

South Dakota State University  
**Open PRAIRIE: Open Public Research Access Institutional  
Repository and Information Exchange**

---

Bulletins

SDSU Agricultural Experiment Station

---

3-1890

## The Cut-Worm

I.H. Orcutt

*South Dakota Agricultural College*

J.M. Aldrich

*South Dakota Agricultural College*

Follow this and additional works at: [http://openprairie.sdstate.edu/agexperimentsta\\_bulletins](http://openprairie.sdstate.edu/agexperimentsta_bulletins)

---

### Recommended Citation

Orcutt, I.H. and Aldrich, J.M., "The Cut-Worm" (1890). *Bulletins*. Paper 18.  
[http://openprairie.sdstate.edu/agexperimentsta\\_bulletins/18](http://openprairie.sdstate.edu/agexperimentsta_bulletins/18)

This Bulletin is brought to you for free and open access by the SDSU Agricultural Experiment Station at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Bulletins by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact [michael.biondo@sdstate.edu](mailto:michael.biondo@sdstate.edu).

BULLETIN ROOM MINNESOTA  
LIBRARY, UNIVERSITY OF AGRICULTURE  
SOUTH DAKOTA EXPERIMENT STATION  
LIBRARY.

No. ....  
AGRICULTURAL COLLEGE

AND

EXPERIMENT STATION.

BROOKINGS, SOUTH DAKOTA.

---

Bulletin No. 18.

MARCH, 1890.

---

DEPARTMENT OF ENTOMOLOGY

---

THE CUT-WORM.

OFFICERS OF THE  
Experiment Station.

---

BOARD OF TRUSTEES.

A. B. SMEDLEY, President, Milbank. O. T. GRATTAN, Elkton.  
GEORGE MOREHOUSE, Brookings. JOSEPH HOLT, Esmond.  
L. H. BAILEY, Faulkton. JOHN M. ROPER, Parker.  
Gov. A. C. MELLETTTE, *Ex-Officio*.

---

STAFF.

LEWIS McLOUTH, Director.  
LUTHER FOSTER, Supt. of Agricultural Experiments.  
CHAS. A. KEFFER, Supt. of Forestry and Horticultural Experiments.  
I. H. ORCUTT, Entomologist.  
JAS. H. SHEPARD, Chemist.  
C. A. CARY, Veterinarian.  
C. J. COTEY, Stenographer and Accountant.  
ROBERT F. KERR, Librarian.  
J. M. ALDRICH, Assistant Entomologist.  
JAS. C. DUFFEY, Foreman of the Gardens.  
W. C. COPELAND, Foreman of the Farm.  
WILLIAM LAWSON, Herdsman.

---

Any resident of South Dakota can have bulletins of the Station mailed to him free by addressing a request to the Director at Brookings, South Dakota. Back numbers cannot generally be supplied.

Correspondence is invited upon any question relating to farm interests. Questions relating to farm crops or stock should be addressed to Professor Foster; questions relating to tree culture or to gardening should be addressed to Professor Keffer; questions relating to insects should be addressed to Professor Orcutt; questions concerning the chemical composition of soils or waters should be addressed to Professor Shepard, and questions about the diseases of animals and their treatment should be addressed to Dr. Cary—all at Brookings, South Dakota.

LEWIS McLOUTH, Director.

## Department of Entomology.

I. H. ORCUTT, Entomologist.

J. M. ALDRICH, Assistant.

The work of the department for the last year has been of two kinds. First, the attempt to keep in check the injurious insects of the farm, garden, and tree plantations. Second, such experiments and original investigations as could be made. The progress of events showed early in the season that cut-worms were among our worst enemies, and later reports as given further on, show them to be quite generally distributed through the State. They have, therefore, received as much attention as circumstances would allow. Notes more or less extended were made on various other pests in their season, but this group has been selected as our chief subject of study.

