Research Note

BACTERIAL LEAF SPOT OF COFFEE[1]

Very few bacteria have been incriminated as disease agents of coffee, (*Coffea arabica* L.). In Brazil,[2,3] *Pseudomonas syringae* pv. *garcae* was reported as the causal agent of coffee leaf spot. Wellman[4] mentioned aureolate bacterial leaf spot (*Pseudomonas* sp.) causing damage to coffee in Brazil. Severe defoliation and dark-colored leaf spots with a broad yellow halo were associated with the malady.

Bacterial diseases of coffee have not been reported in Puerto Rico although the island has been producing coffee for many years. Recently in Adjuntas, the tips of some coffee leaves were found to be affected by browning and necrosis. A gram negative bacillus was consistently isolated from affected tissues. The organism is a member of the *Pseudomonas* fluorescent group as indicated by the fact that the bacillus produces fluorescent pigment (visible under UV light) on King's medium B. The pathogen is strictly aerobic and induces a hypersensitive reaction on tobacco. It is catalase positive, arginine dihydrolase negative, produces levan, utilizes sucrose and mannitol but not lactose, maltose, salicine, cellobiose, trehalose or rhamnose. It grows at 5° C, but not at 41° C, and is ice nucleic active (INA).[5] The characteristics of the bacterium that I have isolated and studied are consistent with those listed for *Ps. syringae*.[2,5]

No symptoms were produced *in vitro* when potato and carrot slices were inoculated with isolates of the organism. However, when green limes were inoculated with the same isolates, brown-black necrotic, sunken lesions appeared some 10 to 12 days later.

In the greenhouse, typical symptoms were obtained on coffee leaves inoculated by rubbing with aqueous suspensions (10^8 cells/ml) of the isolates. Symptoms were evident on test plants as early as 5 days after inoculation (Fig. 1).

When inoculated on a range of known hosts including pepper, kidney beans (*Marca Diablo*) and *Datura* plants, symptoms incited on all these species were similar.

A similar bacterium was recovered from coffee leaves that developed typical symptoms of disease after inoculation with the original isolate. The morphology and the biochemical behavior of the recovered organism were identical to those of the original isolate.

Results obtained from reactions on tobacco plus biochemical and pathogenicity studies confirm that this organism belongs to the *Ps. syringae* group. Furthermore, this isolate induces black sunken lesions on limes and is INA positive. These last properties distinguish it from other *Ps. syringae*

[1]Manuscript submitted to Editorial Board 2 March 1988.

[2]Fahy, P. C. and G. J. Persley, 1983. Plant bacterial diseases: A diagnostic guide. Academic Press, Australia.

[3]Lozano, C. J., 1981. *In*: Proceedings of the Fifth Intern. Conference on Plant Pathogenic Bacteria, CIAT, Colombia.

[4]Wellman, F. L., 1961. Coffee: Botany, cultivation and utilization. Interscience Publishers, Inc., New York.

[5]Schaad, N. W., 1980. Laboratory Guide for Identification of Plant Pathogenic Bacteria. Bacteriology Committee of American Phytopathological Society, St. Paul, Minnesota.

FIG. 1.—Coffee plant exhibiting dark necrotic lesion on tip of leaves after 5 days inoculated with *Ps. syringae* pv. *syringae*.

TABLE 1.—*In vitro* susceptibility of the coffee strain of *Ps. syringae* pv. *syringae* to various antibiotics as represented by zones of inhibition

Antibiotic	Concentration per disk	Diameter inhibition zone (mm)	Result[1]
Tetracycline (TE_{30})	30 ug	52	S[2]
Aureomycin (A_{30})	30 ug	50	S
Chloroamphenicol (C_{30})	30 ug	25	S
Streptomycin (S_{10})	10 ug	23	S
Polymyxin B (PB_{300})	300 units	14	S
Neomycin (N_{30})	30 ug	14	S
Erythromycin (E_{15})	15 ug	10	S
Bacitracin (B_{10})	10 units	0	R[3]
Novobiocin (NB_{30})	30 ug	0	R
Nystatin (NY_{100}	100 units	0	R
Penicillin (P_{10})	10 units	0	R

[1]Reported on the presence or absence of a zone of inhibition and not by diameter size.
[2]S = Sensitive to concentration tested.
[3]R = Resistant or not susceptible to concentration tested.

pathovars and characterize it as *Ps. syringae* pv. *syringae*.[2]

An *in vitro* sensitivity test[6] revealed that this pathogen is susceptible to tetracycline, aureomycin, chloroamphenicol, streptomycin, polymyxin B, neomycin and erythromycin, and resistant to bacitracin, novobiocin, nystatin and penicillin (table 1).

Although expensive, antibiotics are effective for controlling this organism. As *Pseudomonas* are common inhabitants of the soil, the main control of plant diseases incited by them are based on cultural practices. Measures should be taken to avoid spreading the disease in areas devoted to coffee. Disinfection of soil, removal of infected plants and other sanitation practices should reduce the incidence of the disease.

Ps. syringae pv. *syringae* has been isolated on the mainland from various unrelated plant species.[7] This is the first report on the presence of a bacterial disease of coffee in Puerto Rico.

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[6]Bacto sensitivity disks for antibiotics, Difco Manual, 9th ed, 1977.

[7]Bergey, D. H., et al., 1974. Manual of Determinative Bacteriology, 8th ed, William and Wilkins Co., Baltimore, Md.