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BIRDS WILL CHECK WIREWORM'S DEPREDATIONS.

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Cultural Methods Recommended to Combat These Pests Which Damage Wheat, Cotton, and Other Crops.

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Washington, D. C. Birds are probably the most important factor in restricting the depredations of wireworms, according to the U.S. Department of Agriculture's new bulletin (No. 156) "Wireworms Attacking Cereal and Forage Crops." While this bulletin is a "professional paper" and goes into great detail regarding the life history and habits of these pests, it also suggests a number of practical methods for checking or eradicating this menace to such crops as wheat, cotton, and corn.

Among the birds that are known to feed on wireworms (either the larvae that do the damage or the adult beetles) are the following:

Bobwhite	Ruffed grouse	California quail
Flicker	Crow	Cowbird
Mourning dove	Whippoorwill	Bobolink.

Beside the above, certain hawks, cuckoos, woodpeckers, phoebes, fly-catchers, jays, blackbirds, orioles, and sparrows, help the farmer in protecting his grain from the undesirable wireworm.

While the wireworms, when they do most of their damage are merely grubs measuring from one-half inch to over three inches in length, they are more readily recognized when grown into adult beetles. These beetles are known in certain localities as "click-beetles," "skip-jacks," "snapping beetles," etc. These names are all derived from the beetle's habit of snapping the fore part of the body when placed upon its back or held between the fingers. The worms that do the damage are usually yellow or reddish-brown with three pairs of short legs near the fron of the body.

The term wireworm is sometimes misapplied to the larva of another group of beetles. The meal-worm, which feeds upon stored products in warehouses and granaries, is one of these false wireworms. The beetles of this group of insects do not snap the forepart of the body as do those of the true wireworm.

The true wireworm, economically, is one of the five worst pests that attack Indian corn. It is amongst the twelve worst pests attacking wheat and oats. With the exception of the cotton and corn wireworm, these insects begin their attacks immediately after seeding time, when they attack the seed, eating out the inside and leaving only the hull. When they are very numerous they often consume all the seed, making reseeding necessary, and in severe outbreaks a second reseeding is sometimes made before a stand is obtained. Aside from the extra labor and cost of the seed, this delays the planting of the crop, and if it be corn, in the Northern States the season is too short to mature so late planted a crop and, except for the fodder, it is a failure. Where wireworms are present, even in very small numbers, corn will make a poor stand, which will necessitate the planting-in of missing hills. In some regions where these insects are quite numerous it is customary to sow three or four times the amount of seed that would normally be necessary in order to get a good stand.

Cultural Methods of Value.

The only remedies which have actually proved to be of practical value in combating any of the wireworms are cultural methods. Even these in a number of cases have not proved entirely satisfactory; however they are preferable to such apparently ineffective means as endeavoring to kill the adult beetles by poison baits, drying the seed to prevent its being eaton by the insect, or the introduction of poisonous substances into the soil.

The wheat wireworm measures, when full grown, about an inch

in length and it is about as thick as the lead in a pencil. Its adult is a small brown beetle only about one-quarter of an inch long. This is the most common wireworm of the northeastern and middle-western States.

The wheat wireworm is normally a grass feeder, living on the roots of sod, and with the abundance of its natural food supply producing no appreciable disturbance in the meadows, but when the sod land is broken these wireworms concentrate in the drill rows or hills of corn, the usual crop to follow sod in the eastern United States, and often produce absolute failure of the crop by destroying the seed and eating off the roots of such plants as may germinate. This species is usually more destructive, therefore, on land recently broken from sod.

To combat the wheat wireworm, the Department's specialist recommends plowing sod land immediately after the first hay cutting, usually early in July, when the land is intended for corn the following year. This land should be cultivated deeply throughout the remainder of the summer. Land that is in corn and badly infested should be deeply cultivated even at the risk of slightly "root-pruning" the corn. This cultivation should be continued as long as the corn can be cultivated, and as soon as the crop is removed the field should be very thoroughly cultivated before sowing to wheat. In regions where wheat is seeded down for hay any treatment of infested wheat fields is precluded. Where wheat is not followed by seeding, the field should be plowed as soon as the wheat is harvested.

Thorough preparation of the corn seed bed and a liberal use of barnyard manure or other fertilizer will often give a fair stand of corn in spite of the wireworms, a vigorous plant often being able to produce roots enough to withstand the depredations of several wireworms.

The wireworms that attack corn and cotton are not hard and wiry as are most of the tribe, but soft and elongated. When full grown these grubs are about an inch in length but scarcely thicker than pack thread. Unlike most of the eastern wireworms, which are usually most destructive in damp, low-lying fields, these insects seem to be far more numerous on the higher parts of the fields in light sandy soil. These wireworms are among the most troublesome species of the southern United States. Investigators are, as yet, unable to recommend definitely, any cultural method but it is probable that something in the near future will be shown to be effective.

The dry-land wireworm, which at present seems to be confined to certain retions in Washington and Oregon, may be destroyed by the following practice:

(1) Disk or drag harrow the summer fallow as early as possible in the spring, in order to produce a dust mulch and thereby conserve the accumulated winter's moisture; (2) continue disking as often as is necessary to maintain the dust mulch and keep down the weeds; (3) plow the summer fallow in July or early in August, and immediately drag; (4) plow the stubble as soon as the crop is off.

As these worms are of three different ages in most infested fields, and as only about one-third of these will be in the pupal stage each year, it is evident that the first year of this practice will not show startling results. However, if the practice is continued for a couple of years it will undoubtedly reduce the number of these pests very considerably. Aside from its beneficial results in killing insects, this method of handling the land will materially reduce the weeds. Early disking merely softens up the soil and allows all the weed seed present to sprout, and the entire crop of weeds is subsequently destroyed by the summer plowing. By the present method of farming the weed seeds are turned down to such a depth that many can not germinate, but lie dormant and sprout whenever they happen to be brought to the surface by subsequent cultivation. One crop of weed seed is in this manner often a pest for several succeeding years.

A slight variation of these suggestions will readily adapt them to the more humid sections inhabited by the inflated wireworm,

which occurs throughout most of the northern United States but seems limited as a pest to cereal crops in certain parts of Washington, Oregon, and Idaho. The inflated wireworm is only about one-half inch long and pale yellow in color

Other wireworms of less importance but known to attack vegetables, alfalfa, etc, are described in the new bulletin.

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