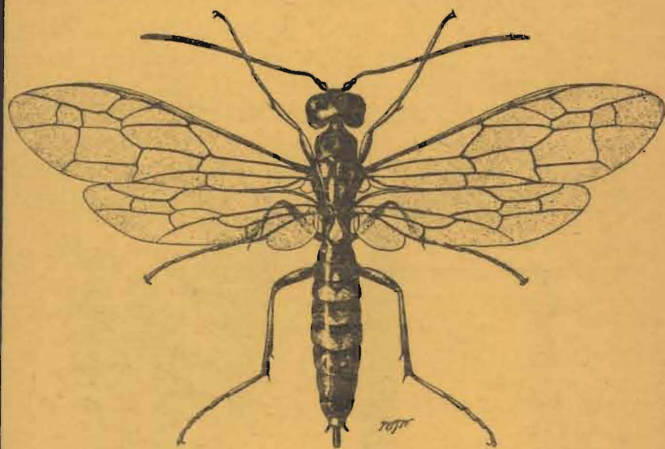


The Wheat Stem SAWFLY



5 THE ADULT WHEAT STEM SAWFLY. ENLARGED.
544.3 (After Ainslie)

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no. 94

NORTH DAKOTA AGRICULTURAL COLLEGE
EXTENSION SERVICE
FARGO, NORTH DAKOTA



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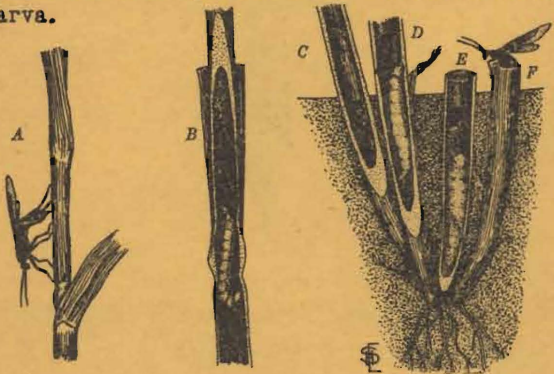
The wheat stem sawfly has increased in recent years throughout North Dakota, Montana and the Canadian Provinces. With this increase, crop losses have occurred and methods of controlling the sawfly have become an essential part of farm management.

This insect has been known in North Dakota since 1905, and has caused serious damage to spring wheat in some areas within the state since then.

Type of Injury

The larvae, or immature stages, develop as true stem borers within the plant attacked. They tunnel up and down the stem, feeding on the tissue, thus weakening the stems. When the plants begin to mature, they move to the lower end of the stems, which they girdle from inside close to the soil surface. Stems so girdled usually break off and fall to the ground.

Casual examination of infested plants during the growing season will show no sign of the insect. However, if the stems are split, a sawdust-like material will show the working of the larva and careful examination will also usually reveal the whitish-colored larva.



THE WHEAT STEM SAWFLY LIFE HISTORY
(After Strickland)

- A. Adult laying egg in wheat stem.
- B. Larva inside stem.
- C. Non-infested straw.
- D. Larva cutting straw at harvest time.
- E. Larva in over-wintering position in straw stub.
- F. Adult emerging from stub in spring.

Description and Life History

The adult sawfly is a wasp-like insect about 1/3 inch long, black and yellow colored, with dark wings. These adults emerge in May and June and deposit their small, milky white eggs in the stems of developing plants. The eggs hatch within a week to 10 days, and the soft-skinned, whitish colored legless grubs, with brownish heads, immediately begin feeding. Full grown larvae are about 1/2 inch long.

When the larva completes its growth, it moves to the lower part of the stem and begins to prepare for winter hibernation. It cuts a neat groove entirely around the inside of the stem, usually at or a little above the ground line. It then packs this area with castings from its feeding activities, working from below the groove. When the stem, weakened by the internal groove, breaks over from wind action, the larva is thus left in the remaining short stub in the ground, well protected by the tight plug. The space within the stub is then completely lined with a thin silken membrane, and the larva remains inactive within this chamber throughout the winter.

In the spring when the soil warms up the larva becomes active again. It soon changes into the pupal stage, in which is made the transition from the grub-like larva to the adult sawfly. This usually is a short period of about 10 days. Then the adult sawfly emerges from the pupal case and forces its way up through the plug in the top of the stub to the open, and begins the life cycle again. Thus, there is a single generation of these insects in a season.

Plants Attacked

Spring wheat suffers most from this insect. Various native grasses, including quack, slender and western wheat grass, wild rye and others are natural host plants. Barley is occasionally infested, and eggs may be deposited in oats, brome grass and crested wheat grass, but the larvae cannot complete their development in these plants. Durum wheat has considerable resistance to

this insect, and is rarely damaged extensively. Flax is practically immune to sawfly.

