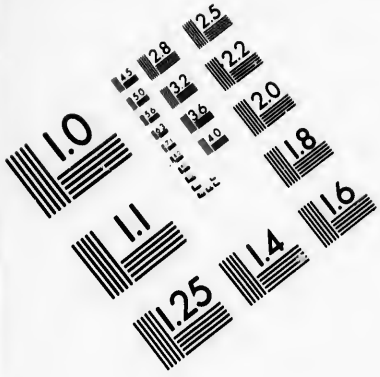

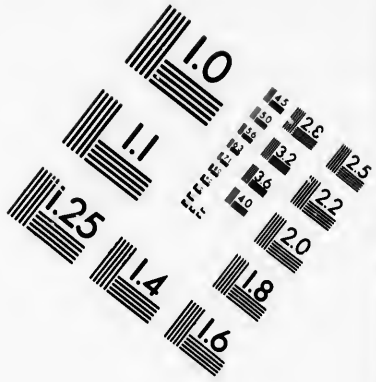

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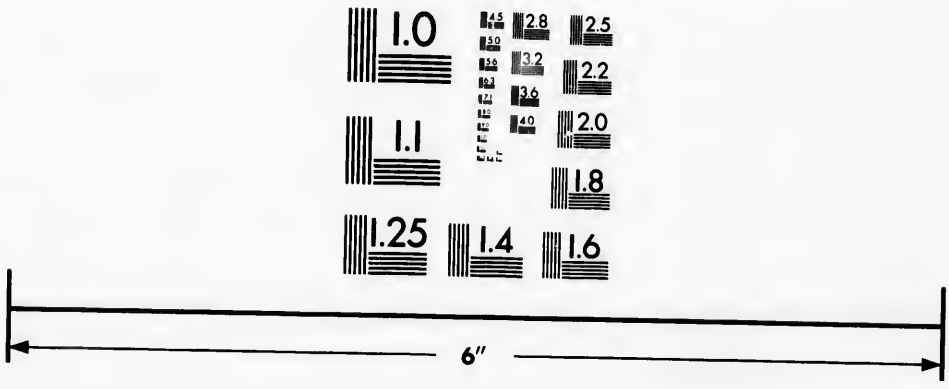

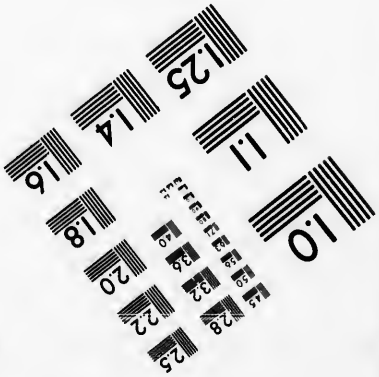

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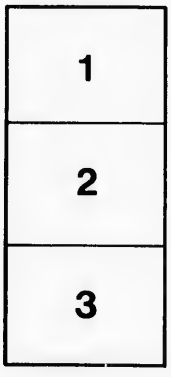

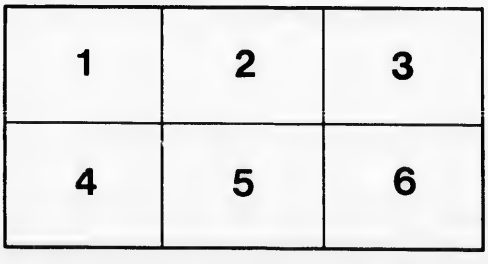

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DEPARTMENT OF AGRICULTURE

BRITISH COLUMBIA

CUTWORMS and GRASSHOPPERS

METHODS OF PREVENTION AND DESTRUCTION

EXTRACT FROM THE REPORT OF

R. M. PALMER, Inspector of Fruit Pests

TO

THE HONOURABLE THE MINISTER OF AGRICULTURE

1898-99

VICTORIA, JULY, 1900

CUTWORMS.

MOTH.

LARVA.

