

1877.
NEW ZEALAND.

THE COLORADO POTATO BEETLE

(HISTORY AND DESCRIPTION OF).

[With a Plate.]

Presented to both Houses of the General Assembly by Command of His Excellency.

No. 1.

The AGENT-GENERAL, London, to the Hon. the COLONIAL SECRETARY, Wellington.

7, Westminster Chambers, Victoria Street, Westminster S.W.,

26th July, 1877.

SIR,—

I have the honor to inform you that I have forwarded to you by post six small cases containing models of the Colorado beetles, in various stages of development. I have, besides, sent about a dozen to different persons, who I think will be able to procure for them extended inspection. I have not sent any to the Provincial Districts of Marlborough and Westland, and I hope you will spare at least one case each to Mr. Seymour and Mr. Bonar. Perhaps, also, you will let Mr. Rolleston have one.

The Colorado beetle has made its appearance in Europe, and the greatest apprehension exists as to the ravages it may commit. It is not supposed those ravages will be confined to the potato. It seems to be generally admitted that the best precautionary measure to take is to circulate a description of the insect, and thousands and tens of thousands of illustrations and models are being distributed over Great Britain and the Continent. One firm in London has ordered 10,000 cases, such as I am sending you, for circulation amongst its clients.

It is asserted to be positively necessary to spread a knowledge of the insect throughout the world, its ravages are so desolating, and its power of adapting itself to various vegetable food so alarming. New Zealand, with its direct communication with America, runs some danger of its introduction. You will let me know if you wish a larger supply of these models.

I have, &c.,

JULIUS VOGEL,

Agent-General.

The Hon. the Colonial Secretary, Wellington.

No. 2.

The AGENT-GENERAL, London, to the Hon. the COLONIAL SECRETARY, Wellington.

7, Westminster Chambers, Victoria Street, Westminster, S.W.,

16th August, 1877.

SIR,—

In continuation of my letter of 26th July, No. 762, on the subject of the Colorado beetle, I have the honor to enclose, for the information of the Government, a copy of a Parliamentary Paper containing a report of the Canadian Minister of Agriculture on the subject; and also correspondence with Her Majesty's Legation at Berlin and the Hague relating to the recent appearance of the beetle at Mull'heim, in Germany, and at Rotterdam. The paper also contains illustrations of the beetle, issued by the Canadian and the Dutch Governments. The models which I sent you by the last mail were, I understand, prepared under the direction of the Government of Germany. I forgot to mention that their cost was 18s. a dozen boxes.

I also enclose you a copy of an Act introduced by Her Majesty's Government, and which has just received the Royal assent, for preventing the introduction and spreading of insects destructive to crops, and especially of the insect designated as "*Doryphora decem-lineata*," and commonly called the Colorado beetle.

I have, &c.,

JULIUS VOGEL,

Agent-General.

The Hon. the Colonial Secretary, Wellington.

No. 3.

HISTORY, PROGRESS, HABITS, DESCRIPTION, &c., of the BEETLE.

THE following account of this destructive insect has been compiled chiefly from the enclosures to the foregoing letters, with the view of impressing the importance of arresting its introduction into the colony. In order to facilitate the recognition of this pest the accompanying plate has been prepared, showing the insect in all stages of its development, the adult form being drawn from specimens collected by Dr. Hector, in America, during the summer of 1876.

History and Progress of the Beetle in America.

All authorities seem to agree in fixing the original home of the potato beetle (*Doryphora decemlineata*) in the District of Colorado, United States, but it is probable the insect had a wider distribution before it was first noticed on its march eastward. In proof of this, specimens of this beetle have been in the Colonial Museum, Wellington, for several years, and ticketed as a native of Mexico, under the name of *Polygramma lineata*.

Quoting from Dr. R. Brown: "It is more than fifty years since Say found this beetle feeding on *Solanum rostratum*, a poor relation of the edible potato, (*Solanum tuberosum*), growing on the eastern slopes of the Rocky Mountains. It was not, however, until about sixteen or seventeen years ago that it first became notorious. Just then Colorado and some other states and territories on the Rocky Mountains began to be settled up and potatoes cultivated; then it was *Doryphora* appeared in all the native viciousness of its character. It deserted the wild *Solanum* for the cultivated one, and began to commit immense havoc in the potato patches." Moving eastward on the line of potato cultivation, and in an opposite direction to the settlement of the country westward, the devouring host had reached, in the year 1859, within one hundred miles of Omaha City, in Nebraska; in 1861 it appeared in Iowa; in 1865 it began to devastate Missouri, and crossed the Mississippi, in Illinois; in 1868 it had reached Indiana; in 1870 Ohio and the confines of Canada were reached, as also portions of Pennsylvania and New York. During 1871 a great many of these beetles covered the River Detroit, in Michigan, crossed Lake Erie on floating leaves and similar rafts, and shortly took possession of the country between St. Clair and Niagara River. Week after week its progress was reported with as much care, and, indeed, more general interest than that of an invading army, until it had been found in every potato-growing state or province from Canada to the southern limits of the United States. In its travels it was the most accommodating of insects. It would go afoot or fly, take a lift in an emigrants' wagon, or dead-head itself in a Pullman car; it would nestle in a soldier's knapsack, or travel with other insect allies in an Indian's blanket. It travelled in ten years at the rate of eighty miles or so per annum, and endured all the vicissitudes of climate which 40° below zero in winter and 100° in the shade in summer may express. Worst of all, when it travelled, its tastes in plant life extended, and although, unhappily, still retaining the potato in its bill of fare, it added to it a number of other plants, chiefly of the solanaceous order, such as the egg plant and tomato; but that it will restrict its depredations to plants of this order need not be expected with such a voracious insect; in fact, an Illinois writer says on this subject, "Incredible as it may appear, it has established itself in the cabbage garden as readily as the potato field."

