

MUCH DAMAGE TO CORN AND COTTON

Larvae of Beetles Feed on Underground Stems of Plants.

WIREWORM AND ITS CONTROL

Several Hundred Kinds of Beetles Found in Nearly All Parts of United States—Many Are Very Destructive.

(By EDMUND H. GIBSON.)
The injury by the corn and cotton wireworms is caused by the feeding of the wormlike young or larvae of slender beetles, known as "click beetles" or "snapping beetles," upon the roots, sprouts and underground stems of plants, which are thereby weakened and stunted or killed.

These wireworms have been known to totally destroy corn throughout fields of large acreage. However, this is not usually the case and the attack is most frequently concentrated in "spots" scattered throughout the field, the plants in these spots being wholly destroyed. In other parts of the field there may be slight injury as shown by the dwarfed appearance of the plants, which may later produce 50 per cent or more of a normal yield.

The wireworms are ravenous feeders, often cutting off all the roots of a plant. They are especially destructive during the two months before they transform to adults. A single half-grown wireworm is capable of killing a young corn sprout and severely injuring a plant from six to eight inches in height. Therefore it can be seen that when there is a concentrated attack by many wireworms in one hill the plants have but small chance of surviving.

The parent of the corn and cotton wireworm is a small dark brown click-beetle, or "snapping-beetle," measuring about one-fourth of an inch in length. The young wireworms, or larvae, after hatching from the eggs are minute, measuring from an eighth to three-sixteenths of an inch in length. All stages of the insect are spent in the ground except the adult or beetle, which only enters it at the time of egg deposition.

Reports show that the corn and cotton wireworm has been destructive in the Carolinas, Illinois, Missouri, Arkansas and Mississippi. This would indicate a wide distribution, probably a wider one than the mere records reveal, and it is possible that the species may occur throughout the entire eastern half of the United States. Its occurrence is closely related to the distribution of soils of light, sandy type, as it is known that the immature stages exist only in such soils. Occasionally an adult has been collected several miles from sandy locations, but



Corn and Cotton Wireworm—*a*, Adult Beetle; *b*, Larva.

Its presence there was more than likely due to its own flight from the field of its origin. In some localities this species is referred to as the "sandy-spot wireworm."

Corn plants infested by this wireworm become wilted and stunted, with leaves of a bluish shade, brown at the tips, which stand out from the stalks stiffly instead of bending over gracefully as in a healthy plant. Deprived of most of the roots through the work of the larvae of this wireworm, the plant can be pulled up with little effort. Weak plants soon succumb, leaving gaps in the rows, but the more vigorous plants put forth new roots in abnormal numbers. These are matted together and distorted, and although the plants survive, only "nubbins" are produced. The infestation is not confined to the impoverished areas, for there may be larvae among the roots of tall and apparently healthy plants. Rolling land infested by this insect presents a patchy appearance, the sandy knolls standing out distinct and bare, although overgrown later with weeds, particularly crab grass, briars and morning glories. For a long time there was a theory among farmers that lightning caused the injury to corn which is now rightly attributed to this wireworm.

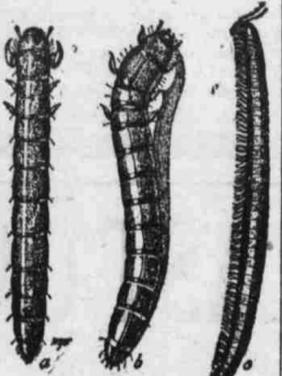
In the case of cowpeas, the fibrous roots suffer most, the thicker roots being perforated, so that the plants become yellow and dwarfed, and fall to vine.

Cotton is injured in the early stages by larvae boring into the seed and injuring the very young plants, checking the growth so much that the plant dies or struggles along only to produce little or no cotton.

Beetles of the corn and cotton wireworm are abroad in the fields from early June until the last of August. The eggs, which are laid in groups of from three to twenty in the soil about the roots of corn, cowpeas and other food plants, are deposited, for the most part, during late June and July. These hatch in from eight to eleven days into the young wireworms or larvae, which immediately commence feeding upon the roots. Each full-grown larva constructs a small earthen cell in the soil and in this it changes to a pupa. The pupal stage averages 12 days in length and during this time the pupa is almost motionless and takes no food. After this it transforms to the adult or beetle.

