

**CIHM  
Microfiche  
Series  
(Monographs)**

**ICMH  
Collection de  
microfiches  
(monographies)**



**Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques**

**© 1997**

## 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.

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 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:

- 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 discolourations 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

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

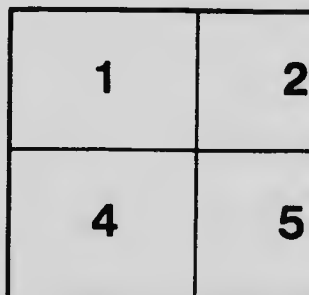
Library  
Agriculture Canada

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 sheet contains the symbol  $\rightarrow$  (meaning "CONTINUED"), or the symbol  $\nabla$  (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:

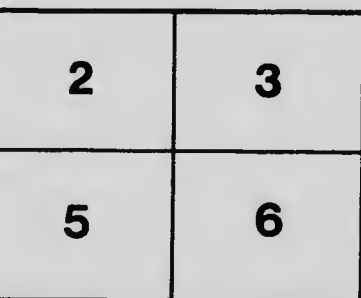
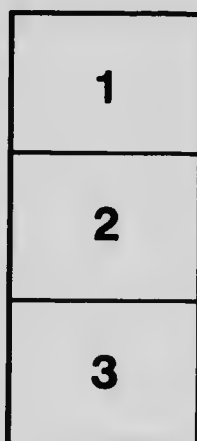
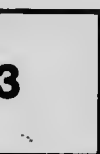
Bibliothèque  
Agriculture Canada

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 plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, 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.

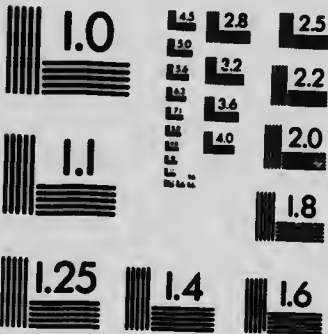
Un des symboles suivants apparaît sur la dernière image de chaque microfiche, selon le cas: le symbole  $\rightarrow$  signifie "A SUIVRE", le symbole  $\nabla$  signifie "FIN".

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**

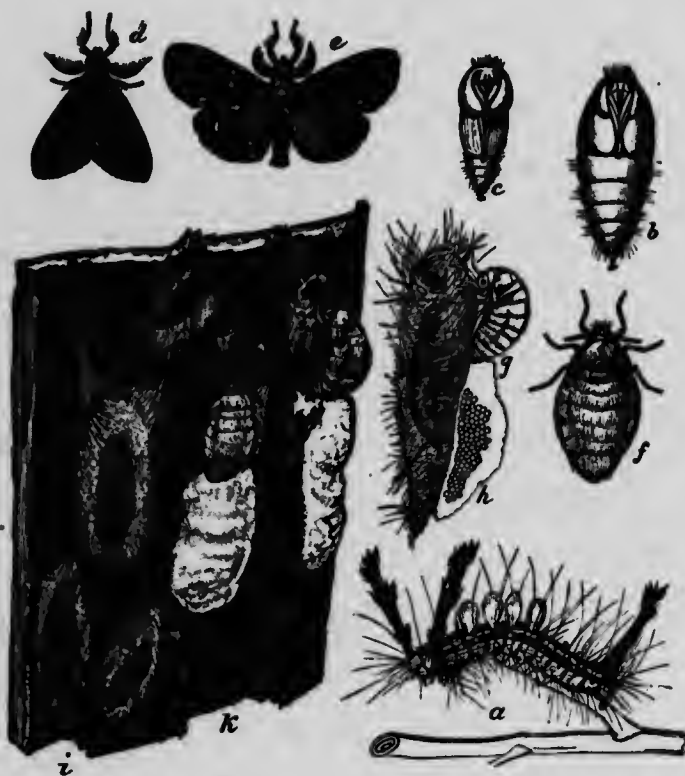
1653 East Main Street  
Rochester, New York 14609 USA  
(716) 482 - 0300 - Phone  
(716) 286 - 5989 - Fax

DEPARTMENT OF AGRICULTURE,  
NEW BRUNSWICK.

PUBLICATION NO. 34.

# TUSSOCK MOTH.

By WILLIAM MCINTOSH.



WHITE-MARKED TUSSOCK MOTH.—*a*, larva; *b*, female pupa; *c*, male pupa; *d*, *e*, male moth; *f*, female moth; *g*, female laying eggs; *h*, egg-mass; *i*, *k*, cocoons, all slightly enlarged. (After Howard, U. S. Dept. Agr.)

Hon. J. F. TWEEDALE, Minister of Agriculture,

FREDERICTON, N. B.

April, 1917.

630.4  
N534



# THE WHITE-MARKED TUSSOCK MOTH.

*Hemerocampa leucostigma* (Sm. & Ab.)

---

By WILLIAM McINTOSH.

---

IN New Brunswick at least three kinds of Tussock Moths occur. *Notolopus antiqua* (Rusty Tussock moth), *Hemerocampa definita* (Definite marked Tussock moth) and *Hemerocampa leucostigma*, (the white-marked Tussock Moth.) The two species first named are very generally distributed over the Province, but do not occur in sufficient numbers to cause great damage. The white-marked Tussock, while not so evenly distributed throughout New Brunswick, is a far more dangerous insect than either of the others. It seems to thrive best in towns, villages and thickly populated districts. It is claimed that the reason for this is the protection afforded by English sparrows, which drive away the native birds that formerly destroyed the caterpillars of this moth.

