

Phytophthora Root Rot

(*Phytophthora sojae*)

MAIN CROPS AFFECTED

- Soybean

OTHER SUSCEPTIBLE CROPS

- Lupin

PHYTOPHTHORA ROOT ROT OCCURRENCE

- *Phytophthora sojae* is a soil-borne oomycete which is one of the causal agents of soybean root rot
- Multiple races of *Phytophthora sojae* have been identified in Manitoba and are considered to be endemic to the soils of the region
- Each time a soybean crop is grown in a field new phytophthora resting spores are returned to the soil. Similar to clubroot and aphanomyces, these spores are long lived and will remain dormant until a host crop is seeded into the field again.
- Each time a host crop is seeded the number of resting spores in a field increases
- Infection compromises the plant's ability to move water and nutrients
- Roots appear brown and rotted, brown lesions from the soil line up to the first branches may appear, leaves will turn yellow, wilt and plants will eventually die

PHYTOPHTHORA LOSSES – BY THE NUMBERS

- Canadian estimates suggest yield decreases of 10-40% (Bailey et al. 2003)
- In the United States, Phytophthora is the #1 disease that decreases soybean yields. More than 532 million bushels are estimated to have been lost from 1996-2007.
- North Dakota, South Dakota and Minnesota are considered to be the highest at-risk growing regions in the United States for yield loss due to Phytophthora infections

FACTORS THAT INCREASE DISEASE INCIDENCE

- Wet weather
- Low areas and/or areas with poor drainage
- High clay, and/or compacted soils
- The number of times soybeans have been grown in the field

INTEGO Solo 

INTEGO SOLO – PERFORMANCE ON PHYTOPHTHORA

- INTEGO™ Solo is a unique Group 22 active ingredient with strong activity against oomycete diseases like root rot caused by *Phytophthora*, *Pythium* and *Aphanomyces*
- INTEGO Solo is a systemic seed treatment – it stays in the roots of the plants, and stops fungal growth when infection is attempted
- INTEGO Solo controls *Phytophthora sojae* and several *Pythium* spp. that are only partially controlled by metalaxyl alone
- INTEGO Solo controls pre-emergent and post-emergent damping off
- Trials completed over four years at Ohio State University have indicated an average 5.6 bu./ac. increase with INTEGO Solo over the untreated check and a 35% increase in yield gain over using metalaxyl alone
- In addition to reduced disease symptoms and yield benefits in the year of application, INTEGO Solo will result in a reduction in the number of *Phytophthora* resting spores returned to the soil when soybeans are planted.



Nufarm

Grow a better tomorrow.

INTEGO™ Solo

Ethaboxam

COMPLETE SEED PROTECTION AGAINST PYTHIUM AND PHYTOPHTHORA

Introducing INTEGO™ Solo for soybeans – containing the newest fungicide seed treatment for control of Pythium and Phytophthora in more than 35 years. In field trials, INTEGO Solo in soybeans yielded an average of 1.5 bu./ac. over standard seed treatments by protecting soybeans against Pythium and phytophthora.

- **Protection for the entire root system** – unique mode of action creates a complete zone of defense below ground
- **Protects against a wider spectrum** – protects against a wider spectrum of Pythium and Phytophthora species
- **User-friendly treatment** – smooth flowability and low use rate ensures a consistent, even application and easy treatment experience

MAJOR CROPS

- Chickpea
- Dry bean
- Field pea
- Lentil
- Soybean

MAJOR DISEASES CONTROLLED

- Early season root rot caused by Phytophthora (*Phytophthora sojae*)
- Pythium seed rot/damping off (*Pythium* spp.)

DISEASES SUPPRESSED

- Early season root rot caused by Aphanomyces (*Aphanomyces euteiches*)

APPLICATION

- For on-farm use and in commercial seed treating systems
- This product contains no colourant. According to the Seeds Act, seeds must be conspicuously coloured when treated, therefore adding dye or tank mixing with another seed treatment is required.

RATES

- 19.6 mL per 100 kg of seed
- One jug treats 709 bushels

BENEFITS

- The only product available to aid in the defense against Aphanomyces root rot in field crops
- INTEGO Solo (ethaboxam) is a new active ingredient, and the only Group 22 seed treatment in Western Canada
- INTEGO Solo is the only product that provides broad-spectrum oomycete disease management and provides activity on *Aphanomyces euteiches*, *Phytophthora sojae* and *Pythium* spp.
- Simple, light, ready-to-mix packaging
- INTEGO Solo is a systemic fungicide that protects against early season seed rots, seedling blights and longer term infections of the plant

TANK MIXES

- INTEGO Solo should always be mixed with another seed treatment for complete protection against *Fusarium* and *Rhizoctonia* spp. as well as other fungal pathogens
- INTEGO Solo is compatible with most liquid inoculants – always check with inoculant suppliers for specific details and treating instructions

INTEGO™ Solo 

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Always read and follow label directions.
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