Efficacy of New Vitaflo 280 (Carbathiin and Thiram) to Control Soil- and Seed Borne Diseases of Common Bean (*Phaseolus vulgaris* L.), Soybean (*Glycine max* (L.) Merrill), Pea (*Pisum sativum* L.), and Lentil (*Lens culinaris* Medicus) and Compatibility with Rhizobium Inoculants.

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Efficacy of Vitaflo 280 to Control Seed Rot and Seedling Blight of Pulse Crops.

The new Vitaflo 280 [Carbathiin (systemic) and Thiram (contact)] fungicide has a broad spectrum disease control and is registered on wheat, barley, oat, rye, triticale, dry common beans, snap common beans, soybean, corn, lentil, flax including edible oil flax and pea. This product is a water based flowable, low dusting and odor, soft settle and easy to reconstitute, easier to clean up due to change to a pigment vs a dye for the colorant, and safer on Rhizobium. Results of trials conducted in western Canada indicates that Vitaflo 280 at a rate of 260 mL 100 kg⁻¹ of seed significantly increased percent emergence and grain yield of dry bean seed infected with *Anthracnose* when compared with the untreated control (UC). Vitaflo 280 significantly decreased dry bean *Anthracnose* leaf infection when compared with the UC and was similar to DCT (commercial control). On an average of six station years Vitaflo 280 significantly increased percent emergence of dry bean planted in soils infected with *Rhizoctonia solani* when compared with the UC.

On an average of four station years Vitaflo 280 at 260 mL 100 kg⁻¹ significantly increased percent emergence of soybean seed infected with *Phomopsis spp*. Vitaflo 280 also significantly increased percent emergence of soybean planted in soils infected with *R. solani* and *Fusarium spp* on an average of six and ten station years, respectively.

Vitaflo 280 at a rate of 330 mL 100 kg⁻¹ of seed significantly increased percent emergence (ten station years) and grain yield (five station years) of pea seed infected with *Mycosphaerella pinodes* (Ascochyta blight) when compared with the UC. Vitaflo 280 at a rate of 260 mL 100 kg⁻¹ significantly increased percent emergence of pea planted in soils infected with *Rhizoctonia solani* (eight station years) and *Fusarium spp*. (12 station years). On an average of 16 station years, Vitaflo 280, significantly increased grain yield of pea planted in soils infected with *R. solani* when compared with the UC.
Vitaflo 280 at a rate of 330 mL 100 kg$^{-1}$ of seed significantly increased percent emergence (12 station years) and grain yield (four station years) of lentil seed infected with 
*Botrytis cinerea* when compared with the UC. Vitaflo 280 significantly increased percent emergence (12 station years) and grain yield (four station years) of lentils planted in soils infected with *R. solani* when compared with the UC. In addition, Vitaflo 280 significantly increased percent emergence (nine station years) of lentils planted in soils infected with *Fusarium spp* when compared with the UC.

**Vitaflo 280 Compatibility with Rhizobium Inoculants**

Rhizobium inoculants can be applied as a tank-mix when the inoculant is mixed with the fungicide and then the mixture applied to the seed. Wet sequential if the inoculant is applied to the seed when the fungicide is still wet on the seed surface. Dry sequential if the inoculant is applied to the seed when the fungicide has dried on the seed surface. The maximum time between application of HiStick L soybean inoculant (Becker Underwood) or Cell-Tech soybean inoculant (Nitragin) and Vitaflo 280 on seed and planting is one day (24 hours) for tank-mix, wet-sequential, and dry-sequential. The maximum time between application of HiStick+ soybean inoculant (Becker Underwood) and Vitaflo 280 on seed and planting is one day (24 hours) for wet-sequential and two days (48 hours) for dry-sequential.

Fungicidal seed treatments had no effect on visual nodulation and percent Nitrogen derived from the atmosphere (Ndfa) of chickpea, dry bean, lentil, and pea. Visual nodulation and percent Ndfa of chickpea, dry bean, lentil, and pea treated with Vitaflo 280 and inoculated with Rhizobium was similar to that observed in these crops inoculated with Rhizobium and non-treated with fungicide. Rhizobium inoculation of chickpea, dry bean, lentil, and pea significantly increased visual nodulation and percent Ndfa when compared with the non inoculated control, suggesting that these soils may not have a native Rhizobium strain capable of efficiently nodulate these crops. Therefore, the new Vitaflo 280 at the recommended rates has no effect on visual nodulation or the ability of the Rhizobium to fix N$_2$ from the atmosphere, regardless of the inoculation time.