

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF OKLAHOMA

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MECHANICAL COLLEGE AND
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AGRICULTURE, COOPERATING

EXTENSION SERVICE
COUNTY AGENT WORK
STILLWATER, OKLAHOMA

Distributed in Furtherance of the Acts of Congress of May 8 and June 30, 1914

THE HESSIAN FLY
IN
OKLAHOMA

Why Not
Raise Wheat
Instead of
Hessian Fly?

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INTRODUCTION

The Hessian fly seriously damaged the wheat crop in Kay, Garfield, Grant, Noble, Pawnee, Alfalfa, Major, Woods, and Woodward counties in 1927.

A heavy infestation occurred in the fall of 1926. At the time it was too late to help the 1927 crop, but a control campaign was started to protect the 1928 crop.

HESSIAN FLY SITUATION IN JANUARY, 1928

Where control measures were carefully carried out, much of the wheat is free from infestation. Unfortunately there were those in almost every community who did not observe Hessian fly control measures. As a result there was a rather heavy infestation in some fields from which flies may spread in the spring of 1928 to infest much of the wheat that was free from fly all winter.

Wheat that was up before October 12, 1927, is quite generally infested while that which came up later is relatively free of infestation. The later seeded wheat is looking well and is in excellent condition.

In some localities where the seed bed was not sufficiently worked to hold the moisture and where the seeding was delayed too long some injury has resulted. It is important to seed as soon after the fly safe date as possible.

The following is a summary of information obtained from seeding plots that were conducted cooperatively by the Experiment Station and the Extension Service in Garfield, Alfalfa, and Woods counties.

FLY INFESTATION AT DIFFERENT PLANTING DATES

	Sept. 15 1927	Sept. 20 1927	Sept. 26 1927	Sept. 30 1927	Oct. 5 1927	Oct. 10 1927	Oct. 15 1927	Oct. 20 1927
Woods County	16.%	22.%	16%	4%	3.%	½%	0	0
Central Alfalfa County	17.%	10%	*	6%	14.%	0	0	0
Southern Alfalfa County	15%	14%	40%	*	4.%	0	0	0
Eastern Garfield County	80%	74%	*	81%	62%	½%	0	0

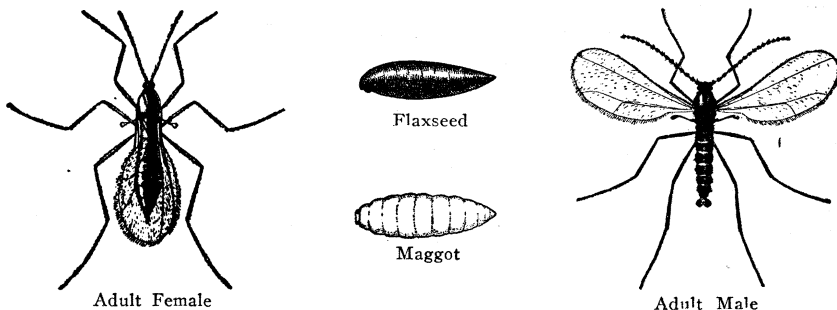
*No seeding.

These figures are based on 1927 conditions and may vary considerably for later years, however, they show that there is a definite relation between date of seeding and Hessian fly infestation.

STAGES OF THE HESSIAN FLY

The Hessian fly passes through four distinct stages in its development—the adult, egg, larva, and flax seed. These are briefly described here in order that the fly may be recognized in any of its stages.

The adult is a small, long legged, dark colored insect, resembling a mosquito. The eggs are so small that they are scarcely visible to the naked eye. They are of a reddish color, cylindrical in shape and are usually deposited in the grooves on the upper surface of the leaf. The eggs resemble the early stages of leaf rust. The larva or maggots are white in color and are found between the leaf sheath and the stalk either at the crown or at one of the joints. The maggot varies in length from the size of the egg to about one-fourth inch in length. The flaxseed, or resting stage, is the one best known by farmers. It is a reddish brown capsule, found at certain seasons between the leaf sheath and the stalk either at the crown or one of the joints. The flaxseed is about one-fourth inch in length and resembles the maggot in shape except that it is more rounded at the ends. It is from this flaxseed stage that the adult emerges.



LIFE HISTORY OF THE HESSIAN FLY

The life history of the Hessian fly is subject to great variation during the year, but in general it follows a rather definite course. In Oklahoma activity begins about the middle of March. The adult fly, resembling a very small mosquito, begins to emerge from the "flaxseed" in which state it has passed the winter. The fly may pass the winter either in volunteer or the early seeded regular crop of wheat, barley or rye. The adults continue to emerge until about the middle of April. These adults live only a few days but during that time they lay the eggs which produce the first brood. Each female deposits from one hundred to three hundred of the tiny reddish eggs in the grooves on the upper leaf surface of wheat, barley or rye.

