



Fusarium root rot management in soybean

CATEGORY [disease](#) | May 28, 2020

Eight of nine fungicides tested helped to manage Fusarium root rot in soybeans in Alberta. Several soybean varieties were identified with partial resistance to Fusarium root rot.

Root rot caused by *Fusarium* spp. is prevalent in soybean crops in Alberta. The objectives of this study were to compare the efficacy of fungicide seed treatments in reducing Fusarium root rot of soybeans, and to evaluate a collection of short-season soybean varieties for their reactions to Fusarium root rot disease.

Apron Maxx RTA, EverGol Energy, Trilex EverGol, Rancona Summit + Apron XL, Rancona Summit + Maxim 480FS, Rancona Summit + Maxim 480FS + Vibrance, Vibrance + Apron XL, Vitaflo 280, and Vitaflo 280 + Apron XL fungicide seed treatments were assessed for their efficacy in promoting seedling survival, reducing root rot symptoms, and maintaining yield of the soybean variety TH29002RR in field plots at Brooks, Alberta in 2012 and 2013. The same seed treatments were also assessed in the greenhouse at the Crop Development Centre North on TH29002RR.

Fungicide-free seeds of TH29002RR were planted into a plot inoculated with a virulent isolate of *F. avenaceum* and into non-inoculated plots as controls.

All treatments except Vibrance + Apron XL improved emergence under field and greenhouse conditions. All the fungicide formulations reduced root rot severity on *Fusarium*-inoculated soybean seedlings under field conditions. The inoculated control without seed treatment had a 2.5 out of 4 rating for root rot in the field, compared to a range of 0.8 to 1 for the fungicide seed treatments. All treatments except Vibrance + Apron XL reduced root rot under greenhouse conditions.

However, none of the fungicides gave complete disease control, as all had lower levels of seedling emergence compared with the non-inoculated treatment under greenhouse and field conditions. Root discoloration was observed in all treatments under greenhouse and field conditions.

None of the fungicide treatments produced seed yield as high as the non-inoculated control under field conditions. None produced a yield greater than 50% of the disease-free control in the field experiments.

Treatment with Rancona + Apron XL or Apron Maxx RTA resulted in a higher seed yield compared with the inoculated control, while none of the other seed treatments produced a significantly different seed yield compared with the inoculated control.

Investigating root rot resistance

Ten short-season, glyphosate-tolerant soybean varieties, 90M01, 900Y61, 900Y71, 900Y81, TH27005RR, TH29002RR, TH32004R2Y, LS003R, LS005RR, and NSC Portage were compared for resistance or tolerance to *Fusarium* root rot under field conditions. Two additional glyphosate-sensitive varieties, OAC Prudence and Tundra, also were evaluated under greenhouse conditions.

Significant differences were observed in the percentage of emergence of *Fusarium*-inoculated soybean varieties under field conditions. Among the varieties, 90M01 had better emergence than all the others except 900Y61 and 900Y81 under field conditions. 900Y71 had higher emergence losses due to *Fusarium* than all other varieties.

Under greenhouse conditions, 900Y81 had lower seedling losses compared with all the other varieties except 'Tundra' and OAC Prudence. 900Y71 had a greater loss of emergence than all the other varieties except NSC Portage and LS005RR. 900Y81, OAC Prudence, and Tundra had lower disease severity compared with all the other varieties except TH27005RR and 900Y61.

Stability analysis showed that the emergence of 900Y61, 900Y81, 90M01, and LS003RR were closest to the ideal genotype, which was defined as the genotype that has the highest seedling emergence relative to the non-inoculated control, and was absolutely stable across the different environments.

Soybean varieties exhibited varying levels of resistance to Fusarium root rot. Under field conditions, LS003RR had the lowest mean disease severity rating of 1.2, which was significantly lower than that of TH32004R2Y, TH27005RR, and 900Y71. The varieties LS003RR, 900Y61, NSC Portage, TH29002RR, and 90M01 had significantly lower disease severity ratings compared with TH32004R2Y (1.6 disease severity rating).

The varieties that showed the highest Fusarium root rot resistance levels in this study could be used by plant breeders to improve resistance to root rot.

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