### CUT-WORMS.

To speak of the "cut-worm" in a general way may be intelligible enough to most people, but still it should be remembered that there are many species. Probably as many as twenty-five are found in our State, though about half a dozen species comprise a majority of the worms. While there is a general similarity of habits among these common species, it may yet be found that the differences which exist are sufficient to require widely different methods in the extermination of the worms.

**LIFE HISTORY.**—This topic was pretty fully discussed in Bulletin No. 13. As that is now out of print it is worth while to repeat that the worms are the larvæ of the plain brown moths (often called millers)

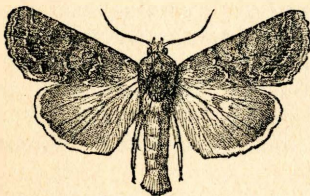


FIGURE 1.

which are so common about midsummer and later (Fig. 1), (*Agrotis devastator*). The transformation from the larval to the mature or moth stage takes place usually in July or August, though large numbers transform earlier or later. The moths lay eggs soon after appearing. In late summer and fall the larvæ, though they must have hatched, are exceedingly hard to discover. The interval between the maturing of the moths and the destructive activity of the larvæ the following spring remains almost totally unexplored by science. Only here and there a solitary observation is recorded, and some of these without the name of the species.



It is possible and quite probable that investigation will show that the common cut-worm moths lay their eggs indiscriminately upon whatever plant is convenient. Still the possibility of a valuable discovery in this line should not be neglected. It seems strange that these insects, which are among the worst pests all over the country, should not have been more fully studied. Probably the difficulty of finding the eggs is the chief reason. Our own efforts last year were quite unavailing, though we confined large numbers of the moths in a room with a variety of growing plants. The experience of the season was very useful, however, and will enable us to renew the effort with better prospects of success.

Other points in the habits of the worms have been somewhat elucidated by us in the past year. The distance the worms are able to travel is probably much underestimated, as would appear from the following circumstance. In the height of the cut-worm season last year nearly 500 specimens were placed in a soap box with some earth and a little food in a corner of the office. The box was one-third full of earth and was left uncovered. Next day a few worms were seen about the floor, and after replacing them the box was covered with netting. Two days later a broom standing in the opposite corner of the room happened to be picked up and several worms fell from it. An examination showed that forty-six worms had concealed themselves in it—nearly ten per cent. of those placed in the box twenty-two and a half feet away two days before. Most of them must have found the broom the first night, as the box was covered afterward.

The plants most injured at the Station were garden vegetables and young trees. Seedling boxelders were much troubled. A plantation of older trees from one to three feet high was also badly eaten. The worms climbed to the tops of the tallest trees, but it should be noted that this was on a plat of ground kept absolutely free from all other growth, so the worms had no alternative but to climb or starve. The trees were of several kinds and they selected elm, cherry, boxelder, maple, birch, and ash, but avoided the poplars, pines and larches. It was not at all uncommon to dig out twenty worms about the base of one little tree of any of the kinds injured, and in one or two cases over forty were found. One evening an examination was made with a lantern, about ten o'clock, and about half a dozen worms were found in each tree, eleven being the highest number observed. In the raspberry patch, where the cultivation was equally good, a single bush was found that night to contain thirty-eight worms, but the raspberries had been set two years, and so had much more foliage than the little trees.

The principal damage throughout the State was done to corn, but in our locality no complaint in regard to it was made, so we found no opportunity to study the worms in cornfields.

REMEDIES.—A great many remedies have been proposed, the majority entirely without reason. The worms cease their work at a certain period, being full grown, and any remedy applied at this time

is very likely to be thought successful, no matter how useless it may be in reality.

#### SOAKING SEED CORN IN BRINE OR COPPERAS SOLUTION.

This has been recommended by high authority but evidently without previous confirmatory tests. As field work in this department could not be commenced until the assistant was appointed, late in May, we could not give this remedy a satisfactory trial in the planting season. It seems certain, however, that its value is over-estimated. It is based upon the theory that the growing plant will absorb so much of the salt or the copperas that it will acquire a taste unpleasant to the worms—a theory contradicted by every botanical authority. Plants absorb only pure water and nutritive materials, with an almost imperceptible amount of mineral salts of a very few kinds.

