Postemergence Damping-off of Peanut Plants Caused by Pythium myriotylum

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ABSTRACT

Three isolates of *Pythium myriotylum* designated pod breakdown isolate (PBI), greenhouse isolate (GHI), and post emergence damping-off isolate (PEDI), were tested for pathogenicity and virulence to peanut seeds and seedlings. Percent emergence was less and postemergence damping-off was greater for PEDI than for the two other isolates indicating differences in virulence. Postemergence damping-off was the primary manifestation of the PEDI.

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Pythium myriotylum Drechs. causes seed decay, root rot, vascular wilt, and pod breakdown of peanut (*Arachis hypogaea* L.) plants (1, 2, 4, 5, 6, 7). The most commonly recognized manifestation of the fungus on peanut throughout the world is probably pod breakdown. The fungus is not usually associated with extensive postemergence damping-off in peanut plants.

In 1971 we examined an area in a test plot on the Coastal Plain Station at Tifton, Georgia, where peanut plants were severely stunted or dead 2-4 weeks after emerging. Tissue platings from diseased plants on potato-dextrose agar and corn meal agar amended with 100 ppm pimafucin (2.5% pimaricin) consistently yielded *Pythium myriotylum*. Preliminary greenhouse tests indicated that this isolate was extremely virulent to peanuts. The purpose of this experiment was to compare pathogenicity and virulence of this isolate with that of two others from different sources to peanut.

Three isolates of *P. myriotylum* were tested for pathogenicity and virulence to peanut seeds and seedlings: a pod breakdown isolate (PBI) from field-grown decayed peanut pod in 1966; a greenhouse isolate (GHI) from a kernel produced on a plant growing in a greenhouse in 1967; and the postemergence damping-off isolate (PEDI) from a diseased seedling in the infected field test plot. The PBI and GHI were checked for pathogenicity to peanut pods in 1969 and were highly virulent. McCarter and Littrell (6) in 1970 determined that these isolates caused root rot of peanut plants.

Inoculum was produced on a medium containing 1,500 *g* of 90% Tifton loamy sand (80% sand, 5% silt, 15% clay) plus 10% annual ryegrass (*Lolium multiflorum* Lam.) seed (w/w) in Fernbach flasks, plugged with cotton, and autoclaved 1 hr on 2 successive days. The flasks were seeded with separate isolates, and cultures were harvested after 14 days at 27 C.

The following treatments were established in a greenhouse in 20-cm pots containing soil obtained from the diseased area of the field: nontreated control; steamed (105 C ± 5 C for 2 hr) control; and the three isolates at inoculum concentrations of 1:100, 1:500, and 1:2,500 (v/v).

Seed of cultivar 'Starr' (Spanish-type, avg. 98% germination) were fumigated under vacuum with vapor from methylmercury dicyandiamide (Panogen 15) and were not coated with any chemical (2). Five seeds were planted, radicle tip down, in each pot 2 days after infestation. Each inoculum concentration was replicated 10 times in a randomized complete block design. Stand counts and number of postemergence damped-off plants were made at 14 and 21 days after planting.

Assays on a selective medium for pythiaceous fungi (3) indicated that *Pythium* was present in the nontreated control and infested treatments but not in the steamed control at 21 days after planting. The PEDI at 1:100 was

TABLE 1. Effects of *Pythium* isolates on emergence and postemergence damping-off of peanut plants [a]

Treatment	Inoculum concn (v/v)	After 14 days		After 21 days	
		Percent emergence	Percent PEDO[b,c]	Percent emergence	Percent PEDO[b,c]
Nontreated control	---	90 y	4 x	90 yz	4 x
Steamed control	---	90 y	0 x	98 yz	0 x
Pod rot isolate	1:100	92 y	0 x	92 yz	4 x
	1:500	94 y	0 x	94 yz	2 x
	1:2500	92 y	0 x	96 yz	2 x
Greenhouse isolate	1:100	78 y	0 x	80 yz	0 x
	1:500	94 y	0 x	94 yz	0 x
	1:2500	96 y	0 x	100 z	0 x
Damping-off isolate	1:100	34 x	2 x	40 x	28 y
	1:500	80 y	2 x	84 yz	66 z
	1:2500	82 y	12 y	82 y	74 z

[a] Means in the same column followed by the same letter not significantly different ($P = 0.01$) according to Duncan's multiple range test.
[b] PEDO = postemergence damping-off.
[c] Data in this column transformed to $\sqrt{n + 0.5}$ for statistical analysis. Converted data are presented.

the only treatment that had reduced emergence at 14 and 21 days (Table 1). Postemergence damping-off for PEDI was also significantly greater at 1:2,500 14 days after planting and at all concentrations after 21 days. The lower percent postemergence damping-off for PEDI at 1:100 at 21 days than for other concentrations of the same isolate was related to lower plant emergence. The main damage caused by the PEDI was postemergence damping-off at the greatest dilutions of inoculum (1:500 and 1:2,500). Since the PBI and GHI were highly virulent on peanut pods in 1969 and caused root rot of peanut plants in 1970, differences among the isolates in degree of postemergence damping-off are probably characteristic of the isolates and not attributable to loss of virulence by the PBI and GHI isolates. To our knowledge, this is the first time that *P. myriotylum* has been reported as causing extensive postemergence damping-off of peanut seedlings. Therefore, this more virulent isolate may be of recent origin or possibly may have genetic traits that prevented it from becoming widely established in the peanut belt of the United States.

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