

Pest Alert

Vol. 17 No. 11

June 30, 2000

**The Pest Alert is now found on the World Wide Web at
<http://www.colostate.edu/programs/pestaalert>**

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JUNE 25 VEGNET REPORT

During June of 2000, rainfall has been low throughout all of Colorado, western Nebraska, eastern Wyoming and western Kansas. Temperatures averaged in the mid 80s to low 90s at most sites. The regional weather forecast predicts above average rainfall and average temperatures for the next week.

There are still no reports of foliar disease problems on sugar beet, onion or bean at this stage. This week may bring lower temperatures and more moisture, so follow an aggressive scouting program to detect early signs of pest problems.

Please share sightings of pest problems by calling the CSU VegNet Team at 970-491-6987 (Howard Schwartz), 491-7846 (Mark McMillan), or 491-0256 (Kris Otto).

POTATO

A few samples of Alternaria blight and Early Blight have been brought in from the Front Range area, and should be managed with protectant fungicides such as the EBDCs (e.g., maneb, mancozeb, penncozeb, dithane, polyram), super tin; Bravo may not be very effective against the Alternaria blight, but does work well against Early Blight.

Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating.
Cooperative Extension programs are available to all without discrimination.

The potato foliar disease model was complicated by the mid-May freeze, which caused partial to complete death of emerged potato foliage. If one uses a May 1 emergence date, the early blight model (threshold of 300) is averaging 340 throughout the Front Range and northeastern Colorado; however, if one uses a May 15 emergence (regrowth) date, then the early blight model is averaging 280. The late blight model (threshold of 18) still remains below 3 at all reporting sites in Colorado, regardless of the early or mid May emergence date. Since not all potato plants were frozen back in every field, it is probably better to use the earlier emergence date to schedule aggressive scouting calendars to detect the first signs of early blight before initiating your fungicide program as row closure is achieved and tuber bulking commences.

DRY BEAN

The bean rust model confirms that there is low potential for disease development based upon scattered outbreaks of light rust late in the 1999 season, no evidence of infected volunteer bean plants this spring, widespread planting of rust-resistant varieties, reduced bean acreage, high temperatures and dry conditions this spring, and forecasts for continued hot, dry conditions.

If these high temperature periods persist throughout the vegetative and flowering periods, common bacterial blight will probably be the most reported foliar disease threat this season; especially if storms and/or contaminated irrigation water move the bacterium within and between bean fields. The early to mid-season copper-based bactericide program initiated during the vegetative period (preferably with a ground-rig) can reduce common blight (bacterial brown spot, halo blight) severity later during flowering and pod-set.

The hot, dry conditions this spring have contributed to recent reports of high thrips populations on dry bean plants in northeastern Colorado and surrounding region. Thrips are small, active, cigarette-shaped, yellow-to-brown insects. Onion thrips are most commonly associated with furrow irrigated beans grown in close proximity to winter wheat. Infestations commonly occur as the wheat matures and the onion thrips disperse in search of new food sources. Onion thrips feeding results in leaf cupping and distortion that is made severe by plant stress (low moisture and high temperature).

Consider treatment (Orthene, Disyston, Lannate, etc) if there are more than 15 thrips per plant and damage is observed. Tap the plant on white cardboard or in a white container and then count the thrips that have been knocked off. Onion thrips infestations and damage are often more severe at field edges so be sure to assess the entire field before making a treatment decision. Western flower thrips feed in developing flowers and can cause flower and pod abortion. Five flower thrips per blossom can reduce the number of pods per plant.

ONION

Onion transplants continue to bulk up rapidly with our earlier warm growing conditions and lack of storm damage. Maintain the copper-based bactericide program, tank-mixed with an EBDC product on a 7 to 10 day interval to reduce problems with bacterial diseases and any fungal diseases (Purple Blotch, Botrytis Blast) that could develop as the plants continue to develop and mature in the next few weeks.

Most seeded fields are growing vigorously are approaching the pre to early-bulb stage and may benefit from a protectant bactericide/fungicide application (copper + EBDC product such as maneb, mancozeb, dithane, penncozeb) for the bacterial disease complex. There are a few early seeded fields that are at the early bulb stage, and these fields may benefit from protection as plant canopies create more favorable microclimates and as the plants become more susceptible physiologically.