#### PUTTING A TABLESPOONFUL OF SALT ON EACH HILL

has been recommended and several have testified that their corn so treated escaped while their neighbors' suffered. This would not be at all conclusive evidence, as it often happens that of two fields close together, one is infested and the other is not. The practical value of the measure is much to be doubted. While the salt might so permeate the hill that the worm would not burrow there, it would not affect a spot of very great size, and the worms would have to go only a few inches to find a spot free from it in which to burrow and pass the day. When the worms are once found to be in a field in the spring, they can be depended upon to stay right there until they mature or starve, and succulent corn sprouts above ground, will not be neglected by them.

#### WATERING.

In gardens conveniently located, it will pay to water regularly each evening. This serves a double purpose, promoting the growth of the plants and also making the worms less active and more disposed to disease.

#### COVERING THE GARDEN SPOT WITH LOOSE STRAW

and burning it off is no doubt often successful. The straw should be left on the ground sometime after the weather moderates in the spring, so that the worms will come up and hide under it.

#### STARVING

the worms will be the subject of further experiment this season. Two worms lived a month without food in one of our breeding boxes last summer. They made cells in the earth as if preparing to hibernate. When dug out at the end of that time they became active in a few minutes.

#### DIGGING OUT BY HAND

is not such a task as most people suppose, and yields immediate, positive results. Very little practice will make it rapid work. Four students in two and one-half hours dug out 4,300 in our apple orchard—about seven a minute for each person. They practically cleared of

worms an orchard covering two acres. Records equally as good were not uncommon about the gardens.

#### TIN PROTECTORS

may be made of old fruit cans. The ends can be melted off by putting them on a hot stove for a moment. A gardener near the Station had upwards of 1200 in use last season. He found that the worms sometimes climbed over by means of the paper labels which he had not taken the trouble to remove entirely from all the cans.

For use in the Horticultural Department we had tins made at a tin shop. They are two and a half by eight inches in size with a narrow lap at each end, forming a tube when the ends are bent round and hooked together. This is a perfect protector if properly applied. It should be inserted in the ground but slightly. In our experience the worms did not crawl under if the tube barely reached below the surface. Lumps close outside sometimes enabled worms to climb over, so care had to be taken to leave the earth smooth near the tube. The cost of the tins was seventy-five cents per hundred. They promise to be very durable, as they are required in the field less than two months and are then taken up and put under cover until the next year. If work is counted at its usual value, they are more economical than old fruit cans.

**PARASITES.**—The reports of eastern entomologists describes some parasites upon the cut-worm, so we wrote to the Station Entomologists of Illinois and Iowa, and the State Entomologist of New York, with a view to getting a shipment of worms and rearing the parasites for introduction here. The replies were uniformly unfavorable. The cut-worms are infested in those States to a very slight degree only, probably not more than they are here, as two or three cases came under our observation last summer, in which, however, we did not succeed in rearing the parasites.

**PREVENTIVES.**—This part of the subject requires much further study. At present we can do little more than indicate important fields for investigation.

The first requisite is more light on the subject of the eggs. If there is any particular kind of plant upon or about which the moth prefers to lay her eggs, the knowledge of the fact is of the very highest practical importance. The time for close observation and study is not in the spring when the worms are injurious. It is rather in late summer when the laying of eggs for the next brood is in progress. A man need not be a trained entomologist to assist in this work, though the habit of accurate observation will be useful.

The chief questions for investigation may be stated as follows:

1. Is there anything in the state of cultivation of a field, or the kind of plants growing on it, that determines whether eggs shall be laid there?

2. Will a crop, such as millet, which the worms do not like, and which effectually chokes out all other growth, leave the ground free from worms in the fall?



