

THE RESPONSE OF SUNFLOWER GENOTYPES TO NATURAL  
INFECTION BY MACROPHOMINA PHASEOLI

By

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Experimental sunflower plantings at Beltsville, Maryland in 1968 and 1969 were severely infected by charcoal stem rot incited by Macrophomina phaseoli (Maubl.) Ashby (= M. phaseolina (Tassi) G. Gold., the pycnidial stage of Rhizoctonia bataticola (Taub.) Butler. M. phaseoli is the name commonly used in the United States.

Charcoal stem rot is a widely distributed disease of the cultivated sunflower, Helianthus annuus L., and of many other plant species in the United States and elsewhere. "Peste negra" as this disease is also known, is considered to be of economic significance in South America, and it is reported to be important in Eastern Europe. The perennial H. tuberosus L. and the wild annual H. debilis ssp. cucumerifolius (T. et G.) Heiser, are hosts of M. phaseoli.

The present study of response of sunflowers to natural infection by the charcoal stem rot fungus Macrophomina phaseoli (Table 1) revealed wide genotypic variability. The early maturing varieties Krasnodarets and Armavirec were the most susceptible. The late maturing Lyng Manchurian-26 and the moderately late T 64001, P-21 ms X HA 60, Commander, and NK HO 1 were the most resistant. Other varieties which were intermediate in their maturity were correspondingly intermediate in their susceptibility. Differences in disease response of Lyng Manchurian-26, Arrowhead, Peredovic, Armavirec and Krasnodarets as shown by the Duncan's New Multiple Range Test were significant at the 0.05 level. Differences in the disease response of the other varieties were not significant. The occurrence of resistant individual plants within segregating progenies indicated that resistant varieties can be developed. Confirmatory evidence in support of this conclusion is provided by the recent field observations in Texas which have shown that in certain genotypes, resistance to charcoal stem rot is a dominant character.

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Table 1. Susceptibility of sunflowers to charcoal stem rot under natural infection conditions at Beltsville, Maryland in 1968.

Variety	Plants killed <sup>1/</sup> %
Lyng Manchurian-26 (E. J. Lyng Co.)	9.0 a <sup>2/</sup>
T 64001 (S-37-388T2 X HA 6,7, & 43)	14.4 ab
P-21 ms X HA 60	15.2 ab
Commander (1963 Breeder's seed. Can. Dept. Agr., Morden, Man.)	18.5 abc
NK HO 1 (Northrup, King & Co.)	19.3 abc
Peredovik (66) (1967 Cargill, Inc.)	24.5 abcd
T 56002 (S-37-388T1 X HA 6,7, & 43)	25.8 abcd
VNIIMK 8931 (66) (1967 Cargill, Inc.)	29.4 bcd
Mingren (1967 Minn. Incr.)	36.9 cde
Morden-I Hy. <sup>3/</sup> (1967 Can. Dept. Agr., Morden, Man.)	40.7 de
Smena	42.6 de
VNIIMK 8931 (1963 Can. Dept. Agr., Morden, Man.)	44.5 de
Arrowhead (1967 Minn. Foundation)	51.5 e
Peredovik (1963 Breeder's Seed, Can. Dept. Agr., Morden, Man.)	52.5 e
Armavirec (1966 Breeder's Seed, Can. Dept. Agr., Morden, Man.)	75.9 f
Krasnodarets (1967 Cargill, Inc.)	79.8 f

<sup>1/</sup> Based on the number of plants killed in 3 row-plots with 4 replications per variety.

<sup>2/</sup> Duncan's New Multiple Range Test: percentage values followed by same letters are not significant at the 0.05 level.

<sup>3/</sup> Recently renamed 'Valley'.