



The Hessian Fly IN NORTH DAKOTA



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NORTH DAKOTA AGRICULTURAL COLLEGE
EXTENSION SERVICE
FARGO, NORTH DAKOTA

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The hessian fly is primarily a winter wheat pest, but has frequently developed in injurious numbers in spring wheat areas under favorable weather conditions.

GROWTH STAGES

The adult hessian fly is a small winged insect of the same general form as a mosquito, but not more than 1/3 the size of the common mosquito. It is dark grey to black in color.

These adult flies are frail and live only a few days. However, during their short life, each female lays 100 to 200 small eggs, placing them on the upper surfaces of the leaves of wheat plants.

Within a few days the small reddish-colored maggots or larvae hatch and begin feeding. This maggot stage is the only feeding stage of the insect, and the only stage that is harmful to the plant.

Very soon after the maggot hatches, it works its way down between the leaf sheath and the stem of the plant. Here it becomes stationary, and begins active feeding by sucking the plant juices. It becomes white or transparent in color, and completes its development in this location in about 3 weeks.

The maggot then goes into a resting stage, commonly referred to as the "flaxseed" stage, so named because the brownish colored outer covering and the semi-oval outline, tapering to a point at one end, looks somewhat like a small flaxseed.

The true pupal form develops within this "flaxseed" and from it the adult fly emerges.

NATURE OF INJURY

Maggots feeding on young wheat plants stunt the central shoot. The leaf tips become yellow, and the plants eventually die, or survive only by throwing out new shoots to take the place of those killed.

On older plants, the maggots weaken the stems just above the first or second joint, and the stems bend or break over at these points.

Breakage just above these joints is a striking characteristic of hessian fly injury during the later part of the growing season. Examination of the straw at this spot will usually reveal the fully developed maggots or "flaxseeds" between the stem and the leaf sheath.

THE LIFE CYCLE

In North Dakota the hessian fly overwinters in the "flaxseed" stage in stubble and volunteer wheat.

Adult flies come out about May 15, and eggs are laid immediately. In 1944, the earliest maggots from these first generation eggs had completed their development by the first week in June, and by June 20, the majority of them were in the "flaxseed" stage.

The first adult flies of the second generation emerged the first week of July, and eggs from them gave rise to maggots which developed during July.

Many second generation maggots remained in the "flaxseed" stage all winter in stubble fields. However, some of them completed development and emerged as adult flies sometime during early fall.

These third generation flies deposited eggs on volunteer wheat, and on October 18, hessian fly maggots were found on volunteer grain in the New England vicinity.

Wheat stubble from a heavily damaged field examined in the fall of 1944 revealed nearly 40 percent of the stems attacked. About 20 percent of the "flaxseeds" found were below the first joint; 58 percent between the first and second joint, and 22 percent above the second joint. Only a small fraction of 1 percent were above the third joint.

This distribution of "flaxseeds" suggests a certain portion of the 1944 infestation came from second generation flies. These emerged after the plants had developed to fair size. However, some of the first brood did not go through another generation.

RELATION TO CLIMATIC CHANGES

Weather conditions are important to hessian fly development. The insect is seldom found in dry or semi-arid areas. High temperatures and dry weather tend to prolong the resting or "flaxseed" stage, and thus reduce development of the summer generations.

Likewise, dry weather in the fall reduces the number of insects developing on volunteer grain, as well as the amount of volunteer grain. Good crop years, with enough moisture and moderate temperatures appear to be favorable hessian fly years.

METHODS OF CONTROL

In spring wheat areas, use of fly resistant varieties, and destruction of the "flaxseed" stage in stubble and volunteer wheat, are principle control measures.

Studies by Ralph Smith, agronomist at the Dickinson branch experiment station, during 1944 and 1945 revealed that Mida wheat has effective resistance to hessian fly at-

tack as do certain un-named varieties under trial. Summarized comparisons with standard varieties in his studies follow:

VARIETY	PERCENT OF PLANTS INFESTED		AVERAGE NO. OF FLIES PER PLANT	
	1944	1945	1944	1945
Rival	70	66	1.68	1.72
Regent	68	54	1.78	1.02
Ceres	62	66	1.44	1.46
Vesta	62	66	1.68	1.50
Pilot	66	46	1.80	1.06
Newthatch	58	48	1.28	1.44
Thatcher	50	40	1.08	1.42
Marquis	42	48	0.94	1.28
Average of above	59.7	44.2	1.46	1.36
Mida	22	30	0.52	0.72

These results indicate this variety will offer enough protection against these insects under conditions similar to those of the past two years, the heaviest on record.

Plowing all infested stubble land before May 15 will destroy hessian flies. Follow spring plowing with a packer. Volunteer wheat must likewise be plowed to destroy insects developing from this source.

Where plowing is not possible, disking and harrowing will destroy many of the insects. Early spring disking of stubble will also favor development of early volunteer grain on which the flies will lay their eggs

instead of flying to the seeded crop to do so. Destroy such spring volunteer wheat before July 1.

In infested areas, strip cropping presents special problems. If old stubble strips cannot be cultivated early to destroy the insects, you may burn the stubble off before the flies emerge about the middle of May.

Such burning would destroy only those "flaxseeds" above the first and second joints but would not destroy those below the first joint because many of these are below the soil surface.

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