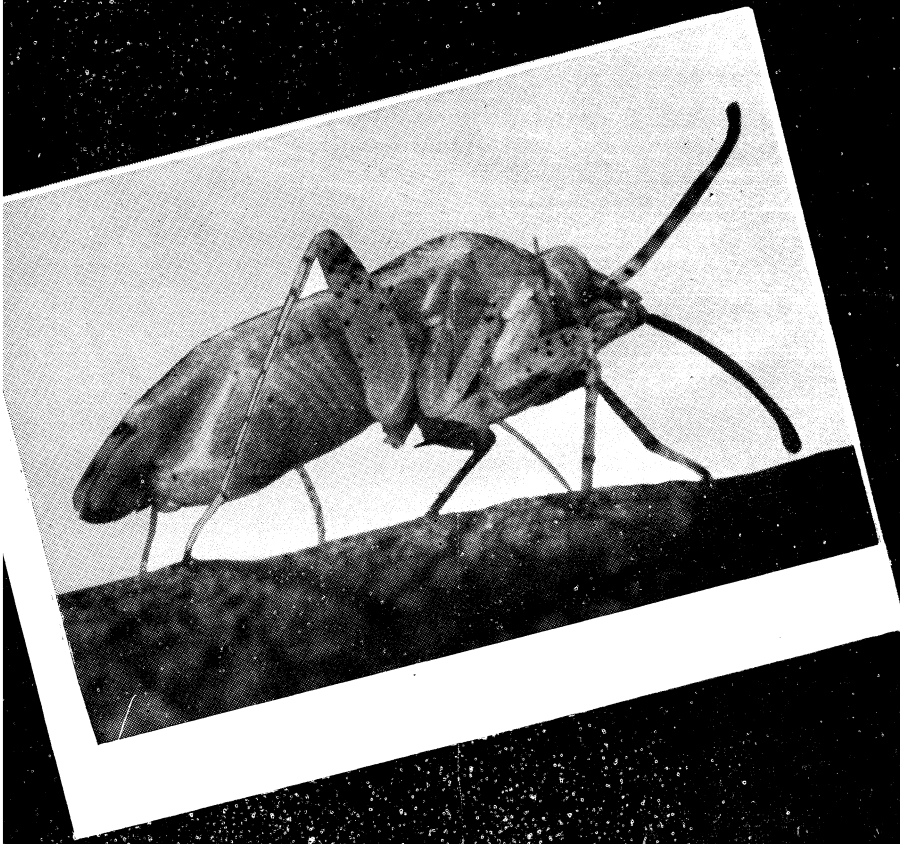

THE COTTON FLEA HOPPER IN OKLAHOMA

By Charles H. Brett

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The Cotton Flea Hopper in Oklahoma

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Efforts to control the cotton flea hopper (Figure 1) are generally unnecessary in Oklahoma, research over a number of years indicates.[1] In tests against the heaviest flea hopper infestations that could be found each year there has been no evidence that this insect, acting alone, reduces yields.

There is a possibility that flea hoppers might decrease cotton yields when their attacks are accompanied by a boll weevil outbreak, although this has not been demonstrated experimentally. In Oklahoma, fortunately, the principal flea hopper area is well outside of boll weevil territory (Figure 2). Insect counts in southeastern Oklahoma cotton fields seldom show infestations higher than 10 flea hoppers per 100 terminals. This is about the number found *after treatment* in states where the flea hopper is a problem. In those states, infestations often are as high as 150 per 100 terminals.

The section of Oklahoma where a combined flea hopper and boll weevil attack might possibly occur is in the south central counties (cross hatched area in Figure 2), and further west in land lying close to the Red River. (Flea hopper infestation is heaviest in river valleys.) In this part of the state, dusting to control the flea hopper may sometimes be necessary.

The fact that the cotton flea hopper is not as serious a threat in Oklahoma as has sometimes been feared does not mean that efforts to control other insect pests of cotton can be relaxed. Boll weevils, grasshoppers, leaf worms and numerous other pests are potential destroyers. When conditions favor their increase, they take heavy toll from growers who do not fight them.

A mixture of one part calcium arsenate and two parts of superfine (325-mesh) dusting sulphur will take care of both flea hoppers and boll weevils.[2] Additional information about

[1] Heretofore, the Oklahoma Agricultural Experiment Station has recommended poisoning flea hoppers when the infestation rose above a low level, because this insect has sometimes caused severe losses in other cotton states. Precaution seemed necessary until research could be completed under Oklahoma conditions. This research has now been finished and is reported in Tech. Bul. T-24, *The Cotton Flea Hopper,* Psallus seriatus *Reut., in Oklahoma.* from which the information in this circular is summarized.

