

PLANT DISEASE

IN NOTES

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Say, Bill, I've been intending to ask you, how much time and money did you lose putting on that strawberry spraying demonstration last year?

It may surprise you, Jim, to know that I didn't lose anything. In fact, I got a very nice profit from spraying. I just got a report on all the demonstrations conducted in 1937. Take it home with you and read it. It might even get you in a notion to spray next year.



RESULTS OF SPRAYING DEMONSTRATIONS
ON THE
CONTROL OF STRAWBERRY LEAFSPOT DISEASES, 1937.

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INTRODUCTION

Common leafspot^{1/} and scorch^{2/} have been unusually severe on strawberries in eastern North Carolina in recent years, and losses to the growers have been heavy. Periodic epidemics of these diseases have occurred in North Carolina since the beginning of strawberry culture. A severe epidemic of scorch occurred in the Eastern Carolina belt in 1921 and 1922. In 1931, both scorch and common leafspot were severe, and they have been more or less severe each year since. Recent work, which shows a definite correlation between the production of a strawberry plant and the number of healthy leaves on it in the late fall or early winter, has added materially to an understanding of the scope of damage that the leafspot diseases may cause as a result of defoliation. In the light of this work it appears^{possible} that the leafspot diseases may cause considerable damage even though visible signs of the diseases indicate mild attacks.

Control of the leafspot diseases by the application of fungicidal sprays has been investigated by the Agricultural Experiment Stations in many of the states where the crop is of commercial importance. In all of the experimental work excellent control of the diseases has been obtained by timely applications of Bordeaux mixture. As a result of this experimental work and the extension work which followed, spraying of strawberries has become a general practice in the production areas to the south of North Carolina. However, very little spraying has been done in North Carolina. This evidently has resulted from the fact that early experimental tests with Bordeaux mixture in this state gave good control of the leafspot diseases, but the increased returns from spraying did not offset the cost of spraying. While this evidently was true in 1923 and 1924, when the experimental tests were conducted, the unusual severity of the leafspot diseases in recent years suggested a possibility that spraying would be an economical practice under present conditions, at least in fields where heavy infections were evident. Evidence of this was obtained in experimental tests conducted by Mr. G. A. Meckstroth (U.S.D.A.) in eastern North Carolina in 1936. In order to obtain further evidence, demonstrational work was conducted on the problem in 1937. Results of these demonstrations follow.

LOCATION OF DEMONSTRATIONS

A total of five demonstrations were conducted. Following are records of the location of each demonstration and the general condition of the plants at the time the demonstration was started.

1. B. A. Garrell, Columbus County. Klondyke variety. Second year of production in 1937. Single row system. Eleven acres in field. Heavy defoliation of plants by scorch in the summer and fall of 1936. Common leafspot was prevalent over the entire planting, but was not severe.

^{1/} Caused by the fungus Mycosphaerella fragaræ.

^{2/} Caused by the fungus Diplocarpon carliana.

2. B. T. Bullock, Columbus County. Klondyke variety. Third year of production in 1937. Matted row system. - Four acres in field. Common leafspot was extremely severe in 1935 and 1936, and caused an estimated 50 per cent reduction in yield in both of these years. Almost 100 per cent of the foliage on a 2-acre portion of the field to the east, was heavily infected with common leafspot. Some defoliations had resulted from the disease in the fall and winter of 1936. Scorch was severe on the western side of the field and caused heavy defoliation in the summer and fall of 1936.

3. L. D. Guy, Duplin County. Blakemore variety. Second year of production in 1937. Single row system. One acre in field. Both common leafspot and scorch were prevalent in the field, but signs of the diseases indicated that damage from them was relatively light.

4. W. S. Well, Duplin County. Missionary variety. Third year of production in 1937. Matted row system. Two acres in planting. Extremely heavy common leafspot infections and moderate scorch infections were evident in the field in the fall of 1936, and persisted until spraying was started in March, 1937. Heavy defoliation occurred in the fall of 1936 as a result of the diseases. Both diseases had been prevalent in the field since the first year of production, and had caused an estimated 25 to 30 per cent reduction in yield.

5. S. V. Wilkens, Duplin County. Dorsett variety. Second year of production in 1937. Single row system. Two acres in field. Common leafspot infections general over field and extremely severe. Berry crop practically destroyed in 1936 by the disease, and heavy defoliation of the plants occurred in the fall of 1936. Very light scorch infection in field.

PROCEDURE

The spray material used in all of the demonstrations was home-mixed 4-4-50 Bordeaux mixture. The spray equipment varied. Mr. Garrell used a 25-gallon, tractor rig with two stationary nozzles. The rig was drawn down one middle and sprayed one side of each adjacent row. The machine maintained about 100 pounds of pressure. Mr. Bullock, Mr. Wilkens, and Mr. Guy, used five-gallon capacity knapsack sprayers. Mr. Wells used a Meyers outfit with two leads and maintained about 150 pounds of pressure. The nozzles were not stationary. The tank held 50 gallons of spray material. All of the spray equipment appeared to give satisfactory coverage of the plants when in the hands of competent operators.

The first spray applications in all cases were made during the week of March 8-13. Subsequent applications were made at from 10 to 14-day intervals.

The records made of the amount of disease on the plants were established by an examination of ten units, e.g., ten plants or ten leaflets, excepting the percentage of leaflets diseased, which was established from an examination of 100 leaflets in each case.

