

Pre-emptive Strikes for Disease Control

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We started our diagnostic lab about a year and a half ago. It has been good to see the number of samples we receive of plugs and cuttings and sometimes even seeds for a wide variety of ornamentals. Indeed, the most likely source of many diseases is the seeds, cuttings or plugs they are started from. This has been the case on flowering potted crops (like hydrangea and geranium), perennials (like *Dianthus* and *Erysimum*) and woody ornamentals (like *Mandevilla* and *Chitalpa*). Some of the pathogens we have been finding include *Cercospora*, *Fusarium*, *Peronospora*, *Phytophthora*, *Pseudomonas*, *Rhizoctonia* and *Xanthomonas* - to name a few. Unfortunately, on some crops contamination with serious plant pathogens is very common.

The main purpose of this article is to remind you that if you start with diseased planting materials you will probably end up with a diseased crop later on that will, at least, cost more money to produce. It is easy to think that all you have to do is to apply enough fungicides or bactericides and all of your worries are over but some of the hardest diseases to control are those listed above. After performing efficacy trials for nearly 27 years, even under our highly controlled conditions some diseases defy 100% control.

The first step in any disease control strategy is to identify the problem early. This means you must check your cuttings, seedlings and plugs when you receive them or when they are transplanted. If you don't check early you will surely be fighting an uphill battle for the entire crop cycle. If you are not sure what the problem is then by all means have it diagnosed by a competent lab.

Certain crops seem to have disease issues from the very beginning. For these you can employ a routine fungicide application. A broad-spectrum approach may not be the best strategy during the propagation phase. Since most fungicides at higher labeled rates can affect rooting in at least a few crops, it is important to know what disease is causing the problem. This is the only way to make sure that you do not apply more products than absolutely necessary and it will allow you to avoid applying costly products that may delay rooting.

Some fungicides and bactericides are best applied as a spray on stock plants the day before cuttings are harvested. We have found through our experiments that *Cylindrocladium* is best controlled when stock plants of miniature rose, azalea and myrtle are sprayed with either Medallion or Terraguard one day before cuttings are made. The same products can delay or even stop rooting when used as a cutting drench after sticking. When products do not affect the rooting process, a single drench after sticking can be very effective for *Rhizoctonia*, *Fusarium* and *Cylindrocladium*. In other cases, a soak (dip) can be effective but remember this is one of the best ways to spread pathogens like bacteria, *Fusarium* and *Cylindrocladium*. The good news is that there are usually only one or two diseases common to a given ornamental. You can learn these as well as the most effective controls that will not result in delayed rooting. Table 1 shows some of the most effective products for control of diseases that can start in propagation.

Table 1. Some of the most effective fungicides and bactericides for early prevention of diseases. Products with * may delay rooting on a few crops.

| Bacteria (<i>Pseudomonas</i> / <i>Xanthomonas</i>) | Botrytis | <i>Cylindrocladium</i> / <i>Fusarium</i> | Downy mildew | <i>Phytophthora</i> / <i>Pythium</i> | <i>Rhizoctonia</i> |
|--|-----------------|---|--------------------------------|---|--------------------------------------|
| Cease (Rhapsody) | Decree | Heritage | Heritage | Terrazole and Truban | Thiophanate methyl (like 3336) |
| Copper (like Phyton 27) | Medallion* | Medallion* | Stature DM | Subdue MAXX | Chipco 26019 |
| | Chipco 26019 | Terraguard* | Phosphonates (like Aliette) | Phosphonates (like Aliette) | Medallion* |

Trials on Sprencing Seeds

We recently completed some trials on treatment of seeds after sowing. The first trial was performed with *Moluccella* (Bells-of-Ireland) seed naturally contaminated with *Cercospora apii* and the second trial was performed on *Celosia* sp. artificially inoculated with *Rhizoctonia solani*. In each case, we planted 15 seeds per 3.5 inch pot followed immediately by a fungicide or water sprench. The fungicides and rates we chose for the Celosia-Rhizoctonia trial is listed in Table 2. We chose products that had performed well in preventing disease in earlier plant trials. For the Bells-of-Ireland trial, we recorded final germination 3 weeks after sowing the seed and saw the first signs of *Cercospora* leaf spot about 2 weeks afterward. In the case of the Celosia with *Rhizoctonia* damping-off, we recorded germination after 6 days and saw the first signs of disease after 10 days.



Figure 1. Celosia seedlings with Rhizoctonia root rot.

Table 2. Efficacy of fungicides in controlling seedling diseases on Celosia.

| Treatment | Rate/100 gal. | Number of spots/pot (Moluccella) | Healthy plants/pot Celosia |
|-----------------------|---------------|----------------------------------|----------------------------|
| Water – noninoculated | ----- | 3.0 b | 13.7 c |
| Water – inoculated | ----- | Not applicable | 0.7 a |
| Clearys 3336 | 8 oz | 0.1 a | 11.3 bc |
| Clearys 3336 | 16 oz | 1.0 a | 11.2 bc |
| Medallion | 1 oz | 0.9 a | 13.8 c |
| Heritage | 0.9 oz | 0.3 a | 9.0 b |
| Insignia | 2.5 oz | 0.9 a | 9.4 b |
| Terraclor 75W | 4 oz | Not tested | 10.9 bc |
| Chipco 26019 | 16 oz | Not tested | 3.2 a |
| Actinovate | 6 oz | Not tested | 1.4 a |

It was immediately obvious that all of the fungicides improved *Moluccella* seedling emergence although the 8 oz rate of 3336 was not quite as effective as the other products tested (data not shown). Initially, Heritage delayed emergence but by the final germination count the seedlings were equal in size to the others. Only 3336 prevented disease development 100%. The two strobilurins, Heritage and Insignia were statistically equal to 3336 but a few spots did develop on these treatments. Unfortunately, Medallion and Phyton 27 failed to reduce development of *Cercospora* leaf spot when used as a drench at sowing. The *Celosia* trial also showed some delay in emergence for the Heritage treatment. Best control of *Rhizoctonia* damping-off was seen with Medallion at the 1 oz/100 gal rate.



Figure 2. Moluccella with *Cercospora*.

These results indicate the possibility of controlling at least two seedling diseases with a single post-sowing fungicide drench. It is critical to know which disease your might encounter in order to best pick the appropriate fungicide. Remember that some fungicides adversely affect some seeds so indiscriminate use is not advised.