Efficacy of Crown (Carbathiin and Thiabendazole) to Control Seed Borne Ascochyta Blight on Kabuli Chickpea.

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Introduction

Ascochyta blight (*Ascochyta rabiei*) of chickpea (*Cicer arietinum L.*) is an economically important disease transmitted through the seed and stubble. In 2000, approximately 25% of the chickpea acreage in Saskatchewan was lost as a result of ascochyta blight (Pearsy, 2000). Partial resistance in 'Sanford', 'Dwelley', 'Myles', and 'B90' chickpea cultivars becomes less effective as the plant matures. The sexual stage (*Didymella rabiei*) has been found on chickpea residues in some regions of Saskatchewan (Chongo et al., 2000). Ascochyta infection from seed-borne inoculum occurs as scattered patches across the field and the disease spread from these patches. When infected seeds are sown, the fungus infects the seedling as it emerges and continue to sporulates on the plant until it eventually infects neighbouring plants. This disease may cause serious damage to a chickpea crop under cool and wet growing conditions, particularly at flowering and pod setting (Nene, 1984). Infected seed is presumed responsible for the introduction of the pathogen into new areas (Kaiser and Hannan, 1988). This study was conducted to determine efficacy of Crown (Carbathiin 92 g L^{-1} and Thiabendazole 58 g L^{-1}) to control seed borne ascochyta blight on Kabuli chickpea.

Materials and Methods

In 2000, seeds of Dwelley and Sanford chickpea varieties with 27% and 11% ascochyta infection, respectively, were sown at Aberdeen and Saskatoon, Saskatchewan. The experimental design was a RCB with four replications. Plot were 1 m wide by 18 m long. To avoid inter-plot contamination triticale was pre-seeded between plot. Treatments were: Apron FL (Metalaxyl 28.34%) at 16 ml per 100 kg of seed (control), and Crown (at 300 ml and 600 ml per 100 kg of seed). Seed for the Crown untreated control were treated with Apron FL (Metalaxyl). Apron FL provides an excellent control on *Pythium spp*. on chickpea, reducing damage caused by early season root rot, seed rot and seedling blight (Matus et al., 1998). Bravo (Chlorothalonil 500 g L^{-1}) at the recommended rate was applied three times during the growing season (early flowering and at ten-day intervals). Plants per m^2 were counted at flowering. Ascochyta incidence (%) and severity (0-4 scale) were measured at three growth stages (node 7, node 11, and flowering). Grain yield and ascochyta infection (%) on mature seeds was determined.

Data was analyzed by using SAS GLM (SAS/STAT, 1988). Variety, and replication were regarde as fixed effects, while location was considered as random effect. Ascochyta incidence, ascochyta severity, and ascochyta infection on mature seed were analysed across locations and varieties. Plant m^{-2} and grain yield were analysed across varieties.

Results and Discussion

The highly seed borne nature of Ascochyta rabiei makes fungicidal seed treatments essential and useful (Maden et al., 1975). Our results indicate that both rates of Crown (Carbathiin and Thiabendazole) significantly decreased Kabuli chickpea ascochyta incidence by 70% (Table 1), ascochyta severity by 80%, and ascochyta infection on mature seed by 70% (Table 2) when compared with the Crown untreated control. Similarly, Kaiser and Hannan (1988) reported that Thiabendazole reduced the incidence of seed borne *Ascochyta rabiei* from 45% in the untreated control to 0% in treated seed. In the present study, Ascochyta blight was observed using both rates of Crown. Suggesting that *A. rabiei* was effectively controlled but not eradicated by Crown fungicidal seed treatment. Treatment of seed with Crown fungicide can greatly help in reducing the initial inoculum level and preventing the spread of the disease or races into new areas (Hanounik and Reddy, 1981). Both rates of Crown significantly increased plants per m^2 by 65% and seed yield by 80% when compared with the Crown untreated control (Table 2). Therefore, Crown effectively controlled seed borne infection of *A. rabiei* on Kabuli chickpea.

Table 1. Means for ascochyta incidence (%) and severity (0-4) of Kabuli chickpea grown in Saskatoon and Aberdeen, Saskatchewan 2000.

	Incidence (%)			**Severity (0-4)**		
Growth stages	Apron FL[x]	Apron FL[x] + Crown 300[y]	Apron FL[x] + Crown 600[z]	Apron FL[x]	Apron FL[x] + Crown 300[y]	Apron FL[x] + Crown 600[z]
7 node	42a	15b	12b	0.59a	0.15b	0.14b
11 node	39a	11b	11b	0.47a	0.13b	0.11b
Flowering	43a	14b	14b	0.83a	0.17b	0.13b

[x], 16 ml per 100 kg of seed.
[y], 300 ml per 100 kg of seed.
[z], 600 ml per 100 kg of seed.
Means followed by the same letter within a row are not significantly different at P=0.05.

Table 2. Means for plant m^{-2}, grain yield, and ascochyta infection on mature seeds (%) of Kabuli chickpea grown in Saskatoon and Aberdeen, Saskatchewan 2000.

Trait	Apron FL[x]		Apron FL[x] + Crown 300[y]		Apron FL[x] + Crown 600[z]	
	Saskatoon	Aberdeen	Saskatoon	Aberdeen	Saskatoon	Aberdeen
Plant m^{-2}	17a	19a	25b	33b	23b	34b
Seed yield (kg ha^{-1})	260a	460b	460b	940b	400b	920b
Ascochyta infection on mature seed (%)	3.41a[xy]		1.12b[xy]		0.89b[xy]	

[x], 16 ml per 100 kg of seed.
[y], 300 ml per 100 kg of seed.
[z], 600 ml per 100 kg of seed
[xy], Combined two locations and two varieties.
Means followed by the same letter within a row are not significantly different at P=0.05.

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