

Peanut Wilt Caused by *Pythium myriotylum*

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A wilt disease of unknown cause has been observed on peanuts, *Arachis hypogaea* L., in Virginia for several years. The disease acquired the name "X-wilt" about 1957 when attempts to identify the causal organism (K. H. Garren, L. I. Miller, *personal communications*) were unsuccessful. Before 1966 the disease occurred sporadically, and often was limited to patches of plants scattered through fields. Epiphytotic with spectacular symptoms occurred in Virginia in 1966-67, and in some fields many plants died. This is a report on investigations after 1966 which showed that "X-wilt" is caused mainly by *Pythium myriotylum* Drechs. "Pythium wilt" is now suggested as a better name for this disease.

This disease is usually first noticeable in mid-August, when leaflets and petioles of the growing shoots of infected plants wilt. If hot, dry conditions prevail, more leaflets and petioles wilt, until eventually the entire plant is affected. At first, wilted plants usually recover their turgidity at night, and many outgrow the disease. Occasionally, wilt symptoms appear suddenly, and plants are quickly killed.

Shortly after the appearance of wilt symptoms, leaflets become chlorotic or light green in color. Leaflet margins pucker, and an adaxial curling or rolling occurs, starting at the apical end of the leaflet. Some leaflets eventually fold, gradually turn brown, and shed prematurely.

The root systems of severely wilted plants are greatly reduced by deterioration of the lateral and fibrous roots. Roots are dark brown and almost devoid of nodules. During early stages of infection, the vascular tissue of the tap root turns light brown. This discoloration may extend from the tip of the tap root to several cm into the stem. In advanced stages of infection, the vascular tissue of the roots turns dark brown, and the cortical tissue turns almost black and sloughs easily. At this point the discoloration extends into the primary and lateral branches of the stem, and in some cases may be found in the vascular tissue of the petioles.

Plants that wilt early in the season (prior to 15 August) usually have a considerable number of pods affected by pod breakdown (3). Those plants on which symptoms are first visible late in the growing season, or shortly before harvest, seem to have little pod breakdown.

TABLE 1. Frequency of isolation of *Pythium myriotylum* isolated from the hypocotyl and roots of slightly and severely infected Virginia Bunch 46-2 peanuts^a

Source	Slightly Wilted	Severely Wilted
	%	%
Hypocotyl		
Wood	55	80
Pith	40	15
Taproot		
Cortex	20	0
Wood	60	10
Pith	9	0
Lateral Roots	25	2
Fibrous Roots	8	0

^a Plated on CMAP (3).

From 1966-68, *P. myriotylum* was isolated consistently from roots or pieces of vascular tissue from the tap roots of wilted plants on CMAP (3) and cornmeal agar (CMA). The isolation frequency of *P. myriotylum* from different parts of infected roots plated on CMAP is shown in Table 1. Other *Pythium* spp. were encountered infrequently.

Inoculation tests were conducted with isolates of *P. myriotylum*. A fungal suspension was prepared by scraping the surface of 6-day-old cultures of *P. myriotylum* growing on CMA and blending with sterile water for 3 sec. A control suspension was similarly made from sterile cornmeal agar. Washed roots of 3-month-old peanut plants (var. Virginia Bunch 46-2) were suspended in these aqueous suspensions for 30 min and immediately planted in 10-inch clay pots containing sterilized soil. Pods were watered to field capacity and shaded; plants were observed daily for signs of wilt.

Inoculated plants were healthy 4 days later, but by the 7th day most of them showed wilt symptoms. Symptoms intensified gradually, and most of the inoculated plants died within 3 weeks (Fig. 1). A few inoculated plants showed early wilt symptoms but eventually recovered. In contrast to control plants, new root growth was not discernible at 21 days in the inoculated plants (Fig. 2). Vascular tissue of inoculated plants was discolored, and microscopic examination of the root pith revealed many *Pythium* oospores. *P. myriotylum* was easily isolated from such material.

Since Drechsler (1) named this fungus in 1930, the number of known hosts of *P. myriotylum* has increased greatly, but this appears to be the first proof that it can cause a vascular wilt of peanuts. Perry (7) and Jackson & Bell (4) found this fungus associated with wilted peanuts, but did not test its pathogenicity. In a note distributed to some North Carolina county extension personnel in 1965, W. E. Cooper and J. C. Wells described symptoms of a wilt of peanuts which they suspected was caused by a *Pythium* sp.

The report of McCarter & Littrell (5), showing that rye (*Secale cereale*) and rye grass (*Lolium multiflorum*) are susceptible to *P. myriotylum*, is of interest to Virginia peanut growers, most of whom use rye in rotation with peanuts. Since rye or rye grass is almost always the cover crop in the peanut-corn-peanut stan-

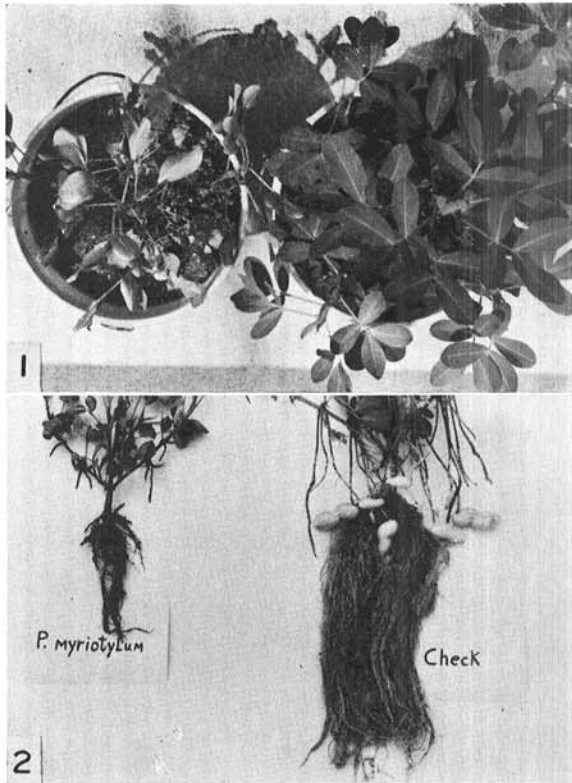


Fig. 1-2. 1) Foliage symptoms of peanut wilt occurring 21 days after inoculation with *Pythium myriotylum*. Healthy plant on the right. 2) Effect of *P. myriotylum* on the root system of peanuts 21 days after inoculation. Healthy plant on right.

dard rotation, a rapid build-up of inoculum could occur in most Virginia fields.

Middleton (6) noted that *P. myriotylum* was encountered only in the warmer climates of the world. Waterhouse & Waterston (8) defined its optimum and maximum growth at 37 and 44 C, respectively. In Virginia, Pythium wilt is usually more evident in August and September, during the period when soil temperatures reach their maximum.

Garren (3) recently demonstrated that *P. myriotylum* was one of the causal agents of peanut pod breakdown. Frank (2) also showed it causes pod breakdown of peanuts in Israel. Thus, *P. myriotylum* appears to be involved in two distinct disorders in peanuts.

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