

# SOME SUGGESTIONS CONCERNING THE CORN ROOT WORM.

(*Diabrotica longicornis*), Say.

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The Corn Root-worm has done no small amount of damage in Iowa, during the past few years, though for the seasons of 1887 and 1888, its injuries have doubtless been less appreciated owing to the general prevalence of its better known and more generally destructive associate, the Chinch Bug.

Occasional reports, however, show that the territory invaded by it is gradually extending and, unless proper means are adopted there is danger of a very general destruction of our staple crop from its ravages.

In 1884 I published, in a college bulletin, an account of the insect, its habits, and the method to be adopted for its suppression, largely collated from the report of Prof. S. A. Forbes, of Illinois, where the insect had operated very destructively. Since that publication, I have observed the insect both here and in other parts of the state, but these observations only serve to confirm the conclusions already reached, and in the following statements I lay no claim to originality, but believe the importance of the insect to the farmers of the state, is sufficient to justify a restatement of the essential points in its history.

The following condensed statement of the life history of the insect is quoted from the report of Prof. Forbes, 1st Annual Report, State Entomologist of Illinois, for 1882, pp. 30-31.

"The corn root worm, in the form in which it effects the roots of corn is a slender white grub, not thicker than a pin, from one-fourth to three-eighths of an inch in length, with a small brown head, and six very short legs. It commences its attack on the root in May or June, eating its way beneath the surface, and killing the root as fast as it proceeds. Late

in July or early in August it transforms in the ground, near the base of the hill, changing into a white pupa, about .15 of an inch long and two-thirds that width, looking somewhat like an adult beetle, but with the wings and wing covers rudimentary, and with the wings closely drawn up against the body. A few days later it emerges as a perfect insect, about one-fifth of an inch in length, varying in color from a pale greenish brown to bright grass-green, and usually without spots or markings of any kind. The beetle climbs up the stalk, living on fallen pollen and upon the silk at the top of the ear, until the latter dries, when a few of the beetles creep down between the husks and feed upon the corn itself, while the other resort for food to the pollen of such weeds in the field as are at that time in blossom. In September and October, the eggs are laid in the ground, upon or about the roots of the corn, and most of the beetles soon after disappear from the field. They may ordinarily be found upon the late blooming plants, feeding as usual upon the pollen of the flowers, and also to some extent upon the molds and other fungi, and upon decaying vegetation. The insect hibernates in the egg, as a rule, and does not hatch until the ground has been plowed and planted to corn in the spring, probably in May and June."

"Although the adult beetles, when numerous, do some harm by eating the silk before the kernels are fertilized by the pollen, and also destroy occasionally a few kernels in the tip of the ear, yet the principal injury is done by the larvæ in its attack upon the roots. The extent of this injury depends not only upon the number of the worms, but also upon the soil and weather and the general condition of the crop, being worst on high land and in dry weather."

In this state the greatest injuries have occurred in the southern and south-eastern portions.

As early as 1882 it attracted attention in some of the southern counties and reports sent to me with specimens of the insect indicated a considerable amount of damage. In the years 1884-5 it caused considerable loss in Linn and adjoining counties where I examined its operations. The adult form has been observed in this locality in limited numbers but sufficient to warn cultivators against the practice of keeping corn year after year on the same land. Of late we have heard of it in northern and western localities and there is reason to believe that it is generally distributed over the state and only needs opportunity to rapidly increase and cause serious damage.

It is apparently quite free from natural enemies of all kinds, and its increase and decrease, regulated in great degree by the method of farming generally followed in any community whether of a succession of corn on the same land or frequent rotation of crops. When the insect was at its worst, the agricultural papers of the state quite generally urged the recommendation of change in crops for land that had been some years in corn and was infested with the insect, and we have yet to learn of a case where rotation has been resorted to without the desired result.

Since the eggs are almost universally deposited in the ground around roots of standing corn, during September and October and do not hatch until the following spring and, moreover, as the larvæ do not seem able to subsist on the roots of other crops, it is readily seen that if the old corn field is planted to some other crop the young must perish of starvation and if the practice is adopted throughout a community, the next generation of the beetles must be greatly depleted. The newly hatched worms are very delicate minute creatures and are unable to make any migration in search of food, so there is perfect safety in planting corn on land that has been in some other crop, directly along side or within a rod of the old corn field.

Having shown that the insect is within control, it remains only to urge all who may read these lines to adopt in every case where there is the slightest indication of its presence the necessary plan and urge its adoption on all the farmers of the locality.

Indeed, the rotation of crops is practiced generally by intelligent farmers for other considerations and by so doing they have unconsciously kept in check an insect that would otherwise almost certainly have ravaged their fields to an extent hard to realize.

The intelligent adoption of the same plan in a concerted movement of the cultivators in a corn growing locality should result in the most decided advantage, and having such an effective and applicable method at hand it only rests with the farmers themselves whether they are to be sufferers from this pest year after year or not.

Inasmuch as the rotation of crops implies in many cases a transfer from grass to corn, it may be in place to speak of another worm which has during the last few years caused much damage to corn when planted on sod land. I refer to the root web-worm or sod worm, the full history of which I presented in my Reports to Prof. Riley for 1887, and which was,

published in the annual report of the Commissioner of Agriculture for that year. I have here shown that injury to corn may be avoided if the sod is plowed early in the fall or late in spring. In the latter case it should be before the first of June and after the maturity of the bulk of the worms, about the first week in May. If this is kept in mind it may save much vexation in loss of corn or in time and labor necessary for replanting. (For full description of habits and remedies for this insect see Report of Entomologist in Annual Report of the Department of Agriculture for 1887, pp 154-160).