTFACT - 121.

WINTER GRAIN MITES
By Lee Townsend

Scott VanSickle of Wheat Tech in Russellville, reported winter grain mites in some fields. These small mites have a dark brown to black body with reddish legs. They can occur in small grains and grasses throughout temperate regions of the world. As with many other mites, they use needle-loke mouthparts to remove the contents of individual plant cells. Heavily infested plants often do not die but can be stunted and have reduced grain yield. damage is more severe to young plants that to heathy, growing plants.

Winter grain mites have two generations. One begins in September or October and peaks in December or January. The second generation is active in March and April. They are most active when temperatures are between 40^{O} and 70º.

There are not established thresholds for these rare small grain pests.

GRAINS

PROBABLE IMPACT OF 1999 DROUGHT ON THE FUTURE DISEASE POTENTIAL IN GRAIN CROPS
by Donald E. Hershman and Paul Vincelli

Soybean:

Foliar, Pod, and Stem Diseases Caused by Fungi: Overall, the potential for foliar and pod/seed fungal diseases to develop during the 2000 cropping season should be slightly below normal as a result of the 1999 drought. Levels of these diseases were especially low this past season because they are very moisture dependent. Inoculum potential of the causal fungi, thus, should be lower than normal during 2000.

Root and Lower Stem Diseases: The potential for Charcoal rot and Fusarium stem rot should be higher in 2000 because these diseases were very common during 1999. Greater than normal levels of these diseases this past summer were related to the serious crop stress experienced in many fields during the crop reproductive stages. High levels of the causal fungi will be available to infect crops next season, especially if mid- to late-season stress conditions develop again. The potential for other soil-borne disease (i.e., Rhizoctonia, Pythium, Phytophthora root rots, southern stem blight, and SDS) should be unaffected by the drought. The organisms that cause these respective diseases in soybean are highly stable, and have strong dormancy mechanisms for surviving drought conditions.

Soybean Cyst Nematode (SCN): Levels of SCN should unchanged by the drought. Damage may appear to be greater than normal due to crop stress, but actual SCN populations should not be affected one way or the other.

Virus Diseases: Soybean mosaic virus potential may be reduced in 2000. Incidence of SMV during 1999 appeared to be lower than normal, possibly due to reduced aphid populations (SMV vector) related to the drought. Carryover of SMV in seed grown in Kentucky should be below normal next season. Thus, the potential for spread of SMV should be reduced somewhat.

Wheat:

Seed (and seed-borne) and seedling diseases: Soil-borne diseases that affect seed and seedlings should be at normal levels. Seed-borne pathogens, especially, *Stagonospora nodorum*, should be at below normal levels due to the fact that glume blotch levels were significantly below normal during 1999. Loose smut and Fusarium head blight levels were very low during the spring of 1999, so seed-borne diseases with those fungi should be lower than normal.

Leaf rust: The potential for leaf rust in 2000 should be unaffected by the drought in Kentucky during 1999. Rust typically blows in from more southerly states in the spring and history tells us that overwintering inoculum of the rust causal fungus in the south is both prolific and consistent..

Powdery mildew, Stagonospora leaf and glume blotch, and tan spot: Levels of these diseases were exceptionally low during 1999. The fungi that cause these diseases overwinter in crop residue, much of which has not decomposed as is normal due to the dry conditions. Nonetheless, the potential for these diseases may be below normal (at most normal) during 2000 because fungal populations available to initiate infections in the fall or to overwinter should be below normal.

Speckled leaf blotch: Levels of this disease were much higher than normal this year. Since little wheat residue has deteriorated during the growing season, and due to the high levels of the causal fungus available to overwinter, I would anticipate an increased potential for speckled leaf blotch to occur during the spring of 2000.

Take-all: Levels of take-all were about normal during the spring of 1999. However, there is the potential for slightly elevated levels in 2000 due to the fact that the fungus survives in crop residue and that the crop residue has not deteriorated much during the summer of 1999. This suggests that greater levels of causal fungus may be available to overwinter in Kentucky.

Soil-borne viruses: The potential for both wheat spindle streak and wheat soil-borne mosaic to affect wheat next spring should be unaffected by the drought conditions in 1999. These diseases are vectored by a very stable soil-borne fungus that has good dormancy characteristics.

