

**Pitaya/Bipolaris Fungicide Trial**  
**IR4 report**  
**Sep-Oct 2012**

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**Objective(s)**

1. Evaluate fungicides to control *Bipolaris* bud and fruit rot of dragon fruit (Pitaya).
2. Collect efficacy and crop safety data to determine which fungicides should be further developed into a registration.

To determine fungicide efficacy for controlling *Bipolaris* bud and fruit rot of Pitaya, plants were submitted to one of seven fungicide treatments, including inoculated and non-inoculated controls (Table 1). Experimental units were a fruit treated with a single fungicide treatment, with 11 repetitions.

**Fungicide application**

Fungicide treatments were applied as a heavy spray (~67 ml per fruit) every 14 days for a total of two applications on 9/7 and 9/21. Fungicides were mixed according to rates listed in Table 1.

**Inoculation**

Inoculum was prepared by plating *Bipolaris cactivora* isolates 092409-737, -738, and -739 on V8 agar medium. Seven-day-old cultures were used for inoculation. A hand-held pressurized ULVA+ sprayer containing a solution of  $1 \times 10^5$  sporangia/ml was used to inoculate the fruit. Inoculation was conducted on 9/8.

**Disease ratings**

Disease incidence (number of spots on fruit) and severity (percent of fruit exhibiting symptoms) ratings were recorded on 9/17 and 9/26.

All disease variables were submitted to analysis of variance (ANOVA) using SAS v 9.3, and means were separated using Student Newman Keuls test.

**Results**

Disease pressure throughout the trial was moderate to severe. Fruit rot severity ratings for fungicide treated plants were lower than the inoculated control plants. Plants treated with Switch at a 14 oz rate had the lowest disease incidence. Fruit rot severity ratings for plants treated with Quadris Top were statistically lower than the untreated, inoculated controls. No phytotoxicity was observed for any treatment.

Table 1. Efficacy of select fungicides for control of *Bipolaris* fruit rot of Pitaya.

|   | Treatment(s)          | Rate/100 gal | Incidence | Severity |
|---|-----------------------|--------------|-----------|----------|
| 1 | Untreated, inoculated | ---          | 10 a      | 30.2 a   |
| 2 | Switch                | 14 oz        | 5.7 ab    | 18.6 ab  |
| 3 | Abound                | 9.25 fl oz   | 6.4 ab    | 21.4 ab  |
| 4 | Bravo WeatherStik     | 2 pints      | 6.7 ab    | 20.5 ab  |
| 5 | Tilt                  | 4 fl oz      | 8.5 a     | 23.4 ab  |
| 6 | Quadris Top           | 11.5 fl oz   | 6.5 a     | 13 b     |

Column means indicated with the same letters are not significantly different ( $P \leq 0.05$ ) based on Student Newman Keuls test.