[2] A 5 to 10 percent DDT dust is effective in killing flea hoppers, but is more expensive and does not control boll weevils.

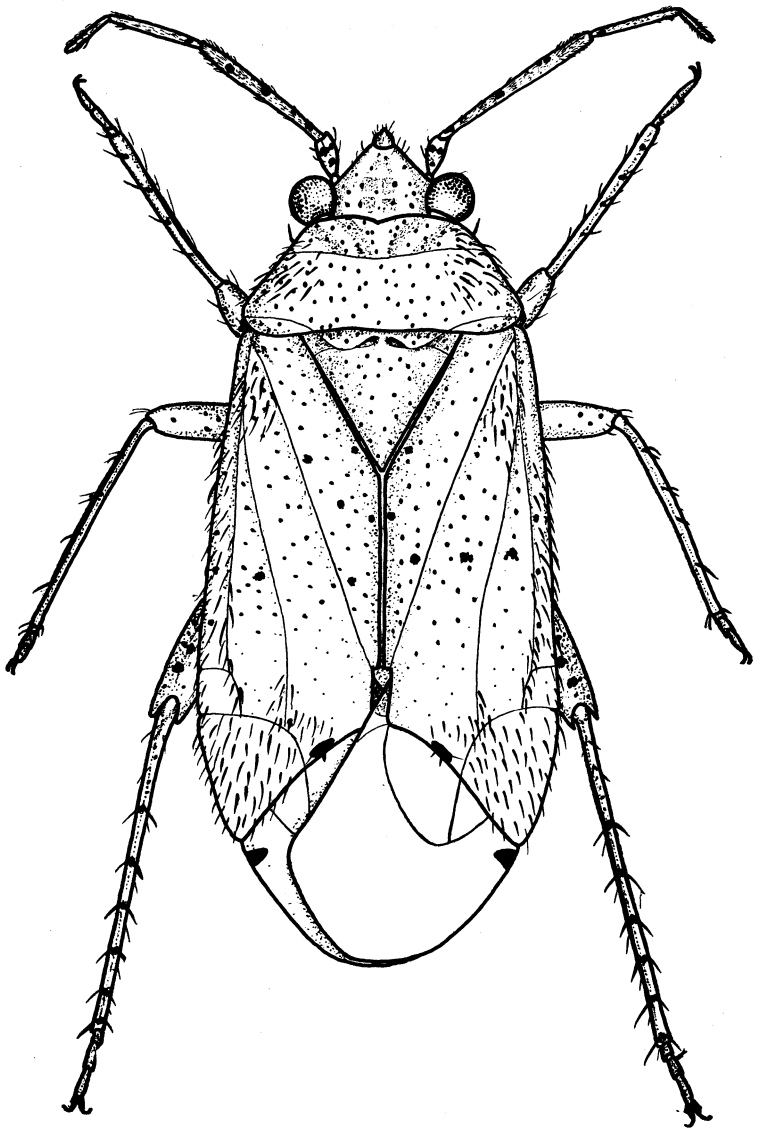

Fig. 1.—The Cotton Flea Hopper.

The cotton flea hopper is a small, pale green bug about ⅛ inch long. Its eyes are reddish to brown. When examined under a magnifying glass, it is seen to be covered with many tiny brown dots. A photograph of this insect is shown on the cover.

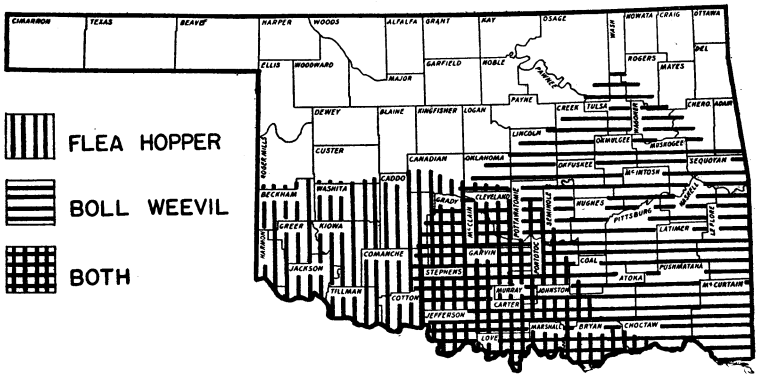

Fig. 2.—Cotton Flea Hopper and Boll Weevil Areas in Oklahoma. Vertical lines mark the part of Oklahoma where moderate to severe outbreaks of cotton flea hopper are likely to occur. Horizontal lines show the section where boll weevil infestation may be moderate to severe. The flea hopper is not likely to affect yield of cotton except in the south central section where the two areas overlap, and in the Red River valley further west.

