

WHEAT (*Triticum aestivum*)

Pythium damping-off and root rot; *Pythium ultimum* var. *ultimum*

K.L. Schroeder

Dept. of Plant, Soil and
Entomological Sciences,
University of Idaho, Moscow, ID
83844-2339

Evaluation of Intego Solo for the management of metalaxyl-resistant *Pythium* spp. in spring wheat, 2016.

Pythium root rot, caused by numerous species of *Pythium*, is a chronic problem that can limit vigorous seedling establishment. *Pythium* spp. infect the germinating seed and seedling, reducing vigor and causing stunting of spring wheat in northern Idaho. Currently, seed treatments containing metalaxyl or its isomer mefanoxam are the only chemical treatment options available for management of this seedling disease. Other management options include residue management to minimize cool, wet soils in the spring and avoiding poorly drained fields when seeding. Recently, isolates of *Pythium ultimum* var. *ultimum* were found in northern Idaho and eastern Washington that are resistant to metalaxyl. The impacts of these isolates is most noticeable in spring legumes, but also can have a negative impact on spring wheat.

Experimental products were evaluated for management of metalaxyl-resistant isolates in inoculated trials at the Parker Research Farm east of Moscow, ID. Two isolates of *P. ultimum* var. *ultimum* (157 and 191 from Kendrick and Juliaetta, ID respectively) were inoculated onto a 1:1 (vol/vol) mixture of oats and cereal rye in an equal volume of distilled water. The grain-water mixture was autoclaved twice on two consecutive days for 45 min at 121°C. The sterilized grain mixture was inoculated with agar plugs (~1.5 cm diameter) containing the isolates and incubated for 2 weeks at room temperature. The inoculum was air dried and ground using a Chard® GM150 grain mill. Ground inoculum of both isolates was mixed together in a 1:1 (w/w) ration, combined with the wheat seed at planting and incorporated into the soil at a rate of 14.4 g/m². Plots were seeded with a 7-row Hege planter with double-disc openers with 20 cm between openers. Each plot was 6.1 m long and each treatment was replicated four times. Spring wheat cv UI Winchester was treated with NipsIt Suite Cereals OF SP (NipsIt, 3.26 ml/kg), V-10403 (3.39 ml/kg), V-10403 (3.39 ml/kg) + Rizolex (0.20 ml/kg), V-10403 (3.39 ml/kg) + Release LC (4%, 0.65 ml/kg), or CruiserMaxx Vibrance Cereals (3.26 ml/kg). V-10403 is an experimental product comprised of NipsIT Suite Cereals OF SP (3.26 ml/kg) and Intego Solo (0.13 ml/kg). A non-treated check was also included. Plots were seeded on May 6 at a rate of 301 seeds/m². Emergence was recorded 8 and 15 days after planting. The number of emerged wheat plants was recorded from three 0.5 m long rows within each plot. Six weeks after planting, 10 plants were randomly collected from each plot to assess the number of tillers, first leaf length and plant height. Shorter first leaf length is an indicator of damaged fine roots and root hairs due to Pythium root rot. At the end of the growing season, all seed from the trial was harvested, recording the yield and test weight for each plot. A mature plant height also was recorded at harvest.

At 8 days after planting, plots that included V-10403 + Rizolex had the greatest emergence followed by other treatments containing V-10403. Plots treated with V-10403 had significantly greater emergence than either the non-treated control or the CruiserMaxx Vibrance treatment. At 15 days after planting, similar trends were observed for most treatments, but there were no significant differences. The number of tillers per plant ranged from an average of 3.2 to 3.9 tillers. The highest number of tillers per plant was observed in the non-treated control, NipsIt, and V-10403 + Release LC. First leaf length, which is often a good indicator of root damage due to *Pythium*, was measured with V-10403 treatments having the longest leaf length. Treatment with V-10403 + Rizolex or V-10403 + Release LC resulted in a significantly longer first leaf than the non-treated control, NipsIt, or CruiserMaxx Vibrance. Seedling plant height was greatest for treatments containing NipsIt or V-10403 and was 2 to 8% taller than the non-treated control. No significant differences were observed among yields, test weight or mature plant height. However, all seed treatments produced a greater yield than the non-treated control and treatments containing V-10403 were numerically higher than other seed treatments. Likewise, the mature plant height was greater for treatments containing V-10403 versus those treatments that

did not contain this product. Treatment with V-10403 alone or in combination with Rizolex or Release LC appears to increase the rate of emergence, decrease damage caused by metalaxyl-resistant *Pythium ultimum* and increase yield.

| Treatment ^z | Day 8 Emergence (plants/m ²) ^y | Day 15 Emergence (plants/m ²) | Tillers (no/plant) ^x | First Leaf Length (cm) ^x | Plant Height (cm) ^x |
|------------------------------|---|---|------------------------------------|---|--------------------------------------|
| Non-treated control | 94 c | 107 | 3.9 a | 6.1 c | 28.7 b |
| NipsIt | 112 bc | 115 | 3.8 ab | 5.9 c | 29.9 ab |
| V-10403 | 122 ab | 109 | 3.5 bc | 6.5 bc | 30.8 a |
| V-10403 + Rizolex | 150 a | 127 | 3.2 c | 7.4 ab | 29.2 ab |
| V-10403 + Release LC | 131 ab | 115 | 3.7 ab | 7.6 a | 30.0 ab |
| CruiserMaxx Vibrance Cereals | 91 c | 105 | 3.5 b | 5.9 c | 28.3 b |
| Average | 117 | 113 | 3.6 | 6.5 | 29.5 |
| LSD (0.05) | 29 | ns | 0.3 | 1.0 | 2.0 |
| CV^w | 28.3 | 28.0 | 19.9 | 33.0 | 15.5 |

^zNipsIt = NipsIt SUITE Cereals OF. V-10403 is a combination of NipsIT Suite Cereals OF SP and Intego Solo.

^y Means followed by the same letter within a column are not significantly different according to Fisher's LSD mean comparison at P=0.05.

^x Seedling assessment six weeks after planting.

^w Coefficient of variation.

| Treatment ^z | Yield (kg/ha) | Test Weight (kg/hl) | Mature Plant Height (cm) |
|------------------------------|---------------|------------------------|-----------------------------|
| Non-treated control | 2694 | 77.6 | 62.9 |
| NipsIt | 2847 | 77.6 | 65.4 |
| V-10403 | 3228 | 77.9 | 66.0 |
| V-10403 + Rizolex | 3610 | 77.3 | 67.3 |
| V-10403 + Release LC | 3319 | 77.6 | 68.0 |
| CruiserMaxx Vibrance Cereals | 3100 | 77.9 | 64.8 |
| Average | 3169 | 77.7 | 65.2 |
| LSD (0.05) | ns | ns | ns |
| CV^y | 14.3 | 1.1 | 6.4 |

^zNipsIt = NipsIt SUITE Cereals OF. V-10403 is a combination of NipsIT Suite Cereals OF SP and Intego Solo.

^y Coefficient of variation.