fast being devoured. Lupins seemed to be the favorite and not one was left. The beetles seemed to be drunk with the nectar for they stuck to the flowers and we could easily cut the stock and drop it in a pail of kerosene. We caught hundreds in this way. Later, in the afternoon, they seemed to have taken flight. There was a flight of about 300 on June 12, eating lupin, roses, syringas, iris, etc., eating the flowers and not the foliage. They appeared suddenly, over night. There was no special wind or other climatic conditions noticed. They were exterminated by hand and after a heavy rain at night none appeared next day."

The other Stockbridge correspondent, on June 23, wrote: "Three days ago I found these beetles eating the roses in the garden. They lighted, half a dozen or so, on one rose and devoured it rapidly. They were either so sluggish or so hungry that they were easily caught and the gardener drowned several hundred in an hour. Since then I have seen only a few scattered individuals. They seem tenacious of life, as specimens have lived three days in a box.

During the last ten years it has been of interest to note that the insects named by the New York State Entomologist in any year as attracting attention, were also as a rule, those receiving similar attention in the Connecticut report of that year, and it was usually safe to expect their presence in Massachusetts the following year. It would almost seem as though most of these cases of increase in abundance originated to the west, and reached Massachusetts from that direction. This has sometimes been so marked that the western end of the state would show an unusual abundance of some pest which the following year extended its injuries into the eastern end of the state.

The above is of course, only a generalization, but it has nevertheless occurred so often as to attract some attention.

INJURIOUS INSECTS OF 1911 AT TREESBANK, MANITOBA

By NORMAN CRIDDLE

The season of 1911 had few surprises for the economic Entomologist and the injury done to crops and other vegetation was chiefly due to the continuous, or increased abundance of insects commonly met with the previous year. The most important of these are depicted in the following notes.

Insects Injurious to Grain and Grasses

Hessian Fly, *Mayetiola destructor*.—Infested spring wheat plants were gathered on May 17, being injured chiefly below the ground. The larvæ at this time were small and difficult to detect. On June

16 adults began to emerge from the above mentioned plant and continued to do so for about a week afterwards but owing to lack of time and unsuitable breeding cages, I was unable to carry them farther.

In the past it has always been supposed that the Hessian fly was single brooded in Manitoba, but from the above observation there is strong reason for suspecting otherwise. I believe that eventually the life history will prove to be somewhat as follows: Adults appear from over wintering pupæ in early spring as soon as the first spring wheat shows above the ground upon which they deposit their eggs, this attack being confined to young plants. The insect reaches maturity about the second week in June, varying of course, with the seasons, and soon after lays its eggs upon stemmed plants from which we have the commonly noticeable breaking down of the stems in late July. Larvæ of this generation reach the pupal stage in August to appear as flies the following spring. Much of this surmise has already been partly worked out.

Injury to grain from Hessian fly was difficult to estimate owing to the similarity of attack to the lesser wheat-stem maggot. It does not, however, appear to have been extensive and very little damage was done by the, presumably, second brood.

The Lesser Wheat-stem Maggot, *Oscinis soror* (?).—There are probably few insects that are so persistently injurious to spring wheat in Manitoba as this. Damage is done by it every year and occasionally to such a large extent as to cause extensive depredations amounting in some instances to twenty per cent. Whole fields will have a patchy appearance as if the grain had failed to germinate properly. An observant person, however, will at once detect the withered plants showing, perhaps a single green leaf remaining, while others will be entirely killed. When dug up plants look as if they had been pinched or chewed near the roots.

The flies appear in the early spring when plants have made but one or two leaves. Eggs seem to be laid singly or occasionally in pairs close to the ground and the larvæ after hatching, at once work their way downwards below the ground where they remain. There is another generation in June and perhaps yet another in late autumn attacking volunteer wheat and some of the grasses, though I was unable to secure flies by sweeping after June. Adults were reared from wheat gathered on May 17, appearing June 12 and for several days after. They were also collected from native grasses, particularly from genus *Agropyron* and from the now extensively cultivated grass, *Agropyron tenerum*.

Injury to grain in some cases amounted to five per cent but usually was much less. Late sown wheat seems to be freer from attack.

Western Wheat-stem Sawfly, *Cephus occidentalis*.—This species was again troublesome but not quite so much as in 1910. The first adults were observed on June 16. Fields next to last season's crop occasionally suffered on the edges to some 40% but the damage did not extend into them for more than a couple of hundred feet and became less severe towards the centre. These sawflies still appear remarkably free from parasites.

Grasshoppers or Locusts.—As was anticipated a rather severe outbreak occurred during the year, resulting in a few instances in considerable injury but as a rule the poisoned horse droppings were sufficient to keep them in check. They commenced to appear, as usual, early in May, but were retarded somewhat by cool weather. On July 10 the well-known fungus disease, *Empusa grylli*, broke out among them and continued to spread so that by the first of August as many as a dozen dead locusts could be counted in a square yard and often two or three upon a single weed. The disease, however, was by no means evenly distributed. It continued intermittently until October, by which time most of the locusts had died off. Several parasites were also at work, particularly a tachina fly, while the common prairie blister beetle, *Epicauta sericeus*, was exceptionally numerous. There were also vast numbers of red mites—*Trombidium*—present which in August became so plentiful as to leave very few locusts free of them.