If one uses an April 1 emergence date for seeded onions, the Purple Blotch disease model (threshold value of 300) is averaging 250 - 300 in the Front Range area, 300 at Fort Morgan, 250 in the Arkansas Valley, and 250 on the West Slope. Therefore, most onion areas are approaching the threshold and require aggressive scouting programs to detect early infection in the next 7 to 14 days in transplanted and/or seeded fields.

Pink root and Fusarium basal plate rot affected plants are being observed in many fields this year, and probably the incidence is due in part to the early-season high temperature stress. Avoid additional stress from root pruning (during cultivation and/or lay-by applications of fertilizer). (Schwartz)

WHAT IS A PYRETHROID?

One of the oldest insecticides in use, dating back to the early 1800s, are those derived from the flowers of certain composite flowers, in particular *Chrysanthemum (=Pyrethrum) cinaerifolium*. Extracts of these "**pyrethrum** daisies" contain active insecticidal ingredients known as **pyrethrins**. Pyrethrins are commonly included in a wide variety of insecticide formulations, primarily for household pest control. However it is widely labeled for use including essentially all food crops and ornamentals, for livestock and for stored grain. These natural pyrethrins are also the only insecticides allowed for use in food handling areas.

Pyrethrins have several interesting and useful characteristics. For one they have very low toxicity to mammals. They also break down very rapidly, typically within a few hours, minimizing problems with residues. Also they can have very rapid effects, known as "knockdown", which incapacitates susceptible insects. (Recovery may occur in many cases if dosages are sublethal.)

The basic insecticidal compounds of pyrethrins have been "tweaked" in the lab to create synthetic analogues, known as **pyrethroids**, a.k.a. "synthetic pyrethrins". These man-made insecticides were developed to have a range of features. For example, most pyrethroids have substantial persistence in the order of days to weeks. (Some studies regarding persistence on bark suggest effects for a year.) Pyrethroids may also have a different range of affected species, e.g., a few have miticidal activity. Knockdown effects are not as dramatic as with pyrethrins, but they tend to be faster acting than other classes of insecticides and often have irritation effects on insects. Activity against insects is also quite high, with typical pyrethroids requiring use rates being in the order of a couple of ounces or less of active ingredient applied per acre versus a pound/A of organophosphate and carbamate insecticides.

Toxicity also tends to be higher to mammals than the pyrethrins, although there is a wide range. For example, some pyrethroids have moderately high mammalian oral toxicity such as deltamethrin (60 mg/kg LD50), bifenthrin (54 mg/kg LD50), and cyhalothrin (50-79 mg/kg

LD50). Others have low oral toxicity to mammals such as permethrin (1500-2000 mg/kg LD50) and resmethrin (8000 mg/kg LD50). Mammalian dermal toxicity of all is low. All have moderate to low toxicity to birds. However, *pyrethroids tend to be extremely toxic to fish*, which has typically restricted uses in vicinity of fish-bearing waters.

Over the past 25 years numerous pyrethroids have emerged and have become a dominant class of insecticides in agriculture, rivalling or surpassing the organophosphates. More recently, they entered the turf/ornamental market. Only now are they finally filtering into the home/garden market. Given the recent restrictions on organophosphates, the use of pyrethroids, at least in the near term, can only be expected to increase.

Some pyrethroids and some of their trade names include:

Permethrin

- *Pounce, Ambush* - Agricultural formulation on a wide variety of fruit, vegetable, field and forage crops
- *Astro* - Formulation sold for commercial turf/ornamental care
- *Dragnet* - Formulation sold to professional Pest Control Operators for use against household insects
- *Bonide Eight Garden and Home, Ortho Bug-B-Gon Multipurpose Garden Dust, Eliminator Garden and Pet Dust, Ford's Intercept Insect Control/Vegetable, Lawn, Garden Spray Concentrate, K-Gro Multi Purpose Insect Killer*. - Over the counter formulations available in nursery outlets with a wide range of uses including edible garden and fruit crops, ornamentals, general pest control, and parasites of pets.

Esfenvalerate

- *Asana* - Agricultural formulation on a wide variety of fruit, vegetable, field and forage crops
- *Ortho Bug-B-Gon Multi-Purpose Insect Killer* - Over the counter formulation a wide range of uses including some edible garden and fruit crops, ornamentals and general pest control.

