Research Note

A NEW BLIGHT OF PIGEON PEA IN PUERTO RICO[1]

Premature bud, flower, and pod drop and witches' brooming were found on fields of 2B-Bushy and Kaki pigeon peas at the Isabela (fig. 1 A–C) and Lajas (fig. 2 A–D) Research Center, College of Agricultural Sciences of the University of Puerto Rico in November and December 1983. Large (0.3 to 1.0 cm) irregularly circular lesions were found on

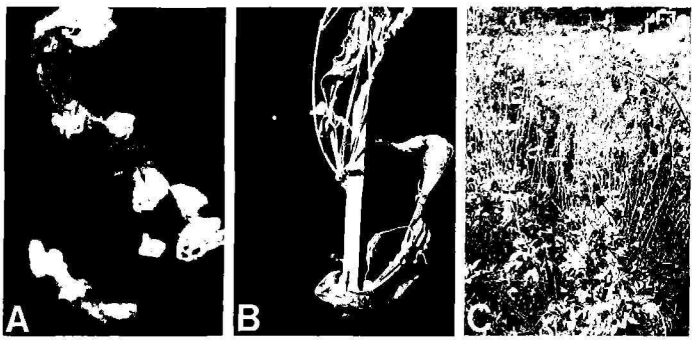

FIG. 1.—A. Proliferation of abscission scars (arrows) resulting from the premature dropping of pigeon pea flowers on 2B-Bushy pigeon peas at the Isabela Research Center. B. Proliferation of secondary shoots (witches' broom) in Kaki pigeon peas. Note prematurely aborted pod (arrow). C. Field view of the excessive flower, pod drop, and proliferation of secondary shoots. Lack of normal pod clusters shows reduction in production potential.

pigeon pea leaves in Lajas but not in Isabela. The first pigeon pea harvest in Lajas was about 20% of normal, and subsequent harvesting was abandoned because of insufficient yield. In Isabela 80 to 90% losses were estimated based on abscission scar frequency.

Conidia and conidiophores (fig. 3) of *Alternaria* formed definite dark bands within pigeon pea leaf lesion in Lajas (fig. 2). Diseased buds and flowers were internally colonized by *Alternaria* more than any other

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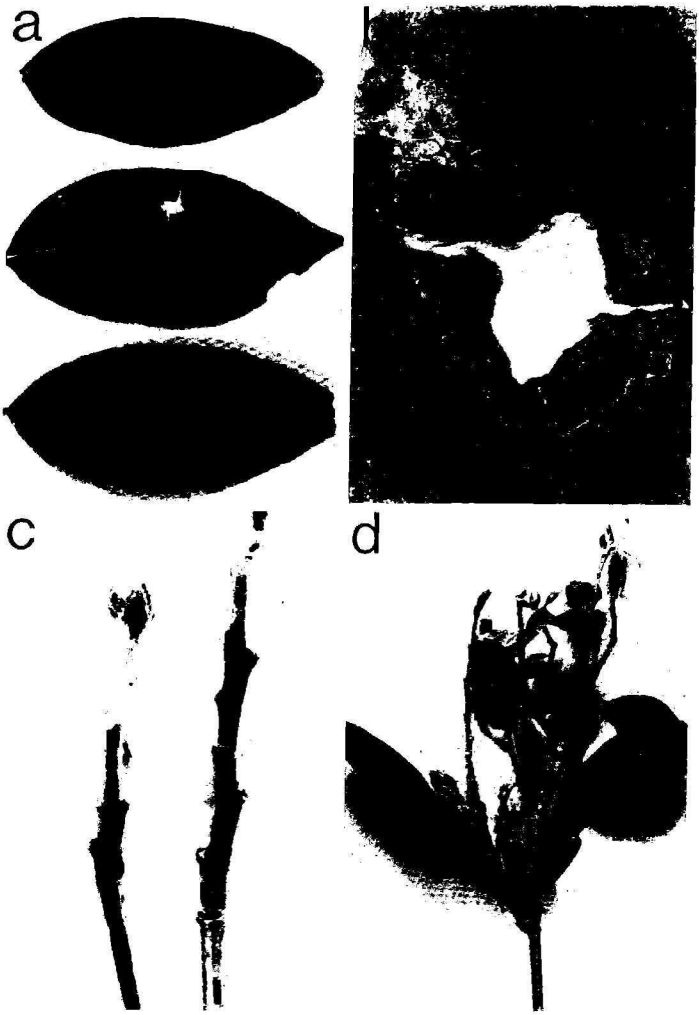

FIG. 2.—A. Leaflets of Kaki and 2B-Bushy pigeon peas in Lajas showing circular necrotic lesions. B. Close-up of a mature leaf lesion showing a dark band of *Alternaria* conidiophores surrounding a central tear. C. Aborted flower clusters of 2B-Bushy pigeon peas showing apical growth of *Alternaria* mycelium. D. Witches' broom symptoms in 2B-Bushy pigeon peas in Lajas.

