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The Agricultural Experiment Station

FORT COLLINS, COLORADO.

GRASSHOPPERS.

THEIR HABITS AND REMEDIES.

BY C. P. GILLETTE.

The several injurious species of grasshoppers occurring in Colorado undoubtedly occasion heavier annual loss than any other single insect pest, not excepting the codlin moth. It is the object of this brief paper to give the most important information as to the habits of these destructive insects and the remedies that may be used against them.

LIFE HABITS.

All our specially destructive grasshoppers spend the winter in the egg state in the ground. The eggs are from about 3 to 4-sixteenths of an inch in length, cylindrical in form, yellowish white to yellowish brown in color and are deposited in compact masses of from about 20 to as many as 75 together. The females dig small holes to the depth of an inch or a little more with the stout ovipositor at the tip of the abdomen. The abdomen is then thrust in as far as it will reach and a gluey material is exuded and smeared over the inner wall of the little cavity making it firm. Then the egg mass is deposited and it is also covered with the gluey material which soon hardens and protects the eggs from excessive moisture and from being easily crushed. Egg-laying of some of the species begins about the first of August and continues until hard freezing late in the fall kills all the old females. As a rule, a single female deposits two packets of eggs.

The places most chosen by the females for the purpose of egg-laying are ditch-banks, the borders of fields and road

sides. The egg packets are also most often found about the roots of plants, as alfalfa, clover or weeds. If the eggs are at all abundant, a little digging about such plants where

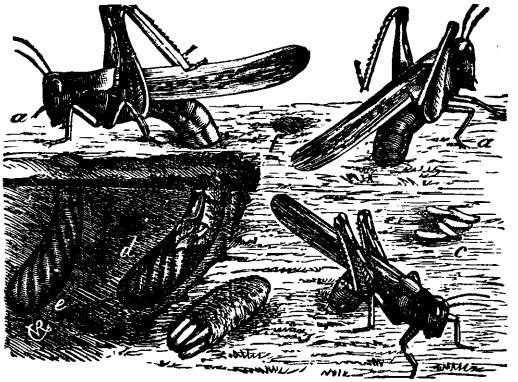

FIG. 1.—GRASSHOPPERS LAYING EGGS.—After Riley.

the grasshoppers were numerous in the fall will usually reveal them.

The eggs begin to hatch about as soon as vegetation starts in the spring and continue for several weeks, but the eggs of a single pod all hatch together. The young hoppers begin at once to feed upon such tender growing plants as are at hand various common weeds entering largely into their diet. When young and wingless, they are inclined to remain rather close to their place of hatching but as they grow they scatter about more and may become quite evenly distributed through a large field. The tendency to remain together in large flocks is more or less marked however, and particularly is this noticed late in the afternoon when they congregate along the borders of the fields and upon the fences to spend the night. So marked is this habit that where grasshoppers are abundant it is a common sight to see a strip from ten to thirty or more feet wide about the borders of an alfalfa field that is almost denuded of vegetation. Sometimes the grasshoppers do great damage by ascending trees and eating fruit and foliage and gnawing the tender bark from the twigs. Such injuries usually occur alongside an alfalfa or pasture field from which the grasshoppers have migrated.

REMEDIES.

There are many remedies that may be used to advantage against grasshoppers. Which is best to use in a given case depends upon circumstances. It may be best often to use a combination of remedial or preventive measures.

The best of all artificial remedies, where it can be used, is plowing deeply late in the fall or early in the spring, all the ground where the eggs are abundant. Even the young hoppers, when very small, may be turned under quite successfully in this manner and destroyed.

Where plowing cannot be resorted to, a thorough harrowing, especially with a disk harrow, will do much to destroy the eggs. Some will be crushed, others will be eaten by birds and still others will succumb to the freezing and thawing and drying when separated from the egg-mass. These remedies must be applied before the young hoppers hatch.

DESTRUCTION OF THE GRASSHOPPERS.