Having reached the Atlantic seaboard of the United States and the Dominion of Canada, *Doryphora* appears impelled by some strong instinct to pass further east, in defiance of the Atlantic Ocean, swarming in the streets of the seaports, covering the wharves and jetties—most unlikely places for food—and crawling into vessels as if determined to force a passage to other fields and further conquest. *Doryphora* was seen on board ships thirty miles at sea, in such abundance that the hatches had to be shut down to keep it out. The New England sea-shore is also in places frequently marked by a long bank of the bodies of the beetle, washed up by the waves and tainting the air, thus proving attempts at crossing the Atlantic by flight.

The memorandum of the Canadian Minister of Agriculture, upon reference to a despatch of the Secretary of State for the Colonies on the subject of the Colorado beetle, gives a lively description of the situation in towns, as follows:—

"It may be considered an almost insoluble problem, in regard to transatlantic ships' traffic, to prevent by more extensive supervisory measures the introduction of those beetles in Europe. Not only does it move by flying and by navigating, so to speak, smooth water, but also travels on common vehicles, railway carriages, and platforms, or decks of vessels, &c., especially during the months of August and September."

In localities fully invaded, the beetle may be seen creeping on side-walks, bridges, and wharves, crawling up buildings, occupying fences, lodging themselves in every crevice, penetrating houses and dwellings, ascending and occupying vehicles of all sorts, finding their way into boats and vessels, placing themselves on any and every article, and being found alive after a long sojourn in situations where there would seem to exist no chance for them to find any subsistence.

Description of its Habits.

Quoting from an Illinois writer: "The devastations of the Colorado beetle are all the greater from the fact of its propagating itself with extraordinary rapidity, several broods following each other in the course of the year. The first batch of infant larvæ appears towards the end of May, or if the weather be mild of April. In fact, scarcely has the potato plant shown itself above the ground, before the insect which has been hibernating during the winter, also wakes to life. The female loses no time in depositing from seven to twelve hundred eggs, in clusters of twelve or thirteen, on the underside of the leaf. Within five or six days, according to the state of the weather, the larvæ escape from the egg and begin

their work of devastation, which goes on for some seventeen days, when the little creatures retire below the soil in order to undergo the pupal condition. After a delay of ten or fourteen days, the perfect insect comes into being, and the business of egg-laying commences anew. In this way, according to recent observations, three broods follow each other, the last as just stated wintering below the surface of the ground.

"It has been calculated by the Entomologist to the United States Department of Agriculture that, if the progeny of a single pair were allowed to increase without molestation for one season, the result would amount to over sixty millions.

"No description can do justice to the marvellous voracity of this insect, especially in its larval state. When once a field of potatoes has been attacked all hope of a harvest must be given up; in a very few days it is changed into an arid waste, a mere mass of dried-up stalks."

Description of the Insect.

Eggs of a deep orange colour, glued to the under-side of leaves. The larvæ when hatched are nearly black, passing through shades of reddish-black, when a week old, to reddish-yellow, varying to orange or flesh colour in the mature larvæ. In the pupa or chrysalis, and perfect insect, the colour varies from a creamy colour to pale-orange.

It will only be necessary to add that varieties of this beetle are found some of whom have been raised to the rank of species. They are said by some authors to breed promiscuously, travel together, and are all equally destructive. They may be all known by the black longitudinal stripes on the wing-covers, which in *Doryphora decem-lineata* are distinct and ten in number, while in one, called *Doryphora juncta*, the second and third lines are united at bottom. Although in general appearance the insect could hardly be mistaken if compared with the drawing, they vary so much in the details of the markings that a careful examination might fail to find many exactly alike; they also vary much in the shade of colour, being found from orange to flesh colour.

Remedial Measures if introduced.

