

BACTERIAL LEAF SPOT OF BOUGAINVILLEA

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Bougainvillea Comm. ex Juss is a member of the Nyctaginaceae family. A native of South America with large colorful floral bracts, it is among the most spectacular of flowering vines and shrubs used in landscape designs. The floral bracts are arranged in triplets surrounding the small, tubular white flowers (1, 2). Various bract shades of red, purple, pink and orange, as well as white and some bicolored varieties are available. The climbing vines are anchored with sharp thorns rather than coiled tendrils. Leaves are ovoid to elliptic-lanceolate, may be variegated, and vary considerably in size between varieties. Although there are many species of *Bougainvillea*, most plants in the ornamental trade today are hybrids of three horticulturally important species: *B. glabra*, *B. spectabilis*, and *B. peruviana*. In the tropics and subtropics bougainvilleas are used in borders, on fences, and as espaliers (2). *Bougainvillea* has recently gained popularity in colder climates where it is used as hanging baskets and pot plants for patio gardens during the summer months. Accompanying the recent increase in bougainvillea production in Florida, a bacterial leaf spot disease has emerged on the popular variety 'Barbara Karst'. The causal agent, *Pseudomonas andropogonis* (E. F. Sm.) Stapp. has since been recovered from at least 12 different varieties at several locations throughout Florida and the southeastern United States.

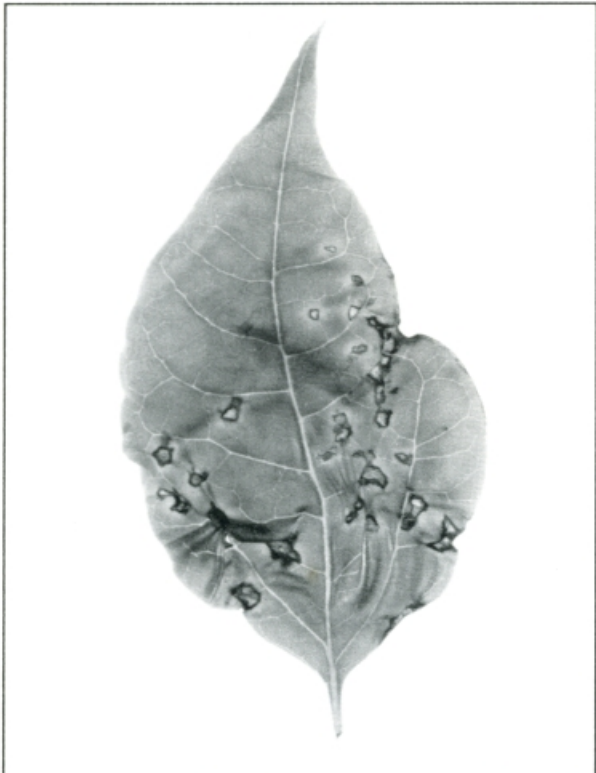


Figure 1. Tan colored leaf spots with reddish-brown borders on bougainvillea. Note the puckered, distorted leaf shape caused by early infection of expanding leaves.

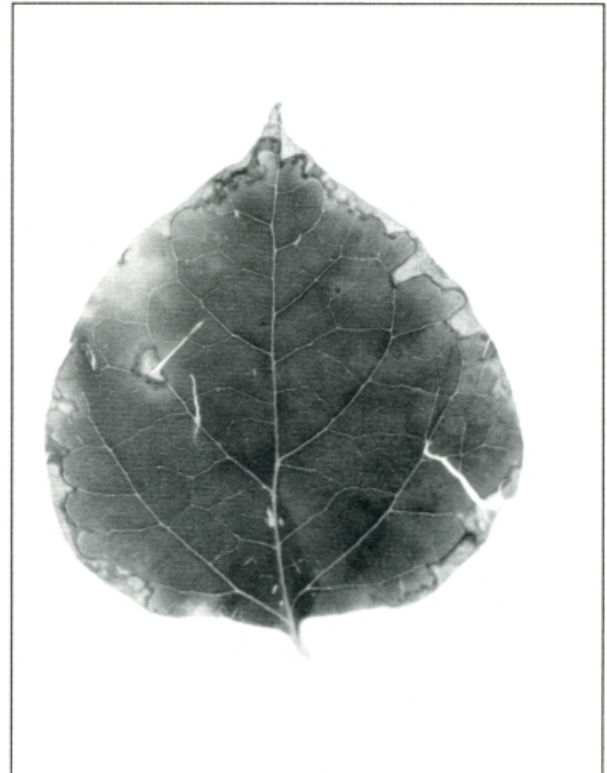


Figure 2. Leaf margin discoloration and necrosis on bougainvillea.

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SYMPTOMS AND DISEASE DEVELOPMENT: The early symptoms are small reddish-brown leaf spots which usually occur on younger foliage. These enlarge into circular or irregular dark necrotic spots. When environmental conditions are drier and less favorable leaf spots develop slowly. Lesions have a tan center surrounded by a dark reddish-brown margin, and are sometimes bordered by a chlorotic halo (Fig. 1) (5, 6). Necrotic leaf margins, resembling excess soil soluble salts damage, are so common that reddish-brown marginal necrosis is often the main symptom present (Fig. 2). In time, leaf edges may become ragged as the necrotic tissue turns dry and papery. Under conditions of high rainfall or relative humidity the lesions develop quickly and are often black and vein delimited. Infection of developing leaves and bracts results in puckered, distorted growth (5, 6). Nursery plants grown under frequent overhead irrigation may exhibit this type of disease development. Defoliation will occur when leaf spotting, blighting or marginal necrosis becomes severe (5, 6).

PATHOGEN: *P. andropogonis* is worldwide in distribution and causes an array of leaf spots, necrotic stripes, and streaks on a variety of host plants. Some important agronomic hosts are corn, sorghum, velvet bean, chick pea, and clover. The pathogen also infects many ornamentals including carnations, tulips, statice, ruscus, and orchids (3).

Some isolates of *P. andropogonis* are host specific while others have a broad host spectrum. Inoculation of bougainvillea with isolates from diverse hosts and locations show that bougainvillea is susceptible to some but not all isolates (5).

CONTROL: Maintaining dry foliage is the primary control measure. The pathogen is spread by water splash, handling, and propagation from diseased stock plants (6). Starting with clean stock plants and avoidance of overhead irrigation will minimize chances of disease outbreaks. Good sanitation and removal of infected leaves and/or plants from the growing area reduces the risk of infecting healthy plants. In frost-free climates where bougainvillea is perennial, disease incidence drops during cool and/or dry weather (6).

SURVEY AND DETECTION: The most common symptoms of this disease are red-brown leaf margin discoloration and/or necrosis. Leaf spots are circular to irregularly shaped with tan centers and reddish-brown borders. Small leaf spots would be reddish-brown to black in color. Angular, black necrotic leaf lesions with puckered, distorted growth are also characteristic of the disease. Infected bracts show tan or black lesions with distorted growth (5, 6). *Note for clinical diagnosis:* Microscopic observation shows profuse bacterial streaming from the edges of leaf spots. Bacterial growth on nutrient agar plates will not appear until the second day and is strongly inhibited in the presence of other bacteria. Colonies are butyrous becoming viscid (4) and the bacteria quickly die out when kept in culture for very long. *P. andropogonis* is a non-fluorescent pseudomonad. Hypersensitivity can be demonstrated using fresh isolates on tomato and sometimes tobacco, but this ability is lost quickly in older cultures. For biochemical tests refer to Lelliot and Stead (4).

LITERATURE CITED

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