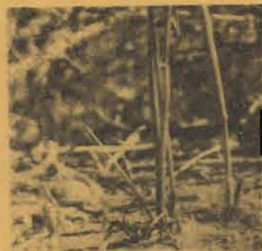
All commercial varieties of hard spring wheat appear to be subject to sawfly attack. No varieties are available that have effective resistance.

General Habits

Adult sawflies first appear in the spring about the time western wheat grass or blue stem (*Agropyron smithii*) is beginning to head out. They are active on quiet days when the sun is shining and the temperature near 65 degrees F., or higher. Their activity stops almost instantly when the sun is hidden behind a cloud, or when a heavy wind is blowing. When not in flight, the adults usually rest head downwards on the stems or leaves of grasses. A heavy rain will thus force water under the wings, and further activity is delayed until they have dried off.

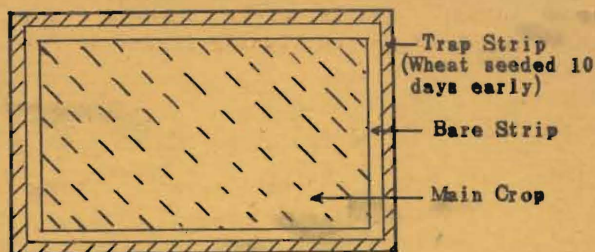
In selecting stems for egg deposition, sawflies seek the strongest and best developed grass stems available. Sawflies are not strong fliers, and normally do not travel further than necessary to find suitable stems for egg laying. They move through the vegetation in low flight, drifting about in a manner which makes them hard to see. Since this slow flight stops at once when any wind is present, migration from one area to another is often very slow.

Either excessive moisture or extreme drought during June and July (periods of adult activity) reduces sawflies. Dry weather conditions slow up development of host plants and may likewise slow up growth and development of sawflies. Favorable conditions for sawflies include a moist spring,



a dry, sunny June and enough moisture during July to allow full development of grasses or grains.

**Short Stubs of Wheat
Stems Due to Sawfly
Activity**



General Plan of Sawfly Trap

Control Measures

Sawfly control involves several procedures, none of which can be entirely effective, but when combined into a complete program, will usually offer fairly complete control. More important control measures are:

1. **DRIVE OUT SAWFLIES** by using resistant crops such as flax, oats, barley and fall rye. Durum is much more resistant than hard wheat, but may suffer some damage in heavily infested areas.
2. **TRAP SAWFLIES** in strips of wheat planted 10 days before the main crop. This is the chief means of killing sawflies. The trap strip should be 10 to 20 feet wide, placed between the old infested stubble and the new wheat crop with an adjoining 10 foot bare strip between the trap strip and the regular crop. The trap strip must be destroyed about the middle of July, either by cutting for hay or by thorough shallow tillage.

Trapping reduces sawflies in two ways: first, the trap strip receives eggs which would otherwise be scattered through 5 to 10 rods of the crop, and secondly, each stem in the trap strip will have several eggs deposited in it, but only one sawfly larva will survive because the oldest one kills all the others.

3. **AVOID EXCESSIVE LOSS** by harvesting infested fields "on the green side". The

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degree of infestation can be determined two or three weeks before harvest by splitting open straws from different sections of the field. If infested, the typical sawdust-like material left by the sawfly will be found. If a high percent of the straws are infested in certain parts of the field, early harvesting of those areas will avoid extensive breaking and lodging. Usually the crop goes down badly when over 1/5 of the stems in a light stand, or 1/3 in a heavy stand, are infested.

4. KILL SOME SAWFLIES by tillage methods.

Shallow surface tillage immediately after harvest is effective in killing sawflies as it brings the stubs of stems in which the insects overwinter up to the surface where the drying action of sunny weather will kill the larvae. However, larvae will be killed only in stubs that are entirely exposed.

Plowing 6 inches deep, with the furrow well turned and packed, buries the stubs deep enough to prevent the insects from emerging. Fall plowing is better than spring plowing. Shallow plowing has little effect on sawflies.

Stubble burning does not destroy sawfly larvae. They are too far below ground in the short stubs to be affected by the heat.

5. USE CROP ROTATIONS. Do not seed wheat on a field where sawfly damage occurred the year before. Seed wheat only after clean summerfallow, or following an immune crop such as oats, barley or flax.

Use all the above procedures in severely infested areas. Entire community action is required for greatest effectiveness. Sawfly losses can be materially reduced by these methods in a short time, but continued use of control measures is advised in districts where these insects have become permanently established.

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