sentially of the same size, texture, and appearance and could not be distinguished from those of the pathogen.

### Discussion

The results of this study suggest that environment has an important effect on the morphology of two forms of *Cercospora apii.* This is particularly apparent when figures 2A and 2B are compared. Characteristics such as the presence or absence of a stroma, number and length of conidiophores, the shape of the conidiophore tip, the number of geniculations, and uniformity of width and color of conidiophores were found to be quite different in the two environments. Similar differences were apparent in the length of conidia, the number of septations, the configuration of the base and tip of conidia, and in the production of secondary conidia. Only two characteristics among those used consistantly to described hyaline acicular species of *Cercospora* appeared to be unchanged by environment. These were the acicular shape of mature conidia and the fact that the conidia were hyaline. The variability of these characteristics should not preclude their use in distinguishing between species of *Cercospora.* However, it is suggested that before such characteristics can be taxonomically useful, they must deviate significantly from the type species in varying environments, or they must exhibit stability under variations in environment.

In view of morphology indistinguishable from that of *C. apii,* but differences in pathogenicity, it is proposed that the name *Cercospora apii* Fres. f. sp. *clerodendri* be used to identify the pathogen of *Clerodendrum* spp.

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# LEAF SPOT OF ARACEAE CAUSED BY PSEUDOMONAS CICHORII (SWINGLE) STAPP

C. Wehlburg[1], C. P. Seymour[1], and R. E. Stall[2]

### Abstract

*Pseudomonas cichorii* has been known as a pathogen of escarole, cabbage, celery, and chrysanthemum for some time. Isolations from leafspots on *Scindapsus* sp. yielded a pseudomonad which was identified as *P. cichorii,* further substantiating the wide host range of this pathogen. A number of plants belonging to the Araceae proved highly susceptible when inoculated with *P. cichorii,* whereas other members of this family showed varying degrees of susceptibility.

### Introduction

Among the most important plants grown as foliar ornamentals are those belonging to the family of the Araceae. They are usually grown in greenhouses under conditions of high humidity and high temperature, and are often crowded together on the benches. Such conditions are almost ideal for the development and the spread of pathogenic organisms.

Such plants are grown exclusively for their foliage; therefore, any spotting of the leaf surface mars the appearance of the plants and lowers their market value.

The following study reports on the isolation of a bacterium pathogenic to several genera of the Araceae.

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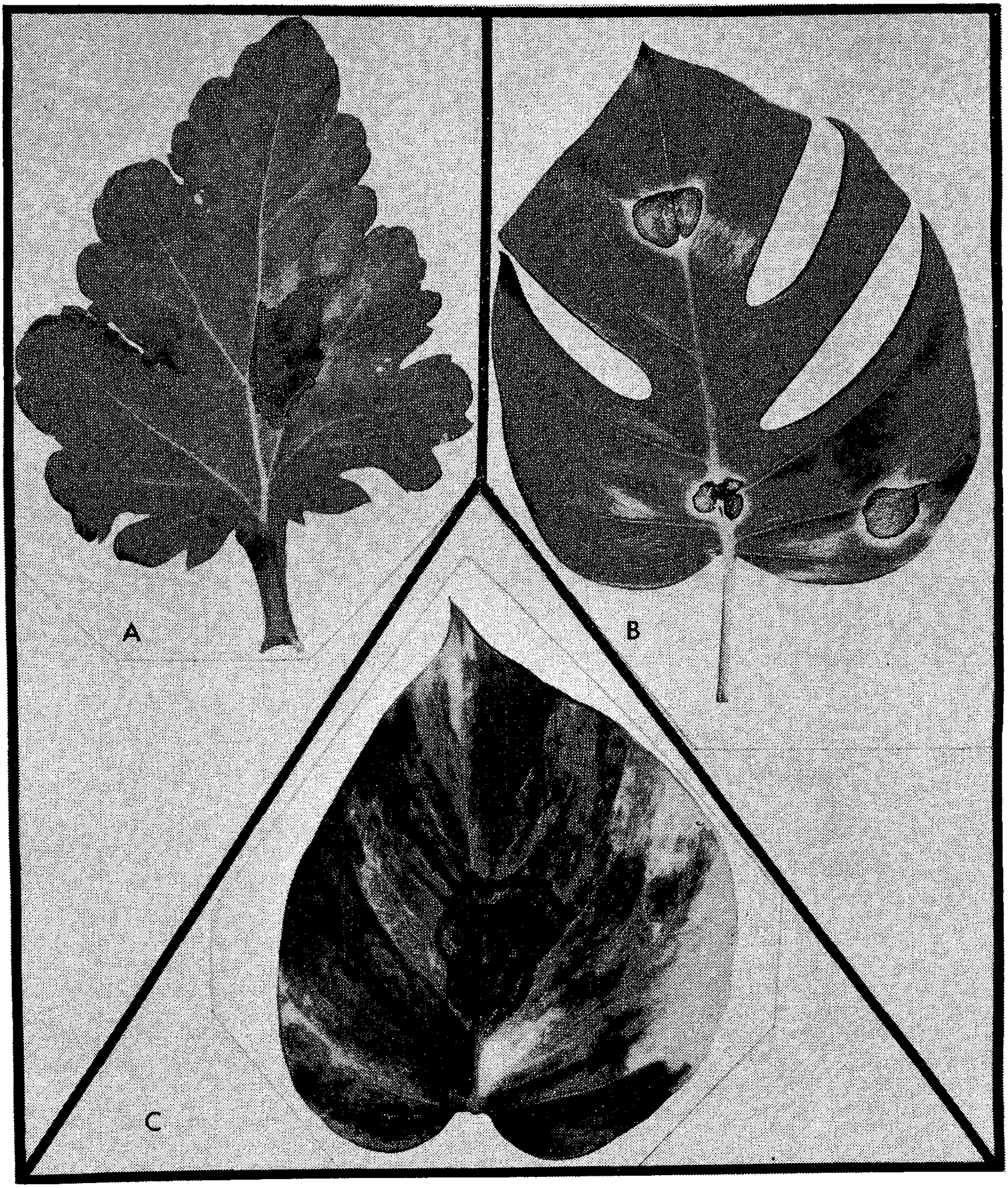