Burning.—When the grasshoppers are quite small and travel slowly, they may be killed along ditch banks and in other places where they are abundant by covering the ground with straw and then burning it.

Poisoning.—Young hoppers may also be poisoned in large numbers by thoroughly spraying the young weeds and other vegetation on the waste land where they are hatching in large numbers with any of the arsenical poisons, as Paris green, arsenite of lime, arsenate of lead, etc. The poisons should be used rather strong. Later, when the hoppers get into the crops, they may be poisoned quite successfully by the use of arsenic-bran mash. Mix a pound of Paris green or white arsenic with about 20 pounds of bran, moisten enough with water so that the particles will adhere together in a crumbly mass, and then sow broadcast where the hoppers are most abundant. Do not use this where chickens feed.

Bandages.—To keep grasshoppers out of trees, bandage the trunks with cotton batting or printer's ink or axle grease. If either of the last two named substances is used do not put it upon the bark of the tree but upon heavy paper which is first wrapped about the trunk. If the hoppers jump or fly into the trees, using poisonous sprays or driving with whips will have to be resorted to.

Hopper-dozers.—For open fields, the hopper-dozers, or catchers, are probably our best remedy after the grasshoppers have hatched. A cheap and simple form of hopper-dozer, which is probably as effectual as any, is shown at Fig. 2. The pan is made of sheet iron and the back is extended by means of upright stakes and a strip of muslin. In the pan is placed a quantity of kerosene or crude petro-

leum, or a small amount of water with oil upon the surface and the pan or dozer is then drawn over the field by hand or by means of a couple of horses kept well apart so as to collect the hoppers. If the horses are in front of the middle of the pan, many of the hoppers will jump out at the

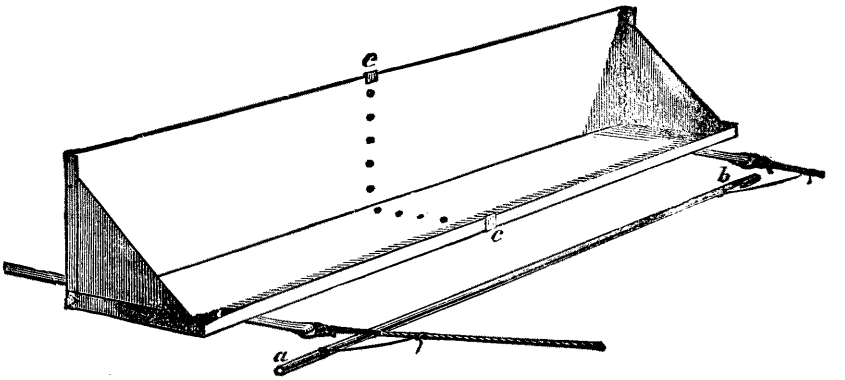

FIG. 2.—HOPPER-DOZERS.—After Riley.

sides and escape the pan. Every hopper that gets wet with the oil dies. Many will jump into the oil and jump out to die. When they become abundant in the pan, they should be thrown out.

Another type of hopper-dozer which is much liked by many who have used it catches the grasshoppers alive in a box. It is manufactured by a Mr. J. H. Behrens, Evans, Colorado, and costs about $12.00.

Grasshopper Diseases.—The African grasshopper fungus was experimented with quite extensively last summer in Colorado. nearly 400 tubes of the fungus being sent out to those requesting a quantity for trial. The station also used a number of tubes endeavoring to spread the disease among the grasshoppers about Fort Collins. There is very little evidence that the disease became destructive to the grasshoppers in any case where it was used. There is a native grasshopper disease that is generally distributed over the country which did kill great numbers of grasshoppers in nearly all parts of the state last year. It is a peculiarity of this disease that it causes its victims to crawl to the tops of plants to die. If this disease does not occur in a locality where grasshoppers are abundant, it might be well to obtain a quantity of the dead hoppers from this disease, crush them as finely as possible in water and sprinkle the decoction over the living hoppers and food-plants where possible, especially upon low ground, and just before dark.