

## Southern magnolia leaf spot diseases and disease control

by Jackie Mullen

During my past 7 years at the Plant Diagnostic Lab, I have seen many southern magnolia (*Magnolia grandiflora*) leaf samples with leaf spot disease. These plant samples were sent from landscapes and container nurseries at various locations around Alabama. In Table 1, I have listed leaf spot diseases seen at Auburn's Plant Diagnostic Lab. Among these are several fungal diseases, one bacterial disease, and one algal disease.

### Fungal leaf spot diseases.

Identification of fungal leaf spots from symptom characteristics is often difficult. Generally, fungal leaf spots on southern magnolia begin as small brown-grey dots. As the dots enlarge, the spot center often becomes gray with the margin remaining a darker gray or brown color (see Figure 1). Spot size and shape will vary with time of infection, age of leaf, and weather conditions. Sometimes tiny, black specks can be seen in spot centers. These specks are the fruiting bodies (reproductive structures).

When a leaf spot sample arrives in our lab, we usually examine the spotted tissue with a microscope.

*Jackie Mullen is an Extension program associate-plant pathologist with the Alabama Cooperative Extension Service, Auburn University, Auburn, Alabama 36849. Her major job responsibility is plant problem diagnosis at the Plant Diagnostic Lab.*

(Most leaf spot diseases are not distinctive enough in symptom appearance to allow for identification of the causal agent without microscopic study.) We are looking for evidence of fungal reproductive bodies (sometimes seen with the naked eye as small black dots) and the spores contained within these bodies. Fungal identification is based on the characteristics of the fruiting bodies and their spores. If we cannot find identifying fungal structures, fruiting bodies or spores with a microscopic study, pieces of spotted tissue are placed in a sterile nutrient medium. After a few days, we examine these "tissue cultures" for growth of fungus or bacteria. If either fungus or bacteria have grown out of the tissue onto the gel-like media, then the disease agent can usually be determined.

Disease control recommendations for a homeowner and a nurseryman (or commercial grower) usually differ. Fungal leaf spot disease control in a landscape usually involves only sanitation since this type of disease

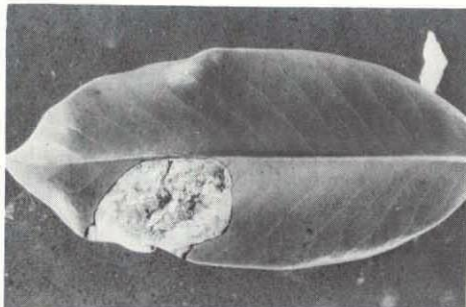


Figure 1. Fungal leaf spot (caused by *Phoma* sp.) on southern magnolia.

Table 1. Southern magnolia leaf spot diseases seen at Auburn University's Plant Diagnostic Lab 1976-1986.

Fungal leaf spots	Alternaria spp. Colletotrichum spp. Pestalotia spp. Pestalotiopsis spp. Phoma spp. Phyllosticta spp.
Bacterial leaf spot	Pseudomonas cichorii
Algal leaf spot	Cephaleuros spp.

does not usually threaten the general health of the tree. Diseased and spotted foliage should be removed and destroyed if possible. Also, all fallen leaves should be removed and destroyed.

In a nursery setting or any location where small trees or seedlings are grown in close proximity to each other, leaf spot disease may be a serious problem and plant death may result. Also, leaf spot or any damage on these plants will lower their market value. Disease control in a nursery often involves a combination of sanitation, cultural modifications, and chemical spray treatments.

The specific chemical treatment recommended for control of fungal leaf spot disease depends on the identity of the fungal disease agent and the type of plant affected. Fore and Dithane M-45 (mancozeb products) are both registered for control of Gloeosporium leaf spot on southern magnolia. Gloeosporium is a fungus closely related to Colletotrichum and, in fact, many species of Gloeosporium have been recently reclassified as Colletotrichum species. Copper-containing fungicides are often mentioned (Pirone) as providing good localized protection against fungal leaf spot diseases on southern magnolia. Recent work in a large magnolia planting confirmed that copper (we used Kocide 101) does provide good protective localized control of several fungal

leaf spot diseases. The fungal leaf spot diseases found were caused by Alternaria, Phyllosticta, Gloeosporium, and Colletotrichum (Mullen, Cobb, and Shumack).

**Bacterial leaf spot disease.** In 1981 I was involved with identification and disease control studies of a previously undescribed bacterial leaf spot disease of southern magnolia which was found at three locations in southern Alabama (Mullen, J. M. & G. S. Cobb, 1984; Mullen, et al., 1983).