Bifenthrin

- *Capture* - Agricultural formulation on some field crops.
- *Brigade* - Agricultural formulation on some tree fruit crops.
- *Talstar* - Formulation sold for commercial turf/ornamental care
- *Ortho Houseplant and Garden Insect Killer, Ortho Home Defense Indoor and Outdoor Insect Killer* - Over the counter formulations available in nursery outlets for use on ornamentals and for general pest control.

Cyfluthrin

- *Baythroid* - Agricultural formulation on some field and vegetable crops.
- *Tempo* - Formulation sold for commercial turf/ornamental care. Also, some formulations are used by Pest Control Operators.
- *Bayer Advanced Garden Lawn and Garden Multi Insect Killer*. - Over the counter formulations available in nursery outlets for use on turf/ornamentals and for general pest control.

Tralomethrin

- *Spectracide Indoor and Outdoor Home Insect Control 4, K-Rid Home Insect Killer 4, Real-Kill Home Insect Control.* - Over the counter formulations available in nursery outlets for use for general pest control on non-food crop sites.

Resmethrin

- Ford's Intercept Insect Control/Rose, Flower and Ornamentals, Burgess bug Killer Insect Fog, fertilome whitefly and Mealybug Killer. - Over the counter formulations available in nursery outlets for use for general pest control (primarily as a fogger) and indoor and outdoor ornamental plants. (Cranshaw)

REREGISTRATION PERFORMANCE MEASURES AND GOALS DETAILED

EPA published its fiscal year 1999 account of progress in meeting pesticide reregistration performance measures and goals in the Federal Register on June 14. The integration of tolerance reassessment with the reregistration process is discussed. The status of various related regulatory activities including numbers of Reregistration Eligibility Decisions (REDs) and Data Call-In Notices issued, product reregistration and tolerance reassessment actions completed, reregistration studies reviewed, and "fast track" registration applications approved are described. EPA's tentative schedule is to complete REDs for the organophosphates (OPs) and other priority pesticides during fiscal years 2000 and 2001. The Federal Register Notice (65 FR 37375) is available on the EPA web site at: <http://www.epa.gov/fedrgstr>. Public comments are invited for 60 days, through August 14, 2000 and should be identified by Office of Pesticide Programs docket number OPP-34221. (McDonald)

EPA CONTINUES IMPLEMENTATION OF AZINPHOS_METHYL RISK REDUCTION MEASURES

On June 22, EPA took an important step in implementing the August 2, 1999 agreement to help mitigate risks from the pesticide azinphos_methyl, by issuing a final rule to revoke and lower certain tolerances for the pesticide azinphos_methyl. This is part of the reregistration process due to the Food Quality Protection Act (FQPA). The final rule:

- Implements changes resulting from the August 2 agreement (revocation of the tolerance on sugarcane and lowering of tolerances on apples, crabapples, cranberries, grapes, pears, and quinces);
- Revokes tolerances for commodities for which there are no registered uses;
- Revokes a tolerance for sugarcane bagasse, a crop that is no longer a significant animal feed item;
- Revokes a tolerance for dried citrus pulp, a commodity for which processing studies show no concentration in the processed commodity;
- Revokes 13 tolerances for various meat products and milk, for which available data show no indication of finite residues;
- Removes the tolerance for nectarines because that use is covered by the tolerance for peaches;

- Lowers tolerances on almond, potato, and almond hulls to achieve compatibility with international standards (Codex MRLs); and
- Changes commodity terminology and definitions to conform to current EPA practice.

The revocation of the tolerance on sugarcane will be effective June 30, 2000. Other changes and revocations will take effect 90 days after publication of this rule (i.e., September 20, 2000). EPA must receive objections and requests for hearings, identified by docket number OPP-301003 by August 21, 2000. Of the 35 tolerances revoked in this rule, 22 count toward the Agency's goal to reassess 66% of pre-1996 tolerances by August 2002, as mandated by FQPA.

The Federal Register notice (Vol. 65, No. 121, Pages 38748-38753) is available on the EPA web site at: <http://www.epa.gov/fedrgstr>. (McDonald)

EPA CONCERNED ABOUT DIAZINON RELATED RISKS

EPA is concerned about a number of residential and occupational risks from diazinon. The risks have been identified in its preliminary health effects assessment for the organophosphate (OP) insecticide.