Cutworms, or Surface Caterpillars, the larvæ of Noctuid or Owlet Moths, are reported from all parts of the Province, especially destructive to garden and root crops, but also attacking fruit trees and plants and grain crops.

There are many different species of this family, and the parent moths vary greatly in size, form and colouring. Most of them are dull coloured, with obscure markings, and fly at night. The caterpillars of the different species vary also in their habits, but on the whole are very similar, being smooth, almost naked, grayish or brownish caterpillars, of some dull shade of colour similar to the ground in which they usually hide during the day. They are commonly night feeders, and not to be found during the daytime unless disturbed; but some species when they occur in large numbers, a periodic event, change their habits and feed by day as well, and when this is the case will often be found distributed all over the plants upon which they are living, or in holes which they have eaten in tomatoes, carrots, cabbages, etc.

The eggs from which cutworms hatch are laid by some species in autumn, by others in spring or summer, so that caterpillars of all ages and sizes are found at the same time.

Some of the species develop climbing habits to such an extent that fruit trees and bushes are attacked in their young shoots, foliage and fruit.

The following methods and remedies are recommended against these destructive pests, but judgment must be used in choosing those most adapted to the particular form of attack in any instance of their occurrence:

(1.) Preventive measures.—Clean culture by which all vegetation possible is removed upon which the caterpillars could feed in the autumn or which would attract the moths when they are egg-laying.

(2.) The banding or wrapping of the stems of freshly set out plants with rings of heavy paper or tin, as cutworms are unable to climb over smooth surfaces.

(3.) Poisoning the caterpillars with the following mixture is an excellent way of dealing with them in spring and early summer: One pound of Paris green to 50 lbs. of bran. In making the mixture it is advisable to dampen the bran slightly with water containing a little sugar, adding the Paris green gradually and stirring thoroughly together. If it is desired to use the mixture wet add more sugar and water, but better results are obtained when it is just moist enough for the Paris green to adhere to the particles of bran. Small quantities of the mixture should be placed at the base of the plants to be protected or along the rows. A convenient way of distributing this poisoned bran amongst crops which are grown in drills, is by means of a combined hand wheel hoe and seed drill. The seed-box should be filled with the mixture and lines of it dropped along the rows, close to the crop to be protected, in shallow furrows. Strange as it may seem this mixture appears to be preferred by the cutworms to living plants.

(4.) When cutworms appear in vast numbers, as they do periodically, and have assumed the day-feeding habit and are found distributed over the surface of plants indiscriminately, the

method of destruction requires modifying to suit the change of feeding habit. In this case a mixture of Paris green and flour, at the rate of 1 lb. to 20 lbs. flour, may be dusted or blown over the entire surface of the plant and will give good results. The mixture will adhere well if used before the dew is evaporated in the early morning, or after the plants have been lightly sprinkled with water. A convenient way of distributing this mixture is by means of the Leggett powder gun or the ordinary powder bellows sold by seedsmen. Or in place of the powder, a spraying mixture made with 1 lb. Paris green and 2 lbs. fresh slaked lime to 100 gallons water. The plants to be protected should be well covered with the mixture, applied with a fine nozzle on the spraying outfit, and care taken to keep the mixture well stirred or the poison will settle and not be equally distributed. In all cases it must be borne in mind that the poison requires to be eaten by the caterpillars to be effective, and thorough work is necessary in distributing it or many will escape.

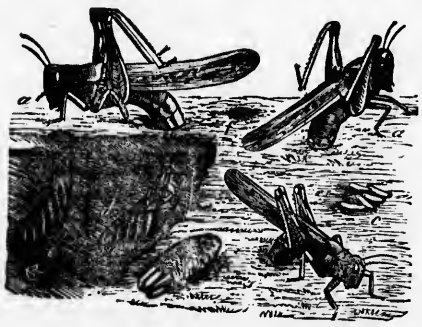
Cutworm Lion.

Natural Enemies.