Halifax, Charlottetown, Montreal, Toronto, Hamilton and other Canadian cities have had serious outbreaks of this insect during the past few years, and in a great number of the cities and towns of the eastern United States it has been a veritable scourge. While its activities were more marked in the more populous centres, in 1908 very serious damage was done to the apple orchards in some sections of New York state, a number of growers estimating their loss at twenty-five per cent of the total crop. In the past ten years there have been numerous records of damage to fruit trees by this pest.

Lately, this insect has been increasing very rapidly in south-eastern New Brunswick, and last summer (1916) the Tussock caterpillars appeared in immense numbers in the City of Moncton and vicinity. Throughout the summer they did a great deal of damage to shade trees, and caused much inconvenience to citizens by swarming into houses and places of business. In one or two cases, families had to leave their homes to escape the caterpillars which could not be kept out of the houses.



### Life History and Habits.

This insect passes the winter in the egg stage. The egg clusters are conspicuous white masses, usually containing from one hundred to over five hundred eggs, covered with a hard frothy substance. The eggs hatch in late May or early June and the tiny caterpillars feed upon the soft tissue on the underside of the leaves. As they increase in size they eat holes through the leaf, and when full grown devour every part of the leaf except the main ribs. The larval stage lasts five or six weeks, the caterpillars casting their skins five times. When they are nearly ready to pupate, they sometimes crawl to a considerable distance, and in this way spread to other trees. When they occur in great numbers, after completely stripping the trees upon which they have been feeding, they migrate to nearby trees. These may be protected by banding, which is described under remedies. In July the caterpillars are full grown and ready to pass into the pupal stage. They form their cocoons on the bark of the trunk or large branches of a tree, although the cocoons may be found on fences, buildings, telephone poles, etc. The insects remain in the cocoon about two weeks. The male, upon emerging, flies off seeking for a mate. The female is wingless and therefore cannot fly; but while she can crawl a short distance, she usually remains upon the cocoon from which she emerged. She deposits her eggs on the empty cocoon and shortly afterwards dies. The difference between the male and female is well shown in the illustration. These insects do not eat in the adult stage.

**Food Plants.**—The white-marked Tussock Moth feeds upon a great number of deciduous trees and shrubs, including fruit trees.

**Distribution.**—It is found from Jacksonville, Florida, to Northern New Brunswick and Quebec, and west to Nebraska and Oregon.

**Description.**—The various stages of this insect are shown in the illustration. The full grown caterpillar (a) has a coral red head, a pair of long, black plumes over it, another tail-like plume at the end of the body, four yellowish-white spots or tussocks on its back, and just behind these two small retractile red tubercles. Along the back there is a broad, black band bordered by narrow, yellowish stripes. The sides are dark grey with a black line indicating the position of the breathing pores. Below this the body is yellowish.

The adult female is about five-eighths of an inch in length, grey and wingless.

The male has feathery antennae and a wing spread of about one and one-quarter inches. The wings are marked with several shades of grey and greyish-white.

The eggs, as already stated, are deposited on the empty cocoon and covered with a mass of white frothy matter which forms an effective protection for them.

## Remedies.

The most effectual methods of controlling this insect are (1) destroying the egg clusters; (2) poisoning the food of the caterpillars by spraying.

One of the most satisfactory and economical remedies for this pest is gathering and destroying the egg masses. In the United States, where this work is done on a large scale, the men use a smati hoe blade mounted on the end of a long pole. The egg masses are dislodged by means of this implement, carefully collected and burned (for if left on the ground they will hatch.)

Another method is to wet the egg masses on the tree with crude creosote by means of a sponge attached to a long pole. The creosote destroys the eggs and discolors the egg mass so that it is easy to distinguish the treated from the untreated eggs. This treatment is not effective unless the egg mass is thoroughly saturated with creosote.

As the little caterpillars hatch late in May or early in June the eggs should be destroyed before the middle of May.

While the above methods are advised for the suppression of these insects on the shade trees in towns, for the fruit grower spraying is preferable. A thorough spraying of the fruit trees with lead arsenate—three pounds to fifty gallons of water—will be found effectual; or better still, spray with poisoned Bordeaux mixture or one of the sprays recommended by the Horticultural Division. By applying early in June, the young Tussock caterpillars are destroyed along with other fruit tree pests which usually attack the trees at that time.

The female being wingless, the only way whereby this insect can spread is by the caterpillars crawling. Therefore trees which have been thoroughly cleaned or those near an infested area may be protected by a strip of loose cotton bound tightly around the trunk near the middle of the cloth, with the part above the string turned down; a band six inches wide painted on the tree with tree tanglefoot, or ordinary sticky fly-paper tied around the trunk also prove effective barriers.

**Natural Enemies.**—Fortunately, this moth has many natural enemies. In country districts the caterpillars are eaten by the birds, and in the egg, caterpillar and cocoon stages large numbers succumb to the attacks of parasites. It has been found that sometimes nearly ninety per cent are destroyed by natural agencies alone. If it were not for the efficient aid rendered by the birds and insect enemies of this moth, it could not be controlled and would cause wholesale destruction of trees and shrubs.





