

Circular No. 7

Destroying Boll Weevils by Clean Farming

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Weevils breed in cotton until frost kills it

Weevils are absolutely dependent upon cotton for feeding and breeding. As a rule, the number of weevils in the field is considerably reduced during the period while cotton is opening. After the crop is matured, if favorable rains occur, there is usually a considerable growth of late squares with blooms and many small bolls formed. This condition is remarkably favorable for the development of weevils, and the number of weevils increases very rapidly until frost destroys the cotton.

Migrated weevils become established in late top growth

Migrated weevils, which have flown many miles into new territory, are likely to find just this late growth of squares in which they reproduce and thus establish the weevils in the new territory. It is possible for two or three generations to be thus produced before frost. The danger is that planters may not realize the presence of the weevils, as the fields are usually neglected after the cotton is picked out, and thus the conditions most favorable for the weevils are left without a single effort being made to remove them. Naturally not as many weevils are likely to be produced in the new territory as may be found during the fall in older infested fields. But the danger to the crop of the following year may be nearly as great.

Many thousands of weevils may occur on each acre of cotton

In old infested fields, it is by no means uncommon to find from one to four or five weevils for each plant growing in the field. This means that from five to twenty-five thousand weevils per acre may be found at the time of the first frost. It is a well established fact that the weevils developing and becoming adult late in the fall are those which are most likely to survive the winter. They have not exhausted their vitality by long flights or by any considerable reproductive activity, as have older weevils. It becomes doubly important therefore that the development of weevils late in fall should be prevented as much as is possible.

Weevils hibernate as adults

As with nearly all insects, the winter season is passed quietly and without feeding by the full grown or adult weevils, which find shelter in any kind of rubbish in or around the cotton fields where they are when the first frost occurs. The dormant winter condition of the insect is spoken of as hibernation.

Hibernation usually begins with first killing frost

As cool weather approaches in the fall, weevils become less active and some may seek winter shelter even before frost occurs. Most of them, however, continue to feed until green cotton is largely destroyed. The occurrence of the first killing frost is a signal for the great majority of weevils to seek shelter for the winter. This we call entering hibernation. If the freeze is severe enough to completely destroy squares and bolls, the immature stages of the weevil in them are likely to be killed, but if only foliage is killed, the immature stages may complete their development and emerge, or enter hibernation within the unopened bolls especially.

Hibernate principally in cotton field

Under ordinary conditions, few weevils fly to any considerable distance from the cotton fields in search of winter quarters. They have no power of purposely selecting exceptionally favorable conditions. It is well known, however, that during warm days following frosty nights, weevils having little shelter may be again somewhat active and again enter shelter, so that in time the weevils gradually secure the most favorable shelter available. The large majority of weevils find winter quarters in or near the field in which they were feeding when frost occurred. Innumerable experiments have shown that the most favorable conditions for successful hibernation are found in fields in which the cotton stalks, with grass, weeds, fallen leaves, etc., are left undisturbed until nearly time to plant the following spring. Under these conditions, the maximum number of weevils will survive.

Standing stalks give most favorable shelter for weevils

Under exceptionally favorable conditions over 40 per cent of the fall weevils may survive

A large number of carefully planned and executed experiments have been made to determine the effect of the destruction of green cotton at varying dates in the fall, and the effect of various classes of shelter upon the survival of weevils. It has been found that the range in survival is sometimes as low as a fraction of one per cent., when conditions are unfavorable, and again as high as between 40 and 45 per cent. where exceptionally favorable conditions and seasons have occurred. It is needless to say that there is very little prospect for successful cotton culture under the latter condition.

WILL YOU CHOOSE TO DESTROY THE WEEVILS IN THE FALL OR HAVE THEM DESTROY YOUR COTTON CROP NEXT YEAR? The earlier stalks are destroyed, the fewer weevils will survive the winter and the smaller will be the damage to the succeeding crop. **THIS EARLY FALL DESTRUCTION OF THE STALKS IS THE MOST IMPORTANT SINGLE**

STEP IN THE ENTIRE FIGHT AGAINST THE BOLL WEEVIL. Wherever weevils occur, or may enter new territory, stalks should be up-rooted and burned if possible at least a month before frost.

Three methods
of destroying
stalks

There are several methods of destroying cotton stalks, each of which has some points of advantage, but only one of which is absolutely certain in its results and can be fully recommended. The preferred method involves the up-rooting, piling and burning of the plants. A less effective method, but one which may be followed under certain conditions, is to cut the stalks down with a stalk chopper and plow them under deeply, following the plowing with a discing of the field. We can advise the plowing under instead of burning stalks wherever the planter is equipped with plows and mules, so that he can put them under an average of six inches of soil. The third method, which can be possible only in exceptional cases, is to turn in sufficient stock to graze off all green cotton within a few days' time.