Produced by Novartis Crop Protection Inc., diazinon is registered for use on a variety of food crops; food and feed handling establishments; livestock areas; indoor and outdoor residential sites; and in flea and tick pet collars. It is also an ingredient in pest strips. According to EPA's Office of Pesticide Programs Health Effects Division total annual domestic usage is approximately 6 million pounds of active ingredient (ai), based on usage information for 1987 - 1997. More recent information places 1999 diazinon sales at 13.5 million pounds ai. Most of this is outdoor residential use, lawn care operators and pest control operators.

The public comment period ends July 18, 2000. For more information see <http://www.epa.gov/opsrrd1/diazinon.htm>. (McDonald)

MALATHION RISKS, "GENERALLY ACCEPTABLE"

Malathion presents very few unacceptable risks to human health, EPA determined recently in its preliminary and long-awaited evaluation of the widely used insecticide. Some of the most anticipated findings were those relating to malathion's use for mosquito control. In this assessment, which was performed separately from the others, EPA's Office of Pesticide Programs Health Effects Division estimated that the risks from aerial and terrestrial application are well below the agency's threshold of concern. Because the general public is exposed to malathion during its use for mosquito control, EPA's conclusions on its carcinogenicity also were of interest. Previously, EPA had classified the organophosphate (OP) as a likely carcinogen. In the latest assessment, EPA has tempered its evaluation by placing malathion in its proposed "suggestive" category. Dietary exposures to malathion are not a concern to EPA. EPA has eliminated the Food Quality Protection Act (FQPA) 10X safety factor for malathion because the toxicological database is complete. Studies have not demonstrated reproductive effects in pups, developmental studies have not demonstrated fetal effects and "neuropathology and OPDIN were negative," the assessment says. The acute Population Adjusted Dose (aPAD) for malathion was set at 0.5 milligrams/kilogram/day.

At that level, each population subgroup is exposed to less than 100% of the aPAD — with nursing infants less than 1 year (35%) and children age 1 to 6 (38%) being the most exposed subgroups. For more information see:

http://www.epa.gov/oppsrrd1/op/malathion_bak.htm
(McDonald)

CHLORPYRIFOS (DURSBAN/LORSBAN) PHASE-OUT

Certain uses of chlorpyrifos are being phased-out (cancelled) over a period of months to years. Most of these are the homeowner products. There are four important points to know:

- 1) It is still legal to sell these products.
- 2) It is still legal to buy and use the products ACCORDING TO LABEL DIRECTIONS.
- 3) End users of these products should NOT panic and throw them in the trash. They should use them or give them to someone who can/will use them.
- 4) End users should NOT return them to the retailer (see points 2 and 3 above).

An EPA Fact Sheet entitled, "Chlorpyrifos Revised Risk Assessment and Agreement with Registrations" is available at: www.epa.gov/pesticides/announcement6800.htm. The 25-page overview of the chlorpyrifos risk assessment is posted to OPP's website at: www.epa.gov/pesticides/op/chlorpyrifos.htm. EPA has posted a list of registered chemical alternatives for chlorpyrifos at: www.epa.gov/pesticides/op/chlorpyrifos/alternatives.htm.

Some summary information follows:

Food uses for chlorpyrifos are: cranberries, strawberries, citrus, apples, figs, pears, nectarines, cherries, peaches, plums, grapes, almonds, pecans, walnuts, onions, peppers, kale, broccoli, brussel sprouts, cabbage, cauliflower, collards, cucurbits, asparagus, roots/tubers, corn, tomatoes, lentils, beans, peas, sorghum, tobacco, wheat, alfalfa, peanuts, soybeans, sunflower, cotton, sugar beets, mint, and bananas.

Chlorpyrifos is also used as a termiticide; mosquitocide; a treatment for lawns, turf and ornamentals; an indoor crack and crevice and spot treatment; in pet collars; as a treatment for pasture, woodland and lots/farmsteads; and as a cattle eartag.

Use of chlorpyrifos in and around homes and in non-residential settings will be eliminated or phased-out by the chlorpyrifos manufacturers. Further, apple use will be restricted and use on tomatoes will be eliminated.

Chlorpyrifos is not currently a restricted use pesticide. It is applied by the following methods: aerial, chemigation, groundboom, tractor-drawn granular spreader, airblast sprayer, low & high pressure hand wands, hydraulic hand-held sprayer, shaker can, bulbous duster, belly grinder, push-type spreader, large tank sprayer, compressed air sprayer, hose-end sprayer, aerosol sprayer, hand, pet collars and eartags.

