BACTERIAL BLIGHT OF POINSETTIA

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The poinsettia, *Euphorbia pulcherrima* Willd., is one of south Florida's most popular ornamental plants. Heretofore, the most destructive disease of outdoor grown poinsettias in southern Florida was scab, caused by *Sphaceloma poinsettiae* Jenkins and Ruehle (1, 4). Recent tests have shown that the scab disease can be effectively controlled using sprays of protective fungicides (2). During the past year our attention has been focused on another disease known as bacterial blight of poinsettia. It is the purpose of this paper to discuss briefly some of the preliminary work on bacterial blight now under investigation at the Subtropical Experiment Station.

Bacterial blight of poinsettia was first observed by the author during the spring of 1958. Symptoms of the disease were unlike those of any previously described disease in Florida. However, photographs taken by Dr. G. D. Ruehle in 1941 showing symptoms of an unknown poinsettia disease, collected from the Spalding Estate in Miami, resembles in many respects the disease under study here. Isolations made in the laboratory consistently yielded two types of bacteria, one of which proved pathogenic to poinsettia plants. A search through the literature revealed that a similar disease had previously been described in 1941 in greenhouse grown poinsettias in New Jersey (3). A later report (5) listed the disease as also being present in poinsettia plants grown in greenhouses in Maryland, Pennsylvania and New York.

Disease symptoms.—The disease causes a malformation and blighting of the growing point of one or more stems of a plant (fig. 1). The growing point becomes curved downward and inward toward the affected area of the stem. The terminal leaves are also curved and develop characteristic light spots which later become necrotic, and form brown blotches (fig. 2). The leaves eventually drop, leaving the stem bare. A close examination of the green stem shows characteristic longitudinal, narrow, water-soaked streaks. The disease organism generally confines itself within the stem streaks prior to blighting the terminal growing point, but at times large irregular, water-soaked, brownish lesions form along the stem. Affected plants often show latex droplets which dry to a golden brown. When infected stems are cut open, the color is pale yellow to light tan in the phloem region.

The nature of the disease is such that plants may be infected yet show no visible symptoms.

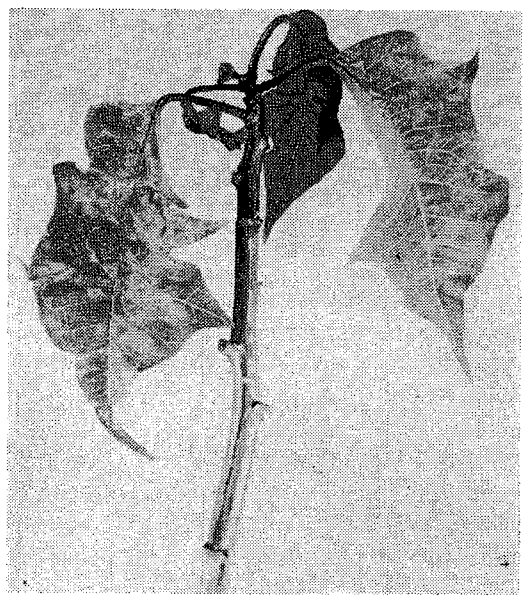

Figure 1. Poinsettia stem showing typical symptoms of bacterial blight.

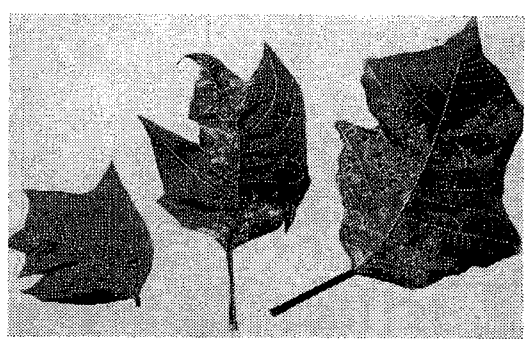

Figure 2. Symptoms of bacterial blight on terminal leaves of poinsettia.

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When diseased stock plants were cut-back and maintained in the nursery, new growth appeared normal for nearly 12 months prior to disease expression. Frequently only one branch becomes blighted and the remaining shoots appear normal.

Spread of the disease.—In the nursery, the disease organism is believed to spread to adjacent plants primarily on contaminated knives or tools used when plants are cut-back, or when tip cuttings are taken for propagation. In addition, disease spread may also occur in the rooting bench if infected cuttings are placed adjacent to healthy cuttings. In a similar manner, the practice by nurserymen to "bleed" stem cuttings of latex by placing them in a pail of water also may serve to spread the organism. Cuttings inoculated with the pathogen were observed to root in many instances and appear normal for several months. Infected cuttings may spread the disease from one location to another.