controlling these and other cotton pests is given in Experiment Station Circular C-96, *Protecting Cotton from Insects and Plant Diseases,* and in Extension Circular E-430, *Cotton Insect Control.* A convenient power duster designed by the author to be carried on a trailer for use in cotton insect control is shown in Figure 3.

EFFECT OF FLEA HOPPER CONTROL ON YIELDS

Table I shows the results of 25 tests made to determine the effects of flea hopper control on cotton yields. Considerable care was taken to locate the tests in fields that were being heavily attacked. In 1944 and 1945, no other fields in the State were found having more insects than the test fields. In all cases the fields used for the tests had a flea hopper population much greater than would normally occur.

Portions of each field were dusted to control the flea hopper. Other parts of the same field were left undusted. In all cases good control was obtained in the dusted portions. In 13 of the 25 tests, the dusted plots produced less seed cotton than the undusted areas. Yields were higher in 11 of the dusted areas, and in one test the yields were equal on dusted and un-

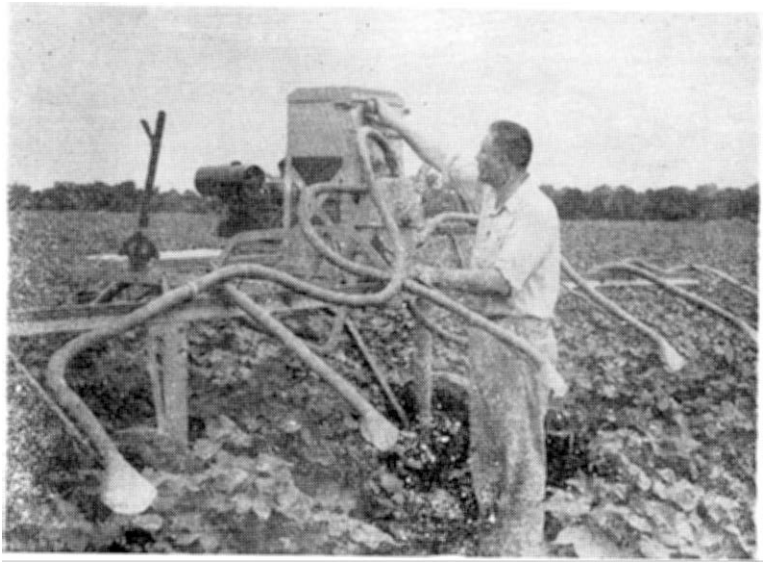

Fig. 3.—A Trailer Cotton Duster.

Although dusting to control cotton flea hopper may not be as important in Oklahoma as heretofore thought necessary, control of other cotton insects cannot be relaxed. This duster is convenient because it is built on a trailer and can be pulled from farm to farm behind an automobile. It does not tie up a tractor except when actually in use.

dusted plots. As an average of all the tests, there was a gain of eight and four-tenths pounds per acre where the flea hopper was controlled. This small figure indicates no relationship between flea hopper control and yield.

LIFE HISTORY OF THE COTTON FLEA HOPPER

The cotton flea hopper places its eggs just beneath the surface of the branches of host plants (Figure 4). In this way it passes the winter. During April or May, the eggs hatch into tiny green nymphs which are so small they are seldom found unless one is trained to see them (Figure 5). These nymphs are similar to the adult except that they are wingless. After passing through a series of growing stages they develop wings and migrate to other plants (Figure 6). Generally they remain in weeds of various sorts such as goatweeds, horsenettles,

TABLE I.—Relation of Flea Hopper Control to Yield of Cotton in Oklahoma.