An examination for eggs shows a considerable decrease in their numbers in comparison with last season, with an unusually large proportion of them destroyed. They are, however, still in sufficient numbers to cause trouble provided no farther damage is done to them.

During the season some experiments were tried with sawdust as a substitute for horse droppings which proved, on the whole, successful. It was not supposed that this substance would replace horse droppings, but when the latter are not easily procurable it will, I believe, prove equally satisfactory to bran with the advantage of being cheaper. It requires, however, a larger quantity of salt to make it attractive but has the advantage of being easily spread finely so that there should be no risk of poisoning stock when it is placed correctly.

Insects Injurious to Roots and Vegetables

Imported Cabbage Worm, *Pontia rapæ*.—This butterfly is again on the increase. It was observed to be particularly numerous in the neighborhood of Stinkweed, *Thlaspi arvense*, upon which it feeds extensively.

Colorado Potato Beetle, *Leptinotarsa 10-lineata*.—Surpassed even last year's high record for numbers and took advantage of early lack

of attention. Considerable injury was done by it to potatoes, and several garden plants were attacked, including *Nicandra physaloides* and *Nicotiana affinis*.

Turnip Beetle, *Entomoscelis adonidis*.—Very prevalent in June upon small wallflower, *Erysimum parviflorum*, which is its native food plant. Later it became quite rare and was only present in small numbers upon turnips in the fall.

Peppergrass Beetle, *Galeruca externa*.—This insect was enormously abundant wherever its chief food plant occurred. During May larvæ were found covering the ground in patches of several feet in circumference and plants of *Lepidium* were so badly infested that in places where they prevailed to the exclusion of other plants, large patches of half an acre or more were completely stripped bare and killed. Besides these all other species of *Cruciferae* were attacked especially the genus *Arabis*, but farm crops escaped with slight injury due no doubt, to their scarcity in the family of plants usually eaten.

Miscellaneous

Among insects not so directly affecting agriculture, that were common during the year, the following are worthy of being recorded:

Willow-leaf Beetle. *Galerucella decora*.—This beetle appeared suddenly on the 31st of May from unknown breeding grounds and at once proceeded to attack Aspen poplars which by the evening in certain spots, were actually bent down with the weight of beetles upon them and from a short distance whole bushes had a spotty grey appearance. The insects seemed to have congregated in certain places so that every tree covering an area of several acres would be infested, while the surrounding country remained comparatively free, edges of bushes were more attacked than centers and the sunny sides more so than shady ones.

Within twenty-four hours most of the leaves within the infested areas had been skeletonized, causing them to shrivel up and turn a dirty brown color. Willows also suffered severely, eventually more so than the poplars because it is upon them that the insects breed. This became abundantly manifest later in the season when the willows becoming completely stripped many of the larvæ died from starvation and but a moderate proportion reached maturity.

June Beetles *Lachnosterna* sp. including *rugosa*, *dubia* and *grandis* as determined by Doctor Glasgow, did considerable injury by eating the leaves of several trees and shrubs, but the larvæ were less numerous than usual and so caused little trouble.

Another leaf eater observed here for the first time was the Larch Sawfly. Though from the fact that even isolated trees, far removed

from others, were stripped, there is reason for suspecting that they must have been present the previous summer.

Plant lice of many species were also unusually prevalent during the early part of the season but later became greatly reduced through their usual predaceous and parasitical enemies.

From a stockman's point of view an interesting event was an extensive outbreak of the well-known fungous disease, *Empusa muscae*, during June and early July. Strangely enough only the smaller flies were attacked, but these included the Hornfly which was so severely infected that it was of little annoyance to cattle, though promising a severe outbreak early in the season.

I may mention here that careful observations with both this and the locust fungus have led me to believe that cold—with possibly lack of sunlight, is the chief factor in the encouragement of these diseases, and that wet "muggy" weather has little to do with their spread. A moment's thought will bring to mind the fact that there is but one period of the year when *Empusa muscae* is nearly always present, namely late autumn when the temperature is becoming low. In 1911 low temperatures were invariably followed by an increased number of deaths from *E. grylli* and so it was with *E. muscae* and flies.¹

Among other troublesome insects may be mentioned an unusually severe outbreak of mosquitoes covering most of the province, also an abnormal number of stable flies, *Stomoxys calcitrans*, and Horse bot flies, *Gastrophilus equi*.

THE COTTON SQUARE-WEEVIL OF PERU AND ITS PARASITES

By CHARLES H. T. TOWNSEND, *Piura, Peru*

At the 1910 meeting of the Association of Economic Entomologists, a paper by the writer was presented announcing the discovery of this new cotton pest of the boll-weevil class and giving such notes upon it as had been possible of accumulation within two months after first making its acquaintance. The article appeared in the April, 1911, issue of the Journal of Economic Entomology. The present article gives fuller information concerning it and its parasites, being such additional facts as have come to light during the past year.

Mr. W. Dwight Pierce has examined specimens of the weevil and states that it may be called *Anthonomus vestitus*, the description by

¹ I am indebted to Mr. H. T. Güssow, Dominion Botanist, for the determination of both these fungi.