

Special Research Report: # 125: Disease Management

Integrated Management of *Fusarium* in Florist Crops

Management of *Fusarium* Corm Rot of *Gladiolus*

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BACKGROUND

Fusarium corm rot of *gladiolus* occurs wherever *gladioli* are grown. The pathogen is a soilborne fungus called *Fusarium oxysporum* f. sp. *gladioli*. Plants become yellow and stunted and occasionally die. Most plants initially become diseased because infected corms are planted.

Field symptoms appear as stunted and yellow plants see Fig 1. In severe cases, plants will wither and die. Given that corms may already harbor infections, avoidance of the disease is difficult (see Fig 2). Our aim was to determine how effective several biological and chemical fungicides were in suppressing the disease.



Fig. 1 - Stunting and yellowing symptoms of *Fusarium* corm rot of *gladiolus*.

We also explored the effect of using an unregistered product called Actigard 50 WP that has no effect against the pathogen, but stimulates the plant's defense mechanisms to make it more resistant to the disease.



Fig 2 - *Fusarium* corm rot infections (courtesy of British Gladiolus Society)

MATERIALS AND METHODS

Field studies were conducted over the years 2003-2006 in naturally infested field plots. Depending on the year, 10 corms of cultivars Purple Passion or Oscar were planted in rows 2 feet long. Prior to planting, corms were exposed to one of the

products listed in Table 1. Corms were soaked in solutions for 20 min. Plants were rated for disease during the summer and estimates of area under the disease progress curve (AUDPC) were made. Marketable flower spikes were harvested and counted.

Table 1 - List of products, rates (formulated product), and types of product (C = Chemical, B = Biological)
Actigard, (100 ppm), C
Actinovate, (1.2 oz/gal), B
Cleary's 3336, (3.5 oz/gal), C
Companion, (0.4 oz/gal), B
Mycostop, (0.4 oz/gal), B
PlantShield, (4.2 oz/gal), B
Medallion, (1.0 oz/gal), C
Heritage, (1.0 oz/gal), C
Terraguard, (3.3 oz/gal), C

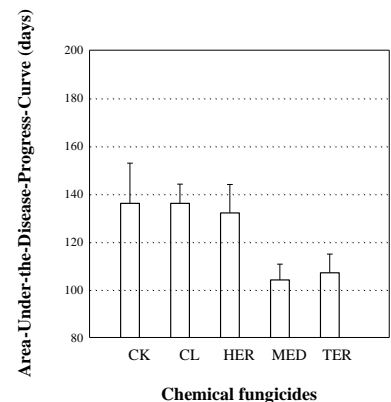


Fig. 3 -Effect of fungicides on disease progress (CK= Control, CL= Cleary's 3336 50 WP, HER = Heritage 50 WP, MED = Medallion 50 WP, TER= Terraguard 50 WP).

CONCLUSIONS

None of the biological fungicides were effective in suppressing *Fusarium* corm rot (Fig 3). This may be because most biological fungicides act only as preventatives and may have no effect on corms that are already infected. In addition, most manufacturers of these biological fungicides suggest that repeated applications be made, which was not done in these studies. Of the chemical fungicides that were tested, Terraguard 50 WP and Medallion 50 WP gave the most suppression of disease symptoms. The fungicide, Cleary's 3336 50 WP was not effective. We have hypothesized that to the ineffectiveness of Cleary's 3336 50 WP in this reaserch may have been a result of pathogen resistance to the fungicide that has developed over the years.

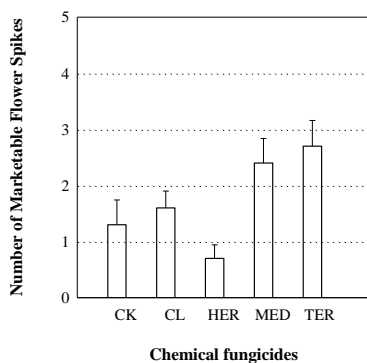


Fig 4
Effect of fungicides on marketable flower spikes (CK= Control, CL= Cleary's 3336 50 WP, HER = Heritage 50 WP, MED = Medallion 50 WP, TER= Terraguard 50 WP).

Marketable flower spikes were increased in plots where corms were treated with the chemical fungicides Medallion 50 WP and Terraguard 50 WP (See Fig 4).

When corms were soaked in Actigard 50 WP for 20 min, we observed a significant reduction in disease progress and increase in marketable flower spikes (See Figs 5 & 6).

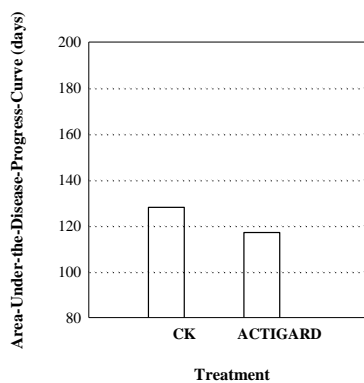


Fig 5 - Effect of Actigard 50 WP on disease progress of *Fusarium* crown rot.

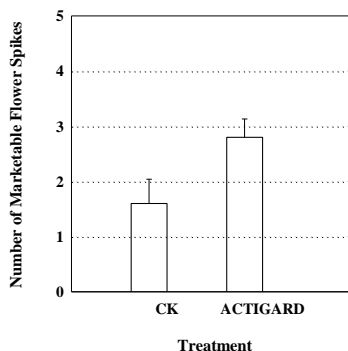


Fig 6 - Effect of Actigard 50 WP on disease progress of marketable flower spikes.

Surprisingly, a single 20 min soak of corms in 100 ppm of Actigard 50 WP could lead to season-long protection from

Fusarium crown and root rot. Actigard acts by activating the defense mechanism in plants. Although Actigard is not registered for ornamentals, these findings suggest that it may have value in suppressing *Fusarium* corm rot. We observed no phytotoxicity at the rate of 50 ppm. Further testing may lead to registration.

IMPACT TO THE INDUSTRY

Since most cultivars do not have resistance to *Fusarium* corm rot, growers must rely on management. Although chemicals remain a viable strategy, their application is costly, undesirable, and can be short-lived if resistance develops in the pathogen. We found that the 20-min soak of Medallion 50 WP, Terraguard 50 WP, or the unregistered product Actigard 50 WP provided long-term protection against *Fusarium*. These applications only require minimal amounts of product which, in turn, reduces costs, labor and human exposure .

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