



CONTROL OF WHEAT STEM SAWFLY IN THE PRAIRIE PROVINCES

THE wheat stem sawfly occurs throughout the greater part of the open plains area of the spring-wheat belt. It is an insect of major importance and losses each year amount to several millions of bushels. As a rule the most severe losses occur during years when the rainfall is below normal.

The adult sawfly is a narrow-bodied, wasp-like insect about $\frac{1}{2}$ an inch long. Its body and legs are black with yellow bands. During the later part of June and early July it can be found flying among the plants in the margins of wheat fields. The egg is laid inside the stem of the wheat plant. From this egg a small grub hatches which completely tunnels the stem. As the plant ripens, the grub retires to the bottom of the stem, girdles it from the inside at the ground level and remains below the cut, in the stub, which it has lined with a silken cocoon and plugged at the upper end. The winter is spent in the stub, and toward the later part of May and early June the grub transforms into a pupa, from which the adult emerges about the middle of June.



Fig. 1.—Photograph of wheat stem sawfly damage to a wheat field in Alberta in 1940.

Photo by H. J. Mather.

HOW TO RECOGNIZE THE DAMAGE

The most obvious damage from wheat stem sawfly

630.4
C212
WPS
SP 59

Published by Authority of Honourable J. G. GARDINER, Minister of Agriculture, Ottawa, 1941.

41

is the presence of fallen stems in the field during harvest time. The stems are cut off just above the ground level. If the cutting has been done by the sawfly grub, the upper part of the stem will be found to be filled with a sawdust-like deposit, while the stub still attached to the roots will contain the active grub approximately $\frac{1}{2}$ an inch long.

EFFECT OF FARMING PRACTICES ON WHEAT STEM SAWFLY

Any type of farming practice or rotation in which wheat is seeded on land containing infested stubble or adjoining such land tends to increase the abundance of the sawfly. Infestations in large field units, which are summer-fallowed in alternate years, are usually found to be confined to the margins. Strip farming, on the other hand, with many margins exposed to invasion from adjacent summer-fallow, greatly intensifies the infestation.

The increase in the use of the combined harvester-thresher has tended to increase losses from this insect. As the insect cuts the stems just before the wheat is ready to be harvested, the practice of letting the crop stand until it is thoroughly ripe so that it can be "combined" ensures all of the infested stems being cut by the insect. This means that unless the crop is very heavy and the infestation light the majority of the cut stems will fall to the ground, where they cannot be recovered by the harvesting machinery.

CONTROL

A most important element in the effective control of wheat stem sawfly is the recognition of the presence of the insect and of its potential capacity to destroy crops. If steps are taken to reduce its numbers when infestations are small, very severe losses can be avoided. Farmers are well advised to acquaint themselves with the type of damage caused so that when the first signs of the insect are found in their fields control measures may be undertaken.

In order to establish successful control in any community there must be whole-hearted co-operation on the part of everyone. Careful planning is essential in order to obtain the best results. Wheat farmers throughout the infested area should incorporate control of the wheat stem sawfly as an integral part of their farming practice.

TRAP CROPS

The adult insect seldom flies farther from the point of emergence than is necessary to find suitable plants in which to lay its eggs. This is why the margins of cropped land nearest to the point of emergence are more heavily infested

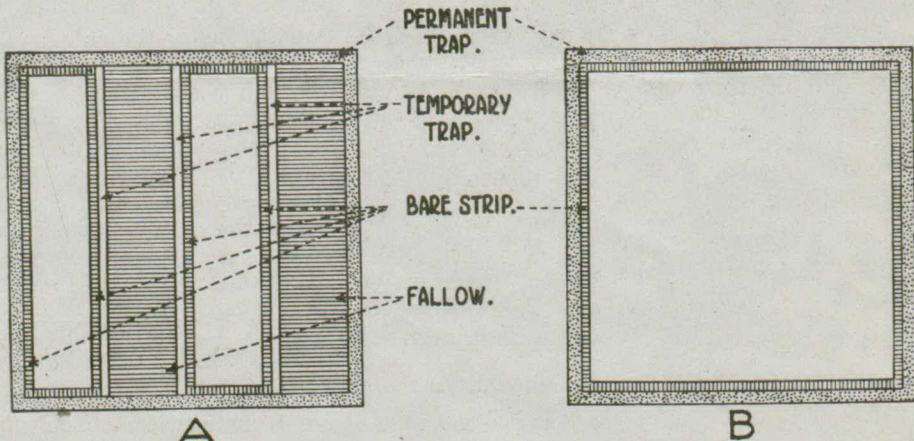


FIG. 2.—Diagram showing ground plan of trapping methods; (A) arrangement of the protective traps on a stripped farm; (B) best method of guarding a large field from attack by sawfly.

than the middle of the fields. This habit of the insect has given rise to the practice of using the field margins as a trap and cutting this growth for hay to destroy the eggs and grubs in the stems.