Barley yellow dwarf (BYD): BYD risk, at least the risk of fall and late winter infections which affect yield the most, should be reduced because of the drought. The severe drought throughout much of Kentucky this summer has greatly reduced aphid populations locally due to death and dormancy of the aphid's alternate hosts. Aphids blowing in from other areas are still a possibility, but, overall, the BYD risk should be down. Aphids are the only natural means of transmitting BYD to plants so anything that influences aphid populations will also affect the BYD potential.

Fusarium Head Blight (Head scab): *Gibberella zeae* stalk and ear rot levels were below normal during 1999. Nonetheless, there is a very poor relationship between the level of Gibberella zeae in corn one season and availability of *Gibberella zeae* to infect wheat and cause Fusarium head blight the next season. This is because corn residue is quickly colonized by *Fusarium graminearum* (sexual stage =

Gibberella zeae) once the corn residue comes in contact with soil following harvest. As a result, the potential for Fusarium head blight during 2000 should be about normal.

Corn:

The bottom line on corn is that the drought of 1999 has not given a reason to substantially change any disease management practices for this crop in 2000, but several diseases are discussed below.

Gray Leaf Spot:

Probably the major effect expected from the 1999 growing season is a reduced level of primary inoculum from gray leaf spot, for several reasons. On average corn was planted two weeks ahead of normal across the state, which reduced disease potential from this disease. For much of the state, dry air masses predominated for most of the summer. As a result, the relative humidity was too low for activity of the gray leaf spot fungus on corn leaves. The combination of these two factors resulted in light levels of gray leaf spot in many fields. This is good news, since it means that growers can expect a slightly reduced risk of the disease in 2000. However, this is not a reason to change management programs for this disease for next year. Fields of no-till continuous corn still have a substantial risk if conditions favor the disease, and other fields may also experience moderate to severe disease pressure if weather is very conducive for the disease.
Furthermore, scattered fields throughout Kentucky had sufficient rainfall through June to allow a significant level of gray leaf spot, even if yields were not noticeably affected by the disease. Fields like these could have just about as high a risk this year as any other year. For most situations, the conservative thing to do is to consider hybrids with a substantial level of gray leaf spot resistance this year if sowing corn into any field that was in corn last year, or into a no-till field that was in corn two years ago. If next season, you are "sitting on the fence" regarding spraying your crop with fungicides, then take into account the likelihood that inoculum levels are probably slightly lower than normal in most fields.

Stalk Rots: As mentioned above, levels of charcoal rot were higher than normal in soybeans last year, so expect an increase in levels of inoculum of this disease in the soil. Corn and sorghum are also hosts to charcoal rot. If planting corn into fields with a known history of charcoal rot, avoid high plant populations and high nitrogen combined with low potash. Also scout for lodging potential as harvest approaches.

Other Diseases: A variety of diseases are not expected to be significantly influenced by the drought last year. These include common rust and southern rust (which both overwinter south of us), and the virus complex (which is influenced by many factors, especially time of peak activity of insect vectors). Anthracnose diseases, Northern and Southern leaf blight, and Stenocarpella (=Diplodia) ear rot may be at slightly lower levels, because lower disease pressure last year would lead to lower inoculum levels this year, but once again, I wouldn't weigh this too heavily into management decisions.

FRUIT CROPS

HOW WILL FRUIT CROP DISEASES RESPOND TO THE DROUGHT OF 1999?
by John Hartman

Tree fruits. Tree fruits are subject to many of the same diseases as shade trees. Fungi such as *Nectria*, *Cytospora* and *Botryosphaeria* cause cankers of tree fruits suffering from drought stress. The effects are likely to be the same as for landscape trees. As for reduced inoculum for foliar diseases such as apple scab or cherry leaf spot, again the response should be about the same as for landscape trees. See the section in this newsletter concerning the effect of drought on diseases of landscape trees.

Small fruits. Blueberries and brambles are especially susceptible to fungal cankers, and grapes also can become cankered. They are likely to react to drought in a similar way as woody landscape plants, discussed elsewhere in this newsletter. Reduced foliar diseases could also be expected for these crops, at first. Strawberries that were not watered probably died last summer from lack of water or from the black root rot complex which is usually more severe on drought-stressed crops. On the other hand, if they did survive, this season could bring a reduced threat from leaf spot and anthracnose diseases, at least at first.

SHADE TREES AND ORNAMENTALS

HOW WILL LANDSCAPE PLANT DISEASES RESPOND TO THE DROUGHT OF 1999?

by John Hartman

In contrast to the drought effects on diseases of annual crops discussed in the accompanying articles, drought effects on diseases of perennial plants can be very dramatic. In the case of trees and shrubs or fruit crops, the drought has not only affected the pathogen but also the physiology of the host from one year to the next. Host plant condition affects its reaction to disease.

