

Work of Experiment Stations with Insects and Fungi

A BULLETIN, No. 150, entitled: "The Common Fungous and Insect Pests of Growing Vegetable Crops," was prepared by Prof. Wm. Lochhead and Mr. T. D. Jarvis, and issued by the O.A.C., Guelph. Growers may obtain a copy on application to the college or to the Dept. of Agri., Toronto.

In the bulletin an attempt is made to describe concisely the common fungous and insect enemies of vegetable crops, and to state briefly the best methods of controlling these pests. "It is believed that the publication of such information in bulletin form will fill a long-felt want. While criticism may, perhaps, be made of some of the treatments recommended, to the effect that they are too expensive, too burdensome, or but partially effective, it can at least be said that they are the best that up to the present have been devised. It is true that with some vegetable crops the returns are so small that every means must be taken to reduce the cost of growing and marketing the crop. As a consequence, some growers will, perhaps, prefer to replant rather than practise the treatments recommended in the bulletin."

SPRAYING FOR SAN JOSE SCALE

We are just in receipt of a bulletin, No. 107, issued by the W. Va. Exp. Sta. on the results obtained from commercial insecticides for the San Jose scale. Tests were made of various concentrated materials that are on the market. Of the spray materials used in the experiment Target Brand Scale Destroyer and Kil-o-Scale gave the best results, being practically identical. The bulletin says in part:

"Concentrated soluble oil preparations are the most convenient to use of any material yet devised for the destruction of scale insects. They mix readily with cold water and are not injurious to spray pumps, harness, horses, nor the face and hands of the user. None of them, however, seem to possess the fungicidal properties of the lime and sulphur sprays, but as scale killers some, at least, are entirely satisfactory and greatly simplify the matter of combatting scale insects on fruit trees. The ease with which these materials may be prepared for use in small orchards and fruit gardens, as well as larger plantations, offer good reason for the hope that in the future more interest will be taken in the matter of spraying by those who own scale-infested trees."

PETROLEUM EMULSIONS

In bull. No. 75, of the Agr. Exp. Sta. at Newark, Del., an attempt is made to describe methods of making petroleum emulsions without guaranty of their efficiency as insecticides. "These emulsions depend on soap for their existence, and sometimes on other auxiliary agents. Different formulas call for different proportions of emulsifier, and are, accordingly, differently adapted to summer and winter applications. Soluble oils sometimes require a preliminary 'manipulation' with a little water before they will emulsify. It is cheaper to prepare the emulsifier, or 'concentrated oil,' alone and to add the necessary amount of petroleum oils at the place where the material is to be used. High ratio 'soluble oils' are usually turbid, separate in 2 parts and need to be mixed before using. Probably a small fraction of the oil emulsified is visible when magnified. Some emulsions separate within a short time, others last for months.

"Most of the various insecticides, except Paris green, decompose soap, and therefore destroy the emulsions that they are mixed with. Hence, there is urgent need of clean vessels and utensils. Kaolin, or even good clay, may be used as a 'marker' to indicate the completeness of the spraying. Crude oil emulsions are somewhat more difficult to make than those with kerosene, but they are practicable. The cost of materials needed to emulsify a gal. of kerosene

or of petroleum oils ranges from 1½ cts. to 15 cts. 'Soluble oils' may easily be made, with but a few appliances and with but little skill."

INSECTS AND INSECTICIDES

The Agr. Exp. Sta. of Fort Collins, Col., has issued a bulletin, No. 114, containing information in regard to the common insect pests and the remedies that are commonly used for their destruction or prevention. The 1st part deals with the most important insects attacking both large and small fruits, detailing, in particular, those that attack the different parts of the tree, bush or plant. The description, life history, habits and remedies for each are included.

The 2nd part takes up the preparation and use of the more common insecticides, giving in detail those substances that kill by being eaten by external contact, by being inhaled, and those that repel. Insect traps are also dealt with.

