



*Control of*  
**LEAF SPOT and STRAWBERRY  
WEEVIL on TRAILING BLACKBERRIES**

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THE COMMERCIAL PRODUCTION of trailing blackberries (Young and Boyesen varieties) has been of horticultural importance in central Alabama for several years. In 1940, the estimated value of the blackberry crop in Chilton County was \$14,000; in 1954, it was \$250,000, an average of over \$400 per acre. From all indications this industry will continue to expand.

Diseases and insects are two of the limiting factors in the production of blackberries. Leaf spot is the most im-

portant disease, and the strawberry weevil is the major insect pest of the crop. Experiments on control of leaf spot and strawberry weevil have been conducted for the past 3 years at the Chilton Area Horticultural Substation near Clanton. Results of these experiments and recommendations for the control of the pests are reported in this leaflet.

### **BLACKBERRY LEAF SPOT**

#### **Symptoms and Development**

Trailing blackberries in Alabama are frequently affected by a leaf spot disease, caused by the fungus *Septoria rubi* West. The fungus causes exten-

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TABLE 1. CONTROL OF LEAF SPOT OF TRAILING BLACKBERRIES WITH FUNGICIDAL SPRAYS AT CLANTON, ALABAMA, 1952-53-54

Treatment	Average number of lesions per leaflet		
	1952 <sup>1</sup>	1953	1954
Untreated check	47.6	127.4	25.8
Ferbam (Fermate), 1½ lb. per 100 gal.	9.2	54.8	5.5
Captan (Orthocide), 2 lb. per 100 gal.	17.1	56.9	4.5
Maneb (Manzate), 2 lb. per 100 gal.	20.1	56.6	2.8
Captan (2 lb.) + Ortho Leaf Feed (1 lb.) per 100 gal.	---	48.3	4.5
LSD, 1%	18.2	30.9	9.7

<sup>1</sup> Tribasic copper sulfate, nabam, and Dow F-1003 all caused injury in 1952.

sive spotting of the leaves as well as inconspicuous lesions on the leaf stalk and occasionally on the canes. Leaf spot first appears as minute purple specks, which enlarge to irregular purple-brown spots about ½ inch in diameter. Older spots are more circular in outline with light-brown to tan centers surrounded by a zone of purple tissue. The centers of old spots are gray to white with brown or reddish borders. Small black dots, the fruiting bodies (pycnidia) of the fungus, can be seen in these gray-white centers.

The fungus overwinters in leaves or in the bark of the leaf stalks and canes. The fruiting bodies produce hundreds of microscopic needle-shaped spores, each of which can cause another leaf spot. Under high moisture conditions in early spring, spores are discharged from the fruiting bodies. They are spread by insects and splashing rain to the leaves, where they cause infection. Blackberry leaves may become heavily spotted, turn yellow to red-brown, and die. Although the leaf spot disease of blackberries has not caused extensive damage in the last 3 years, it may result in serious damage by defoliation in wet years.

### Experimental Results

During the past 3 years, leaf spot was controlled in Alabama with several fungicidal spray materials. Fungicides were combined with DDT insecticide

for strawberry weevil control. Sprays were applied with a hand boom connected to a small power sprayer operated at 250 to 300 pounds pressure to wet the foliage thoroughly at each application.

Shortly after the canes were hung on a barbed-wire trellis in late winter, a delayed dormant spray of liquid lime-sulfur (1-10) was applied to kill the fungus overwintering on the canes. Foliage fungicides were applied at 7- to 14-day intervals after the first leaves were well developed for at least 3 applications before harvest. Three years' results of the experiments, 1952-54, are given in Table 1. The concentrations of the spray materials are also recorded in this summary. Ferbam (Fermate, Nu Leaf), maneb (Manzate, Dithane M-22) and captan (Orthocide, Stauffer) were very effective in reducing leaf spot damage.

## STRAWBERRY WEEVIL

### Life History and Damage

The strawberry weevil, *Anthonomus signatus* Say, is a small, dark reddish-brown snout beetle from 1/12 to 1/8 inch long. It looks very much like the boll weevil but is considerably smaller. The adult weevils become active early in the spring about the time blackberries and strawberries are coming into bloom. The female weevil makes a puncture in the blackberry bud with

her long beak and lays an egg in the puncture. She then crawls down and girdles the stem of the bud. The eggs hatch into small, white, soft-bodied grubs that have no legs. The grubs feed inside the bud and after about 4 weeks they change to the pupal stage within the bud. The new brood of adults emerges shortly before mid-summer. The newly emerged adults feed for a short time and then go into hibernation under trash in the field, where they remain until the following spring.