The larvae, or wireworms, feed upon the roots of their food plants throughout the summer months and up to about the first of October, and during this time are found within 18 inches of the surface of the ground, the depth depending upon the moisture content of the top soil. During a hot, dry spell the wireworms remain from 12 to 18 inches below the surface, but after a rain they can be found within two inches of the surface.

With the approach of cold weather they begin a general downward move-



Larvae Likely to Be Mistaken for Wireworms—*a*, False Wireworm; *b*, Mealworm; *c*, Thousand Legger.

ment, which accounts for the farmer's inability to locate them during the late fall and winter months. They have been found in the sand at the remarkable depth of five feet. From these facts it will be seen that fall or winter plowing would be useless as a control or remedial measure.

As soon as winter breaks up, the larvae gradually make their way to within two to three feet of the surface. By the middle of April they are numerous within six inches of the surface of the ground. From the time the larvae travel downward in the fall until they return to the top soil they eat practically nothing. In laboratory experiments, larvae remained alive and healthy in cages of moist pure sand, without organic food, for six months.

Late fall and winter plowing as a method of reducing the numbers of the pest by turning up and exposing the larvae to the elements is of no value, as the wireworms are at this time at such depths in the soil that they would not be disturbed by the plowing. Plowing or cultivating for this purpose at other times of the year is of little avail, as the wireworms are so quick of movement that almost as soon as exposed they are again hidden in the loosened soil. Even chickens or turkeys are not sufficiently alert to catch many.

Any system of crop rotation after harvesting the corn may be carried out, and a winter cover crop such as wheat or rye is advised. Pasturing this during winter months and turning it under in the spring is very beneficial, since humus is thus added and the sandy soil is thereby stiffened. An infested field should not be planted to corn two years in succession.

If a catch crop of red clover can be obtained it is an excellent one to come in the rotation for two or three years. Such combinations as wheat and clover not only afford two crops a year from the same field, but also permit the soil to remain undisturbed during the period when the female beetles are laying their eggs.

The manuring of infested areas has long been recommended as the best control measure. The theory was advanced, especially by some farmers, that the manure turned under is actually distasteful to the larvae and kills them outright. Although this is not the case, nevertheless the turning under of manure and cover crops has the effect of adding humus to the top soil; and, as it is known that the larvae cannot long survive except in sandy soils, it is well to spread as much manure as possible on infested areas and to turn it under.

If it were practicable to allow the infested fields to lie idle, or "lay out," as it is termed, for a period of three years, this would no doubt prove the most effective means of getting rid of the pest, since by leaving the ground undisturbed a crust would be formed on the surface through which the majority of adult wireworms could not emerge. It would also serve to prevent the few emerging adults, as well as those flying in from other fields, from entering the soil for egg deposition. However, this practice naturally will not often appeal to the farmer.

CANADA THISTLE PEST

Prickly Plant Is Found in Almost Every Part of Country.

No Other Weed Has Ever Received So Much Unfavorable Attention.—Roots, Rather Than Tops, Must Be Destroyed.

In the states north of the Ohio river, probably no plant bears such a bad reputation as does the so-called Canada thistle. This marvelously prickly plant abounds in grain fields, pastures, and meadows throughout the central West, and is locally common in the northeastern states. It is found in parts of West Virginia, Kentucky, and Missouri, and of late years has been increasingly troublesome in the grain-growing sections of the Northwest. Canada thistle, or simply "thistle," has been condemned in the laws of 25 states, and at least one hundred local communities, no other three plants together having received so much unfavorable attention. Certainly no plant is more generally and heartily disliked, unless it be the sand bur of the southern coastal plain.

The cause of the remarkable vitality of Canada thistle and the point that distinguishes it from other prickly plants that are commonly mistaken for it is the long cordlike perennial root. This root penetrates the soil at



Canada Thistle.

a depth of eight to fifteen inches, or more, and gives rise at frequent intervals to leafy shoots. Thus it will often be found that an entire patch of thistles is attached to one root, and is in reality but one plant. The root is exceedingly hardy, and can live over winter or through a prolonged drought in a dormant condition. Pieces of the root that are broken off by a plow or cultivator and carried to other places will await a warm, moist period, and then begin to send up leafy shoots, thus establishing a new patch forthwith. If the leafy stems are cut down, others will be sent up to take their place, and this process may be repeated from two to eight times before the root becomes exhausted.

