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How to Control The Pale Western Cutworm

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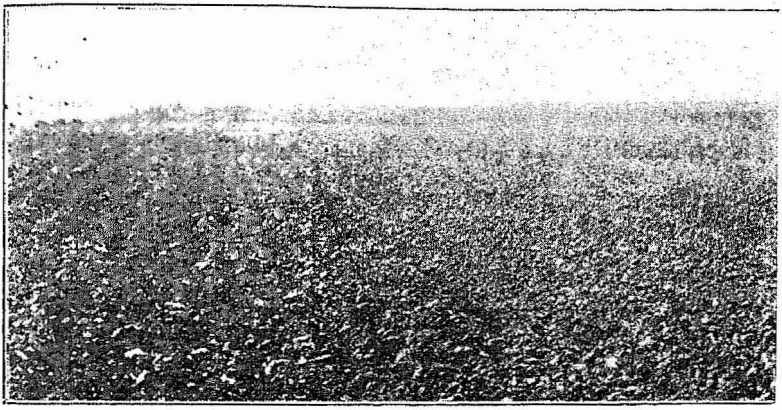

Proper summer tillage is one of the best means of control.

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In a Nutshell

(1) The Pale Western Cutworm is a dry weather insect, and can be expected to increase and do damage during the dry years in any or all parts of Montana east of the Continental Divide.

(2) This cutworm cannot be satisfactorily poisoned with the usual cutworm poisoned bait, as it works entirely under ground.

(3) This cutworm is usually active In the field from very early spring until late in June, preventing re-seeding in time to secure a crop.

(4) The moth lays its eggs between the first of August and the 15th of September.

(5) The moth prefers wheat stubble, weedy fields, and loose soil for depositng its eggs.

(6) Control is confined to cultivation methods.

(7) Plowless summer fallow is attractive for egg laying and should be avoided especially during dry years in infected areas.

(8) Clean summer fallow, left untouched between August 1 and September 15 is usually safe for the next year's crop.

(9) Early, deep, spring plowing completed early in May will kill the young worm and will turn under all green growth that serves as its food.

(10) There is evidence to show that seeding with a press drill will help materially to reduce damage if a field is infested with this cutworm.

The grower who stubbles in his crop; uses plowless summer fallow; has a weedy summer fallow, or continually works it between August 1 and September 15, **is inviting damage from the Pale Western Cutworm** especially in dry years in infected areas.

Any cutworm found in your fields in the spring should be sent by you or your county agent to the Department of Entomology of the Extension Service, Bozeman, Montana, for identification. Other cutworms can be controlled by use of poisoned bait, the Pale Western Cutworm cannot.

How to Control the Pale Western Cutworm

The Pale Western Cutworm was first observed doing damage to wheat in the Province of Alberta, Canada, in 1911. It caused serious damage there in 1911 and 1912. In 1915 the first specimens were sent in to this station from Brady, Montana. From 1918 to 1921 this insect increased in numbers throughout the plains area of Montana, doing a tremendous amount of damage to grain—amounting to more than $2,600,000.00 in 1920, and well over $1,560,000.00 in 1921. In 1920, an average of more than 30 per cent of the grain in the infested regions was destroyed, and in 1921, the loss was nearly 19 per cent. The distribution of this damage is shown in the following table:

	Per Cent Damage	
County	1920	1921
Broadwater	23.9	8.0
Cascade	35.0	30.0
Chouteau	30.7	10.7
Dawson	...	10.0
Fallon	...	12.0
Glacier	...	35.0
Hill	25.1	33.0
Jefferson	36.0	12.0
Liberty	47.1	50.0
Phillips	16.9	...
Prairie	29.0	7.0
Toole	50.0	33.0
Yellowstone	...	5.0
Average	30.4	19.9

Dr. W. C. Cook of the Montana Experiment Station has made an intensive study of Montana cutworms during the past eight years. The results of these studies soon will be published by the Montana Experiment Station in a bulletin entitled, "Field Studies of the Pale Western Cutworm."

The material in this bulletin of the Montana Extension Service is taken almost entirely from Dr. Cook's publication and is intended to present in a a brief way the best means of control so far discovered.

A Dry Weather Pest

Since 1921 the Pale Western Cutworm has almost entirely disappeared as an economic factor. However, as it is a dry weather insect, and outbreaks seem to follow seasons in which the total rainfall from May 1 to July 31 is less than four inches, it is expected that it will increase to serious proportions when dry years occur. This cutworm is capable of doing tremendous damage because of the way in which it works, i. e., following along the drill rows and eating a little from plants in its path, so that one worm will do much damage. An infestation of five worms to the square yard will do 50 per cent damage; ten worms to the square yard will destroy the entire crop, wheat, weeds, and everything, leaving the field as bare as a clean summer fallow.

