Evaluation of *Brassica napus* Accessions for Resistance to *Sclerotinia* under Mist-Irrigation

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INTRODUCTION

Sclerotinia stem rot (SSR), caused by *Sclerotinia sclerotiorum*, is a major yield-reducing disease of canola (*Brassica napus* or *B. rapa*) in North Dakota. Currently, the primary method of managing SSR of canola in North Dakota is through the use of fungicides, as no canola cultivars are currently marketed as having resistance to SSR. If SSR resistant canola cultivars were available, canola growers would save the added cost of a fungicide application and be more profitable. The National Plant Germplasm System (NPGS) Plant Introduction Station in Ames, IA maintains over 500 *B. napus* accessions. The objective of this study was to evaluate a subset of the NPGS *B. napus* accessions for resistance to SSR in the field under mist-irrigation in North Dakota.

MATERIALS AND METHODS

Small hill plots were established in a field at Fargo, ND in 2004. Plots were planted (20 seeds per plot) on 27 May 2004, and were spaced 30 cm apart. The statistical design was a randomized complete block with three replications. A total of 141 *B. napus* accessions were evaluated along with the partially-resistant check cultivar Hyola 357. Cultivar Hyola 357 was identified as having partial resistance in the greenhouse from a previous study (Bradley and del Rio, 2004). Plots were inoculated on 8 July 2004 with *S. sclerotiorum* infested millet seed. A mist-irrigation system was used to provide a favorable environment for SSR infection and disease development. Disease severity was evaluated every 3 days for 21 days for a total of seven evaluations using a 0 to 4 scale (Zhao et al., 2004). An area under disease progress curve (AUDPC) was calculated for each plot (Tooley and Grau, 1984). Statistical analysis was done using the general linear model procedure (PROC GLM) in SAS (SAS Institute, Inc., Cary, NC). Fisher's least significant difference (LSD) was used to compare means, where alpha = 0.05.

RESULTS

Significant (P = 0.0363) differences in AUDPC values occurred among *B. napus* accessions (Fig. 1). Six accessions that had AUDPC values significantly (P = 0.05) less than the partially-resistant check cultivar Hyola 357 were PI 469757, PI 469761, PI 436556, PI 469836, PI 469857, and PI 469756 (Table 1).

CONCLUSIONS

Six *B. napus* accessions appeared to have SSR resistance levels significantly better than the partially-resistant check cultivar Hyola 357. These accessions will be evaluated under additional greenhouse and field trials to confirm their apparent partially-resistant reactions. If confirmed, these accessions could be used as sources of resistance in developing elite SSR resistant canola cultivars.

LITERATURE CITED

Bradley, C. A. and del Rio, L. E. 2004. Evaluation of canola cultivars for resistance to *Sclerotinia sclerotiorum* using petiole and detached leaf inoculation. Phytopathology 94:S157 (Abstract).

Tooley, P. W. and Grau, C. R. 1984. Field characterization of rate-reducing resistance to *Phytophthora megasperma* f. sp. *glycinea* in soybean. Phytopathology 74:1201-1208.

Zhao, J., Peltier, A. J., Meng, J., Osborn, T. C., and Grau, C. R. 2004. Evaluation of Sclerotinia stem rot resistance in oilseed *Brassica napus* using a petiole inoculation technique under greenhouse conditions. Plant Dis. 88:1033-1039.

Field evaluations (*clockwise from upper left*): hill plots of *Brassica napus* accessions; *Sclerotinia*-infested millet seed inoculum on an accession; partial-resistant type reaction; susceptible type reaction.

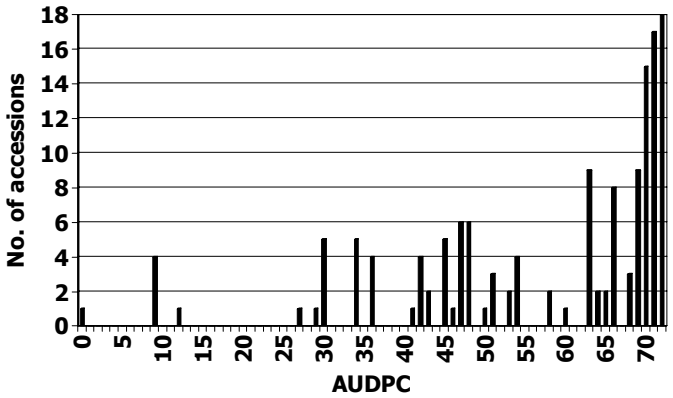

Fig. 1. Frequency distribution of AUDPC values based on Sclerotinia stem rot severity of 141 *Brassica napus* accessions.

Table 1. A partial listing of the data from the evaluation of 141 *Brassica napus* accessions for resistance to Sclerotinia stem rot.

Plant Introduction no.	Origin	Cultivar name	AUDPC
Hyola 357 (res. check)		**Hyola 357**	**54**
26638	?	Ruby	34
458939	Japan	Asahi natane	34
469732	Korea, South	Azuma 156	34
469736	Korea, South	Barplina	34
469829	Korea, South	Karafuto	34
284859	Poland	A 19890	30
469798	France	France 10	30
469854	Korea, South	Kuju 17	30
469867	Korea, South	Kuju 37	30
469909	Korea, South	Mokpo # 4	30
469842	Korea, South	Kraphhauser	29
469803	Germany	Germany	27
469757	Korea, South	Colza 18 Micro	12
436556	China	Gan You no.3	9
469761	Korea, South	Dong Hae 1	9
469836	Korea, South	Kinki # 28	9
469857	Korea, South	Kuju 22	9
469756	Korea, South	Colza	0
		LSD 0.05	41