Burning method
only is fully
effective

For the burning method, stalks may be up-rooted in various ways. The cheapest, most effective and preferred plan is to use what is known as the "A"-shaped stalk cutter. This consists essentially of strongly braced timbers, forming a triangle having sharp, strong knives fastened to the under side of each divergent arm, so as to cut two rows of stalks below the surface of the ground at one time, and throw two adjacent rows into one wind-row. This machine has been fully described in Circular No. 30, of the Louisiana State Crop Pest Commission, and a copy of this circular can probably be obtained by request addressed to the Director of the Experiment Station, Baton Rouge, La. The machine may be made at home by an ordinary carpenter with the iron work done by local blacksmith at a cost for materials of about \$5.00. With one of these cutters from 10 to 15 acres of stalks can be cut per day. If any stalks are not completely severed, they should be chopped out or pulled so that they will not keep green. The stalks in wind-rows may be piled by using a pea-vine rake or in some other way, and will be ready for burning in a week or ten days with dry weather.

Stalk Cutter
home made
\$5.00 to \$10.00

Plowing out
stalks is unsatis-
factory

Stalks may be plowed out, but this is less satisfactory, as many of the roots remain in the ground so firmly that they will need to be pulled. A more laborious method is to up-root them by means of a lever, having in it a notched groove to take firm hold upon the base of the stalk. The stalks should

Burn as soon as foliage and tips are dry

be placed in position to burn while still green to avoid scattering foliage, squares, bolls, etc. The weevils are then concentrated upon the rows or piles of stalks and nearly all of them will remain there until burning can be accomplished. Burn as soon as the foliage is dry enough to produce a good heat, even though the stalks themselves may still be too green to burn cleanly.

Burning destroys weevils in several ways

Burning stalks destroys weevils in a number of ways. First, it will get immediately a large proportion of the weevils already adult and active. Second, it will absolutely destroy all immature stages in squares and bolls. These stages developing into late weevils would be the ones most likely to survive the winter. Third, by the removal of all green cotton, weevils which escape the fire will be likely to starve to death before they succeed in finding food. Fourth, the destruction of the stalks removes a large proportion of the materials which provide most favorable shelter for the weevils during the winter, and weevils still remaining in the field are therefore more likely to perish, or if driven out of the field less likely to find favorable shelter.

Weevils may escape if plowed under

The practice of running a stalk chopper over the field and then trying to turn the stalks under is far less effective since many roots will still remain in the soil to give rise to sprouts upon which the weevils may survive until frost. Ordinary plowing will allow a large proportion of the weevils on the surface of the ground to escape, as experiments have shown that weevils may make their way out through several inches of ordinary loosely plowed soil.

Grazing the stalk is poorest method

Grazing is probably less effective than either of the other methods. Invariably considerable sprout cotton exists in grazed fields, and this is sufficient to maintain adult weevils until they enter hibernation. They can then find plenty of shelter in these unplowed fields.

Clean up the farm. Remove the stumps

Besides the destruction of stalks, there are a number of other points included in what may be called clean farming which should be carefully looked after in fighting the weevil. The presence of stumps or dead timber in the field, while bad agricultural practice under any conditions, is especially favorable to weevil hibernation. Dr. S. A. Knapp has estimated that the presence of stumps in a field costs the cotton farmer on the average \$3.00 per acre each year. With the boll weevil present, they may cost far more than this, because of the shelter which the weeds, growing around them, may give to hibernating weevils. They cost

also by preventing the use of improved machinery, which is especially desirable in boll weevil territory.

Clean ditches
turn rows and
fence lines

In general, we would say clean up all kinds of rubbish along ditches, terraces, turn-rows, and around the edges of the field to reduce the chances of weevils hibernating successfully. This will decrease the injury done by other insects besides the boll weevil.

It pays to destroy
the stalks

From the many demonstrations which have shown the great value of early destruction of stalks in fighting the weevil, we may consider one definite case in which the records were carefully kept and definitely authenticated. On the Gulf coast of Texas in the fall of 1906, the planters in an isolated locality, including 400 acres of cotton, were persuaded to destroy their cotton stalks by burning during the first ten days of October. No cotton was grown nearer than fifteen miles, and here a suitable check area was found. In the check field stalks were allowed to stand as usual until planters were ready to begin their spring work. Without making any other change in the practice usually followed by the planters in each of these localities, the yield obtained in 1907, upon the 400 acres averaged better than two-thirds of a bale per acre in spite of the fact that the soil was rather poor and sandy. Upon the check area hardly one-half of this yield was obtained, although the land here was richer than upon the 400 acre tract. The difference in yield can be attributed only to the difference in the manner of handling the stalks the preceding fall.

\$20.00 per acre on
400 acres

At the market value of cotton that year, the increased yield due to fall destruction of the stalks was worth fully \$20.00 per acre, or more than enough to have bought the land upon which the crop was grown. Somewhat similar good results can be obtained anywhere that the weevil occurs.