Table 2. Raw Data

| Date    | Treatment | Rep<br>(Fruit) | Incidence | Severity (%) |
|---------|-----------|----------------|-----------|--------------|
| 9/17/12 | 1         | 1              | 4         | 10           |
| 9/17/12 | 1         | 2              | 0         | 0            |
| 9/17/12 | 1         | 3              | 0         | 0            |
| 9/17/12 | 1         | 4              | 0         | 0            |
| 9/17/12 | 1         | 5              | 15        | 30           |
| 9/17/12 | 1         | 6              | 18        | 40           |
| 9/17/12 | 1         | 7              | 73        | 55           |
| 9/17/12 | 1         | 8              | 30        | 35           |
| 9/17/12 | 1         | 9              | 18        | 40           |
| 9/17/12 | 1         | 10             | 11        | 20           |
| 9/17/12 | 1         | 11             | 5         | 10           |
| 9/17/12 | 2         | 1              | 1         | 25           |
| 9/17/12 | 2         | 2              | 5         | 10           |
| 9/17/12 | 2         | 3              | 101       | 70           |
| 9/17/12 | 2         | 4              | 4         | 10           |
| 9/17/12 | 2         | 5              | 4         | 25           |
| 9/17/12 | 2         | 6              | 10        | 15           |
| 9/17/12 | 2         | 7              | 0         | 0            |
| 9/17/12 | 2         | 8              | 0         | 0            |
| 9/17/12 | 2         | 9              | 0         | 0            |
| 9/17/12 | 2         | 10             | 0         | 0            |
| 9/17/12 | 2         | 11             | 0         | 0            |
| 9/17/12 | 3         | 1              | 10        | 15           |
| 9/17/12 | 3         | 2              | 0         | 0            |
| 9/17/12 | 3         | 3              | 0         | 0            |
| 9/17/12 | 3         | 4              | 0         | 0            |
| 9/17/12 | 3         | 5              | 0         | 0            |
| 9/17/12 | 3         | 6              | 0         | 0            |
| 9/17/12 | 3         | 7              | 5         | 25           |
| 9/17/12 | 3         | 8              | 0         | 0            |
| 9/17/12 | 3         | 9              | 102       | 60           |
| 9/17/12 | 3         | 10             | 15        | 35           |
| 9/17/12 | 3         | 11             | 6         | 15           |
| 9/17/12 | 4         | 1              | 7         | 10           |
| 9/17/12 | 4         | 2              | 3         | 5            |
| 9/17/12 | 4         | 3              | 7         | 20           |
| 9/17/12 | 4         | 4              | 8         | 10           |
| 9/17/12 | 4         | 5              | 0         | 0            |

|         |   |    |      |     |
|---------|---|----|------|-----|
| 9/17/12 | 4 | 6  | 0    | 0   |
| 9/17/12 | 4 | 7  | 0    | 0   |
| 9/17/12 | 4 | 8  | 15   | 15  |
| 9/17/12 | 4 | 9  | 93   | 55  |
| 9/17/12 | 4 | 10 | 15   | 35  |
| 9/17/12 | 4 | 11 | 0    | 0   |
| 9/17/12 | 5 | 1  | 0    | 0   |
| 9/17/12 | 5 | 2  | 33   | 30  |
| 9/17/12 | 5 | 3  | 0    | 0   |
| 9/17/12 | 5 | 4  | 6    | 10  |
| 9/17/12 | 5 | 5  | 5    | 10  |
| 9/17/12 | 5 | 6  | 56   | 55  |
| 9/17/12 | 5 | 7  | 22   | 35  |
| 9/17/12 | 5 | 8  | 15   | 25  |
| 9/17/12 | 5 | 9  | 50   | 45  |
| 9/17/12 | 5 | 10 | 0    | 0   |
| 9/17/12 | 5 | 11 | 0    | 0   |
| 9/17/12 | 6 | 1  | 0    | 0   |
| 9/17/12 | 6 | 2  | 0    | 0   |
| 9/17/12 | 6 | 3  | 0    | 0   |
| 9/17/12 | 6 | 4  | 0    | 10  |
| 9/17/12 | 6 | 5  | 0    | 30  |
| 9/17/12 | 6 | 6  | 0    | 0   |
| 9/17/12 | 6 | 7  | 15   | 10  |
| 9/17/12 | 6 | 8  | 0    | 0   |
| 9/17/12 | 6 | 9  | 0    | 0   |
| 9/17/12 | 6 | 10 | 0    | 0   |
| 9/17/12 | 6 | 11 | 15   | 45  |
| 9/26/12 | 1 | 1  | ripe | 100 |
| 9/26/12 | 1 | 2  | 0    | 0   |
| 9/26/12 | 1 | 3  | 0    | 0   |
| 9/26/12 | 1 | 4  | 0    | 0   |
| 9/26/12 | 1 | 5  | 25   | 30  |
| 9/26/12 | 1 | 6  | 22   | 45  |
| 9/26/12 | 1 | 7  | 0    | 70  |
| 9/26/12 | 1 | 8  | 0    | 70  |
| 9/26/12 | 1 | 9  | 0    | 55  |
| 9/26/12 | 1 | 10 | 0    | 25  |
| 9/26/12 | 1 | 11 | 0    | 30  |
| 9/26/12 | 2 | 1  | 0    | 25  |
| 9/26/12 | 2 | 2  | 0    | 40  |
| 9/26/12 | 2 | 3  | 0    | 75  |
| 9/26/12 | 2 | 4  | 0    | 15  |

