

Exploring application of Omega and Orondis® Gold in the planting hole for management of root necrosis and Phytophthora crown rot on strawberry transplants

Marcus Marin, Carolina Rebello, and Natalia A. Peres

Summary

This project evaluated applying fungicides directly to planting holes to control Phytophthora crown rot (PhCR) and Anthracnose root necrosis (ARN). Orondis® Gold consistently reduced PhCR as effectively as or better than drip applications. Orondis® Gold with Omega reduced ARN, but further studies are needed. A punch-hole applicator and label review are required for practical feasibility.

Methods

Field experiments were conducted to evaluate the efficacy of Orondis® Gold DC (28 fl oz), Omega (20 fl oz), and Orondis® Gold + Omega applied on planting hole prior to transplanting to control Anthracnose Root Necrosis (ARN, caused by *Colletotrichum acutatum*), and Phytophthora Crown Rot (PhCR, caused by *Phytophthora cactorum*). Dip application of Switch was used as a standard control treatment for ARN, whereas Ridomil Gold applied via drip was used as a standard for PhCR. Experiments were carried out separately for each pathogen, and both included a non-inoculated and inoculated control. Plants were inoculated using a spore suspension mixture containing *Colletotrichum acutatum* or *Phytophthora cactorum* isolates according to each trial. 'Florida Beauty', known to be susceptible to *Colletotrichum acutatum*, was used to evaluate ARN, while Sensation® 'Florida127' was used for PhCR. Disease data and phytotoxicity were evaluated weekly. Data were statistically analyzed for differences among the treatments.

Results

Root necrosis (*Colletotrichum acutatum*) – The incidence of ARN reached 18% in the inoculated control, which had the lowest yield of 678 lb/A. Disease incidence was nil in the non-inoculated treatment, which had the highest yield of 3573 lb/A. Switch and Omega + Orondis® Gold were the most effective treatments, reducing ARN to 1.3% and 6.3% and improving yield in relation to the non-treated control to 2082 and 1385 lb/A, respectively. Orondis® Gold or Omega alone did not reduce ARN or improve yield compared to the most effective treatments, Switch and Omega + Orondis® Gold (Appendix, Table 1). Phytotoxicity was not observed in any of the treatments.

Crown rot (*Phytophthora cactorum*) - The incidence of PhCR reached 44% in the non-inoculated control and 41% in the inoculated control. The similar incidence and disease progress (AUDPC) suggests that transplants may have already been infected from the nursery. Ridomil Gold applied through the drip 8 days after planting reduced PhCR to 15%, while Orondis® Gold applied in the planting hole completely prevented it. Orondis® Gold + Omega in the planting hole showed 11% disease incidence. The most effective treatment for controlling PhCR and improving yield was a single application of Orondis® Gold at 28 fl oz in the planting hole. Omega alone had the highest incidence (66%) and the lowest yield (545 lb/A) (Appendix, Table 2). Phytotoxicity was not observed in any of the treatments.

Takeaways

The targeted application of fungicides to planting holes is a novel, effective, and non-phytotoxic method for the management of PhCR in strawberry production. This application method, which has demonstrated success in reducing disease incidence and progression with Orondis® Gold, may offer a superior alternative to conventional drip tape applications. In previous trials, the application of Ridomil Gold in planting holes also showed good results. However, developing appropriate equipment is necessary, product labels must be revised, and workers might be required to use PPE (e.g., gloves) for planting. Omega applied in planting holes was not effective in controlling ARN. Although the combination of Omega + Orondis® Gold effectively reduced ARN incidence, the synergistic effect of

these products needs to be evaluated in future seasons.

Disclaimer

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Contact

Dr. Natalia A. Peres
UF/IFAS Gulf Coast Research and Education Center
P: 813. 419-6602
E-mail: nperes@ufl.edu

APPENDIX

Table 1. Efficacy of treatments against *Colletotrichum acutatum* causing root necrosis of strawberry.

| Treatment and rate | Method | Incidence (%) | Yield (lb/A) |
|---|---------------|----------------------|---------------------|
| Non-inoculated control | - | 0 c | 3573 a |
| Switch 8 fl oz | dip | 1 c | 2083 b |
| Omega 20 fl oz + Orondis® Gold 28 fl oz | drench/hole | 6 bc | 1385 c |
| Omega 20 fl oz | drench/hole | 18 a | 1154 cd |
| Orondis® Gold 28 fl oz | drench/hole | 12 ab | 782 d |
| Inoculated control | - | 17 a | 678 d |
| <i>P</i> -value | | 0.0007 | 0.0001 |

Values in a column followed by the same letter are not significantly different. *P*-value ≥ 0.05 indicates no differences of treatments.

Table 2. Efficacy of treatments against *Phytophthora cactorum* causing crown rot of strawberry.

| Treatment and rate | Method | Yield (lb/A) | Phytophthora crown rot | |
|---|---------------|---------------------|-------------------------------|---------------|
| | | | Incidence (%) | AUDPC* |
| Non-inoculated control | - | 1518 c | 44 b | 326 b |
| Inoculated control | - | 1133 cd | 41 b | 303 b |
| Ridomil Gold SL 1 pt - 1 and 4 WAI | drip | 2373 b | 15 c | 77 c |
| Omega 20 fl oz planting hole | drench/hole | 545 d | 66 a | 436 a |
| Orondis® Gold DC 28 fl oz planting hole | drench/hole | 3488 a | 0 d | 0 c |
| Orondis® Gold DC 28 fl oz | drench/hole | 2432 b | 11 cd | 9 c |
| <i>P</i> -value | | <0.0001 | <0.0001 | <0.0001 |

*AUDPC= calculated Area Under Disease Progress Curve.

Values in a column followed by the same letter are not significantly different. *P*-value ≥ 0.05 indicates no differences of treatments.