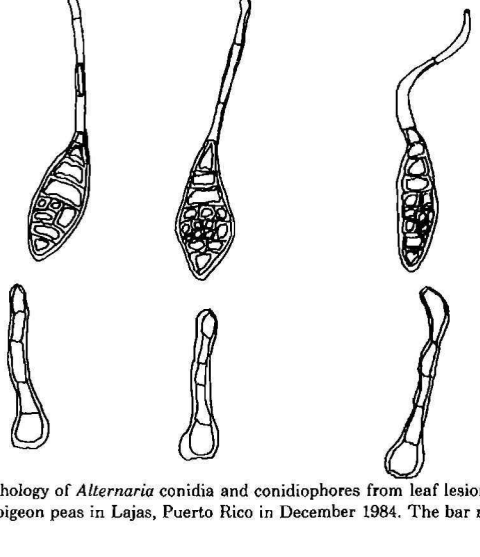

FIG. 3.—Morphology of *Alternaria* conidia and conidiophores from leaf lesions on 2B-Bushy and Kaki pigeon peas in Lajas, Puerto Rico in December 1984. The bar represents 10 microns.

microorganism as shown below.

Microorganism	*Percentage of isolations*[2]	
	Flower buds	*Open flowers*
Altenaria	52	76
Fusarium	38	24
Curvularia	29	24
Rhizopus	0	4
Bacteria	5	4

With a selective recovery method, 82 to 100% of Kaki and 2B-Bushy seeds, respectively, were infected with *Alternaria* in Lajas (table 1).

Experimental fields in Lajas received weekly insecticide treatment. Methomyl (S-MethylN-(methylcarbamoyl,oxy) thioacetimidate), Lannate L E. I. Du Pont de Nemours, Wilmington, Del.[3]) applied at 1 kg

[2] Mean percentage based on 50 isolations each from flower buds and open flowers. Samples were planted on sterile potato dextrose agar. Tissues were submerged for 4 minutes in 0.5% NaOCl and rinsed in sterile distilled water prior to plating. Samples were incubated for 10 days at 27° C and 90% RH.

[3] Trade names in this publication are used only to provide specific information. Mention of a trade name does not constitute a warranty of equipment or materials by the Agricultural

a.i./ha in 250 L water was alternated with endosulfan—(6,7,8,9,10,10-hexachloro-1,5, 5a,6,9a-hexahydro-6, 9-methano-2,4,3-benzodioxanthiepin-3-oxide)—Thiodan 50 PH, FMC Corp, Middle Port, NY) applied at 0.5 kg a.i./ha in 250 L water. In Isabela, permethrin—(3-phenoxyphenyl)methyl(+ or −)cis-trans-3-(2,2-dichloroethenyl)-2,2)dimethylcyclo-propane-carboxylate)—Ambush, FMC Corp) was applied at 0.25 kg a.i./ha in 250 L of water and alternated with methomyl applied as described above. No leafhopper or aphid activity was evident in the plantings. Electron microscopy and transmission studies showed no evidence of viral particles nor mycoplasma-like organisms. For these

TABLE 1.—*Incidence of* **Alternaria** *seed infections in pigeon peas from planting showing* **Alternaria** *leafspot, tip blight, and pod drop symptoms in Lajas, Puerto Rico during December 1984*

Test media[1]	Seed treatment[2]	Samples[3]				
						$\bar{X}$
		2 B-Bushy				
BPDA	NONE	100	100	100	100	100
PDA	NONE	34	38	28	12	28
PDA	NaOCl	38	38	36	40	38
BPDA	NaOCl	76	74	72	82	76
		Kaki				
BPDA	NONE	86	82	90	88	87
PDA	NONE	0	0	0	0	0
PDA	NaOCl	2	4	0	6	0
BPDA	NaOCl	28	22	26	30	27

[1] PDA = potato dextrose agar, BPDA = benomyl amended (50 p/m) potato dextrose agar.

[2] NONE = no surface desinfection, NaOCl = submerged in 0.5% NaOCl for 4 minutes and dried aseptically before plating.

[3] Each sample seed lot consisted of 50 randomly selected seeds.

reasons, we eliminated insect toxins, mycoplasma-like organisms, and virus as possible causes of the disease.

Alternaria was considered as a probable cause of this blight on the basis of the consistency of its association with the disease and the similarity of these syndromes to diseases caused by pathogenic *Alternaria* on other plants. Symptomatology of *Alternaria* blights in other plants include target leaf spots, stem blotches, tip die-backs and fruit and seed rots.[4] An *Alternaria* leaf spot is reported from India and Africa on pigeon pea but not in the New World.[5] Diverse conditions may affect pigeon pea

Experiment Station of the University of Puerto Rico, nor is this mention a statement of preference over other equipment or materials.

[4] Neergaard, P., 1977. Seed Pathology. Macmillan, New York, 839 pp.

[5] Kannaiyan, J. and Y. L. Nene, 1977. Alternaria leaf spot of pigeon pea. Tropical Grain Legume Bull. No. 9:34.

TABLE 2.—*Measurement of conidia and conidiophores of* **Alternaria**

Measurements	Mean	Standard error	Range
	Conidia		
Length	27.4	5.4	67.9–127.3
Max. head width	14.4	0.6	9.9– 17.0
Max. beak width	3.1	0.1	2.8– 4.2
Head length	46.1	1.7	36.8– 56.7
Beak length	41.3	4.0	26.6– 70.8
Tiers of head cells	6.1	0.3	5–8
Tiers of beak cells	3.7	0.3	2–6
	Conidiophores		
Length	47.8	2.9	28.3– 56.6
Max. blade width	7.8	0.3	5.6– 9.9
Max. width apex	5.6	0.1	5.1– 5.7

apices resulting in witches' brooming. Tip die-back from fungus infection may be one of these.

Table 2 presents conidia and conidiophore measurements (microns) of the *Alternaria* associated with the blight.

Because of the magnitude of this disease and the absence of reports of an *Alternaria* blight on pigeon peas in the New World, further studies on disease, etiology, epidemiology, and control are needed.

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