There are two enemies of cutworms which deserve special notice and from the good service they do should be known by sight to every cultivator. They are the fiery ground beetle or cutworm lion (*Calosoma calidum*—Fab.) and the black wasp (*Ammophila luctuosa*). Both of these are desperate enemies of the cutworms, the former feeding on them in all of its stages; the latter digging them out and storing its nest with them as food for its young grubs.

Black Ground Wasp.

GRASSHOPPERS.



Grasshoppers or locusts (*Acrididæ*) are periodically troublesome in many portions of the interior, notably in the Kamloops, Ashcroft and Nicola valley sections, sometimes also on Vancouver island.

Bunch grass pasture lands and grain crops have been very seriously affected some seasons.

They are of several different species, the most common being *Camnula pellucida*, *Melanoplus atlanis* and a species of *Trimerotropis*.

Dr. Fletcher says: "The large amount of damage annually wrought by locusts is seldom appreciated. Their habits are to frequent grass lands, where a large proportion of the crop may

be consumed without making much difference in the appearance of the fields. It is only after hay is cut, or in seasons of unusual drought, that locust injuries are much noticed. If, however, their numbers at all times and their voracity are considered, it will at once be seen that they must every year destroy much produce. They do not develop wings until July, and previous to that they pass most of their lives low down among the stems of grasses."

Their eggs are chiefly laid in stubble fields or in the case of range lands in sandy or gravelly hillocks about an inch or so beneath the surface. They are very seldom laid in thick sod or in newly ploughed land. In the first case it is difficult for the female to form the chamber in which she lays her eggs, owing to the numerous roots of the grasses, and in the second case the chambers could only be made with great difficulty in the dry, powdery earth. The remedy, above all others, which has given satisfactory results is the ploughing down of the eggs; harrowing has been recommended but cannot be relied on. If farmers would plough infested stubble land either in the autumn or early in spring, the eggs which are laid within an inch or two of the surface are buried so deep that the young locusts when hatched are unable to emerge from beneath the soil, or if they do there is nothing on the surface of the ground for them to feed on so that they starve before they can travel by hopping to where there may be food for them. They are, of course, very small when they first emerge, and the sun during the latter part of May and early June is usually very hot, so that no insect that has to hop and is very small can go far before being destroyed by the hot sun or want of food.

Another remedy which has been successful in Manitoba, is to spread long rows of straw across fields where the young locusts are abundant. They gather in these for shelter and can be destroyed by firing the rows of straw at night.

In meadows and pastures we believe the use of the hopper-dozer the most practical plan that can be recommended. In many cases it can be used to capture these and the leaf-hoppers at the same time, especially if used when the grasshoppers are still quite small and can be held by a thin layer of coal-tar used on the simple flat sheet of iron. When larger they need a deeper layer of coal-tar, or a pan of water with a covering of coal oil on it. A cheap and simple plan for this purpose, costing from $1.50 to $2, was described many years ago by Prof. Riley. It consists of a strip of sheet-iron 8 or 10 feet long, turned up 1 inch in front and 1 foot behind, with pieces soldered in at the ends (or made of wood), and hooks placed in front at the ends for the attachment of ropes. If to run on high ground, it will be better to put runners 1½ or 2 inches high underneath. Into this put a layer of coal-tar half an inch deep, or water and kerosene. It can be drawn by a boy at each end, or by horse-power if preferred.

Against attacks on garden crops or orchards a poisonous mixture has been successfully used consisting of arsenic, sugar, bran and water, the proportions being one part (by weight) of arsenic, one of sugar, and fifty of bran, to which is added a certain quantity of water. The arsenic and bran are first mixed together, then the sugar is dissolved in water and added to the bran and arsenic; after which a sufficient quantity of water is added to thoroughly wet the mixture. Portions of this should be placed near the plants to be protected, and also on hatching grounds if these cannot be treated as previously suggested. This mixture seems to have a great attraction for locusts and they feed upon it greedily.

CAUTION—As Paris green is a very active poison to human beings and domestic animals when taken internally, care must be observed in using it.