Plant Disease and Insect Advisory

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Be on the Lookout for Aster Yellows

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Flower production is not without its hazards in the Southern Plains and Midwestern states, and a chief concern among many growers is controlling plant diseases that can rapidly devastate a crop. Aster yellows (AY) are no exception, having the ability to infect the majority of a crop before its presence is even discovered. The causal agent of AY is a plant pathogen belonging to a group known as phytoplasmas (formerly known as mycoplasma-like organisms, or MLO's) and is transmitted by aster leafhopper, *Macrosteles quadrilineatus* Forbes, and several other leafhopper species. These insects have piercing-sucking mouthparts, which they use like straws to insert into plant tissue and extract plant sap. While feeding, they acquire the AY phytoplasma from infected host plants.

Symptoms of AY vary with age and species of host plant, timing of infection, temperature, and the specific strain of phytoplasma. This variability in disease expression makes detection difficult, and the fact that AY is often mistaken for herbicide damage and genetic disorders does not help the situation. In ornamental crops, general symptoms include yellowing of leaf veins, chlorotic leaf tissue, abnormal growth of secondary shoots and flowers, stunting of internodes and flower buds, and flowers that remain green. The disease can kill some susceptible plant species, while others have been reported to outgrow the symptoms. Infected plants are unmarketable due to these aesthetic (or lethal) maladies, but most importantly they may serve as new sources of disease for other plants.

Aster yellows in *Echinacea purpurea,* left, and *Rudbeckia*, right. (Missouri Botanical Gardens PlantFinder, http://www.mobot.org/gardeninghelp/plantfinder/Alpha.asp).

Both the phytoplasma and its aster leafhopper vector have a wide host range of approximately 350 species of plants in 54 plant families, including aster, chrysanthemum, gloxinia, monarda, and many other perennials and flowering plants. The Plant Disease and Insect Diagnostic Laboratory at OSU recently diagnosed a substantial outbreak of AY in columbine, scabiosa, and coreopsis at an Oklahoma nursery. The disease affected hundreds of plants that necessitated the destruction of all three crops. The disease is also devastating in vegetable crops, and growers in the Midwest frequently monitor for infective populations of aster leafhopper migrating northward from southern states in late spring through early summer. Included among the many species of host plant is an array of weedy plants that can serve as reservoirs of the disease in and around production systems, enabling AY to persist in low to moderate levels and increasing the likelihood of crops becoming infected by leafhopper vectors. In this way, infective aster leafhoppers can be viewed as "dirty" hypodermic needles flying around and spreading the disease to new hosts. However, it takes at least 2 hours of continuous feeding for aster leafhopper to acquire the phytoplasma, and a period of 10 days to several weeks may be required for the pathogen to incubate within the leafhopper and become infectious to other plants.

A key factor in managing AY is to monitor for aster leafhopper. Adult aster leafhoppers are generally dark green and measure approximately 1/6 inch in length. They are wedge shaped and hold the wings in a roof-like fashion over their abdomens. This species is easily identified by the characteristic markings on the head, having 6 black spots located between the compound eyes. Aster leafhoppers are able fliers and will jump and/or fly away when disturbed. Thus, a sweep net is an indispensible tool when monitoring for aster leafhopper in production systems.

Adult aster leafhopper. (Whitney Cranshaw, Colorado State University, Bugwood.org.

Unlike fungal and bacterial pathogens, phytoplasmas cannot be directly controlled with pesticides. Once AY is detected, infected plants should be rogued immediately, isolated, and destroyed. Unfortunately, plant removal may not be enough to save a crop because many healthy-looking plants may also be infected. The transmission rate will depend on temperature, population density of aster leafhoppers, and percentage of the insect population that is infectious. As with vegetable plants, host plant resistance to AY may hold promising results for managing the disease in nurseries. However, the diversity of plants that co-occur in a production system favors establishment of AY in other susceptible crops. Effective weed control in and around the nursery can also help reduce transmission through removal of reservoir plants. Though not practical for large-scale nurseries, exclusion devices such as netting and row covers can prevent aster leafhoppers as well as other flying insect pests from contacting the crop. Correctly timed insecticide applications may be the most practical

leafhopper management tool available to large nurseries. Timing is optimized through regular monitoring of aster leafhopper using sweep nets and yellow sticky cards, particularly when large populations are expected during their northward migration. However, native (overwintering) individuals may be active before the migratory populations reach Oklahoma, so keep an eye out for aster leafhopper as soon as plants are uncovered or brought outdoors in early spring. Once detected, contact your county extension office for specific information regarding leafhopper control in your area.

References:

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