**Fig. 1.—Result of artificial inoculations with** P. cichorii **on A.** Chrysanthemum morifolium, **B.** Monstera deliciosa, **and C.** Scindapsus sp.

## THE PATHOGEN

In March 1966, the Pathology Laboratory of the Division of Plant Industry in Gainesville received a specimen of *Scindapsus* sp. with round, dark brown leaf spots from which a white bacterium was isolated. Scindapsus leaves inoculated by needle wounds within 3 days produced similar leaf spots from which the bacterium was re-isolated. All isolates grew well on nutrient agar where they formed raised, glistening, round colonies with a slightly irregular, colorless margin in contrast with the center which was a delicate light brown color under transmitted light. The organism was rod-shaped and motile with 1 or 2 polar flagella. It produced a green fluorescent pigment on King's Medium B (2) within 24 hours; milk became alkaline; nitrates were reduced; no hydrogen sulfide was produced; nutrient broth became turbid with a viscous pellicle and a white sediment; the bacterium did not liquefy gelatin, hydrolyze starch or decompose corn seed oil. Acid but no gas was produced from dextrose, levulose, galactose, mannose, arabinose, and mannitol; sucrose, maltose, and lactose were not utilized.

The above-mentioned characteristics agree with the description of *Pseudomonas cichorii* (Swingle) Stapp in *Bergey's Manual of Determinative Bacteriology*.

## PATHOGENICITY

*Pseudomonas cichorii* has been known as a pathogen of chrysanthemum, cabbage, escarole, and celery for some time (1, 3, 4, 5, 6). Apparently this bacterium has a wide host range, and the fact that it was found to be pathogenic on *Scindapsus* sp. was reason for its inclusion in inoculation tests with a number of Araceae. Inoculations were performed with the isolates of *P. cichorii* from *Scindapsus* sp., from chrysanthemum, and from escarole. The 3 isolates were equally pathogenic on Araceae. Cross inoculations were performed on chrysanthemum and on cabbage. No differences in pathogenicity were observed, supplying additional proof that the isolate from *Scindapsus* sp. was identical with *P. cichorii.* The plants were inoculated by stabbing the leaf with a bundle of fine insect needles through a drop of aqueous bacterial suspension. The inoculated plants were kept in a moist chamber for 48 hours, after which they were placed on a greenhouse bench where they were automatically atomized by a mist sprayer every 10 minutes. The results in Table 1 were recorded after inoculations with all three isolates of *P. cichorii.*

