Evaluation of Parameters to Assess Resistance of White Bean to White Mold.

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Forty cultivars and lines of white bean were assessed for resistance to white mold, caused by *Sclerotinia sclerotiorum*, at the Arkell Research Station, University of Guelph in 1992, 1993, 1994, and 1995 Entries were classified as determinate (I), upright determinate (Ia), indeterminate without guides (IIa), or indeterminate with guides (IIb). Plots were established in June each year in an area naturally infested with sclerotia of the pathogen Plots spaced 72 cm apart were arranged in a randomized complete block design with three replications. Each plot contained three rows 4.5 m long and 18 cm apart. Seeds were sown 5 cm apart in the row. The experimental area was treated with glyphosate (as Roundup) and trifluralin (as Treflan) before seeding. In September, 50 plants (1992, 1993, 1994) or 30 plants (1995) were taken from each plot and rated for severity of disease on a scale of 0, 1, 2, 3, and 4 representing 0, 1-25, 26-50, 51-75, and 76-100% of the stem and branches with symptoms of white mold. Disease incidence was calculated as the percentage of plants with symptoms of white mold on stems or branches, and percentage of pods with white mold was determined from all pods on all plants examined. Data on disease severity, disease incidence (%), and incidence of diseased pods (%) were analyzed by ANOVA, experimental variability was expressed as coefficient of variation, and means were compared by least significant difference at $P = 0.05$. Correlations were determined between pairs of years for each disease parameter, and between pairs of disease parameters. The data provide an opportunity to analyze the repeatability of the results in different years and to consider the most appropriate parameter for evaluating resistance of white bean to white mold

Disease severity and incidence were high in 1992 and 1993, moderate in 1994, and low in 1995. Coefficients of variability increased as mean disease severity and incidence decreased, and were consistently lowest for disease incidence and highest for diseased pods. Significant differences occurred among entries in all disease parameters in all years. Type I entries tended to be more susceptible than type II entries. Consistency of ranking of entries in different years was shown by moderate to high correlation coefficients between pairs of years within each disease parameter. Thus, although the incidence and severity of disease of all entries differed widely among years, their susceptibility relative to other entries was fairly consistent Significant differences occurred amongst entries according to all disease parameters in all years The number of entries per year whose disease reaction differed significantly from the most susceptible reaction was consistently high when disease was measured as severity (26-34) or as diseased pods (24-38), but much more variable when measured as incidence (7-36). Disease incidence was less effective than disease severity in distinguishing entries when the mean level of disease was high. In addition, in eight of ten comparisons of pairs of years, correlation coefficients were higher for disease severity than for disease incidence Disease severity and incidence of diseased pods were comparable in the strength of correlation coeffients and in showing differences among entries. Disease severity and disease incidence can be determined with equal ease and much more easily than the incidence of diseased pods. This suggests that disease severity would offer a convenient and consistent evaluation of resistance to white mold of white bean in field trials, and would provide the data from which disease incidence could be calculated, if desired. Nevertheless, the disease parameters tested were highly correlated with one another, indicating that entries could be evaluated by the most convenient method.

Mean and coefficient of variation of parameters of white mold of white bean			
Year	Severity	Incidence (%)	Diseased Pods (%)
1992	1.9 (24.3)	90.6 (10.4)	11.8 (53.1)
1993	1.5 (25.5)	95.1 (6.0)	5.8 (63.5)
1994	0.6 (96.5)	22.3 (73.0)	5.0 (113.0)
1995	0.2 (114.9)	7 5 (107 6)	0.4 (148.9)

Number in parentheses is coefficient of variation (%) of mean.

Correlation coefficients relating disease severity in pairs of years				
	1993	1994	1995	4-Year Mean
1992	0.59 (0.0001)	0.60 (0.0001)	0.47 (0.0018)	0.89 (0.0001)
1993		0.47 (0.0021)	0.48 (0.0016)	0.78 (0.0001)
1994			0.60 (0.0001)	0.84 (0.0001)
1995				0.68 (0.0001)

Correlation coefficients relating disease incidence in pairs of years				
	1993	1994	1995	4-Year Mean
1992	0.33 (0.0389)	0 51 (0.0008)	0.43 (0.0062)	0.72 (0.0001)
1993		0.39 (0.0141)	0.40 (0.0096)	0.59 (0.0001)
1994			0.59 (0.0001)	0.92 (0.0001)
1995				0.74 (0.0001)

Correlation coefficients relating diseased pods in pairs of years				
	1993	1994	1995	4-Year Mean
1992	0.60 (0.0001)	0.67 (0.0001)	0.55 (0.0003)	0.92 (0.0001)
1993		0.46 (0.0027)	0.41 (0.0078)	0.73 (0.0001)
1994			0.47 (0.0024)	0.87 (0.0001)
1995				0.58 (0.0001)

Correlation coefficients relating pairs of disease parameters			
Year	Severity vs Incidence	Severity vs Diseased Pods	Incidence vs Diseased Pods
1992	0.79 (0.0001)	0.95 (0.0001)	0 76 (0.0001)
1993	0.69 (0.0001)	0 75 (0.0001)	0.38 (0.0158)
1994	0.99 (0 0001)	0.95 (0.0001)	0.92 (0.0001)
1995	0.95 (0.0001)	0.79 (0.0001)	0.77 (0.0001)
4-year mean	0.92 (0.0001)	0.94 (0.0001)	0.85 (0.0001)

Number in parentheses is probability level of correlation coefficient.