The bud in which the egg is laid and of which the stem is girdled never opens. Severe weevil infestations may drastically reduce the yield of blackberries. Yield reductions of 25 per cent due to this insect are common in the Chilton berry-growing area.

### Experiments on Control

Experiments were conducted in 1952, 1953, and 1954 on control of the strawberry weevil with insecticidal sprays. Wettable powder formulations of DDT, chlordane, and toxaphene were used. The amounts of materials per 100 gallons of water were as follows: DDT, 2 pounds of 50 per cent wettable; chlordane, 2 pounds of 50 per cent wettable; and toxaphene, 5 pounds of 40 per cent wettable powder. Ferbam, 2 pounds of 76 per cent wettable per 100 gallons of spray, was used for disease control on all plots including the check. Spray ap-

plications were made with a 3-nozzle hand boom connected by a 100-foot hose to a power sprayer. The sprays were applied at 300 pounds pressure in sufficient quantity to wet the foliage.

Three insecticidal applications were made each year. Spraying was started when the vines began to produce buds freely. Intervals between sprays were from 1 to 2 weeks, depending on the rate of bud production. The interval between the last application of spray and the first picking of ripe berries was from 3 to 4 weeks.

The results of the 3-year experiment are presented in Table 2. Toxaphene, DDT, and chlordane were all effective in controlling the weevil with consequent increases in berry yields. Toxaphene was the most effective; DDT was intermediate; and chlordane was the least effective of the three insecticides.

### SUMMARY

1. Leaf spot is the most important foliage disease of blackberries in Alabama.

2. Experimental results of the past 3 years shows that leaf spot can be effectively controlled by a fungicidal program consisting of a dormant spray of lime-sulfur (1-10) and about 3 applications of a foliage fungicide (ferbam, maneb, or captan) at 7- to 14-day intervals after leaf development before harvest.

3. To control leaf spot, recommend-

TABLE 2. YIELD OF BLACKBERRIES FOLLOWING SPRAYS FOR CONTROL OF THE STRAWBERRY WEEVIL AT CLANTON, ALABAMA, 1952-53-54

Treatment <sup>1</sup>	Yields in pounds per acre			
	1952	1953	1954	3-year average
Untreated check	8,149	7,931	11,967	9,349
Chlordane, 2 lb. 50 %	9,435	8,040	12,828	10,101
DDT, 2 lb. 50 %	9,851	9,341	13,589	10,927
Toxaphene, 5 lb. 40 %	10,028	9,735	13,733	11,165
LSD, 5 %	---	---	---	498

<sup>1</sup> Indicated amounts of insecticides were used as wettable powders per 100 gallons of water. All plots, including the untreated check, received a fungicide for disease control.

ed rates per 100 gallons of spray are: ferbam, 1½ pounds of 76 per cent; captan, 2 pounds of 50 per cent; maneb, 2 pounds of 70 per cent.

4. The strawberry weevil is the most important insect pest of blackberries. It may reduce the yield as much as 25 per cent.

5. Experiments have been conducted for 3 years on control of the strawberry weevil with wettable powder sprays of toxaphene, DDT, and chlordane.

6. Toxaphene and DDT were more effective than chlordane.

7. Three applications of toxaphene or DDT sprays at 7- to 14-day intervals

during the budding period resulted in an increase in berry yields of from 1,500 to 1,800 pounds per acre.

8. Recommended insecticides and rates are 2 pounds of 50 per cent DDT or 5 pounds of 40 per cent toxaphene per 100 gallons of spray.

9. **It is recommended that a fungicide-insecticide combination be used for the most effective control of the blackberry pests.** Ferbam, captan, or maneb may be used in combination with either toxaphene or DDT.

10. Based on the foregoing results, the following procedure should prove effective in controlling the disease and the weevil:

SPRAY	MATERIALS TO MAKE 100 GALLONS OF SPRAY	TIME OF APPLICATION	TO CONTROL
No. 1	10 gal. liquid lime-sulfur	When vines are hung on wires	Overwintered disease-fungus on canes
No. 2	2 lb. 50% DDT or 5 lb. 40% toxaphene and 1½ lb. 76% ferbam (Fermate, Nu Leaf) or	When first buds appear	Strawberry weevil and leaf spot
	2 lb. 50% captan (Orthocide, Stauffer's Captan 50W) or 2 lb. 70% maneb (Manzate, Dithane M-22)		

Additional applications of the No. 2 spray are made at 7- to 14-day intervals up to 2 weeks before harvest, depending on weather conditions.