The eggs hatch in from four to eight days and the young maggots work their way down to the base on the leaf, and then on down behind the leaf sheath to the point where the leaf joins the stalk. Here the maggots remain, feeding until they attain full growth and transform to the flaxseed stage. About the middle of May the second emergence of flies begins, and the cycle is repeated. After harvest the flaxseeds of this brood may be found just above the crown or just above one of the joints. The main fall brood appears from the last of August until about the middle of October; the maximum emergence probably occurring during the last of September and the first of October. Then the cycle is repeated, and after the first of November the flaxseed stage may be found just above the crown between the leaf sheath and the stalk. Practically every stalk or tiller infested in the fall will die and dry up during the winter. The winter is passed in the flaxseed stage which gives rise to the main spring brood. Under favorable conditions a mid-summer brood may occur in the volunteer wheat. The length of the life cycle is variable, depending almost entirely upon climatic conditions. Dry, cool weather lengthens the life cycle, while moist, warm weather shortens it. Excessive dry, hot weather also lengthens it.

The number of broods also varies, ranging from two to five. In 1927 four full broods and a partial fifth occurred in Oklahoma, the fourth being the main fall brood.

METHODS OF CONTROL

The important steps in the control of the Hessian fly are listed blow:

1. Early and deep plowing or listing of all stubble. (Early preparation of seed bed).
2. Destruction of all volunteer wheat.
3. Delayed seeding.
4. Cooperation of all farmers in the community.

WHY PREPARE THE SEED BED EARLY?

The seed bed should be prepared early because the Hessian fly after harvest passes the remainder of the summer as a flaxseed in the stubble. Deep plowing or listing, thoroughly done, buries the flaxseed so deeply that the adult fly is unable to reach the surface to deposit eggs. A cut and cover method of plowing will not give the desired result.

Early preparation of the seed bed is a good practice in wheat farming since it helps to conserve moisture.

Burning the stubble is not advisable as a means of Hessian fly control, as only about fifteen per cent of the flaxseed are destroyed in this way and many very beneficial insects are killed.

HOW SHOULD THE SEED BED BE PREPARED?

The seed bed should be prepared by plowing or listing the stubble under deeply. Plowing is the first choice as it insures a more complete turning under of stubble. It is often a good plan to disk the stubble immediately after harvest. This not only conserves the moisture and makes plowing easier, but it tends to start the growth of volunteer wheat and has a tendency to bring about an early emergence of the fly. About three weeks after disking, the land should be plowed to a depth of at least six inches so that all stubble and volunteer wheat will be covered to a depth of three inches. The plow should be followed with a harrow, disk, or float to refirm the soil. The seed bed should be kept mellow and free from weeds and volunteer wheat.

Deep listing followed by splitting the ridges about a month later, then working down and refirming gives fair results but it is not as satisfactory from the standpoint of fly control as plowing.

WHY DESTROY THE VOLUNTEER WHEAT?

Conditions that favor the development of volunteer wheat also favor an early emergence of the fly. Volunteer wheat furnishes the Hessian fly a place to lay eggs. If there is no wheat available when the flies emerge, they will not find a place to deposit eggs, and will die without providing for a future generation.

WHY DELAY SEEDING?

Seeding should be delayed so that the last brood of emerging adults will not find any wheat in the fields upon which to lay eggs. If seeding is not delayed the early seeded wheat will serve the same purpose to the flies as the volunteer. According to the information now at hand for Oklahoma, wheat should be seeded about October 12 in Harper, Woods, Kay, Noble, Garfield, Major, Woodward, Dewey, Payne, and the northern part of Blaine, Kingfisher, and Logan counties. This date will vary from year to year and it is well to keep in close touch with the county agent who can tell you of variations governing the date of seeding.

WHY IS COMMUNITY COOPERATION NECESSARY?

The Hessian fly is best controlled by the combined efforts of all farmers in the community. Let one farmer in a fly infested community fail to observe any of the control measures and his farm will serve as an incubator for the entire community, since the fly has been known to migrate ten miles or more from an infested field.

However, if one man in the community fails to cooperate in the practical control measures, it does not mean that the whole program will be a failure; but if public sentiment can be molded within the community strong enough so that everyone will carry out a unified program on the Hessian fly control measures, it will certainly help on the next year's crop.

IS IT NECESSARY TO FOLLOW ALL THE FOUR RECOMMENDED STEPS OF CONTROL?

Yes. The four steps recommended for Hessian fly control are each dependent upon the other. No one step will control the fly. Failure to observe any one of the steps may wreck the effectiveness of the control. This was shown in the fall of 1927 where the first two steps were observed, and then the third, delayed seeding, was disregarded. The result was failure.