The point that must be kept in mind in fighting Canada thistles is that it is the roots, rather than the tops, that must be killed. Simply cutting off the tops a few times has much the same effect as pruning an apple tree. But if the tops are cut off deep and frequently, the root must eventually succumb through lack of leaves.

BETTER PRICES FOR PRODUCE

Bringing About Improved Methods and Closer Attention to Scientific Growing of Crops.

Better prices for farm products are bringing about better methods and closer attention to the scientific growing and handling of crops and soils, according to A. N. Brown, editor of Fruit Belt, who declares that the first and fundamental step is to know soils and to know what elements of fertility should be supplied to aid growing crops. If care be not taken to keep the soil supplied by the addition of manures and fertilizers, the yields become smaller each year, but when the soils are managed properly the fertility is maintained and productivity is increased.

BREEDING FOWLS ARE CHEAP

Possible to Purchase Birds Now for Half What They Will Cost Next Fall or Winter.

Many breeders are giving special value on their breeding birds at this time of year and if you are in need of a good cock bird, a hen or two or a pen for breeding next year or for exhibition this fall or winter you are overlooking a good bet if you do not buy now. The same quality along in December will cost you double.

SYSTEM OF FEEDING CALVES

Animals Should Not Be Fed Together Any More Than Bunch of Pigs—Fix Individual Stalls.

Skim milk calves ought not to be fed together, any more than a bunch of hogfish pigs, for some of the calves soon learn to gulp down their share of the feed, then crowd others away from theirs. Individual stalls or booths form the only correct system of feeding the skim milk calves, so that each one will be assured of its portion.

CULL ALL DEFORMED FOWLS

When They Reach Marketable Size Fatten and Sell Them—Keep Them Free From Vermin.

Handle the chicks, and market deformed birds as soon as they are of market size. Crooked backs, hip joints of unequal height, crooked toes, long beaks, combs with side springs, duck feet, off-colored eyes and a pronounced tendency to off-colored feathers cannot readily be detected without handling the birds. It is well to sew a band of red flannel, or mark with colored paint the legs of birds destined for the early market. A dab of paint on the wing bow is also good. Let these birds run with the others till about the size needed, and then pen and fatten. Many a sale can be made at the door if the chicks are cooped and ready. Keep them free from lice and growing every day, but get rid of them quickly.

DESTRUCTIVE TO THE SWINE

Scours in Pigs More Feared Than Outbreak of Cholera by Prominent Nebraska Hog Breeder.

Scours in pigs is declared by one of Nebraska's prominent hog raisers to be more destructive to the swine industry of the state than hog cholera. The causes are overfeeding, change in feed, decayed feed, lack of exercise, or dirty water. Sometimes filth in pens and bedding is an additional cause when it is taken into the pig's system from the sow's udder or from the navel. The college of agriculture says that the correction of these conditions is the first measure to be adopted, and that in case scouring has started, the sow's feed should be cut down to a small amount of oats or bran. When the trouble is corrected, the ration should be increased gradually.

CONTROL OF CABBAGE WORMS

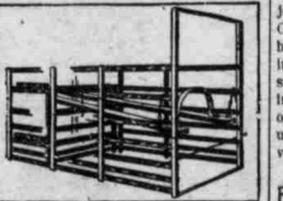
Mixture of Air-Slaked Lime or Wood Ashes and Powdered Arsenate of Lead Is Favored.

Dust a mixture of one or two parts of air-slaked lime or sifted wood ashes and one part dry powdered arsenate of lead through a cheesecloth bag or apply with a blower. Apply while plants are wet with the dew, after each hard rain or once every week or ten days during the season of attack. Paris green can be used with 15 times its bulk of lime or ashes. A week or two before using the cabbage quit applying the poison, as a precaution against getting any appreciable amount of the poison in the portion of the cabbage eaten as human food. Practically all of the poison is removed in stripping the outer leaves. No one need be afraid to use this treatment.

OREGON HOG-BREEDING CRATE

Device Shown in Illustration Can Be Made With Little Cost by Man Handy With Tools.

Effective mating of swine, especially where young sows are mated with old and heavy boars, is a point too often overlooked in hog raising. The Oregon breeding crate shown here can be made with little cost by anyone handy



Hog-Breeding Crate.

with hammer and saw. The crate should be well made of strong material, however, as it is necessary to restrain the sow, hold her in an accessible position, and take away all danger of injury to the boar through slipping.—Farming Business.