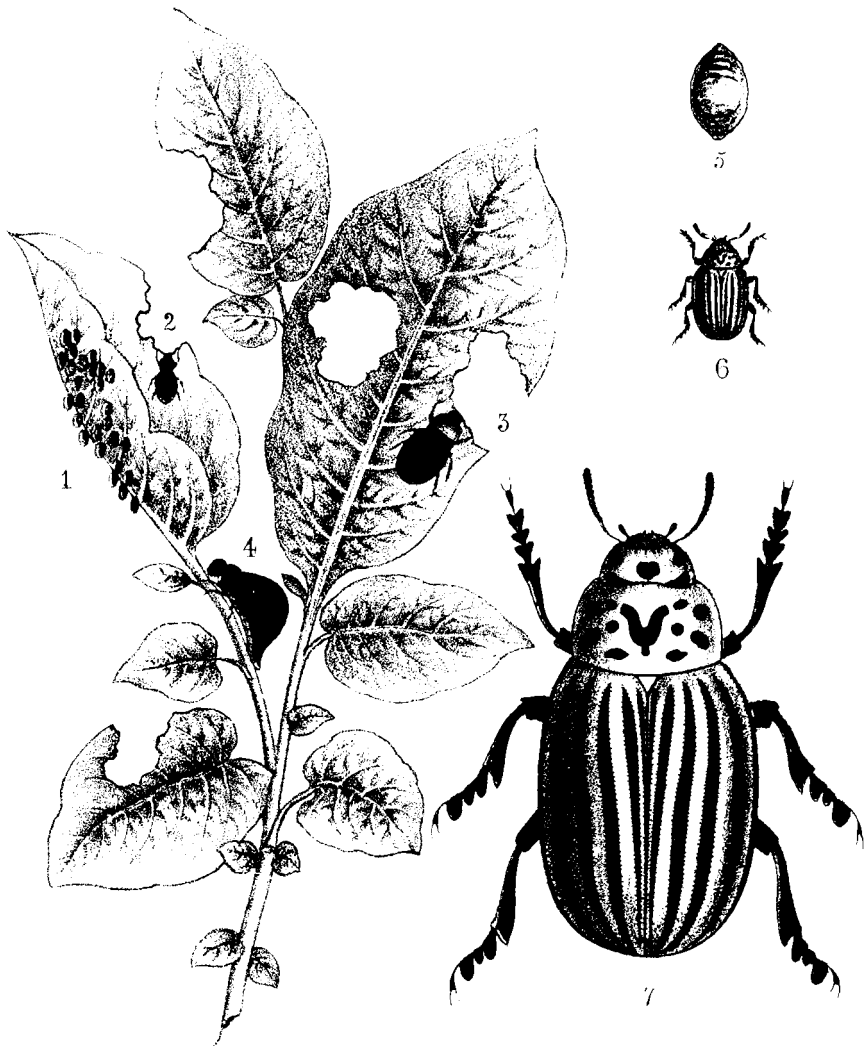
In England fear of the insect culminated in the Destructive Insects Bill passed by Parliament; but, unless potatoes be imported in the future in far greater quantities, and with less care than heretofore, it is believed that the danger of their coming concealed among tubers to be very small. It is certain that the beetle swarms on the Atlantic seaboard of the United States, so that there is every chance that it has over and over again been conveyed on steamers and other vessels leaving for Europe, and the pest is more likely to be introduced in a general manner than from any special association with potatoes. There exists more danger of the insect being introduced by sending living specimens as study objects, as the chance of escape is not small.

The evidence for and against remedial measures by the use of poisons is very conflicting. One writer in Carrol City, Iowa, says: "About seven years ago they first made their appearance at Hamilton, Ontario, Canada, in some numbers, and were shown as specimens of some strange beetle. The next year they appeared quite numerous, and we had to adopt measures to destroy them. Some tried handpicking, others used Paris-green in different ways. Some mixed 1 lb. of Paris-green to 14 lbs. of fine shorts, others the same quantity of fine ashes or plaster. A calm morning should be selected, and while the dew is on the potato tops then dust the mixture over the foliage; the beetles in eating the leaves partake also of the poison, and in a short time die. Some mix the Paris-green with water, and water with a fine water-can. There should be some means used, as soon as the beetles appear, to destroy them, and prevent them from laying their eggs, as they increase very fast if not prevented."

We do not trouble about the Colorado beetle, as we can master them with Paris-green.

Another writer in Ontario offers a very different opinion on the use of Paris-green:—

"Persistent picking by all the potato-growers in this neighbourhood has lessened the virulence of this pest to perhaps one-tenth of the damage sustained at the commencement of the present season, and this without poisoning our ground; and we beg leave hereby, for the benefit of any unfortunate cultivators of the delicious vegetable aforesaid, who may be visited by these creatures, to enter our solemn protest against the use of Paris-green, or any other mineral poison, to destroy not only the offending insects but also the enemies now occupied in the destruction of the eggs, and bugs and beetles themselves. Not many miles from this place horses and cattle have been poisoned by eating the poisoned potato haulm, and in the eastern provinces even the poor little sparrows, that have cost so much to import from England, have been sacrificed to this mode of destroying the enemies they would have dealt with in the ordinary course of nature."



COLORADO POTATO BEETLE.

(*Doryphora decemlineata*.)

- | | |
|--|--|
| 1. Eggs on back of leaf, natural size. | 5. Chrysalis, upper surface, natural size. |
| 2. Larva, three days old, natural size. | 6. Perfect insect, natural size. |
| 3. Larva, three weeks old, natural size. | 7. Perfect insect, enlarged. |
| 4. Mature larva, natural size. | |