The yield records were calculated from measurements of berries picked in the usual manner from the following areas, sprayed and unsprayed areas being the same, at the demonstrations: B. A. Garrell, one, 145-yard row; L. D. Guy, one, 120-yard row; W. S. Wells, two, 103-yard rows; and S. V. Wilkens, two, 15-yard rows. In most cases the same pickers were charged with the responsibility of picking the demonstration rows. Records of the berries picked were kept by the same person throughout the season at each demonstration. The junior authors assisted in keeping records on some occasions.

RESULTS

Results of the demonstrations described above show that spraying materially reduced the prevalence and damage from leafspot and scorch on the strawberry plants (Table 1). The number of living leaves on the sprayed plants was almost double the number on the unsprayed plants just before picking was started. The number of leafspot lesions was about 3 times greater on the old leaflets and 5 times greater on the new leaflets unsprayed as compared to similar ones sprayed. Almost twice as many berries set on the sprayed plants as compared with unsprayed plants. These results show a decided reduction in the prevalence of leafspot as a result of spraying. The records in Table 2 show on the average an increased yield of 62.3 (24 qt.) crates per acre in favor of spraying, with a total value of \$155.75. The cost of spraying was calculated on the basis of \$2.00 for material and \$1.00 for labor to spray one acre one time. On this basis the average cost of spraying for the four demonstrations was \$10.50. Subtracting \$10.50 from \$155.75 leaves \$145.25 as the average profit per acre realized in the four demonstrations from spraying.

General observations and fragmentary data indicate that the berries from sprayed plants were of materially better quality than those from the unsprayed plants. The better quality was in the form of somewhat larger and more uniformly sized berries and a greatly lowered percentage of dead caps on the sprayed as compared to the unsprayed plants.

CONCLUSION

On the basis of the demonstrations described above and experimental work done previously, it is concluded that farmers should spray their strawberries when observations indicate that the leafspot diseases are prevalent. Detailed recommendations for spraying strawberries can be found in Plant Disease Notes, Vol. I, No. 9, September 1936.

TABLE 1. VALUE OF BORDEAUX SPRAY IN THE CONTROL OF COMMON LEAFSPOT OF STRAWBERRIES IN COLUMBUS AND DUPLIN COUNTIES, 1937.

DEMON-STRATOR	COUNTY	VARIETY	Date records were made	Av. No. living leaves per plant		Av. No. dead leaves per plant		Living old leaflets				Living new leaflets				Av. No. living berries per plant		Av. No. dead berries per plant	
				Percentage diseased		Av. No. lesions per leaflet		Percentage diseased		Av. No. lesions per leaflet		living berries per plant		dead berries per plant					
				Sprayed	Unsprayed	Sprayed	Unsprayed	Sprayed	Unsprayed	Sprayed	Unsprayed	Sprayed	Unsprayed	Sprayed	Unsprayed	Sprayed	Unsprayed		
B.A.Garrell	Columbus	Klondyke	4/27	16.0	10.9	1.3	4.7	98	100	45.0	105.0	28	82	4.6	47.1	15.3	13.5	1.0	4.6
B.T.Bullock	Columbus	Klondyke	4/27	15.0	8.0	0.6	4.8	100	100	42.1	79.9	10	70	0.5	14.0	24.0	13.6	1.2	3.2
L.D.Guy	Duplin	Blakenore	4/29	19.8	12.8	6.4	5.1	90	100	4.7	29.2	0	2	0	0	17.2	13.1	6.7	2.8
W.S.Wells	Duplin	Missionary	4/29	13.6	9.5	3.5	4.9	95	100	40.3	107.7	6	35	0.2	2.5	16.3	8.6	2.2	5.0
S.V.Wilkens	Duplin	Dorsett	4/29	23.7	10.5	5.2	9.1	100	100	21.7	117.0	10	55	0.5	21.6	26.1	10.3	2.8	4.1
Averages				17.8	10.3	3.4	5.7	96.6	100	30.8	87.8	10.8	48.8	1.2	17.1	19.6	11.8	2.8	3.9

TABLE 2. YIELD AND VALUE OF STRAWBERRIES
IN SPRAYING DEMONSTRATIONS CONDUCTED
IN COLUMBUS AND DUPLIN COUNTIES, 1937.

DEMON- STRATOR	COUNTY	SPRAYED			UNSPRAYED		Differences per acre in favor of spraying		Approximate cost of spraying one acre.	Approximate profit from spraying per acre
		No. spray ap- plications made	Yield per acre in 24 qt. crates	Total Value @ \$2.50 per crate	Yield per acre in 24 qt. crates	Total Value @ \$2.50 per crate	24 qt. crates	Value @ \$2.50 per crate		
B. A. Garrell	Columbus	3	235	\$687.00	128	\$320.00	107	\$367.50	\$ 9.00	\$358.50
L. D. Guy	Duplin	4	179	447.50	173	432.50	6	15.00	12.00	3.00
W. S. Wells	Duplin	2	226	565.00	194	485.00	32	80.00	6.00	74.00
S. V. Wilkens	Duplin	5	235	687.50	131	327.50	104	260.00	15.00	245.00
Averages			218.8	\$547.00	156.5	\$391.25	62.3	\$155.75	\$10.50	\$145.25