

United States Department of Agriculture Special Page

Bulletins and Special Articles Issued by the Government, of Interest to the Northwest; Suggestions Covering a Wide Range of Activities; Results of Federal Investigations, Etc.

Birds Check Wireworm's Menace

BIRDS are probably the most important factor in restricting the depredations of wireworms, according to the United States 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, flicker, mourning dove, ruffed grouse, crow, Whippoorwill, California quail, cowbird, bobolink. Besides the above, certain hawks, cuckoos, woodpeckers, phoebes, flycatchers, 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 front of the body.

The term wireworm is sometimes misapplied to the larva of another group of beetles. The mealworm, 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.

One of Worst Pests.

The true wireworm, economically, is one of the five worst pests that attack Indian corn. It is amongst the 12 worst pests attacking wheat and oats. With the exception of the cotton and corn wireworms 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.

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.

Combatting Wheat Wireworm.

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.

Destruction in Northwest.

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

(1) Disc 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 discing 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 discing 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 cannot 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.

Long Runs by Speedy River Steamers Past

THAT river traffic in the United States is now generally local and long runs by through fast steamers a thing of the past is shown by an investigation of water transportation in this country which the United States Department of Agriculture has just completed. The report, published as Department Bulletin 74, "Inland Boat Service," deals in particular with freight rates, time of transit and length of routes.

A few hundred miles, the investigator found, is usually the maximum run for any steamboat, one of 400 miles or more being more exceptional. On only 25 of the 102 routes for which this information was available, was the average rate of speed over 10 miles an hour and on 37 it was less than six. An average of 10 or even six miles an hour amounts to 75 or 100 miles in a night's run, which is a good rate of speed for local freight traffic.

In connection with the freight rates the investigator paid particular attention to their relation to the farm price of various products. This was found to vary greatly with the character of the goods. For example, on a 25-mile route in Maine the rate for a barrel of apples was 15 cents while the average farm price was \$1.725. The freight rate in this instance was thus 8.7 per cent of the farm price. In the case of cotton traffic in the South this percentage ranged from 0.9 to 3. Eggs varied still more, the per centage ranging from 0.5 to 10. Because of its great bulk hay was frequently charged from 10 to 40 per cent of its value on the farm. With wheat the range was from 3 to 15 per cent.

On the Pacific Coast an important system of waterways consists of the rivers emptying into San Francisco Bay, and here there is a rich truck region which is not conveniently reached by rail, but is comparatively easy of access by boat. San Francisco, Sacramento and Stockton are the principal centers for this traffic. A second Coast system consists of the Columbia River and its tributaries. From Portland steamers run down the Columbia to Astoria and up as far as Celilo Falls. Above the Celilo Falls other boats reach points on the Upper Columbia and Snake Rivers.

Farmers Assist in the Foot-and-Mouth Fight

THE recent lifting of the foot-and-mouth quarantines from large areas previously closed and the modification of the quarantines in still other sections has been made possible, Federal authorities say, by the co-operation, not only of the various state officials, but of farmers and stockmen themselves. Where this co-operation has been most in evidence, progress in the eradication of the disease has been most rapid. The Federal authorities have, of course, control over the movement of livestock in interstate commerce only; the local quarantines are established and enforced by the state. Their efficiency depends in great measure upon the willingness of the people to submit to the necessary restrictions.

The people not only observed the quarantine regulations, but they did all in their power to expedite the work of slaughter. In many cases they had the ditches in which the animals were to be buried dug and waiting for the killing gangs. As a rule no objection was taken to the appraiser's valuation of the condemned stock, which is the more surprising in view of the fact that so little was generally known of the seriousness of the disease. The farmers did not want to part with their stock. They saw that the sore mouths and feet grew better and they had had no experience with the after effects of the pestilence—the constant aborting, the failure to produce milk, the ability to disseminate disease months after the visible symptoms had disappeared. Nevertheless they accepted the situation, helping instead of hindering.

In only a very few cases was there any attempt to conceal the existence of the disease; in fact, public opinion was so strongly against this that it was practically impossible to do so.

Some folks are always ready to join the procession no matter whether it is bound or how dusty the path.