Dust Used	Pounds per acre	Number of Applications	Pounds of seed cotton per acre* Yield	Gain	Loss
1941 (Average for treatments in 3 fields)					
Sulphur	15	1	--	--	45.0
1942					
Sulphur	10	3	1670.6	----	77.4
Sulphur	15	3	1823.2	75.2	----
Sulphur	15	2	1766.0	18.0	----
Sulphur	15	2	1941.2	99.2	----
Sulphur	15	1	2032.0	190.0	----
Sulphur	15	5	2031.0	189.0	----
2 parts sulphur, 1 part calcium arsenate	12	3	1742.0	----	6.0
1943					
Sulphur	12-14	2	311.0	8.0	----
Sulphur	12-14	2	1452.0	60.0	----
Sulphur	12-14	2	393.0	20.0	----
Sulphur	12-14	2	829.0	12.0	----
1944					
Sulphur	14	1	675.0	----	15.0
Sulphur	14	2	582.0	----	108.0
2 parts sulphur, 1 part Paris green	14	1	607.0	----	83.0
2 parts sulphur, 1 part calcium arsenate	14	1	630.0	----	60.0
2 parts sulphur, 1 part calcium arsenate	14	2	575.0	----	115.0
DDT, 3 percent	14	1	562.0	----	128.0
1945					
DDT, 5 percent	14	1	845.0	0.0	0.0
DDT, 10 percent	14	1	975.0	130.0	----
Sulphur	14	1	850.0	5.0	----
Sabadilla, 10 percent	14	1	740.0	----	105.0
Lethane, B-71	14	1	770.0	----	75.0
AVERAGE			1081.9	76.5	68.1
DIFFERENCE				8.4	

and primroses. They are known to survive on over 100 different kinds of weeds and cultivated plants, including some grasses.

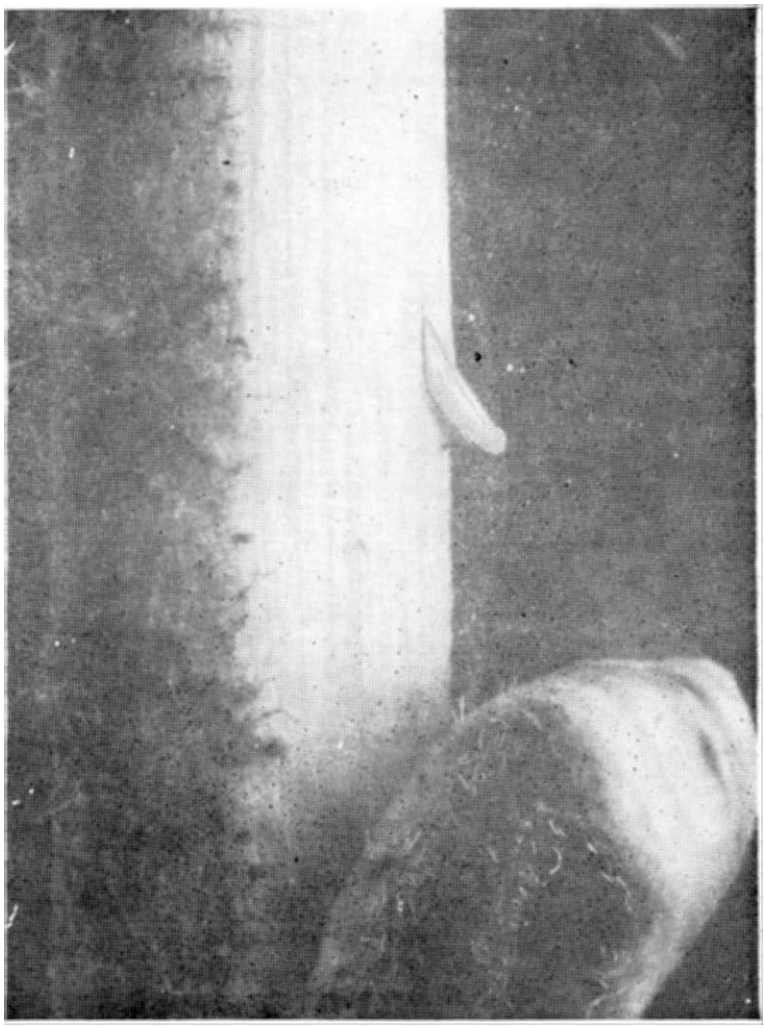

Fig. 4.—Flea hopper egg inserted in the stem of a Croton plant, exposed by peeling back the epidermis.

When cotton is green and growing vigorously many of the insects migrate into it. Here they deposit eggs and a new generation will be completed in three to four weeks. If there is sufficient moisture in the soil to keep plants in good condition, the flea hoppers will increase in numbers rapidly. When hot dry weather causes wilting, they may disappear.