Symptoms of this leaf spot were distinctly different from fungal leaf spot disease. Also, symptoms varied depending on the age of the leaf when infection took place. Young, newly unfolded leaves showed small, dark brown or brown spots. These spots often coalesced and enlarged rapidly until  $\frac{1}{3}$ - $\frac{1}{2}$  of the leaf area was involved. As the brown tissue aged, it became dry and soon deteriorated until large holes were left in the affected leaves (Figure 2). Symptoms were different on older expanding leaves. Here we saw small discrete black spots (up to  $\frac{1}{3}$  inch in diameter) surrounded by thin yellow halos ( $\frac{1}{16}$  inch wide). Mature current season foliage typically showed small black specks (up to  $\frac{1}{16}$

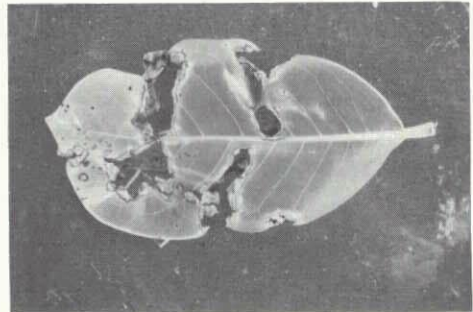


Figure 2. Bacterial leaf spot (caused by *Pseudomonas cichorii*) on southern magnolia.

inch diameter) with very thin yellow halos (up to  $1/16$  inch wide).

Tissue cultures of the spots consistently produced a *Pseudomonas* bacteria. When foliage of healthy container-grown southern magnolias (3-5 feet tall) was sprayed or wiped with a bacterial preparation, symptoms identical to the original problem were produced. The youngest leaves were most susceptible to this bacteria while the older current-season foliage was less susceptible with only small black specks developing. This increase in disease resistance of older foliage is a common finding with bacterial disease. Typically, bacterial disease is most severe on young and tender plant tissue. Further laboratory work showed that the bacteria was *Pseudomonas cichorii*.

Disease control studies were performed at Auburn University's Ornamental Horticulture Field Station at Mobile (see companion article). Results showed that Kocide at one pound per 100 gallons of water or Tri-basic Copper Sulfate at two pounds per 100 gallons of water would provide some disease control (50 percent) in a nursery situation when rainy conditions did not prevail. Chemical treatments did not control disease during humid, rainy periods. Our tests also showed that ground-level irrigation resulted in significantly less disease as compared with overhead irrigation. These findings agreed with previous reports (Engelhard, et al., 1983) on controlling bacterial disease in a greenhouse situation. We concluded that control of this bacterial foliage disease in a nursery situation would require strict sanitation practices in addition to cultural and/or chemical control measures.

**Algal leaf spot.** Algal leaf spot, caused by *Cephaleuros* spp., is a problem on southern magnolia in humid, wet locations (Figure 3). Another name for this disease is green scruff. The spots are raised, fibrous, and usually circular with

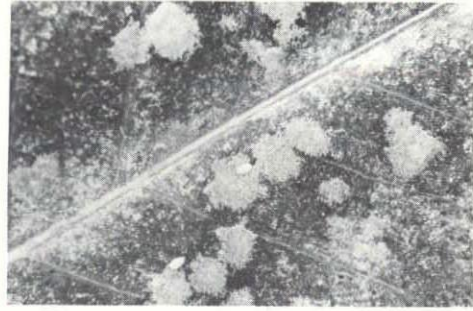


Figure 3. Algal leaf spot (caused by *Cephaleuros* sp.) on southern magnolia.

irregular margins. New, actively growing disease spots are green, green-brown, or red-brown in color. Active infections are characteristic and can be readily distinguished from fungal or bacterial spots. Old dead spots from the previous year appear whitish and slightly raised. While the lesion may appear superficial, the alga is present in and under the waxy cuticle of the upper leaf surface.

Pirone and others report in the literature that copper fungicide-bactericides are effective in providing protective disease control of algal leaf spot. I have found that the copper preparation Kocide 101 (Mullen, Cobb, and Shumack) was effective in providing protective control of this leaf spot in a magnolia 'orchard' situation.

#### LITERATURE CITED

- Mullen, J. M. and G. S. Cobb. 1984. Leaf Spot of Southern Magnolia caused by *Pseudomonas cichorii*. Plant Disease 68:1013-1015.
- Mullen, J. M., P. P. Cobb, and R. L. Shumack. Management Program Developed For An Alabama Magnolia Orchard. Research Report 1983 Ornamentals 1:15-16.
- Pirone, P. 1960. *Diseases and Pests of Ornamental Plants*. John Wiley & Sons, New York. 566 pp.
- Engelhard, A. W., H. C. Mellinger, R. C. Ploetz, and J. W. Miller. 1983. A Leaf Spot of Florists' Geranium Incited by *Pseudomonas cichorii*. Plant Disease 67:541-544.