

## FACT SHEET

# Willow Leaf Beetles, *Calligrapha multipunctata* and *Plagioder a versicolora*

## INTRODUCTION

Leaf beetles (Family: Chrysomelidae) are major pests of shrub willow in the United States and Europe. Two species, *Calligrapha multipunctata* Say, native willow beetle, and *Plagioder a versicolora* Laicharting, imported willow beetle, are commonly found on shrub willow throughout the growing season in the U.S. and are considered “specialists”, feeding almost exclusively on willow. Both the larvae and the adults feed on willow leaves, either skeletonizing the leaf (larvae) or eating through the leaf creating multiple small holes in the leaves (adults). While the damage to leaves caused by beetles rarely kills a plant, it can result in reduced yield and susceptibility to other pests and diseases.



Top: Adult imported willow beetle feeding on a *Salix viminalis* x *S. miyabeana* hybrid. Bottom: Larvae of chrysomelids feeding on a *S. purpurea* x *S. miyabeana* hybrid.

Adult willow beetles. left: native (*Calligrapha multipunctata*) and right: imported (*Plagioder a versicolora*).



## BIOLOGY

In the northeastern U.S., the imported and native willow beetles are common leaf feeders. The native willow beetle, approximately ¼ inch long (8-10 mm) is golden or silver with black spots, while the imported willow beetle is smaller, approximately ⅛ inch long (3-4 mm) and is usually black or incandescent dark green in color. The natural history of both species is fairly similar. The adults emerge from overwintering in late April to early May and feed on young, tender willow leaves, creating little shot holes. Shortly after emerging, the adult females lay small eggs in clusters on the underside of leaves. Young larvae emerge within a few days and feed on the understory leaves. The larvae skeletonize the lower understory leaves, leaving a thin layer of the upper epidermis undamaged. Larvae pass through multiple instars, and then pupate in the soil. Late in the growing season, the adults overwinter in the leaf litter on the ground or under the bark of willow stems. Two to three generations per season occur in the Northeast, depending upon species and local weather conditions.

## SUSCEPTIBILITY

Chrysomelids feed preferentially on particular species of shrub willow including the native species, *S. eriocephala*, *S. bebbiana* and *S. discolor*. They display lower feeding preference for the naturalized species, *S. purpurea*, and other commercial varieties, such as *S. miyabeana* ‘SX64’ or ‘SX67’, *S. sachalinensis* ‘SX61’, *S. purpurea* x *S. miyabeana* ‘Oneida’, and *S. sachalinensis* x *S. miyabeana* ‘Sherburne’ or ‘Canastota’.

Willows respond to beetle herbivory by producing an array of chemical defense compounds in new leaves to ward off additional feeding. Some species will tolerate feeding by chrysomelids, compensating for the herbivory by producing new shoots and leaves. Depending upon the extent and time of feeding in the season, willows may become more susceptible to environmental stresses, such as drought, or other pests and diseases. Specific attention should be paid to plantings during their establishment year when damage to leaves of young plants can result in poor establishment with higher susceptibility to other environmental stresses.

For more information on shrub willow, please visit the following websites: Cornell Willowpedia: <http://willow.cals.cornell.edu>, DoubleA Willow: [www.doubleawillow.com](http://www.doubleawillow.com) and SUNY-ESF: [www.esf.edu/willow](http://www.esf.edu/willow).

## References:

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## MANAGEMENT

The effects of defoliation by larvae and adult chrysomelids on yield have not yet been quantified in the U.S., but based on data collected in Sweden, high defoliation will result in significant yield reductions through the first harvest cycle (Björkman et al., 2000). Defoliation from cottonwood leaf beetle feeding was shown to reduce growth for multiple years in *Populus* (Coyle et al., 2008), and other studies have suggested similar reductions in growth are possible in willow plantings (Kendall and Wiltshire, 1998). In Sweden, planting willow in monocultures increased the risk of pest outbreaks in one study (Dalin et al., 2009), therefore, planting a mixture of varieties in multiple diversity groups may be beneficial. However, more research is needed to fully evaluate this strategy for North America.

At this time, no recommended management practices are currently available for use on chrysomelid beetles in short rotation willow plantings. Conventional pesticides such as carbaryl (Sevin) and spinosad (Conserve) are effective and labeled for use on ornamental shrubs, but none are labeled specifically for willow bioenergy crops. Your local cooperative extension expert may provide more information for specific control in your area.



Damage caused by adult chrysomelid beetles feeding on a natural accession of *Salix discolor*.