

Fusarium Oxysporum f. pisi, Race 5

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ABSTRACT

A new type of *Fusarium* wilt of peas (designated race 5) was observed in northwest Washington during the growing seasons 1963 through 1969. Symptoms on individual plants and the disease pattern in the field are identical to race 1; however, pea cultivars resistant to races 1, 2, and 4 of *Fusarium oxysporum* f. *pisii* are susceptible to race 5. Phytopathology 60:1861-1862.

Fusarium wilt of peas (*Pisum sativum* L.), caused by *Fusarium oxysporum* Schlecht. emend Snyder & Hans. f. *pisii* (Linhf.) race 1 Snyder & Hans., was described in 1928 (4). Near wilt, *F. oxysporum* f. *pisii* race 2 Snyder & Hans., was recognized and identified as a new race in 1935 (7). Races 3 and 3A, described by Schreuder (5) and Buxton (2), respectively, are similar to race 2 but will cause wilt in varieties resistant to race 1 and 2. Bolton et al. (1) described race 4 of *F. oxysporum* f. *pisii* in 1966. Race 4 was reported to resemble race 1 in cultural characters and symptoms produced on susceptible varieties. Until now, only races 1 and 2 of *Fusarium oxysporum* f. *pisii* have been reported to be of economic importance.

During the growing seasons of 1963 through 1969, a severe type of *Fusarium* wilt was observed on peas in northwest Washington (3). In 1967, several cultures of *F. oxysporum* f. *pisii* were isolated from near wilt-resistant pea plants exhibiting typical race 1 wilt symptoms. The cultural characteristics of this *F. oxysporum* isolate were similar to those described for races 1 and 4. Isolates of *Fusarium* capable of causing wilt in races 1, 2, and 4 resistant cultivars (Darkskin Perfection, New Era, and New Wales) were examined by W. C. Snyder and classified as *F. oxysporum* f. *pisii*. The virulence of this cultural type has also been substantiated by T. P. Reiling, Green Giant Co., Dayton, Wash.

The importance of this race of *F. oxysporum* f. *pisii* can best be illustrated by its rapid increase in economic importance in northwest Washington. The disease was first observed in 1963 in one field on a farm in Skagit County, Washington. It spread rapidly on that farm during the following growing season. In 1965, five fields confined to a small geographical area near LaConner, Washington, were known to be infested with this race of pea wilt. Infested fields increased to 13 in 1967 and 129 in 1968, and occurred throughout a 3-county area in northwestern Washington with no apparent relationship to soil types, salinity, or topography.

Table 1 compares races 1, 2, 3, 4, and the race that exists in northwestern Washington (race 5). A direct comparison of race 3 and race 4 with race 1, 2, and 5 was not attempted because type cultures of these two races are not available. In the opinion of the author, the use of published data with respect to the reaction of race 3 and 4 are more valid than comparative studies made with attenuated strains or cultural mutants of the isolates described as *Fusarium oxysporum* f. *pisii*, races 3 and 4. Race 3 has been described as similar to race 2 in symptoms and disease expression. Race 4 is similar in symptom expression to race 1, and does not differ appreciably from race 5 except that race 5 is patho-

TABLE 1. Reaction of pea cultivars to races of *F. oxysporum* f. *pisii*

Race	Susceptible		Resistant race 1		Resistant race 1-2		Resistant race 1-2-4	
	Test variety	Wilt reaction	Test variety	Wilt reaction	Test variety	Wilt reaction	Test variety	Wilt reaction
1 ^a	Little Marvel	+ ^d	Darkskin Perfection	—	New Era	—	New Wales	—
2 ^a	Little Marvel	+	Darkskin Perfection	+	New Era	—	New Wales	—
3 ^b	Rondo	+	Wisconsin Perfection	+	Delwich Commando	+		0
4 ^c	Progress No. 9	+	W.R. Perfection	+	New Era	+	New Wales	—
5 ^a	Little Marvel	+	Darkskin Perfection	+	New Era	+	New Wales	+

^a Roots of 10-day-old seedlings grown in vermiculite were cut while submerged in a spore suspension of *Fusarium oxysporum* f. *pisii*. Seedlings were transplanted into pasteurized soil and grown at approx 21 C (70 F).

^b Race 3 symptoms described as similar to near wilt (race 2). Reaction based on published data (5).

^c Race 4 symptoms described as similar to common wilt (race 1). Reaction based on published data (1).

^d + = That variety is susceptible; — = variety is resistant; 0 = no data available in literature.

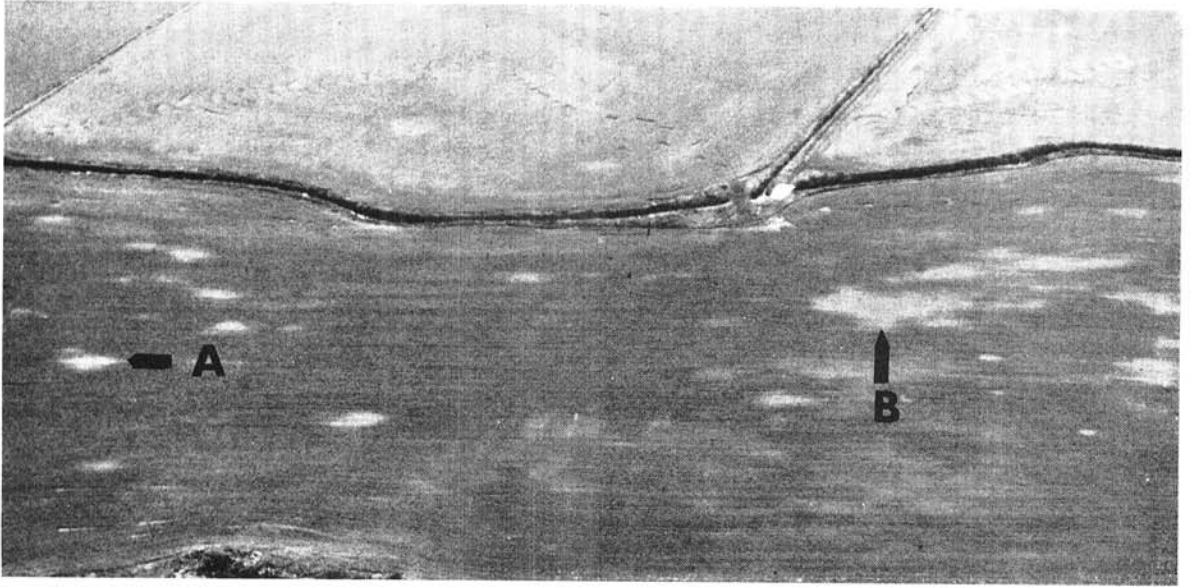


Fig. 1. Pattern of disease development in the field. **A)** Small circular area in which all pea plants were killed by *Fusarium* wilt. **B)** Area in which individual spots have merged to form large area with an irregular margin.

genic and race 4 is nonpathogenic to the New Wales cultivar of peas.

Figure 1 illustrates the pattern of disease development in the field. Typically, small circular areas in which all pea plants are killed are the first obvious indication that this disease is present. Symptoms on individual plants and the general pattern of disease in the field are identical to those described by Schroeder (6) for race 1.

This is the first report since races 1 and 2 were described where a new race of *F. oxysporum* f. *pisi* has become established in nature and has caused economic loss to pea production.

It is proposed that the race in northwest Washington be designated as *F. oxysporum* f. *pisi*, race 5, based on its pathogenicity to wilt-susceptible, wilt-resistant, near wilt-resistant, and New Wales varieties of peas.

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