Table 1. Susceptibility of Araceae to inoculation with *P. cichorii*

| *Plants tested* | *Reaction** |
|---|---|
| Aglaonema sp. | ++ |
| Philodendron cannifolium | ++ |
| Philodendron panduraeforme | ++ |
| Scindapsus sp. | ++ |
| Anthurium sp. | + |
| Caladium sp. | + |
| Homalomena rubescens | + |
| Monstera acuminata | + |
| Monstera deliciosa | + |
| Syngonium sp. | + |
| Xanthosoma sp. | + |
| Xanthosoma lindenii | + |
| Alocasia sp. | − |
| Acorus gramineus variegatus | − |
| Cyrtosperma johnstonii | − |
| Dieffenbachia sp. | − |
| Philodendron cordatum | − |
| Philodendron hastatum | − |
| Philodendron selloum | − |
| Spathiphyllum floribundum | − |
| Zantedeschia sp. | − |

* ++ = highly susceptible; + = susceptible; − = resistant.

## DISCUSSION

High temperatures and free water on the leaves of the host plants are conducive to rapid development of symptoms. If inoculated plants, after showing the initial symptoms of leaf spot, are placed on the greenhhouse bench and care is taken not to wet the leaves when watering, the spots remain limited to small brown areas around the wounds. However, if they are kept wet under an intermittent mist sprayer, the leaf spots will increase rapidly in size and on susceptible varieties will cover a large part of the leaf surface.

Direct control measures have not been worked out and the regular use of bactericides can only be recommended on an experimental basis. Both streptomycin and copper-maneb have been used successfully on vegetable crops and could be of value for the control of this bacterial spot if these materials are shown to be nonphytotoxic to the Araceae.

To prevent the spread of the disease in the greenhouse, affected leaves should be cut out and destroyed; the plants should be well separated and overhead watering avoided where possible. Chrysanthemums, which are susceptible and can serve as a source of inoculum, should not be grown in close proximity to any susceptible Araceae.


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# EFFECTS OF APHELENCHOIDES FRAGARIAE ON BIRDS-NEST FERN AND AZALEAS

D. E. STOKES[1]


## ABSTRACT

*Asplenium nidus* (Birds-nest fern) and *Rhododendron* sp. (Azalea) are reported to be hosts of *Aphelenchoides fragariae* in Florida. Azaleas 'Rentschler's Rose,' 'White Water,' and 'Valentine' developed symptoms typical of this nematode on azalea when inoculated with *A. fragariae* from birds-nest fern. Birds-nest fern developed symptoms typical of that species when inoculated with *A. fragariae* from azalea. Reciprocal inoculations revealed no difference between *A. fragariae* populations from these two sources.


## INTRODUCTION

During 1965, *Asplenium nidus* (Birds-nest fern) and *Rhododendron* sp. (Azalea) were found in Florida infected by a foliar nematode, *Aphelenchoides fragariae* (Ritzema-Bos, 1891) Christie, 1932. It is believed that, in the former case, this host-parasite relationship had not been previously reported in Florida, whereas the latter constituted what is thought to have been a new nematode-host situation. Since the azalea was a new host for this foliar nematode, it appeared desirable to ascertain whether this nematode was different from others known to occur in Florida.

Since May 1965, *A. fragariae*-infected birdsnest ferns from Dade, Hillsborough, Manatee, Marion, and Orange counties were submitted to the Division of Plant Industry's Nematology Laboratory in Gainesville. Reciprocal inoculations were initiated during the spring of 1966 to determine if differences might exist between nematode populations from azalea and birdsnest fern.

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## LITERATURE REVIEW

In 1893, Ritzema-Bos (4) found the leaves of *Asplenium* sp. affected by *Aphelenchus olesistus* (*A. fragariae*).

Clinton (2) first reported *Asplenium nidus-avis* (*Asplenium nidus*) a host of a foliar nematode, *Aphelenchus olesistus* (*Aphlenchoides fragariae*). Crossman and Christie (3) also reported this occurence.

Steiner (5) successfully transferred *Aphelenchoides olesistus* (*A. fragariae*) from ferns to strawberry plants, producing dwarf symptoms typical of strawberry injury by this nematode.

Ark and Tompkins (1) reported *A. fragariae* had ruined crops of birds-nest ferns during certain years in California. They compared symptoms of birds-nest fern with those of a bacterial leaf blight, *Phytomonas asplenii* (*Pseudomonas asplenii*). Turgidity was maintained on *A. fragariae*-infected leaves, whereas leaves with the bacterial diseases were easily crushed when light pressure was applied.


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