

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1996

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming are checked below.

- Coloured covers / Couverture de couleur
- Covers damaged / Couverture endommagée
- Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- Cover title missing / Le titre de couverture manque
- Coloured maps / Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- Bound with other material / Relié avec d'autres documents
- Only edition available / Seule édition disponible
- Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.
- Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from filming / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- Additional comments / Commentaires supplémentaires:

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured pages / Pages de couleur
- Pages damaged / Pages endommagées
- Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed / Pages décolorées, tachetées ou piquées
- Pages detached / Pages détachées
- Showthrough / Transparence
- Quality of print varies / Qualité inégale de l'impression
- Includes supplementary material / Comprend du matériel supplémentaire
- Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image / Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.
- Opposing pages with varying colouration or discolorations are filmed twice to ensure the best possible image / Les pages s'opposant ayant des colorations variables ou des décolorations sont filmées deux fois afin d'obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below /
Ce document est filmé au taux de réduction indiqué ci-dessous.

10x		14x		18x		22x		26x		30x	
		12x		16x		20x		24x		28x	32x

(Note: A checkmark is present in the 22x column of the top row.)

The copy filmed here has been reproduced thanks to the generosity of:

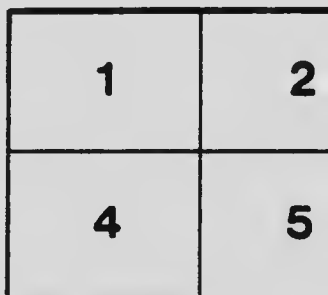
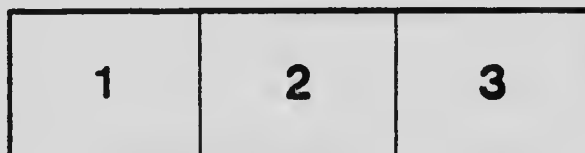
National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Bibliothèque nationale du Canada

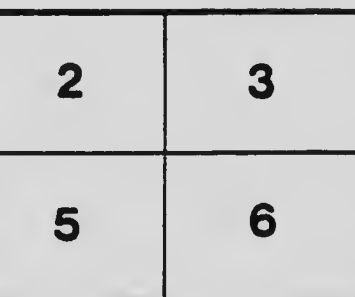
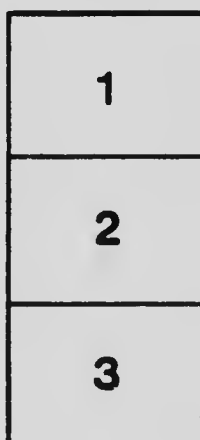
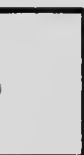
Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier feuillet et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second feuillet, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE"; le symbole ∇ signifie "FIN".

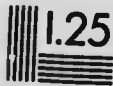
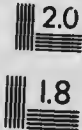
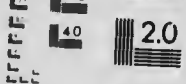
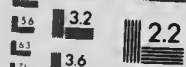
Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents.

Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.



MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

1653 East Main Street
Rochester, New York 14609 USA
(716) 482 - 0300 - Phone
(716) 288 - 5989 - Fax

SEP 19 1920

MANITOBA AGRICULTURAL COLLEGE
Winnipeg, Canada

THE WESTERN WHEAT-STEM SAW-FLY.



Fig. 1. This is an average area in a field of wheat infested with Western Wheat-stem Saw-fly. Note how the stems are bent and broken. Photo taken August 6th, 1920. (Original.)

A. V. MITCHENER, B.A., B.S.A.
Lecturer in Entomology, Manitoba Agricultural College,
Winnipeg, Canada.

0-4
278

11

The Western Wheat-Stem Saw-fly.

(*Cephus occidentalis*)

Plants Injured

The Western Wheat-stem Saw-fly is a four-winged insect which attacks wheat, rye, barley, and some of our native grasses. Its damage at the present time is chiefly confined to wheat. This crop suffers a very great annual loss, much greater than the average farmer realizes. By actual count in one field in August, 1920, as many as 55% of the wheat stems were affected. In the corner of another field over 90% of the straws contained a worm. The heads of these straws contained shrunken grain, and the stand in general was below normal. Similar conditions prevail over a wide area of the Canadian West.

Evidences of Injury

There are several symptoms by which the injury may be detected.

(1) A short time before the crop is ready for the binder, especially if it has been windy, many stalks will be bent over or broken off near their bases. The field will appear as if it had been visited by hail. The prevalence of this condition will depend upon how badly the field is affected.

(2) If the affected straws are split open lengthwise with a knife, there can be seen a fine yellowish powdery substance sometimes scattered along, and sometimes closely packed together, inside the straw. This is formed by the larva or worm as it works its way down the stalk. This is one of the best means of identifying the work of the saw fly.

(3) The larvae are found inside the stalks. These may be distinguished from other cereal infesting larvae by means of a tubelike projection which extends from the hind end of the body.

(4) Just before preparing their winter quarters, the larvae cut a ring around the inside of the stems about an inch above the surface of the ground. When the affected stems are pulled, they break away at that point very readily.

(5) In some cases the heads of the affected stems turn yellow prematurely. This symptom may be confused with injury by other grain insects, and cannot be relied upon unless accompanied by some of the other more reliable evidences of the presence of the Western Wheat-stem Saw-fly.

Life History

The adult insect may be found during the last half of June and the first half of July resting in characteristic position, head downward, upon the stalks of grains and grasses. Eggs are laid near the top of the plant, and the young larva as soon as hatched begins to eat its way downward through the hollow stem, enlarging this hollow as it descends. About the first week in August, it reaches a point in the stem even with the surface of the ground. On its way down, it leaves a trail of yellow dust, which has been mentioned



Fig. 2. Each straw shows the characteristic dust like material left by the larva as it descends the stem. The second stem from the left shows a larva (indicated by the arrow) in its natural position. (Somewhat enlarged). Photo taken August 6th, 1920. (Original.)

already. About an inch above the ground, it cuts off the stem and then plugs up the end of the short stub next to the root and prepares for wintering between the plugged end and the root. It remains in this position during the winter months. When warm weather comes again, it pupates, and along in June the adults begin to emerge and egg laying begins again for the new annual brood.

How to Control the Western Wheat-stem Saw-fly

Few farmers realize the amount of damage that is done by the Western Wheat-stem Saw-fly. Where the crop is moderately light, it is sometimes necessary to rake the stubble to get many of the bent and broken straws. Control measures are as follow:

(1) **Practice crop rotation.** The Saw-fly attacks wheat, rye, and barley only, among the grains. Oats, corn, potatoes, etc., are immune from attack. At least do not sow wheat after wheat and under no circumstances practise what is known as "stubbling in." The adult saw-flies are not strong on the wing, and they will not travel far from the fields where they spent their larval life.

(2) **Plow the stubble lands of infested crops to a depth of six inches.** Cover all stubbles so that the harrows will not drag them out when the ground is being worked in the spring. The plowing should be done any time between the first week of August and the end of May. The larvae live over the winter in the hollow bases of the stubbles, and when these are turned under that deep, the saw-flies are unable to emerge in early summer. Edges of fields where infestation is usually worst should receive especial attention from the plow. In case of spring plowing, the land should be worked and packed before the end of May.

The above suggestions on control deal with preventing attacks by the insect. Once the stems are infested, nothing can be done to prevent damage. Therefore, fight the Western Wheat-stem Saw-fly during the autumn and spring.



