

Bacterial Diseases on Perennials **by A. R. Chase**

Bacterial diseases of perennials have been gaining in importance at almost the same pace as new perennials are being introduced. *Xanthomonas* leaf spot and blight is really gaining ground in our perennial nurseries. For example, we have introduced many new cultivars of wallflower, candytuft and other crucifers that have unfortunately been infected with *Xanthomonas*. We found candytuft infected with this bacterium from a Washington nursery a couple of years ago. The bacteria are probably the same as the one that infects stock (*Matthiola*) via seed contamination. Nobody has proven how the *Erysimum* and *Iberis* are infected but bacteria from all three plants infected alyssum and stock in a recent trial. On stock, the disease can be systemic, causing stems to crack and reveal mushy centers. Wallflowers and candytuft also have leaf spots but on candytuft the stems show symptoms indicating systemic infection. One California nursery had inadvertently spread the infection throughout their wallflower crops using electric pruning shears.

Another example of a recent change is bacterial problems on rosemary and lavender. In the past we have isolated *Pseudomonas cichorii* from these plants but most recently have started to isolate *Xanthomonas* instead. From the standpoint of chemical control, this is probably not relevant since bactericides work reasonably well on both pathogens. All of the lavender types we have found can be infected with one or the other of these bacteria. Use of these plants as perennials has resulted in production systems that supply more water and fertilizer than is ideal for these crops - both conditions weaken the plants and promote disease. Changing the cultural practices is often more effective than relying on bactericides in reducing bacterial diseases. Finally, *Xanthomonas* has traditionally been a warm weather pathogen but the temperature preferences of the bacteria attacking perennials appears to be changing to more moderate regimes. Unfortunately, *Xanthomonas* can be systemic, making latent (without symptoms) infection of rooted cuttings a real concern.

Some Key Elements of Cultural Control

1. Know which diseases tend to occur on your crops (Table 1).
2. Know when each disease is most likely to occur. *Pseudomonas* leaf spot is more severe during the cooler months while *Erwinia* blight is worst during the hottest periods of the year. *Xanthomonas* is typically more problematic during the summer but in some perennials we are starting to see *Xanthomonas* during cooler times as well.
3. Use pathogen-free cuttings and seeds whenever possible. Several prominent diseases caused by *Xanthomonas* are known to be seed-borne (*Ranunculus*, *Zinnia*, *Matthiola*). Still others might be present on plugs or cuttings (*Erwinia*, *Pseudomonas* and *Ralstonia*).

4. Eliminate overhead irrigation and exposure to rainfall when possible. Splashing water moves bacteria and allows them to infect new leaves. Irrigate when the leaves will dry quickly.
5. Scout crops as they are received and once a week afterward. Remove plants with symptoms as soon as they are found. Keeping them around makes contamination of new crops possible. Destroy plants and do not reuse pots. If recycling pots be sure to disinfect them.
6. Have problems diagnosed by a laboratory and keep good records of problems and what you did to control them. It is remarkable how hard it is to remember something after a year or more if it has not been recorded.

Table 1.

<i>Plant</i>	<i>Disease</i>
Basil	Leaf spot (<i>Pseudomonas cichorii</i>)
<i>Bellis</i> (English daisy)	Leaf spot (<i>Xanthomonas</i>)
Bougainvillea	Leaf spot (<i>Pseudomonas andropogonis</i>)
Calla Lily	Soft rot (<i>Erwinia</i> spp.)
Chrysanthemum	Leaf spot and blight (<i>Pseudomonas</i>)
Coreopsis	Pseudomonas leaf spot (<i>Ps. cichorii</i>)
Delphinium	Leaf spot (<i>Pseudomonas</i> and <i>Xanthomonas</i>)
<i>Echinacea</i> (cone flower)	Pseudomonas leaf spot (<i>Pseudomonas</i>)
<i>Erysimum</i> (wallflower)	Blight (<i>Xanthomonas campestris</i> pv. <i>campestris</i>)
Geranium species	Pseudomonas leaf spot (<i>Ps. cichorii</i> and <i>Acidovorax</i>) Southern wilt (<i>Ralstonia</i>) Blight (<i>Xanthomonas campestris</i> pv. <i>pelargonii</i>)
Gerber daisy	Pseudomonas leaf spot (<i>Ps. cichorii</i>)
<i>Hedera helix</i> (English ivy)	Leaf spot (<i>Xanthomonas campestris</i> pv. <i>hederiae</i>)
Hibiscus	Leaf spot (<i>Ps. cichorii</i> , <i>Ps. syringae</i> and <i>Xanthomonas campestris</i> pv. <i>malvacearum</i>)
<i>Iberis</i> (candytuft)	Blight (<i>Xanthomonas campestris</i> pv. <i>campestris</i>)
Impatiens species	Pseudomonas leaf spot (<i>Ps. cichorii</i> and <i>Ps. syringae</i>)
Lavender	Leaf spot and Blight (<i>Pseudomonas</i> and <i>Xanthomonas</i>)
Marigold (<i>Tagetes</i>)	Pseudomonas leaf spot (<i>Ps. syringae</i>)
Poinsettia (<i>Euphorbia</i>)	Xanthomonas leaf spot (<i>Xanthomonas campestris</i> pv. <i>Poinsettiaecola</i>) Blight (<i>Erwinia</i> spp.)
Primula	Pseudomonas leaf spot (<i>Pseudomonas</i>)
Ranunculus	Leaf spot and Blight (<i>Xanthomonas campestris</i>)
Rosemary	Leaf spot and Blight (<i>Pseudomonas</i> and <i>Xanthomonas</i>)
Snapdragon	Pseudomonas leaf spot (<i>Pseudomonas</i>)
Stock (<i>Matthiola</i>)	Blight (<i>Xanthomonas campestris</i> pv. <i>campestris</i>)
Zinnia	Leaf spot (<i>Xanthomonas campestris</i> pv. <i>zinniae</i>)