FEEDING OF MOLTING FOWLS

Material Adaptable for Eggs Will Also Make Feathers—Some Oily Food Is Necessary.

The feed of molting hens should not differ greatly from that of laying hens. Both eggs and feathers are rich in nitrogen, so a food adaptable for eggs will also make feathers. However, the latter are richer in oil than eggs are, and some food of oily nature should be added to this ration to supply this want.

It has been conclusively proved that a liberal amount of sunflower, flaxseed or oil meal to the ration makes hens molt faster and leaves them in a stronger condition and with more vitality.

FAULTY SYSTEM OF FARMING

Cows Would Conserve Fertility of Soil and Convert Feed Into Food Products for Market.

One of the faults of our system of farming is that there are too few cows on farms. More cows would mean more wealth. The cows would save the wealth (soil fertility) that we already have and would convert our feed and pasture crops into food products for home use or for sale. Who ever heard of a dairyman or a farmer with several cows forced to mortgage his crops for supplies?

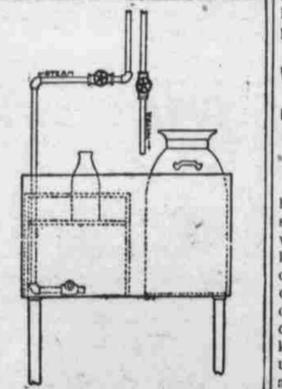
KILLING MILK BACTERIA

No Objection to Pasteurization When Properly Done.

Seems Probable That Within Few Years Supply for Large Cities Will Be Thus Treated—Three Processes Now in Use.

There is no valid objection to pasteurization when properly performed, and the process makes safer even the most carefully handled and inspected milk. It seems probable that within the next two years a large proportion of the milk supply in the large cities will be pasteurized. There is already a marked tendency in this direction.

Before the value of pasteurization as a hygienic measure was as well recognized as it is today, it was practiced in secret by a number of milk dealers as a means of preserving milk and preventing it from souring. Its commercial value in this respect is undoubtedly great, but its chief function is the destruction of disease-producing organisms. Proper pasteurization should destroy about 90 per cent of all the bacteria in the milk, although when the bacterial count of the raw milk is low the reduction may be somewhat smaller. The efficiency of the process, it is pointed out, cannot



Sink Arranged for Pasteurization of Milk.

be based on the per cent, but rather on the character of the bacteria destroyed.

The kinds of bacteria that remain alive after pasteurization depend on the temperature to which the milk is heated and the species of bacteria which are in the raw milk. Three processes of pasteurization, known respectively as the flash process, the holder process and pasteurization in the bottle, are now practiced in this country. In the flash process the milk is raised quickly to a temperature of about 160 degrees F. or more, held there for from 30 seconds to a minute, and then cooled quickly. In the holder process the milk is heated to a temperature of from 140 degrees to 150 degrees F. and held there for half an hour. When pasteurization in bottles is practiced, the raw milk is put into bottles with water-tight seal caps, which are immersed in hot water and held for from 20 to 30 minutes at a temperature of 145 degrees F. In this way the pasteurized milk is not subjected to any danger of reinfection. On the other hand, the seal caps must be absolutely tight and this involves increased cost. In general, it may be said that the holder process is coming into greater favor than either of the others. This process permits of the use of lower temperatures which, for various reasons, is highly desirable.

RATE OF SEEDING FLAX CROP

Where Rainfall Is Not More Than Twenty Inches Twenty Pounds to Acre Is Recommended.

Where the annual rainfall is not more than 20 inches, flax need not be sown at a greater rate than 20 pounds to the acre. This should be reduced to 15 pounds under drier conditions. Where the rainfall is more than 20 inches, a slightly higher yield may be obtained if 25 pounds are sown to the acre. The sowing of more than 25 pounds to the acre on nonirrigated land does not pay.

SHALLOW PLOWING IN FAVOR

Loose Soil Conserves Moisture—Kills Weeds and Puts Land in Much Better Condition.

