



BACTERIA - What's new? What's not?



Bacterial diseases are among the worst things that can happen to an ornamental plant producer. We have seen many new fungicides over the past ten years. Where are the new bactericides? Why can't we use antibiotics on plants the way we use them for ourselves and our pets?

We don't use them because if the newest, best bactericides are used on plants our chances of having human pathogens develop resistance to them is increased. Then a disease like anthrax can become truly devastating even when diagnosed early. I doubt any of us would like to chance death just to use a great new antibiotic for *Xanthomonas* blight on geraniums. This caution leads to the inevitable lack of new bactericides for plant health.

Due to a variety of economic

factors we do not have any truly effective bactericides. The ornamental bactericide market is not an attractive target for product development. In addition, legal battles often cost more than the products they are fought over.

So we rely on the copper products and a few older antibiotics, making the wise grower use cultural controls too.

One of the most important pieces of information is what diseases occur on your crop (Appendix). When you know the disease of each ornamental, especially which ones can get the same diseases, you can time treatments to control an outbreak before your only solution is crop destruction.

Cultural control Checklist

1. Know when disease occurs and time scouting and prevention accordingly.
2. Scout crops as they come in—waiting spreads disease.
3. Discard plants with symptoms even if you think you can rescue them.
4. Eliminate overhead irrigation and exposure to rainfall.
5. Use pathogen-free cuttings and seeds whenever possible.
6. Get an accurate diagnosis. Don't assume what you see today is the same as last year.

Seed-borne diseases and their control

Several prominent diseases caused by *Xanthomonas* are known to be seed-borne (stock, ranunculus, zinnia). We have been testing seeds of some of the most common bedding plants and have found that up to 100% of some seed lots of zinnia and 30% of stock (*Matthiola*) are contaminated with pathogenic *Xanthomonas* bacteria.

Seed treatment with bleach has been known for many years. One of the first documented studies was done in North Carolina with zinnia seed contaminated with *Xanthomonas* (Strider, 1979). Symptoms appeared within 5-14 days of sowing the seed and were first apparent on cotyledons. Their results showed up to 6% of a seed lot contaminated. They settled on 30 minute soaks with bleach (streptomycin was not as effective). Seed soaks in hot water (122F) eliminated the bacteria but reduced germination on some zinnias.

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Bacterial Diseases on Some Ornamentals

Plant	Disease (bacterial pathogen)
Basil	Leaf spot (<i>Pseudomonas cichorii</i>)
Bougainvillea	Leaf spot (<i>Pseudomonas andropogonis</i>)
Calla Lily	Soft rot (including root rot) (<i>Erwinia</i> spp.)
Chrysanthemum	Leaf spot and blight (<i>Pseudomonas=Ps.</i>)
Coreopsis	Pseudomonas leaf spot (<i>Ps. cichorii</i>)
Delphinium	Leaf spot (<i>Pseudomonas</i> and <i>Xanthomonas</i>)
Echinacea (cone flower)	Pseudomonas leaf spot (<i>Pseudomonas</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>hederae</i>)
Hibiscus	Leaf spot (<i>Ps. cichorii</i> , <i>Ps. syringae</i> and <i>Xanthomonas campestris</i> pv. <i>malvacearum</i>)
Impatiens	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>)
Primula	Pseudomonas leaf spot (<i>Pseudomonas</i>)
Ranunculus	Leaf spot and blight (<i>Xanthomonas campestris</i>)
Rosemary	Pseudomonas blight (<i>Pseudomonas</i>)
Snapdragon (photo page 1)	Pseudomonas leaf spot (<i>Pseudomonas syringae</i>)
Stock (<i>Matthiola</i>)	Blight (<i>Xanthomonas campestris</i> pv. <i>campestris</i>)
Verbena	Leaf spot (<i>Pseudomonas aureofaciens</i> , <i>Ps. marginalis</i>)
Zinnia	Leaf spot (<i>Xanthomonas campestris</i> pv. <i>zinniae</i>)

Don't try to treat your problems with a

BANDAGE when you can use



CHASE'S FUNGICIDE ROTATION GUIDE

to prevent them. This handy tool allows you to choose the very best products in a safe and successful rotation for disease control. Why frustrate yourself by trying to learn chemical classes when we have done the work for you?

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RESULTS FROM RECENT BACTERICIDE TRIALS

We have run a few new trials on some of the same products that have been used for bacterial diseases in ornamentals for years. Last winter we tested efficacy of coppers (mainly Camelot and Phytion 27) for control of *Xanthomonas* blight on stock in two trials and *Pseudomonas* leaf spot on verbena. The results are summarized in the table to the left as the percent control each treatment gave. These were all preventative trials and you can see that none of the treatments were very impressive. Only Phytion 27 and Camelot were included in all three trials. Best overall control was achieved with Camelot at 48 oz/100 gal or Phytion at 25-50 oz/100 gal.

It is a little disappointing that we cannot routinely achieve better than 70% control of a bacterial disease. These results match those I have found since starting to work in bacterial disease control on foliage plants in the 1980's. Occasionally, we did find up to 90% control but it was uncommon.

Prevention is the only way to maximize the benefits of using bactericides. If you do not do everything else possible to control these diseases you will be wasting your money on bactericides.

Bactericide (rate/100 gal)	% control Stock Test 1	% control Stock Test 2	% control Verbena
Camelot (16 oz)	Not tested	42.7	25.5
Camelot (48 oz)	47.3	70.2	41.3
Copper Count N (32 oz)	39.7	Not tested	Not tested
Kocide TNO (16 oz)	69.8	Not tested	Not tested
Phytion 27 (15 oz)	Not tested	Not tested	6
Phytion 27 (25 oz)	33.2	62.9	70
Phytion 27 (50 oz)	Not tested	67.5	Not tested
Nordox (16 oz)	68.3	Not tested	Not tested