The accompanying map (Fig. 1) shows where the Pale Western Cutworm is expected to appear during this season (1929) in

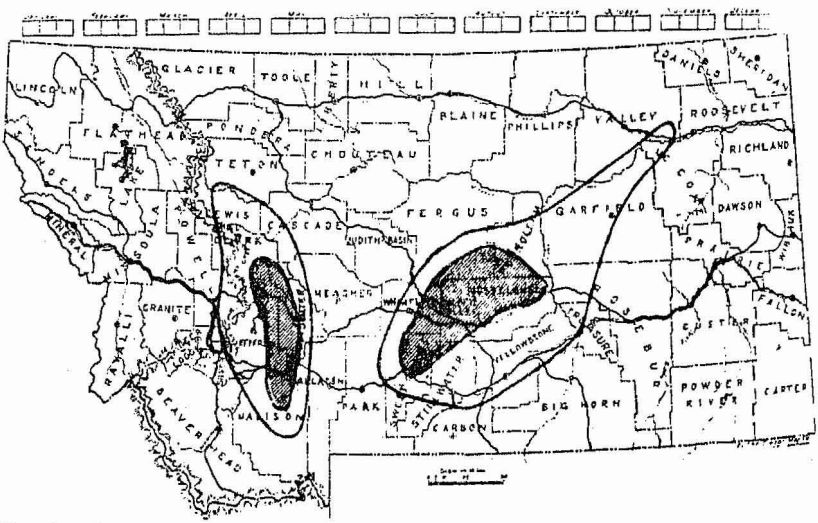

Fig. 1. A forecast showing area that is expected to be infested with Pale Western Cutworm during the season of 1929. The dark areas are those in which local damage is expected. The light areas surrounding these are where light local damage is expected.

sufficient numbers to do some damage. Similar forecasts on this and other insects will be issued each year as information becomes available.

Works Under the Ground

The Pale Western Cutworm is unlike most other cutworms in that it works under the ground and therefore cannot be controlled satisfactorily with the ordinary poisoned baits that are usually so successful in the control of other species. It is quite hardy and can survive a considerable time under adverse food con-

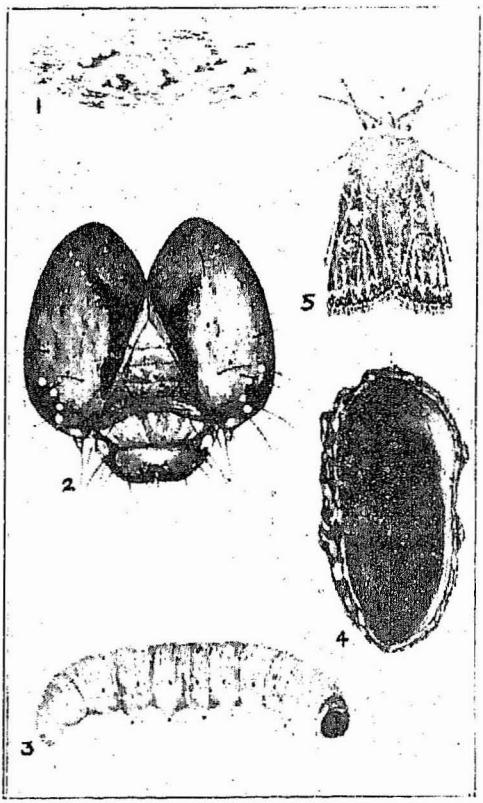

Fig. 2—
1. Eggs of the Pale Western Cutworm.
2. Head of a partly grown cutworm showing the characteristic marking of the head.
3. The larva or cutworm stage. These worms do not have a striped appearance like most cutworms but a rather uniform gray green color and a greasy appearance.
4. The pupa or resting stage of this cutworm in its earthen cell.
5. The adult moth.

ditions. It remains in the soil quite late in the spring, usually so late that there is not time after it has disappeared to reseed and mature a crop before frost.

This cutworm usually does not mature and leave the soil until some time after the 20th of June.

How It Lives and Acts

The fact that the Pale Western Cutworm remains active through the middle of June and in some cases to the first of July, distinguishes it from the common army cutworm which is always through feeding at least by the 15th of May. When the worms are through feeding they go slightly deeper into the soil, building about them earthen cells in which they go into the resting stage or pupate. The moths emerge from these earthen cells late in August and early in September, mate, and soon begin laying eggs. They usually lay their eggs in the stubble of recently cut grain fields and, when abundant, also in soft bare soil. The eggs remain in the soil during the winter and usually all are hatched by the first of May. This cutworm is a uniform slate gray or greenish gray, rather greasy or translucent in appearance, while most of the common cutworms have a more or less striped appearance. The head is a light brown or yellowish color. The fully developed worms are 1¼ to 1½ inches in length. The accompanying plate (Fig. 2) will give an idea of the appearance of the worms, the pupal stage and the moth.