Water moves slowly through a loose soil and a loose soil will, therefore, serve as a mulch and conserve moisture. This is one of the reasons for shallow cultivation. Killing weeds, putting the land in better physical condition and furnishing modes of entrance for oxygen and nitrogen are other reasons. Failure to cultivate properly is one way of farming at a loss.

PAINT IS GOOD INVESTMENT

It Is Necessary if Life of Building Is to Be Considered—Apply Often as Required.

Paint is not a luxury to be added to the building some time in the future—perhaps not until decay has taken place—it is a necessity if the life of the building is to be considered, and is a profitable investment that should be made as often as the farm buildings require it.

USING WHEAT FOR HOG FEED

Information of Much Value Obtained in Experimental Work Carried On at Missouri College.

(By L. A. WEAVER, Missouri Agricultural Experiment Station.)
The Missouri agricultural experiment station has obtained information of value to pork producers, especially in seasons when the corn crop is short, by carrying on experimental work with other crops grown on the farm. By conducting feeding trials with wheat it has been shown that under some conditions wheat may well be used for hog feeding instead of corn. Results obtained show that when corn is worth 70 cents or more a bushel, wheat may be profitably substituted for corn, if the wheat is worth 90 cents or less. Likewise if corn is worth 80 cents per bushel, wheat is worth \$1.03 a bushel as hog feed.

It has been further shown that pork may be produced more cheaply by adding a small amount of tankage to a mixture of corn and wheat than by feeding these feeds without such a supplement.

For example, the cost of producing 100 pounds of pork with corn and tankage was 60 cents less than when corn alone was used. This would mean an additional profit to the producer of \$100 or more on each carload of hogs fed.

The results of these tests are reported in full in Bulletin 136 entitled Feeding Wheat to Fattening Hogs, published by the Missouri agricultural experiment station.

WHITEWASH ABOUT THE FARM

Recipe Given by Nebraska College of Agriculture—Great Help in Destroying Insects.

For general use about the farm buildings to assist in destroying insects, the following recipe for whitewash is offered by the Nebraska College of Agriculture: Slake five quarts of lime with hot water to about the consistency of cream. To this add one pint of zenoleum or some other coal-tar product, and one quart of kerosene. Dilute with about its volume of water; apply with a brush or a pump. This solution when properly applied accomplishes three things: (1) Zenoleum acts as a disinfectant by killing disease germs; (2) the kerosene aids in destroying mites; and (3) the lime whitens the house.

METHOD FOR CLEARING LAND

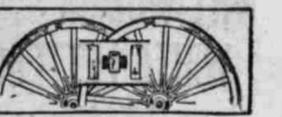
Combination of Blasting and Stump Pulling Is Favored at University of Wisconsin.

As a result of experiments with stump pullers and dynamite working together on the university's demonstration tour, the University of Wisconsin has discovered that the best method of clearing land is a combination of blasting and stump pulling. The stump puller people admitted that time, labor and money could be saved by first loosening the stumps by blasting before pulling them, and the powder men admitted that a similar saving could be effected by having a stump puller complete the job after a comparatively light charge of powder had done its preliminary, preparatory work on the stump.

KEEP WHEEL FROM RATTLING

New Process Provides an Expander Bolt for Purpose Which Is Fitted Into Wheel Rim.

A new method has been devised to stop a buggy or wagon wheel from rattling. Instead of having the blacksmith remove a tire and shrink it on again to compress loose parts, the new process provides an expander bolt for



Screw Keeps Tire Secure.

the purpose. A section of the felly is cut out in order to give necessary room for this expansion. With a tire already in place, the bolt is turned, forcing the wooden rim tight against the outer steel hoop. As a result all looseness in the rim is taken up.—Popular Mechanics.

OVERFEEDING ON GREEN FOOD

Proper Cure for Bloat Is Incision With Trocar to Permit Accumulated Gas to Escape.

Hoven or bloat is a drumlike swelling of front hip, left side, the result of overfeeding on green food or wet clover. The proper cure is an incision with a cattle trocar, relieving the accumulated gas. If the disease is not properly and promptly attended to your cow will die.

KEEP WATCH ON THE CHICKS

Don't Let Them Crowd in Brood Coop—Few Minutes Time May Save an Entire Brood.

If your chicks are still in the small brood coop, you must watch them when the hens begin to leave, as they are apt to crowd into one coop and lose an entire brood. A few minutes each evening may mean many dollars profit or loss, according to the value of your chick.