Boy Champion's Potato Pointers

A 15-YEAR-OLD member of the Department of Agriculture's and Utah's Agricultural College Potato Club has raised a crop of potatoes valued at \$187.77, on one-half acre. His net profits were \$141.07. This is the best record of all the Utah potato club boys this season, and as a result, Howard Dalton, of Willard City, Utah, the champion, is to be given an educational trip to California at the time of the fair.

Although the year was not quite so good for potato production as usual, young Dalton made a record which has probably not been exceeded more than a dozen times in that district, and then only by Merle Hyer, and the potato champion club adult experts who had studied and put into practice the most advanced methods of farming. As others who grow potatoes on irrigated land may be interested in this boy's achievement, below is the story in his own words of just how he did it, which may be of value to potato growers not only in Utah, but in the irrigated sections of Colorado, Idaho, Washington, California, Wyoming, Montana, Nevada, Arizona, New Mexico, Kansas and Nebraska. Here is the story:

The Story.

In the early Spring of 1914 I bought my seed potatoes at Burley, Idaho. I purchased the Idaho Rural potatoes. They were not especially selected seed, therefore I was very careful in preparing the seed for planting. I was anxious that every seed piece had one or two perfect eyes on it. I then treated the seed with a formaldehyde solution (one pint to 30 gallons of water). This treatment consisted in soaking the seed (before cutting) for two hours in the prescribed solution. The purpose of the treatment was to kill any scab germs appearing on the surface of the potatoes. Other than this there was no treatment given.

From March 20 to March 30 I prepared my land. I covered the ground with barnyard manure, using eight tons of wet manure to the half acre. I plowed the land 12 inches deep, using four horses for the work. I immediately followed the plow with a spring-tooth harrow. I harrowed it three different times. I did the plowing in the forenoon and followed with the harrow in the afternoon. I did this to conserve the moisture and mellow the soil. After harrowing I pulverized the clods by dragging up the soil with a square-framed timber. I tried in every way to be particular about every phase of cultivation, as I figured that the secret of my success was good cultivation.

Five days later, on April 5, I again went over the land with a spring-tooth harrow. The following week I again

went over it with a spiked-tooth harrow, which kept the soil moist and mellow. Just before planting I went over it again with the square timber in order to make it perfectly level. On April 15 I planted the seed in plowed furrows four inches deep and the rows 30 inches apart, the seed being dropped about 12 inches apart in the rows. The seed was then covered about four inches deep with a small hand plow.

As soon as the little plants appeared above the ground I began my work on the field. I at once freed the field of weeds by giving it a thorough harrowing with a spike-tooth harrow. This I did May 5, and repeated the same treatment on May 12. On May 26 I used the hand cultivator, drawn by one horse, giving them a thorough cultivation with this implement, after which I cultivated them once with the hand hoe, cleaning out all the weeds.

Watching Growth.

During all the time I was working in my potatoes I watched their growth very carefully, as I was warned about the appearance of plant diseases and insect enemies which might appear to injure the plants. Fortunately, as far as I was able to detect, neither plant diseases nor insect enemies appeared, as the growing plants had such a strong, thrifty appearance.

Up to June 15 the plants had grown rapidly and gave a strong, vigorous appearance. Soon after this date they began to blossom, and on June 25 I gave them the first application of irrigation water. I irrigated them on July 5, and again on July 20. The crop was matured with but these three applications of water. After the second irrigation the vines were so large that I could not work in them without destroying them.

The operations practically ceased from this time on until the tubers were ripe and ready for digging. I sent a selected 50 pounds to the State Fair, which was held at Salt Lake City October 3-10, for which I received honorable mention by the judges. On October 13, 14 and 15 I harvested the crop and the potatoes were weighed and sold right from the field. I found, on careful checking of the weights, that my half acre had produced 360 bushels of marketable potatoes, the equivalent of 720 bushels per acre.

The following table will give the itemized cost of production, with the net profits per half acre:

Value of crop.....	\$187.77
Cost—	
Value of manure.....	\$ 2.00
Spreading manure.....	4.00
Plowing.....	1.00
Harrowing six times.....	1.50
Leveling.....	1.00
Cost of seed, 450 lbs.....	5.20
Planting seed.....	2.00
Cultivating two times.....	1.00
Irrigating three times.....	1.50
Weeding once.....	1.50
Harvesting.....	18.00
Rent on land.....	8.00
Total cost.....	\$ 48.70
Profits.....	141.07