

CONTROLLING DISEASES ON BULBS, CORMS, AND RHIZOMES

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Some of our most popular floriculture crops are produced from storage organs like bulbs, corms and rhizomes. These include lilies, gladiolus, daffodils, iris and caladiums. They provide seasonal color in our landscapes, cut flowers for our arrangements and potted crops. Unfortunately, they often present a challenge to producers since they may be infected with *Botrytis*, *Fusarium*, *Pythium* and *Erwinia* when received. Since the pathogens are often systemic or at least undetected in more superficial infections, their control is difficult. When methyl bromide fumigation is a protection of the past (after January 2005) these problems will multiply since the field production of "pathogen-free" bulbs or corms will be further jeopardized.

We have performed several trials in the past year with disease control on calla lilies, caladiums and gladiolus. All plant materials were donated by generous producers from either Florida or Cali-

fornia. Before each trial started, we confirmed the presence of at least one pathogen.

Fusarium chalk rot on Caladium

The rhizomes we used for this trial were moderately infected with *Fusarium* (chalk rot) when we started. The treatments were applied the day of planting and again two more times on a 30 day interval. Treatment did not significantly affect days to emerge but shortest time overall was found for those treated with the Phyton 27 sprench (a low volume drench applied to the upper 25-33% of the medium), Camelot drench and PlantShield HC drench (Table 1). Top grade was also best for the Caladiums sprenched with Phyton 27 at 25 oz/100 gal. Poorest quality plants were those treated with 3336. Disease severity was evaluated by cutting the rhizome in cross-section and estimating the percentage of the area with symptoms of chalk rot. In this case, the lowest % infection was found on plants treated with the Phyton 27 sprench or the Heritage drench. Most severe % infection was found on rhizomes treated with 3336 or Banrot (Table 1). Since both 3336 and Banrot have thiophanate methyl it appears that it was ineffective against this species of *Fusarium*.

Table 1. Effects of fungicides on *Fusarium* chalk rot on Caladium.

Treatment	Rate/ 100 gal- Method	Days since Emergence	Disease severity (% rhizome infection)	Top Grade
Water	---	41 a	30 ab	2.7 ab
PlantShield HC	4 oz-drench	46 a	52 abc	2.8 ab
Terraguard	4 oz-drench	42 a	47 abc	2.4 ab
Medallion	4 oz-drench	40 a	58 abc	2.3 ab
3336	16 oz-drench	27 a	72 c	2.1 a
Camelot	48 oz-drench	48 a	56 abc	2.6 ab
Heritage	4 oz-drench	46 a	30 ab	3.3 ab
Phyton 27	30 oz-dip (5 min)	46 a	60 abc	2.6 ab
Phyton 27	25 oz-sprenc	47 a	26 a	3.3 b
Phyton 27	20 oz-drench	35 a	66 abc	2.3 ab
Phyton 27	30 oz-drench	44 a	61 abc	2.7 ab
Banrot	8 oz-drench	35 a	68 bc	2.2 ab

Fusarium corm rot on Gladiolus

The *Fusarium* corm rot trial on Gladiolus was performed using the same approach as the Caladium trial except that all treatments were applied as a single 5 minute dip. Dip treatment did not significantly affect emergence date of the Gladiolus (Table 1). Top and root grades were also unaffected by treatment although root grades

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showed some interesting effects (Table 2). Best quality roots were found on corms that were not dipped, or dipped in water or Terraclor. This trial showed a reduction in root quality when corms were dipped in either Medallion (4 oz/100 gal) or Terraguard (4 oz/100 gal). The percentage of the corms showing Fusarium rot was low and not affected significantly by dip treatment. The infection on this batch of Gladiolus corms was in the surface and not systemic. This test indicates the possibility of doing more harm than good with a dip treatment.

Table 2. Effects of fungicides on Fusarium corm rot on Gladiolus.

Treatment	Rate/100 gal	Days since emergence	% corm with rot	Root grade
None	---	41 a	4 a	3.7 a
Water	---	44 a	4 a	3.8 a
Heritage	4 oz	38 a	7 a	3.5 a
Medallion	4 oz	33 a	14 a	3.1 a
Terraguard	4 oz	38 a	6 a	3.2 a
Terraclor 75WP	8 oz	44 a	5 a	3.7 a
Medallion/Terraguard	4 oz each	32 a	15 a	3.0 a
Medallion/Heritage	4 oz each	38 a	3 a	3.5 a

Erwinia and Pythium blight on Calla lilies

The callas used in our trial were found infected with both Erwinia and Pythium making control a real challenge. We used dips, sprenches and drenches in this trial and they were applied three times on a 30 day interval. Callas emerge quickly after planting and as seen in both previous trials the speed of emergence was not affected by our treatment (7-10 days on average). Although top grade was not significantly affected we did see some differences based on treatment (Table 3). The best plants were those that received no treatment, PlantShield HC (dip) and the Camelot drench. Disease severity (wilt, leaf rot) was lowest for no treatment PlantShield HC dip, Phyton 27 drench (20 oz/100 gal), and Camelot drench (16 oz/100 gal). Most severe above ground symptoms occurred on the Phyton 27 drench (30 oz) and the Subdue Maxx drench. Bulb rot was also rated and showed least rot with the untreated control and the PlantShield treatments. Most bulb rot was found on those treated with any of the copper products and the Subdue Maxx (Table 3).

Conclusions

These three trials graphically demonstrate the difficulty most growers face in controlling disease on bulbs, corms and rhizomes that are already infected with a serious pathogen like Fusarium, Pythium or Erwinia. Even the best products for prevention can fail under this scenario. In trials with Easter lilies and Calla lilies we did find some treatments delayed emergence. The trials reported here do not show any delay in emergence. PlantShield HC dips or drenches

and Phyton 27 sprenches appear to be good choices for certain plants and/or pathogens. Be sure to trial products on a small scale before using a new treatment on your whole crop. It is also important to remember that one of the best ways to spread diseases throughout a crop is to dip a few infected bulbs, corms or cuttings into a tank. If you can drench/sprench it will reduce the likelihood of spreading disease.


Table 3. Effects of fungicides/bactericides on Erwinia and Pythium blight on Calla lilies.

Treatment	Rate/100 gal-Method	Bulb rot	Disease severity	Top Grade
None	---	2.4 a	1.4 a	3.7 a
Water	---	3.0 a	2.1 a	3.3 a
PlantShield HC	2.5 lb-dip	2.5 a	1.3 a	3.6 a
PlantShield HC	4 oz-drench	2.5 a	2.2 a	3.1 a
Phyton 27	25 oz-sprenc	3.5 a	2.6 a	2.8 a
Phyton 27	20 oz-drench	3.9 a	1.1 a	2.8 a
Phyton 27	30 oz-drench	3.8 a	3.1 a	2.0 a
Camelot	16 oz-drench	3.4 a	1.2 a	3.8 a
Subdue Maxx	1 oz-drench	3.8 a	2.9 a	2.5 a

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