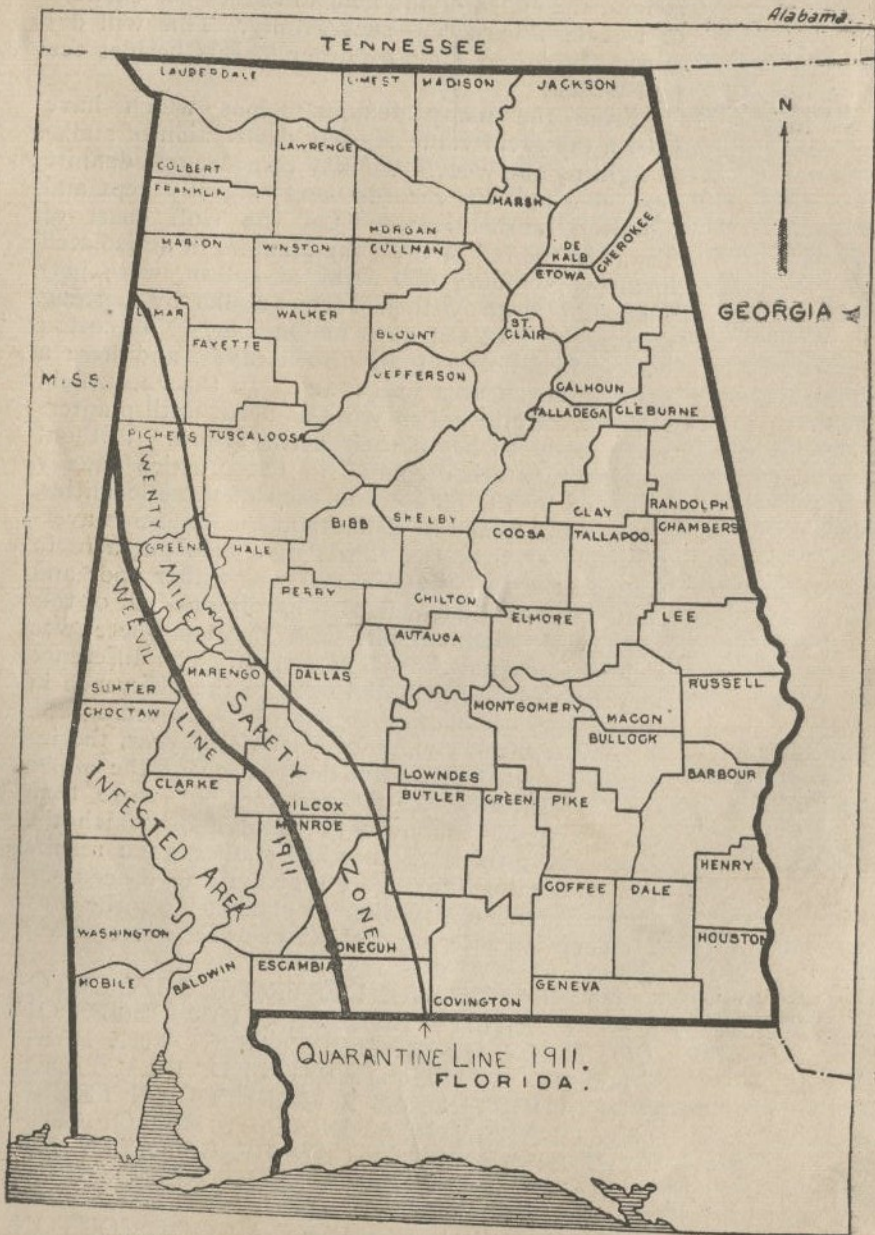
Early fall destruction of stalks clears the way for deep fall plowing and the use of a winter cover crop.

Weevils controlled by stalk
destruction

IF STALKS ARE DESTROYED BY OCTOBER 10 EACH YEAR, AS GOOD CROPS OF COTTON CAN BE MADE AS IN THE PAST AND IF OTHER IMPROVED PRACTICES ARE ADOPTED, AS SUGGESTED IN THESE CIRCULARS, THE AVERAGE YIELD OF COTTON IN ALABAMA CAN BE GREATLY INCREASED IN SPITE OF THE PRESENCE OF THE BOLL WEEVIL.

IF YOU WOULD MAKE A GOOD COTTON

CROP NEXT YEAR, SEE THAT THE STALKS AND THE WEEVILS ARE COMPLETELY DESTROYED EARLY EACH FALL. THIS IS THE LAST STEP IN HANDLING ONE COTTON CROP AND THE FIRST STEP IN MAKING THE NEXT ONE BETTER



ALABAMA WEEVIL LINE OF 1911 AND QUARANTINED AREA