Woody plants. Most of us are familiar with wilting and leaf scorch symptoms associated with dry weather. This past year, leaves of drought-stressed plants closed their stomata which reduced their rate of photosynthesis. Reduction in photosynthesis may not kill a tree or shrub, but it means fewer carbohydrates are made and stored for future use. In the landscape, seedlings and recently transplanted trees and shrubs were at greatest risk because they lacked extensive root systems.

With drought, there are some fungal diseases of landscape trees and shrubs that often do not show symptoms until the following season, after the drought has passed. The role of water stress in encouraging opportunistic plant pathogens is unclear. It is possible that the stress condition interferes with the plant's defense against such pathogens, or possibly, the reduced carbohydrate reserves allows the plant little energy to fight invasion by pathogens.

Expect certain fungi such as *Hypoxylon*, an oak pathogen, and *Armillaria*, which attacks many woody plants, to appear in 2000 because of the 1999 drought stress. In addition expect symptoms of diseases caused by other fungi such as *Thyronectria*, cause of honey locust canker; *Cytospora* or *Valsa*, causes of cankers on prunus, poplar, willow, maple, spruce and other conifers; *Sphaeropsis*, cause of pine tip blight; and *Botryosphaeria* and *Nectria* cause of cankers of many woody plants such as rhododendrons, crabapples, dogwoods, maples, and others to appear the season following the dry weather.

In searching for water, some woody plants could have sacrificed surface roots to the drought while relying more heavily on roots that were deeper in the soil. When the excessive rains return, partial flooding could render these deeper roots more prone to root rot diseases, thus leaving the woody plants with few functional roots. Thus, expect additional woody plant death when the drought breaks.

One possible benefit of the drought could be the reduction in foliar diseases in the year 2000. There should be less carry-over inoculum from shade tree anthracnose diseases, crabapple scab or dogwood powdery mildew, for example. The benefit could be short-lived, however if spring weather is wet and rapidly repeating cycles of these diseases occur. Looking ahead even farther, the rust infections of cedar that should have occurred, but didn't, during the dry 1999 summer might result in fewer cedar galls in the spring of 2001 and less rust on crabapples and hawthorns that same summer.

Herbaceous ornamentals. Perennial flowers and ground covers, like their woody counterparts could have reduced energy reserves due to the drought. This could make them more susceptible to cankers and to root, corm, or bulb rot diseases. There is not much research on the role of stress on diseases of herbaceous ornamentals, so it is difficult to know how the drought will affect these plants. A few diseases such as Volutella blight of Pachysandra, are known to be more severe on stressed plants, but most likely the disease would have appeared during the drought. For foliar diseases, the situation is similar to that of woody plants - reduced primary inoculum might result in less disease, at first.

HOUSEHOLD

DE-MYSTIFYING HOUSE DUST MITES

By Mike Potter

There are many substances in household dust which can cause allergies in humans, including animal dander, insect parts (especially from cockroaches), mold spores and pollen. The most common culprits, however, are house dust mites. House dust mites are tiny creatures related to ticks, chiggers, and spiders, that live in close association with humans. Their primary food is dander (skin scales) shed from human and pet activity. Most homes in Kentucky probably have detectable levels of house dust mites and their allergy-producing fragments.

House dust mites are not parasitic, nor are they capable of biting or stinging humans. Their significance as pests is due to the powerful allergens

contained in the mites, their cast skins, fecal material and secretions. Symptoms of a house dust mite allergy include stuffy or runny nose, sneezing, coughing, or watery eyes. Inhalation of the allergens by hypersensitive individuals can result in acute attacks of bronchial asthma, accompanied by wheezing, shortness of breath, and perhaps even death. Diagnostic tests and clinical studies by allergists have shown house dust mite to be the most common allergy in asthmatics, and an important "root cause" for the development of asthma in young children.

Description, Detection, Habits. House dust mites are tiny – adults are about 0.5 mm long and the immatures are even smaller. Consequently, they generally are visible only with the aid of a microscope. The presence of house dust mites inside a home can be confirmed by collecting dust samples and examining them under a microscope. Another diagnostic test more accessible to householders can be purchased from drug and allergy supply stores. The detection kits (e.g., Acarex ®) measure the presence and infestation level by combining dust samples, collected from various places inside the home, with indicator reagents. *Sensitivity* to house dust mite and their allergenic proteins can be confirmed by an allergist-immunologist, via a skin and/or blood test.