3. Is there any particular time of year at which plowing will destroy the worms, or lessen their numbers?

### CIRCULAR OF INQUIRY.

In order to supplement our own work with the experience of the farmers of the State, we issued last fall a circular of inquiry respecting cut-worms. It is much to be regretted that the large number sent out did not bring us more replies. Many counties were not heard from at all, and some others were represented by only a single answer. Evidently many of the recipients of the Station Bulletins do not appreciate fully the value of hearty and unanimous cooperation. However, the replies received were good, and are edited in a condensed form in the following paragraphs:

The amount of damage done was the subject of the first inquiry. The replies referred chiefly to corn, and we can make no attempt to estimate the damage to other crops, as they were referred to but briefly or not at all in the reports.

From reports which cover fourteen counties the average loss of corn appears to be twenty-one and one-half per cent of the crop. The worst section as far as reports show was Spink county, with Brown and Beadle next. R. J. Ladd, of Athol, estimates the loss of corn in Spink county at 3,000 acres, and other correspondents put it at one-third to three-fourths of the crop. From Aurora, Sanborn, and Hand counties reports of heavy loss were also received. Other counties reported less injury. From the estimates given, it appears that the total loss to the state did not fall far short of 60,000 acres, worth at the time probably \$250,000.

In response to the question, "Will cut-worms be found in a field next year after a clean kept crop of corn?" the tenor of the replies is strongly in favor of the negative. Some say "no;" others "think not;" others "think not so many." On this, as on all other questions, there are conflicting opinions. Until we know very much more about the habits of the insect, it will be impossible to make any positive predictions as to where worms will occur, and we shall continually find inexplicable cases.

Out of about sixty correspondents, only one had known the worms to follow a thrifty crop of millet. *This is an important point.* The value of the testimony is impaired somewhat by the fact that many had not raised millet, while others had not observed particularly.

In regard to the best time for plowing, the replies were exceedingly contradictory. Summer, early fall, late fall, and spring each had advocates, while each was condemned by one or more; so that it is impossible to draw a conclusion favorable to any particular season.

The crop preceding the cut-worm attack was usually wheat, but the number of times that oats were mentioned strongly indicates that they are more liable than wheat to be followed by worms.

The replies seem to indicate that corn after millet would stand



the best chance of being unmolested; while on oat ground it would have the poorest chance.

It is hoped that this Bulletin and the preceding circular will prove of value by pointing out to the farming community the true nature of the problem confronting them, and so direct investigation into the most hopeful channels.

In conclusion, we urge the importance of cooperating with the Station in this work. We are ready to answer all inquiries as far as our knowledge will permit. We need very much to learn all that the people of the State can tell us about the occurrence of the cut-worm, amount of damage done, methods used against it, and any observation that helps toward a full knowledge of its life history. *We want to hear from every farmer in the State.* No matter if you have only to say, "We never had cut-worms here." The sum total of knowledge is increased by your contribution. If you can't afford a letter, write a postal card. In all cases give address, including county. Don't confine yourself to the cut-worm question if other insects are troubling you.

#### COCOONS ON TREES.

We wish especially to procure from different parts of the State the cocoons of the large worms that feed on box elder, maple and other trees (Fig. 2). The cocoons are easily seen before the leaves start. In many sections they are full of parasites. In others the insects making them are nearly all healthy. If samples are sent us we can introduce the parasites in new localities and so destroy the worms. The cocoons should reach us by May 20th, in order that we may have time to reply before the insects commence to issue from the cocoons. Send by mail in a tin or wooden box, and write "from" with your name and address on the outside. We can judge by the contents of the cocoons whether it is advisable to send parasites. If we send them it will be without expense to the correspondent. He will place the cocoons we send among the trees infested, after which the parasites will be perfectly able to take care of themselves.

These large cocoons are made by the larvæ of the *Cecropia* emperor moth, which was described and illustrated in Bulletin No. 13.



FIGURE 2.