An estimated twenty to twenty-four million pounds of chlorpyrifos are applied annually. Approximately 50% of the use of chlorpyrifos is in agricultural settings and 50% of the use is in non-agricultural settings. An estimated 24% of all use of chlorpyrifos is as a termiticide. Mitigation is expected to reduce the total use of chlorpyrifos by as much as 50% when fully implemented based on available use data from the late 1990's.

Chlorpyrifos can cause cholinesterase inhibition in humans; that is, it can over stimulate the nervous system causing nausea, dizziness, confusion, and at high exposures, respiratory paralysis, and death.

Dietary risk from food is below levels of concern based on risk mitigation. The acute and chronic risk assessments are highly refined using USDA Pesticide Data Program (PDP) data and FDA monitoring data that reflects actual use of pesticides for most commodities.

Prior to mitigation, at the 99.9th percentile exposure there were acute risks of concern for the most exposed sensitive population sub-groups, consisting of all infants, children 1-6 years old, children 7-12 years old and females. Use of chlorpyrifos on apples, tomatoes and grapes have been mitigated to address acute dietary risks. After mitigation, at the 99.9th percentile, acute risks are not of concern for the most highly exposed population sub-group, children 1-6 years old.

Chronic dietary risk is not of concern.

Prior to mitigation, post application re-entry risks and mixer/loader/applicator risks for residents are of concern for all exposure scenarios. These risk estimates are based on chlorpyrifos-specific studies supplemented by the Agency's SOPs for estimating residential exposure. To address residential risks, use of chlorpyrifos in and around homes and in non-residential settings will be eliminated or phased-out by the chlorpyrifos manufacturers. After mitigation residential risks are not of concern.

Worker risks are moderate and have been mitigated in some cases. For mixers, loaders, and applicators, risks for some exposure scenarios, including residential applications, are of concern even with maximum Personal Protection Equipment (PPE)/engineering controls, using data from chlorpyrifos-specific studies and the Pesticide Handlers Exposure Database.

Restricted Entry Intervals (REIs) ranging from 1 to 10 days (with most of them being 1 day) would be necessary for various crops and activities to address post application re-entry risks. Typical labels currently require 12-24 hour REIs. As part of the mitigation, the chlorpyrifos registrants have agreed to voluntarily place the new REIs on all agricultural products. This will address post application worker risks.

Drinking water risk is below the levels of concern. A drinking water assessment that relies heavily on monitoring data determined that acute and chronic exposure from drinking water is not of concern based on the mitigation. Additionally, the voluntary mitigation mentioned earlier will mitigate drinking water exposures.

Some localized applications of the subterranean termiticide use within 100 feet of wells have resulted in contamination of individual drinking water wells as evidenced by 251 reported contamination incidents from 1992-1997. In some instances, high levels of contamination have occurred. The risk assessment using high-end concentrations from these incidents conservatively estimates risks in these localized areas as very high. Incidents of this kind have been decreasing steadily since the issuance of the PR Notice on termiticides in 1996.

Aggregate risk is not of concern based on risk mitigation. The short-term and intermediate-term aggregate risks do not exceed EPA's level of concern. Chronic aggregate risks do not raise a concern when all of the uncertainties and mitigation are considered.

Ecological risks are moderate. The risk assessment indicates that risk to birds, fish and mammals are high and that risks to aquatic invertebrates are very high. The mitigation of residential uses is expected to have some beneficial impact on risks to both aquatic and terrestrial organisms. (McDonald)

Horticulture and Landscape Management Field Day

Friday, August 4 2000

The Department of Horticulture and Landscape Architecture will hold a field day at CSU Friday, August 4, 2000. As in previous years the field day will be divided between the Horticulture farm north of Fort Collins on HWY I-25 and the W.D.Holly Plant Environmental Research Center (PERC) on the CSU campus in Fort Collins. Topics to be covered are:

TURF GRASS MANAGEMENT

Drought Resistance of Texas Bluegrass vs. Kentucky blue grass (HRC)
Buffalo grass Establishment and Management (HRC)
Plant Growth Regulator Effects on Turf in Shade (HRC)
National Tall Fescue, Bluegrass, Rye grass, Bent grass, Buffalo grass, and
Fine Fescue Trials (HRC and PERC) Salt grass Research (HRC) Turf grass
Irrigation with Saline Water (HRC) Rye grass to Blue grass Conversion Using
Herbicides (HRC) Necrotic Ring Spot Research (HRC)

LANDSCAPE HORTICULTURE and FLORICULTURE

Annual Flower Trials for 2000 (PERC)
Perennials and Ornamental Grasses for the High Plains (PERC)
Plant Select® Update (HRC & PERC)
Postplant Growth of Woody Plants Following Various Storage Methods
Pre-Emergent Herbicides for Container Grown Perennials (PERC)
Unusual Woody Plants for Colorado (HRC and PERC)
Vegetable Trials for 2000 (PERC)
Plant Growth Regulator Research on Floriculture Crops (PERC)

We will also set up a Plant and Pest Diagnostic clinic at PERC in the afternoon.

