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Selective fungicides reduce sclerotinia head rot and yield loss in sunflower

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Fungicides are a short-term management tool to reduce the impact of sclerotinia head rot disease on yield losses in sunflower

Introduction

Sunflower (*Helianthus annuus* L.) is grown on ~1 million ha in USA and 30,000 ha in Canada. Head rot & mid-stem rot caused by *Sclerotinia sclerotiorum* ascospore infections (Figure 1) are common worldwide. In Manitoba, 50-70% of sunflower crops are affected annually with 10-20% yield loss in most years, and up to 80% in some fields.

Materials and Methods

Field trials were conducted in 2015-17 at the Agriculture and Agri-Food Canada Morden Research & Development Centre in Manitoba to study the effects of fungicides on reducing sclerotinia head rot and yield losses. Four replicates of a Randomized Complete Block Design were established using a susceptible oilseed hybrid. Each fungicide was applied at early flowering or late flowering, or at both dates following the recommendations from manufacturers (Table 1). Plots were 3-rows 3 m long and 0.75 m apart. Sunflower heads were sprayed with fungicides on day one and then inoculated on day two with ascospores and sclerotinia-infected ground millet seed under misting system (Figure 2). Head rot incidence was assessed weekly, and severity was assessed at maturity.

Figure 1. Sclerotinia Head and Mid-stem rot

Results and Discussion

Incidence and severity of Sclerotinia head rot, and the efficacy of fungicides varied from year to year depending on inoculum viability, and prevalent weather conditions. Head rot incidence and severity in the research plots were higher in 2015 (Fig. 3) and in 2017 (Fig. 5) than in 2016 (Fig. 4). Most fungicides reduced the head rot incidence and severity by 10-20% in 2015 & 2017 and by 30-58% in 2016, and improved the yield by up to 20%, 30% and 60%, respectively, in the three years.

Table 1. List of fungicides used, Morden

Fungicides	Chemical % active	a.i / ha	Company
Topsin	Thiophanate-methyle	1.5 kg	EngageAgro
Lance	Boscalid 25	0.25 kg	BASF
Vertisan	DPX-LEM17, Penthiopyrad 20	0.35 kg	DuPont
Astound	Cyprodinil, Fludioxonil	0.6 kg	Syngenta
Acapela	DPX-YT669, Picoxystrobin 25	0.11 kg	BASF
Acapela	DPX-YT669, Picoxystrobin 25	0.22 kg	BAYER
Acapela	DPX-YT669, Picoxystrobin 25	0.33 kg	DuPont
DPX-Q8X63	Experimental	0.35 kg	DuPont
Exempla	Azoxystrobin & Difenoconazole	0.25 kg	Syngenta
Delaro-325	Trifloxystrobin, Prothioconazole	0.27 Kg	BAYER

Figure 2. Fungicide application, inoculation with ascospores & ground millet, and Misting

Fungicide applications at early flowering were more effective than at late flowering, and two applications were better than either one. High rates of Acapela were more effective in reducing head rot in the three years but were effective in improving yield losses in 2016 trial only.

Figure 3. Head rot and yield as % of control with Sclerotinia, Morden 2015

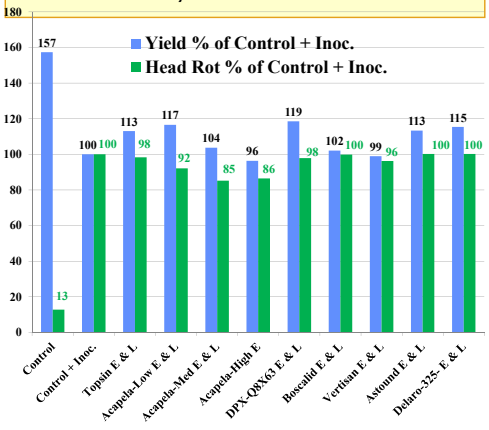


Figure 4. Head rot and yield as % of control with Sclerotinia, Morden 2016

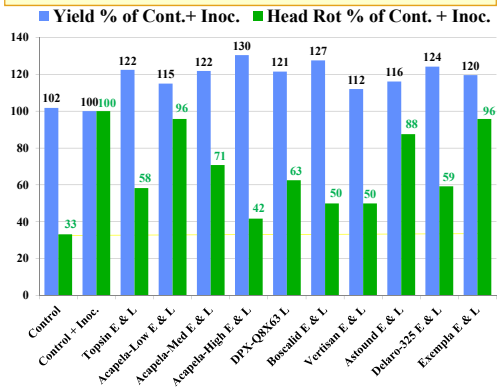
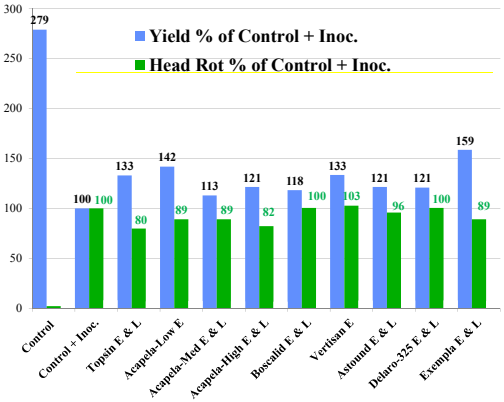


Figure 5. Head rot and yield as % of control with Sclerotinia, Morden 2017



Conclusions

- **Head rot epidemics vary year to year.**
- **Selective fungicides reduced head rot Incidence & severity, and improved yield.**
- **Application at early flowering was better than the late flowering, and two applications were better than one.**
- **Future research should focus on testing new formulations of fungicides and the proper timing of application(s).**

Collaboration & Acknowledgement

- Agriculture and Agri-Food Canada (AAFC)
- National Sclerotinia Initiative (NSI)
- North Dakota State University (NDSU)
- National Sunflower Association of Canada (NSAC)
- National Sunflower Association of USA (NSA)
- Chemical companies for samples and financial support
- Tricia Cabernel, Maurice Penner for technical support

Canada

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