Trap crops have been found to be very useful in the control of the wheat stem sawfly. A trap crop consists of a strip of crop of varying widths so located that the insects moving from an infested part of a field to an uninfested portion must pass through the trap in order to reach the main crop. The accompanying diagram (Fig. 2) illustrates the relative position of the trap and the crop.

Recent experiments have shown that if a strip of ground from 10 to 20 feet wide is kept free of vegetation between the trap crop and the main crop, the adult sawflies moving about among the stems hesitate to fly out over the bare ground. This permits the use of a narrower trap crop and ensures a greater number of eggs being laid in it.

Permanent Traps

A permanent trap for wheat stem sawfly control is established by planting brome grass in the headlands or road allowances adjoining the wheat fields. The establishment of this trap should as far as possible be undertaken on a community wide scale even where temporary trap crops are also used and should be an integral part of any far-reaching control program.

Temporary Traps

A temporary trap crop is one which requires to be seeded each year and must be some plant which is readily attacked by the sawfly. When used with a bare strip, this trap need be no more than 10 to 20 feet wide.

Wheat.—Wheat has been found to be the most satisfactory temporary trap. *It is important that the trap be planted on summerfallow to allow for a maximum growing period. The main crop should be planted 10 days to 2 weeks after the seeding of the trap. In instances where it is impossible to delay seeding of the main crop, commercial fertilizer should be used to stimulate a more rapid growth in the trap.*

Spring rye.—In some areas spring rye has been found to be an exceptionally satisfactory trap. The chief advantage in using spring rye lies in the fact that it may be seeded at the same time as the wheat or even 2 or 3 days after the seeding of the crop.

NOTE.—*Temporary trap crops of wheat and spring rye must be cut for hay about the middle of July.*

Oats.—Oats are not recommended as a trap crop as they have not proved to be reliable.



FIG. 3.—Photograph of a bare-strip trap in use at Rockyford, Alberta, in 1940.

CONTROL BY TILLAGE

Ploughing.—In areas where the mouldboard plough is extensively used, good control can frequently be secured by ploughing down infested stubble to a depth of 6 inches or more any time between harvest and June 1 of the following year.

Surface tillage.—Shallow cultivation with a one-way disk, duck-foot cultivator, or blade weeder has been found to be quite effective in destroying overwintering grubs in the stubs. The implement must be set to work deeply enough to pass just below the crown of the plants. Unless the stubs are left on the surface the operation is not effective.

Summer-fallow.—Strictly speaking, summer-fallow is not a control practice but it does serve a useful purpose in driving sawfly out of a field. However, if tillage operations are carried on in the autumn or early spring systematically either to expose the stubs or bury them deeply, considerable reduction in numbers occurs. Every effort should be made to prevent the sawfly from migrating into adjoining fields during the summer-fallow year. This can be accomplished by leaving borders of volunteer wheat to serve as a trap or by planting trap crops on the borders of infested stubble.

Stubble burning.—Stubble burning is not effective.

STRIP FARMING

Since this relatively recent type of farming is now being used extensively throughout the prairies, a special warning should be given concerning the danger farmers are likely to encounter. Relatively light infestations, of from 1 to 3 per cent, can increase so rapidly as to infest a field in 3 years. Hence, at the first signs of sawfly damage in a stripped field all cropped strips adjacent to infested stubble should be protected with bare-strip traps. If early action is taken, disastrous losses can be completely avoided. If, on the other hand, these infestations are allowed to increase to serious proportions, it will require several years of systematic trapping to bring the sawfly under control.

ROTATIONS

Coarse grains.—It may be more practicable to replace wheat in the more severely infested fields or parts of fields with some other crop. As a crop, oats is immune from attack and can therefore be used in a sawfly-control rotation. Barley can also be used provided it is seeded late so as to avoid attack. Every effort should be made to use these rotations as a means of eliminating the potential menace of the sawfly from individual farms and communities.

Flax.—Flax is completely immune from sawfly attack and is usually a good substitute for wheat in some areas. Only fields that are relatively free from weeds should be seeded to this crop. In some districts a 3-year rotation of flax-wheat-fallow has been found to be very valuable from the standpoint of control.

HARVESTING INFESTED CROPS

The most severe loss from the sawfly is associated with the fact that the stems fall to the ground and are missed by the harvesting machine. In many instances the fallen grain is a complete loss because rain during harvest beats it to the ground where it cannot be recovered.

Farmers throughout the infested area are advised to examine their fields during the latter part of July to determine the extent of the infestation. If 5 per cent or more of the stems are found to be infested plans should be made immediately to commence harvesting operation on the infested portions of the field while the grain is slightly on the green side. This will eliminate the necessity of using special pick-up attachments and the possible complete loss through sprouting during wet weather.

Prepared by C. W. FARSTAD,
*Dominion Entomological Laboratory,
 Lethbridge, Alta.*