House dust mites have specific environmental requirements for their development. The mites tend to be most numerous in warm homes with high humidity. They are especially vulnerable to dehydration, and cannot survive well at relative humidities below 50 percent. Their primary food is skin scales (dander) contained in house dust. People and pets regularly shed small flakes of skin from their bodies as the skin continually renews itself. Since the greatest fallout occurs in areas of human and pet activity, the mites tend to be most numerous in beds, overstuffed furniture, and adjacent carpeted areas. Relative humidity also tends to be higher in these areas, because people perspire and exhale water vapor where they sleep and lounge. Mattresses, sofas, carpet, and other soft furnishings trap and accumulate dust, dander, and moisture, making them ideal microhabitats for mite development. A single gram of house dust (about the weight of a paperclip) can contain thousands of mites, while an infested mattress can contain millions.

The allergenic proteins responsible for causing symptoms are contained within the mites themselves (alive or dead), their shed skins, and especially in their feces. Routine human activity such as housecleaning, walking/playing on carpeting, or making the bed, causes the tiny fecal particles to become airborne and inhaled.

Managing Infestations & Alleviating Symptoms. There are two basic approaches to managing dust mite allergy: 1) treatment of the patient, and 2) modification of the patients' environment to minimize exposure to the mites. An allergist may prescribe quick-relief medications and/or allergy vaccinations (immunotherapy). Immunotherapy involves injecting gradually-increasing concentrations of mite extracts over time in order to desensitize the affected individual.

The second approach – often done in conjunction with patient therapy – is to minimize exposure to the mites and their allergenic materials inside the home. This is not a simple process and usually requires much effort and expense. Dust mite abatement has become a huge industry, with companies offering many products and services to allergy sufferers seeking relief from their symptoms. While some abatement measures are helpful, others are relatively ineffective or as yet unproven. Of the treatment measures mentioned below, numbers 1-3 are generally considered most effective, whereas the others may provide some secondary benefit.

1. *Remove or modify furnishings that accumulate dust and provide habitat for the mites.* Carpeting, upholstered furniture, drapes, curtains, stuffed toys, and other fabric-covered furnishings should be replaced with easy-to-clean items. This is especially important in bedrooms and other areas where allergy sufferers spend most of their time. Carpet is a perfect breeding ground for dust mites. If carpeting must be used, select low pile varieties. Area rugs are easier to clean than wall-to-wall carpeting. Hardwood, tile or linoleum floors are much easier to keep clean and dust-free. The same is true of wooden, leather or plastic-covered sofas and chairs. Do not allow children with dust allergies to sleep or play with stuffed animals.

2. *Encase mattress, box springs, and pillows in allergen-impermeable covers.* Bedding is an extremely important source for dust mite development. Plastic or vinyl covers that zip around mattresses, box springs and pillows seal in allergenic materials so that they are not inhaled while sleeping. They are also easier to keep clean than cotton-based

materials. Various styles of dust-proof bedding protectors are available through mattress and allergy supply stores. Many are equipped with an outer layer of material, such as nylon, to enhance comfort. Ideally, it's best to install dust-proof protectors on new bedding items rather than those which are already laden with allergens. Use only washable bed spreads, sheets and blankets, and launder bedding weekly in hot water.

3. *Attempt to lower relative humidity inside the home.* House dust mites have a difficult time surviving when the relative humidity is below 50 percent. Improving ventilation and installing a dehumidifier can often help to reduce populations indoors. Since fabric-covered surfaces retain air and body moisture better than less porous materials (e.g., wood, vinyl, linoleum), removal or modification of carpets, bedding, overstuffed furniture, etc. will further help to reduce humidity and favorable habitat for dust mite development.

4. *Maintain good levels of sanitation and housecleaning.* Traditional vacuuming and cleaning activities have not shown much benefit in reducing mite populations, or removing their allergenic materials (feces, cast skins, carcasses). Routine, thorough vacuuming can, however, help to remove dust, dander, and a small percentage of mites. When vacuuming is performed, it's important to use a vacuum cleaner equipped with a HEPA (High Efficiency Particulate Arrestor) filtration system, so that the microscopic allergens are retained within the vacuum bag. Vacuum cleaners lacking this level of filtration will simply re-circulate the tiny allergenic particles back into the air, often causing even greater allergy symptoms. Emphasis should be on bedrooms, mattresses, and other locations where dust mites are likely to be living. Ideally, allergic individuals should not be the ones doing the vacuuming, nor should they be around when vacuuming is being performed.