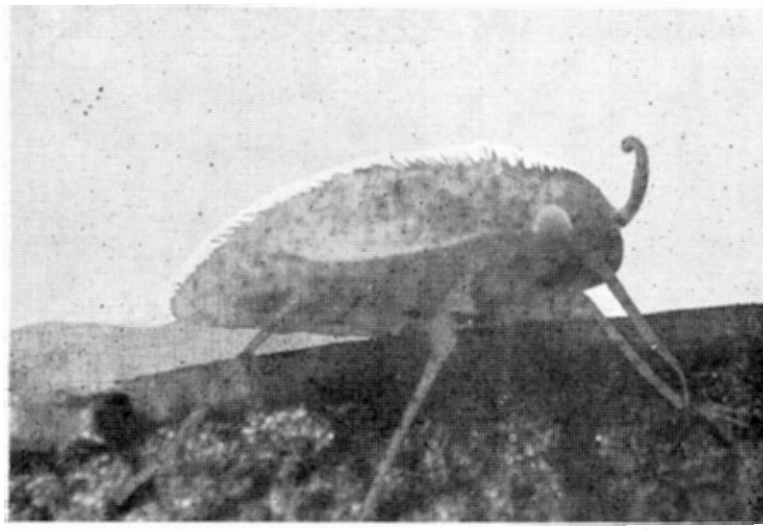

Fig. 5.—Wingless nymph or immature flea hopper.

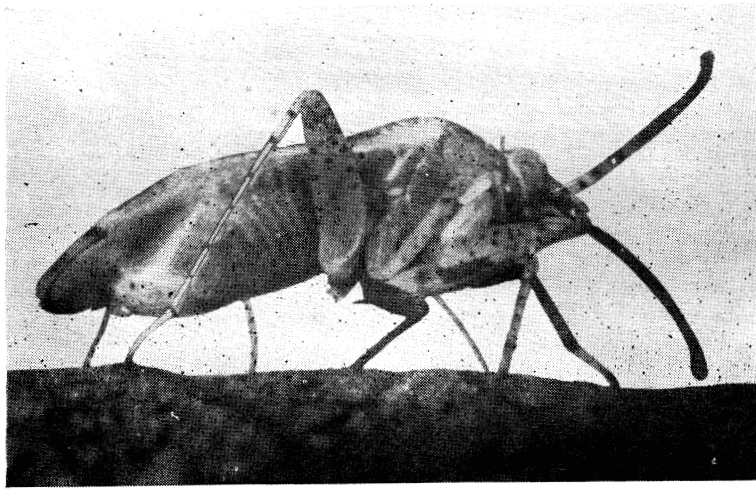

Fig. 6.—Adult flea hopper with well developed wings.

FLEA HOPPER'S EFFECT ON COTTON PLANT

Cotton flea hoppers in all stages of their growth, including the adults, take nourishment by inserting their sucking beaks into tender plant tissues. This may be any part of the plant which is above ground. During hot days they will generally be found on the under side of the lower leaves, but when conditions are favorable they seem to prefer the terminals where young fruiting buds or squares are forming.

Something in the saliva of the flea hopper appears to be poisonous to plant tissue. This is not a serious matter on most parts of the plant, but when a young square is punctured it may be killed and shed.

When cotton is not attacked too heavily, it is able to take care of itself in rather good shape. In fact, if the squares are removed from a plant during the early period of its growth, the plant will grow more vigorously and produce more squares than it normally would. If fewer blooms are produced because of heavy loss of squares, the plant will retain a higher percentage of those which are set on. The total number of bolls produced thus may be as great or even greater than on a plant from which no squares were removed.

The cotton plant normally sheds a great many squares, blooms, and even bolls, whether insects are present or not. It produces many more fruiting buds than it could ever mature. When sunlight and moisture are plentiful, a large portion of the fruiting buds are held on the plant to become bolls. When conditions are less favorable, the proportion held is smaller, being adjusted to what the plant can support. Thus the cotton flea hopper may be only an incidental factor in causing the shed of squares, and therefore cause no loss in yield.

All of these things at least partially explain why flea hoppers in some parts of the Cotton Belt produce injury to the crop while in other regions even the same level of infestation, under different conditions, may cause no loss.

Flea hopper influence supplementing that of the boll weevil would probably bring serious results since each square they caused to be shed would be in addition to boll weevil injury. It is fortunate that in Oklahoma the principal flea hopper area extends beyond boll weevil territory. In that region where flea hoppers become most numerous, the boll weevil is almost unknown (Figure 2).

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