Control by Cultivation

As has been previously mentioned, due to the fact that this cutworm works entirely under ground (see Fig. 3), it is extremely difficult to control, and poisoned bran mash, so effective against other cutworms, is practically useless. This worm remains active in the soil until after it is too late to re-seed to other crops, therefore control must be put into practice one season to become effective the following season. In other words, outbreaks must be anticipated or control practices must be incorporated in the regular farm operations every season. Due to this insect's habits, control is confined almost exclusively to cultural practices and there is enough evidence to indicate that with proper cultivation methods, damage from this cutworm can be almost entirely averted.

Control practices can be divided into three parts:

1. Cultivation that will make the soil unattractive to the moth when seeking a place to deposit its eggs.
2. Cultivation aimed at killing the young worm before the crop is seeded.
3. Cultivation that will make it most difficult for the worm to work in the field.

Checking Egg Laying

It has been found that the moth prefers wheat stubble, weedy ground and a loose, uncrusted soil for depositing its eggs. Therefore, these are conditions which should be avoided during the period the moth is out laying its eggs, which is from the 1st to the 15th of September.

Early spring plowing for summer fallow, preferably early in May, followed by frequent cultivations with such implements as

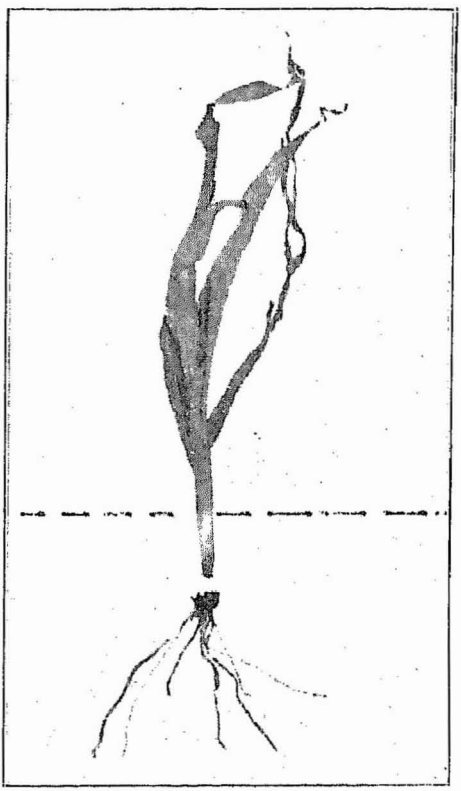

Fig. 3. A corn plant that shows the way this cutworm works. The dotted line indicates the surface of the soil.

the duckfoot weeder up to about August 1, is recommended as an effective means for the control of the Pale Western Cutworm as well as being an approved practice for proper summer fallow.

All cultivation should cease before the first of August, as this will allow any rain or moisture to produce a crust on

the surface. The cutworm moth prefers a loose soil and will usually not deposit many eggs in a crusted field, but will search elsewhere for more favorable places. Of course, stock should be kept off the field at this time because if they are allowed to run on a field they will break up this crust and the cutworm moth will find suitable loose soil in the edges of the foot prints.

A possibility in control which has not yet been proven but which seems well worth trying is trap cultivation. This could be

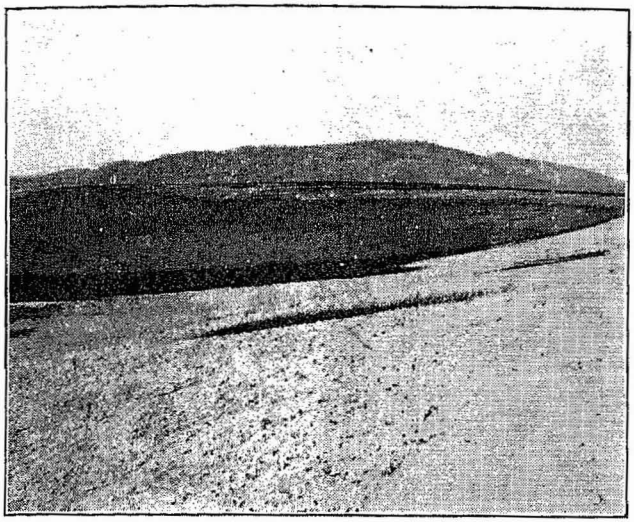

Fig. 4. What was once an excellent stand of wheat almost entirely destroyed by the Pale Western Cutworm.