Inoculation.—Attempts were made to infect healthy poinsettia stems by introducing the pathogen into stem wounds made with a sharp knife. Visible infections occurred around the point of inoculation within one week but blighting of the terminal growing point did not occur until 2 to 8 weeks later. Plants sprayed with a water suspension of the pathogen developed the disease after two months. When the pathogen was added to the soil in which poinsettia plants were growing, no disease developed during a two-month period. When succulent tip cuttings were inoculated by placing the freshly cut ends in a water suspension of the bacterium, infection occurred within 2 to 3 weeks. Similarly, when succulent tip cuttings were removed with a knife contaminated with the bacterial pathogen, characteristic water-soaked streaks

Table 1. Control of poinsettia bacterial blight with sprays at weekly intervals.

Treatments	Concentration	Number of plants infected out of 24	DMRT at 5% level*
Agri-mycin 500	4 lbs./100 gals.	0	
Agri-mycin 500	3 lbs./100 gals.	2	
Agri-mycin 500	2 lbs./100 gals.	3***	
Agri-Strep	60 ppm	3	
Tribasic copper sulfate	4 lbs./100 gals.	5	
Agri-mycin 100	60 ppm	5	
Nabac	½lb./100 gals.	8****	
Natriphene	½lb./100 gals.	13	
Elcide 70**	150 ppm	18****	
Control	water sprayed	15	

* Statistically significant groupings according to Duncan's Multiple Range Test.

** Concentration reduced on 4/17/59 to 75 ppm due to injury.

*** Number of plants infected out of 22 due to loss of 2 plants.

**** Number of plants infected out of 23 due to loss of 1 plant.

developed on stems of the stock plants within two weeks.

Conditions favoring the disease. — Under south Florida conditions, the disease has been observed at various times of the year. Thus, it appears that temperature and humidity are not critical. However, it has been observed that succulent or soft stems, brought about by frequent applications of fertilizers, appear more susceptible to attack than those plants which are growing less vigorously.

The pathogen. — In 1942 Starr and Pirone (5) described a bacterial pathogen isolated from diseases poinsettia plants. In order to identify the casual agent of the disease under study here, six isolates were selected for a study involving the cultural, physiological and morphological characteristics of the bacterial blight pathogen. The results of this study showed that the pathogen causing bacterial blight of poinsettia in Florida is identical, with few exceptions, to *Corynebacterium poinsettiae* Starr & Pirone.

Control: — In previous tests using fungicides to control poinsettia scab, little, if any, bacterial blight occurred in plots sprayed with tribasic copper sulfate. An experiment was designed to test the effectiveness of this and other materials against the disease.

Two hundred and forty poinsettia stock plants were set at random into 40 plots of 6 plants each. Ten spray treatments replicated four times were applied at weekly intervals for six months. Data were recorded at intervals throughout the test period, and the plants were cut-back only once during the test. Since many of the plants had shown symptoms of the disease, no further attempts were made to inoculate the plants. The final data are presented in Table 1 as the total number of plants infected.

The results show that no disease occurred in plants sprayed with Agrimycin 500 at 4 pounds per 100 gallons over the entire period. Lesser amounts of disease occurred in plots treated with Agri-mycin 500 at 2 and 3 pounds per 100 gallons, Agri-Strep, tribasic copper sulfate and Agri-mycin 100. Natriphene, Elcide 70, Nabac and the water sprayed controls did not compare favorably with the above mentioned materials. It is difficult to explain the action of tribasic copper sulfate in reducing disease incidence since the material is not believed to be absorbed to any marked extent. Studies on plant inoculation suggests that the pathogen is systemic within the plant. Present work in progress suggests that streptomycin sulfate is absorbed in sufficient amounts to retard advancement of the bacteria up the stem. Attempts were also made to control the disease in cuttings in the rooting medium. The basal ends of cuttings dusted with rooting hormone powder supplemented with Agri-Strep at 1.0 and 2.0 percent concentrations gave slightly better disease control than those receiving similar treatments of Agrimycin 100 or 500 and Chloromycetin.

The poinsettia organism was completely inhibited within one minute exposure period when Agri-Strep at 25 ppm was added to water contaminated with the pathogen. Thus, it appears possible to reduce disease spread by the use of such materials if added to the water in which cuttings are placed to "bleed" stems of latex.

Due to the systemic nature of the disease, and the fact that the organism can remain in stock plants several months before symptom expression, commercial nurserymen and homeowners are advised to remove and discard infected plants as they appear. Efforts should be made to obtain disease-free stock plants from areas where the disease does not occur.

LITERATURE CITED

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