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BACTERIAL GALL ON LOROPETALUM

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A gall disease characterized by formation of irregular areas of dark-colored callus tissue or 'knots' on the main stem and later shoots on loropetalum (*Loropetalum chinense*) has recently been observed in container stock and in landscapes in Alabama (Conner *et al.* 2013). Similar symptoms have been observed in landscape and nursery plantings of loropetalum in North Carolina and Georgia. The plant pathogenic bacteria *Pseudomonas savastanoi* was isolated from galls on symptomatic loropetalum and was subsequently shown to produce identical galls 8 weeks after inoculation of otherwise healthy loropetalum liners. In addition to bacterial gall on loropetalum, *Pseudomonas savastanoi* also causes olive gall on olive *(Olea europaea*) (Fichtner 2011), which is a worldwide disease of cultivated olive as well as oleander knot (Kavak and Üstün, 2009). Ornamental hosts for *P. savastanoi* in the Olive family include ash, privet, and forsythia. Rapid spread of bacterial gall is easily facilitated by the shipment of infected cuttings as well as diseased liners and container stock.

The most noticeable symptom of bacterial gall on loropetalum is shoot dieback or plant death. Dark colored, rough surfaced galls of varying sizes develop on the shoots or main stem of symptomatic plants (Fig. 1). Eventually, the galls enlarge until a lateral branch or main stem is encircled (Fig. 2) and girdled, which then results in the appearance of dead shoots or plant death, respectively. Wounds attributed to pruning and harvesting cuttings as well as frost or hail are likely entry points for the causal bacterium *P. savastanoi*. On olive, leaf scars give the *P. savastanoi* easy entry into tender shoots.

Figure 1. Gall (arrow) on main stem of loropetalum

Figure 2. Gall formed at branch fork on loropetalum.

Bacteria ooze from the galls on olive during extended periods of wet, cloudy weather (Fichtner, 2011). The bacterium is then dispersed to adjoining healthy shoots or plants by water splash from rain showers or overhead irrigation. Fichtner (2011) also noted that wetter environments greatly increased disease severity on olive. Transmission probably occurs during cutting propagation and liner production, and to a lesser extent in plantings in the landscape. The causal bacterium is an epiphyte that survives extended periods on the bark and only becomes an aggressive pathogen following entry into the plant. Natural openings and wounds can remain susceptible to infection for up to 14 days.

Options for controlling bacterial canker on loropetalum in a container production setting are largely limited to sanitation practices. Since propagation of *P. savastanoi*-colonized cuttings is the most efficient method for disease transmission, maintenance of 'disease-free' blocks of loropetalum as a source of healthy cuttings should be an effective means of restricting disease onset in container stock. Knives and other cutting tools need to be disinfected after each cut with a dilute solution of propyl alcohol or similar bacterial disinfectant. Briefly dipping cuttings in a fresh dilute (10% v/v) bleach solution or similar bactericidal surface disinfectant for 10 seconds followed by a quick rinse in clean tap water should reduce the population of *P. savastanoi* on the bark. Moisture and temperature parameters required for the successful rooting of cuttings of loropetalum and other ornamental hosts also favor infection and subsequent disease development. While weekly applications of a copper fungicide/bactericide during rooting may help prevent infection of tender shoots, but may slow root development and growth. See table 1 for a list of available copper fungicide/ bactericides.

During the production cycle, discard any symptomatic plants found during routine inspections of liner and container stock. To further limit disease spread in a nursery, separate blocks of loropetalum and other *P. savastanoi* ornamental hosts with those of non-host crops. Preventative applications of copper fungicides/bactericides should be continued during extended periods of wet weather from late spring through early fall.

Blocks of diseased container-grown loropetalum should be discarded. There are no chemical treatments that will eradicate the causal bacterium in galls on diseased plants. Removal of dead branches will not eliminate the disease as the bacterium can survive on the surface of healthy bark.

In the landscape, establishment of healthy loropetalum is the best defense against bacterial gall. Prior to planting, loropetalum should be examined thoroughly for limb and main stem cankers. On diseased plants, removal of galled lateral branches may help slow disease spread. Cuts should be made several inches below the gall or canker. Pruning tools should be

dipped before each cut in dilute isopropyl alcohol or similar disinfect to avoid accidently introducing the causal bacterium into the wound. Best time to prune out galled shoots would be during extended periods of dry weather in the spring or fall. Making several protective copper fungicide/bactericide applications after pruning may further slow disease spread (Table 1).

As previously noted, the ornamental host range of *P. savastanoi* includes ash, forsythia, oleander, and privet. Lilac may also be a possible target. While the reaction of loropetalum varieties to bacterial gall has not been assessed, differences may occur that can be exploited by growers to minimize disease related losses. Fichtner (2011) noted that olive varieties differ in their susceptibility to olive gall.

Literature Cited

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Table 1. Copper fungicides registered for use on ornamental crops.

Fungicide	Rate /100 gal	Comments
copper hydroxide **Cupro 2005 T/N/O** **Champ WG**	 0.75 lb. 0.5 lb	Apply as needed at 7- to 14-day intervals. Refer to label for list of target plants, use guidelines, and procedure to test for phytotoxicity. Champ WG is an OMRI listed organic fungicide.
copper sulfate pentahydrate **Phyton 27**	15-35 fl oz	Apply at 7- to 10-day intervals as needed. Refer to label for list of target plants, use guidelines, and procedure to test for phytotoxicity. Also refer to label concerning product use as a disinfectant cutting wash.
copper oxychloride **Kentan DF**	1.5-2 lb/A	Apply as needed at 7- to 14-day intervals. Refer to label for list of target plants, use guidelines, and procedure to test for phytotoxicity.
copper oxychloride + copper hydroxide **Badge X_2** **Badge SC**	 1.5-2 lb/A 1.5-2 pt/A	Apply as needed at 7- to 14-day intervals. Refer to label for list of target plants, use guidelines, and procedure to test for phytotoxicity. Badge X_2 and Badge SC are OMRI listed organic fungicides.