done by leaving untouched a strip in a summer fallowed field about as wide as two drill widths, letting the volunteer grain and weeds on this strip grow, especially during the time the moths will be depositing their eggs (the 1st to the 15th of September). It seems reasonable that a great many moths that would be flying over the summer fallowed field would stop in this narrow strip to deposit their eggs. This strip should be harrowed at least once or twice about the first of September so that surface soil will be loose during the egg laying period. This, together with the presence of weeds, the old stubble and perhaps, some volunteer grain,

would furnish conditions most attractive to moths. These strips in the field should be plowed deeply as early as possible the following spring.

Stubble Must Be Turned Under

Plowless summer fallow, or any method of summer fallowing in which the stubble is not turned under, provides favorable conditions for the Pale Western Cutworm. Such systems of summer tillage have been developed in the state since the last serious Pale Western Cutworm outbreak and what the actual result will be can only be determined when the next outbreak occurs. The stub-

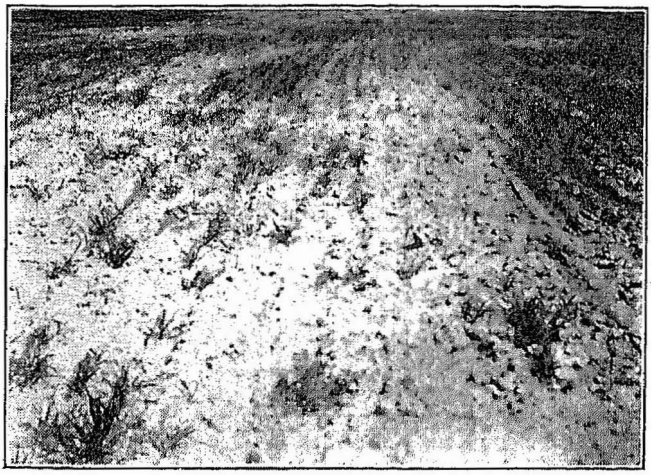

Fig. 5. Typical damage by Pale Western Cutworm.

ble on unplowed fields is more or less attractive to the moth in its search for a place to deposit eggs, catches the wind which keeps the soil surface continually loosened, and leaves a rough surface which does not readily crust over. This plowless summer fallow seems to be especially suitable for cutworm infestation. Growers would be wise to avoid this type of cultivation, especially during dry years and in areas where the Pale Western Cutworm is expected to increase. Much less damage has been done by the Pale Western Cutworm on clean, summer fallowed fields that are left untouched between the first of August and the 15th of September than under any other type of cultivation.

Cultivation to Kill Young Cutworms

Any grain stubble in an infested region probably will contain many eggs of the Pale Western Cutworm. Winter wheat stubble is attractive for egg laying and usually the spring wheat is just being harvested during the time the moth is laying its eggs. The work of the harvesting machines usually leaves the soil crust broken and adds to the attractiveness for egg laying. Thus, any land that is continually cropped is particularly susceptible to Pale Western Cutworm damage unless spring plowing is done as near the first of May as possible. This cutworm hatches very early in the spring, usually by the first of May while the temperature is still quite cool, and at first is quite tiny and not very vigorous. If good, clean, deep plowing is done early in May this tiny worm will be turned under the soil when it is quite cool and it can be killed before it can crawl near enough to the surface to secure food. Early plowing also destroys weeds and other plants which might serve as food for young worms. The earlier the plowing can be done, the better, but it should be completed not later than the 15th of May.

Worms Prefer Loose Soil

There is very little that can be done after the cutworm becomes active and starts its work beneath the surface of the soil. Various types of cultivation have been tried with little success. However, it has been noticed that this cutworm follows the lines of least resistance, that is, it will avoid the firmer parts of the soil. With ordinary seeding the drill row is usually freshly stirred and not as firm as the surrounding soil. The cutworm then finds it easy to follow along the row from one plant to another. When seeding is done with a press drill just the opposite is the case, i. e., the drill row is packed harder than the soil between the rows. A cutworm finds it easier to travel between the rows and is therefore directed away from the grain. It may occasionally cross a drill row and destroy a single plant as it crosses but it will seldom do as much damage as is the case where seeding is done with an ordinary drill.

By looking closely at Fig. 5 every drill swath can be seen. The rows in the edges of the drill that were packed by the wheels

show very little damage while the rows between the wheels that were unpacked were almost completely destroyed. This observation led to the idea of using the press drill which has proved that it will materially reduce cutworm damage.