Morning Program at (HRC)- I-25 and Mountain Vista Drive (Exit 271)

8:00 - 8:45 Registration/donuts, coffee, juice

8:45 - 9:00 Introductions

9:00 - 12:00 Tour of Horticulture Research Center

12-1:30 - lunch

Afternoon Program at PERC, 630 West Lake Street, on the CSU campus

1:30 - 3:30 Tour W.D. Holley Plant Environmental Research Center

Registration Information

DEADLINE FOR PRE-REGISTRATION: 25 July 2000

PRE-REGISTRATION FEE: \$20.00 per person, NOT including lunch

LUNCH AT PERC: \$10.00 ADDITIONAL PER PERSON
(with Pre-registration BY ABOVE DEADLINE, ONLY)

LATE/ON-SITE REGISTRATION: \$30.00 per person;
NO lunch available with late/on-site registration

For more information: Phone 970-491-7684 or FAX 970-491-7745
e-mail to bschilli@agsci.colostate.edu

(Brown)

Corn Disease Update

Rootless Corn Syndrome (RCS) -- When I came up with this a couple of weeks ago a question arose whether Brown had been out in the sun too long. But there really is such a condition and the term used to describe it is rootless corn syndrome. The basic symptom is that the brace roots do not develop and in many instances a discoloring (darkening) develops at the tips (Figure 1 & 2).



Figure 1. Rootless corn syndrome (RCS).



Figure 2. Blackened root tips with RCS.

The cause is due to hot soil (usually the more sandy soils) and hot dry wind. The brace roots touch the soil and the hot soil prevents further development. The consequence is that insufficient brace root growth develops and plants can fall over. To correct this it is recommended to push soil up on both sides of the corn stalk at very slow tractor speeds so as to not knock them over. Cooler weather and irrigation also help to correct it.

Goss's wilt -- Goss's wilt is still be found in the northeast area. One of the interesting aspects of this is that the disease for all practical purposes had basically disappeared up until 2 years ago when we found it in two fields in the Wiggins area. Both those fields had known susceptible cultivars and were in low till fields.

Goss's wilt is caused by a bacteria, *Clavibacter michiganensis* subsp. *nebraskensis*, that survives in debris from previous corn crops on or near the surface of the soil. It is also

reported to be seed borne in very susceptible dent corn lines. Most spread though is through wounds caused by injuries from hail, blowing sand or insect damage.

Symptoms are initially similar to Stewart's blight with various degrees of leaf blight that are gray to light yellow stripes and on some lines reddish. In the instance of Goss's wilt leaf lesions frequently will have dark spots (i.e., freckles) and are excellent diagnostic symptoms (Figures 3 & 4). Also bacteria will exude (flow) from leaf tissue and dry, leaving a shiny appearance to the leaf surface.



Figure 3. Leaf discoloration and stripes.



Figure 4. Black spots (freckles).

Stalk symptoms can also develop that sometimes are confused with bacterial stalk rot. The main difference is that the Goss's wilt symptoms are initially associated with the vascular bundles and the symptoms of bacterial stalk rot are invasive from the stem into the stalk. Goss's wilt symptoms initially show as an orange color in the vascular bundles (Figure 5).

Figure 5. When early infections develop (i.e., this year) wilting, withered and dead seedlings and young plants develop. Systemically infected plants will have an



MANAGEMENT of goss's wilt has been well established using resistance, tillage and rotations. according to the american phytopathological societies corn compendium resistance is controlled by relatively few genes that act in an additive manner. dent corn inbred, a632 and hybrids with this parentage are highly susceptible. rotation and deep plowing to bury infested debris right after harvest are effective in reducing disease

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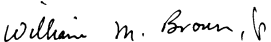
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Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

Sincerely,


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