Raxil® a New Seed Treatment for Wheat and Barley

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Raxil® is a new systemic fungicide belongs to a group known as sterol inhibitors. The active ingredient in the seed treatment formulation is tebuconazole. It has gained wide acceptance in Europe, Australia and the United States. Gustafson is working towards a registration in Canada for Wheat and Barley. Raxil®'s dermal LD 50 is greater than 5000 mg Kg^{-1} and the oral LD 50 is greater than 2000-mg kg^{-1}. The rate of Raxil® application is 1.5 to 2 g active ingredient 100 Kg^{-1} of seed or a 25-fold reduction in the amount of chemical applied as compared to other seed treatments. This combination of Raxil® high LD 50 and activity at very low rates make it a promising chemistry.

Fusarium is a disease challenge of growing concern in Western Canada. Fusarium head blight (FHB) is a fungal disease that infects cereal crops (Canadian Grain Commission, Personal communication). In Manitoba, it infects mostly wheat and barley. Fusarium head blight was first identified in Manitoba in 1923 and the first serious outbreaks were reported in 1984. Since then, surveys conducted by the Grain Research Laboratory have found *Fusarium graminearum* reaching into eastern Saskatchewan. Smaller outbreaks have been recently identified in parts of Saskatchewan and Alberta.

Petri dish trials show that Raxil® has excellent activity against several of the major *Fusarium* species, including *F. graminearum, F. culmorum* and *F. avenaceum*. The growth of each of those species was inhibited by more than 90 % at 20 PPM active ingredient, or 2g 100 Kg^{-1} of seed. In addition, Raxil® has strong activity against *Cochliobolus sativus*, the causal organism of common root rot.

The seed borne phase of *Fusarium* has caused quality problems in seed supplies. In a blotter germ test Vitaflo®-280 and Raxil® increased germination of *Fusarium* infected seed of AC Barrie, and CDC Teal wheat. Greater improvements were achieved with more severely infected seed (Data not shown). In field trials conducted in western Canada in 1994 Vitaflo®-280 and Raxil® increased emergence index of *Fusarium* infected wheat seed by 26% to 57%. Whereas in 1995, twelve seed lots infected with *Fusarium* showed an improved emergence index of 13% and 14 % for Vitaflo®-280 and Raxil® respectively.

Fusarium is ubiquitous in the soil. Surveys conducted in western Canada have found 1000's of propagules per gram of soil (Hwang and Chang, 1989; Hwang and Chakravarty, 1993). In growth room studies with moderate levels of soil borne *Fusarium graminearum* Vitaflo®-280 and Raxil® improved wheat plant establishment by 17 % by 33% respectively, ten days after emergence as compared to the untreated control. By day 25 plant stand of untreated seed was reduced another 25%, whereas, both seed treatments suffered no further reductions in plant stand. Under high *Fusarium graminearum* pressure untreated seed failed to emerge, 5% of the Vitaflo®-280 treated seed emerged, and 35% of the Raxil® treated seed emerged.

In pot experiments, Raxil® and Vitaflo®-280 improved initial plant establishment of wheat seed planted in soil inoculated with *Fusarium avenaceum* or *Fusarium poae*. No further seedling death occurred after plant emergence in pots inoculated with either *Fusarium avenaceum* or *Fusarium poae*

In field trials conducted in Winnipeg in 1990 Vitaflo®-280 and Raxil® significantly improved plant establishment of wheat infected with *Fusarium culmorum* and *Fusarium avenaceum* as compared to the untreated control. Plant stand of wheat infected with *Fusarium culmorum* and *Fusarium avenaceum* and treated with Raxil® was 22% higher than that observed

for Vitaflo®-280. In field trials conducted in Winnipeg in 1991 Raxil® increased emergence of wheat grown in *Fusarium* infected soils by 19%.

In summary, Raxil® is a new systemic fungicide for use as a cereal seed protectant well suited to Canadian disease issues. Raxil®'s benefits are broad-spectrum activity, low use rate, low environmental impact and improved formulation technology. Raxil® is effective against many diseases including true loose smut, seed rot caused by *Fusarium spp., Cochiobulus sativus* and other organisms as well as seedling blight caused by *Fusarium spp., Cochiobulus sativus* and other disease organisms of wheat and barley. Raxil® also controls common bunt/stinking smut, of wheat, as well as false loose smut, covered smut, leaf stripe, and net blotch of barley. In addition, Raxil® effectively controls true loose smut and seedling blight of oats.

®*Vitaflo 280 is a registered trademark of Uniroyal Chemical Co.*

®*Raxil is a registered trademark of Bayer.*

References

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Hwang, S.F. and Chang, K.F. 1989. Incidence and severity of root rot disease complex of field pea in northeastern Alberta in 1988. Can. Plant Dis. Surv. 69:139-141.