
Fusarium solani f. sp. *phaseoli* IN ONTARIO

R. Hall
Department of Environmental Biology
University of Guelph
Guelph, Ontario, Canada N1G 2W1

Fusarium solani f. sp. *phaseoli* is a special form of *Fusarium solani* with distinct morphological and pathological properties. It can be distinguished from other types of *F. solani* by its growth rate and appearance in culture and by the size and shape of its macroconidia (3,1,5). It also has the special feature of being highly pathogenic to the roots and stem of *Phaseolus vulgaris* beans (6).

The fungus is believed to be introduced into an area with its host or infested soil (4). It is also believed to accumulate with repeated culture of beans (2). Data collected in Ontario support these claims.

Phaseolus beans have been grown in Ontario for over 100 years. The area devoted to their production rose from 7000 acres in 1882 to 60,000 acres in 1977. All counties in southern Ontario have a long history of bean cultivation but differ in intensity of production, expressed as the area in beans each year multiplied by the number of years for which records are available (1882 to 1977). These records provide an opportunity to relate the distribution and abundance of the fungus to the history of bean cultivation in different counties.

Thirty-one bean fields were sampled in 1978. One hundred plants were pulled from each field and the ten most discolored stems were comminuted and spread over the selective medium of Nash and Snyder (3) to detect *F. solani* f. sp. *phaseoli*. Twenty-four fields (77%) yielded the fungus. Infested fields occurred in all counties. Of the seven fields not yielding the fungus at least two had not previously supported a bean crop but all infested fields had. The widespread distribution of the fungus in the bean area presumably reflects the long history of bean production in Ontario.

Populations of the fungus were determined in 79 bean fields in 1976 and 1977 by a soil-dilution technique that could detect 6 or more propagules per gram of soil. The fungus was found in 21 fields (27%), and these occurred in three counties: Kent, Huron and Middlesex. Populations greater than 100 propagules per gram occurred in 15% of the fields.

The stem-comminution technique was more sensitive than the soil-dilution assay in detecting the fungus. The first technique showed that the fungus occurred in over 70% of the bean fields sampled and the second showed that populations greater than 6 propagules per gram occurred in less than 30%.

The abundance of the fungus was related to the intensity of bean production, expressed as acre-years of beans between 1882 and 1977. As shown in Table 1, the percentage of fields within a county that yielded the fungus in soil-dilution assays increased as the intensity of bean production increased. These results support the belief that *F. solani* f. sp. *phaseoli* is an

introduced fungus whose populations increase with repeated culture of Phaseolus beans.

Literature cited

1. Matuo, T. and W.C. Snyder. 1973. Use of morphology and mating populations in the identification of formae speciales in Fusarium solani. *Phytopathology* 63:562-565.
2. Menzies, J.D. 1952. Observations on the introduction and spread of bean diseases into newly irrigated areas of the Columbia Basin. *Plant Disease Repr.* 36:44-47.
3. Nash, S.M. and W.C. Snyder. 1962. Quantitative estimations by plate counts of propagules of the bean root rot Fusarium in field soils. *Phytopathology* 52:567-572.
4. Nash, S.M. and W.C. Snyder. 1964. Dissemination of the root rot Fusarium with bean seed. *Phytopathology* 54:880.
5. Snyder, W.C., S.M. Nash and E.E. Trujillo. 1959. Multiple clonal types of Fusarium solani phaseoli in field soil. *Phytopathology* 49:310-312.
6. Zaumeyer, W.J. and H.R. Thomas. 1957. A monographic study of bean diseases and methods for their control. United States Dept. Agriculture Tech. Bull. 868. 255 pp.

Table 1. Incidence of Fusarium solani f. sp. phaseoli in bean fields in relation to intensity of bean production by county.

Data Group	County				
	Kent	Huron	Middlesex	Perth	Oxford
Thousand acre-years in beans 1882-1977	2,212	1,340	571	269	43
No. fields sampled	13	22	17	9	13
Fields yielding the fungus by soil dilution (%)	77	32	24	0	0

HYPERPARASITISM OF Gliocladium virens ON Sclerotinia sclerotiorum

J. C. Tu
 Research Station, Research Branch
 Agriculture Canada, Harrow, Ontario NOR 1G0

G. virens Miller & Foster isolated from decomposed sclerotia of S. sclerotiorum found on a diseased white bean plant was shown to be a potent hyperparasite of S. sclerotiorum.