5. *Consider the use of allergen-trapping air filters.* Microscopic mite particles, especially feces, can remain suspended in the air for hours and be inhaled. To help remove these allergens, HEPA-grade filters can be installed in the central air conditioning & heating system of the home. HEPA filters can also be used within portable air cleaners, placed in bedrooms and other critical areas of the house. The value of portable room air cleaners may be marginal, however, especially in rooms with good ventilation.

Companies that perform air duct cleaning often cite dust mite control as a major reason to purchase their services. As mentioned earlier, dust mites require high relative humidity for their survival. It's doubtful that the humidity levels found within air ducts are high enough to support ongoing mite development. Removing heavy accumulations of dust and filth from air ducts may be of some benefit, but should be considered secondary to allergy abatement measures 1-3 listed above.

6. *Consider treating carpets with an acaracide.* Mite-killing products containing benzyl benzoate (e.g., Acarosan™) are available for treatment of carpeting, upholstery, and other surfaces. Although benzyl benzoate will kill dust mites, clinical trials are lacking that show much improvement in allergy symptoms. The same is true of products containing tannic acid (e.g., Allergy Control™ Solution), which are designed to denature dust mite allergens so that they no longer cause symptoms. Treatment of the premises with either of these chemicals should be considered only as a supplement to more important allergy-reducing measures, such as encasement of bedding and removal of dust-laden furnishings. Conventional pesticides, such as those utilized by pest control firms or sold to homeowners in grocery and hardware stores, are not to be used for control of house dust mites.

For additional information on house dust mites, see the new entomology Entfact # 646.

DIAGNOSTIC LAB-HIGHLIGHTS

DIAGNOSTIC TIPS FOR DROUGHT-RELATED PROBLEMS
by Julie Beale and Paul Bachi

As the long-term impacts of the 1999 drought begin to appear this spring, Extension Agents should expect many inquiries---particularly about landscape plants. Agents themselves may have questions about how best to approach diagnosis of plant problems with regard to the drought and how to prepare samples for submission to the Diagnostic Laboratory. Landscape problems are perhaps the most difficult to diagnosis because of the complex interaction of site, plant, and management factors. The lasting effects of an extreme drought will only add to that complexity in the years to come. People often describe symptoms as appearing "overnight"; however, decline of woody plants is typically a slow process. As our memories of 1999 fade, trees

and shrubs will continue to suffer the drought's effects.

Symptoms of root/soil problems, which are common in spring, may be more prevalent than ever this year. Look for dieback of branch tips, failure to leaf out and/or late budbreak, needle browning and defoliation of conifers, and reduction in shoot growth. In many cases where these symptoms are observed, the drought will have a role, whether or not the damage is compounded by other factors. Observe the site carefully for subtle differences in topography, soil moisture, potential for drying winds or intense sunlight and other factors which may account for differences in damage to plants. Also remember that plant species vary in their tolerance to moisture fluctuations. Remind clients that the extremely *wet* conditions which preceded the drought (Spring 1997 and 1998) may actually have caused the initial damage to plants while the drought merely "finished them off." The usual inquiries about cultural practices--transplanting, mulching, watering, etc.--will be even more important to ask. Trees and shrubs that were "watered regularly" may not have been watered deeply enough to stave off drought damage. Remind clients that symptoms of transplant shock can appear several years after transplanting, especially after a major drought.

Drought stressed plants tend to be more susceptible to certain infectious diseases, such as stress-related cankers and branch dieback, wilts and sometimes root rots. If you suspect a disease is present and wish to submit samples to the Diagnostic Lab, **complete information** on the Plant Disease ID form, plus the Supplemental Tree and Shrub form for woody specimens, and appropriate sample material is critical. In many cases we will need to evaluate root condition, checking for desiccation, poor root development, rotting or discoloration from root decay organisms, and absence of feeder roots; therefore, root samples should be dug carefully with soil still attached (note that "pulling up" roots often strips away feeder roots). The attached soil allows us to assess soil conditions in the root zone as well. Although roots often tell more of the story than the branches and leaves, branch samples are necessary to check for cankers and vascular wilts. Our usual motto holds true: "the better the sample and information provided, the more precise the diagnosis." Only this scenario helps all of us--agents, lab personnel and our clientele--spend our collective time and effort wisely.