|         |   |    |      |     |
|---------|---|----|------|-----|
| 9/26/12 | 2 | 5  | 0    | 80  |
| 9/26/12 | 2 | 6  | 0    | 20  |
| 9/26/12 | 2 | 7  | 0    | 0   |
| 9/26/12 | 2 | 8  | 0    | 0   |
| 9/26/12 | 2 | 9  | 0    | 0   |
| 9/26/12 | 2 | 10 | 0    | 0   |
| 9/26/12 | 2 | 11 | 0    | 0   |
| 9/26/12 | 3 | 1  | 0    | 40  |
| 9/26/12 | 3 | 2  | 2    | 10  |
| 9/26/12 | 3 | 3  | 0    | 0   |
| 9/26/12 | 3 | 4  | 0    | 0   |
| 9/26/12 | 3 | 5  | 0    | 0   |
| 9/26/12 | 3 | 6  | 0    | 0   |
| 9/26/12 | 3 | 7  | ripe | 100 |
| 9/26/12 | 3 | 8  | 0    | 20  |
| 9/26/12 | 3 | 9  | ripe | 100 |
| 9/26/12 | 3 | 10 | 0    | 30  |
| 9/26/12 | 3 | 11 | 0    | 20  |
| 9/26/12 | 4 | 1  | 0    | 50  |
| 9/26/12 | 4 | 2  | 0    | 60  |
| 9/26/12 | 4 | 3  | 0    | 30  |
| 9/26/12 | 4 | 4  | 0    | 40  |
| 9/26/12 | 4 | 5  | 0    | 0   |
| 9/26/12 | 4 | 6  | 0    | 0   |
| 9/26/12 | 4 | 7  | 0    | 0   |
| 9/26/12 | 4 | 8  | 0    | 30  |
| 9/26/12 | 4 | 9  | 0    | 60  |
| 9/26/12 | 4 | 10 | 0    | 30  |
| 9/26/12 | 4 | 11 | 0    | 0   |
| 9/26/12 | 5 | 1  | 0    | 15  |
| 9/26/12 | 5 | 2  | 0    | 80  |
| 9/26/12 | 5 | 3  | 0    | 0   |
| 9/26/12 | 5 | 4  | 0    | 15  |
| 9/26/12 | 5 | 5  | 0    | 15  |
| 9/26/12 | 5 | 6  | 0    | 65  |
| 9/26/12 | 5 | 7  | 0    | 40  |
| 9/26/12 | 5 | 8  | 0    | 30  |
| 9/26/12 | 5 | 9  | 0    | 45  |
| 9/26/12 | 5 | 10 | 0    | 0   |
| 9/26/12 | 5 | 11 | 0    | 0   |
| 9/26/12 | 6 | 1  | 0    | 0   |
| 9/26/12 | 6 | 2  | 0    | 0   |
| 9/26/12 | 6 | 3  | 0    | 0   |

|         |   |    |    |    |
|---------|---|----|----|----|
| 9/26/12 | 6 | 4  | 20 | 25 |
| 9/26/12 | 6 | 5  | 15 | 40 |
| 9/26/12 | 6 | 6  | 20 | 15 |
| 9/26/12 | 6 | 7  | 5  | 10 |
| 9/26/12 | 6 | 8  | 15 | 25 |
| 9/26/12 | 6 | 9  | 15 | 15 |
| 9/26/12 | 6 | 10 | 15 | 5  |
| 9/26/12 | 6 | 11 | 5  | 55 |