The best methods of applying insecticides, wet and dry, are described. Spraying is taken up as follows: "The first requisite for a good job of spraying is a pump that will give plenty of pressure in the hose. Then, if one has a good spraying nozzle and a liquid that is free from solid particles of a size to clog the sprayer, there will be no difficulty in getting a good spray. Barrels and tanks should always be filled through a strainer to avoid loss of time and annoyance through the clogging of nozzles.

"A very fine spray is most economical of material and, for an even and thorough distribution, is best, and is especially useful for the destruction of caterpillars, slugs and other insects that devour the foliage of plants. In case of the first spraying for the codling moth, however, I am still constrained to recommend, as I have done for years, that the spray be a medium coarse one. By this I do not mean that the spray should be composed largely of large drops produced by the breaking up of a solid stream thrown forcibly into the air, and it should not be a fine mist or fog. A rather coarse Vermorel, or a good Bordeaux nozzle with a pressure of 100 or 125 lbs., will furnish such a spray. When spraying is being done to destroy leaf-eating insects, care should be taken not to spray too long in one place, as this will result in the little drops that collect upon the leaves uniting and running off, carrying the poison with them. Here again this rule does not apply to the first treatment for the codling moth. In that application there should be but one end in view, and that to fill every blossom or calyx cup with the spray.

"There are two types of nozzles that are used almost exclusively for the distribution of liquids. Perhaps the most popular among these are the Bordeaux and Seneca nozzles which throw a flat spray or a solid stream, and the Vermorel nozzles which throw a cone-shaped spray, which may be graded from medium coarse to extremely fine, depending upon the pressure and the tip that is used upon the nozzle. It is a big advantage in nozzles of this class to have them joined to the connecting rod so they may be turned at any angle to the rod that is desired. Any of these nozzles may be used singly or in batteries of 2 to 4."

FUNGICIDES AND INSECTICIDES.

A brief treatise on the subject of spraying was issued during the past summer by the Agr. Exp. Sta. at Columbia, Mo. It is bull. No. 23. It contains formulæ for combatting insects and fungi and a spray calendar. Among other interesting points mentioned are the following:

"Plant diseases are caused by some or all of 3 causes—fungi, bacteria, and insects. Many fruit growers attribute the failure of their plants to bad weather; too wet, too dry, too hot, or too cold. These causes are only secondary and their influence is of minor importance. By far the greater amount of damage done to fruit and vegetables is due to fungi, which are minute

plants closely related to the moulds, and live entirely on the bodies of the higher plants. These fungi are very numerous, occurring everywhere on the bodies of both dead and living plants and sometimes on animals. When occurring on dead tissues, they cause the tissues to rot or decay, while on the living plants cause various effects which we know as diseases. These diseases are often attributed to bad weather, but as said above, the weather exerts only a secondary influence. For instance, in the early spring, just after the apple has dropped the petals from its flowers, many of the young fruits are found to have turned yellow and dropped off. Close inspection of these yellow fruits discloses a black mould growing on the body of the apple and also on the stem. Many persons consider this blackening to be directly caused by the cool, wet weather in which it always occurs. It is, however, caused entirely by the apple scab fungus, which develops most rapidly in the cool, wet weather.

"The curling of peach leaves in spring will take place in the same sort of weather, and like the apple scab, is caused directly by a fungus attacking and living on the tissue of the peach leaves. It may be seen as a white mould covering the curled parts of the leaves or twigs. The mould which attacks the fruit of the peach at the time it begins to ripen, causing the fruit to become covered with a grayish mould and quickly rot, is another of the many fungi which attack and destroy the fruit crop.

"No plant is exempt from the ravages of fungi. Nearly all of them develop more rapidly in wet than in dry weather, and the cool, wet weather of spring will usually be followed by a great loss of the fruit through the ravages of fungi. In such cases, it behooves the fruit grower to spray and spray thoroughly.

"For all forms of fungous diseases certain measures may be adopted to control their development. When once a fungus is well established in the plant, however, there is no way by which the disease may be eradicated. Plants differ from animals in being unable to take into their bodies remedial agents, and on this account all material intended for the control of diseases must be put on the outside of the plant. Boring holes in the trees and injecting materials of unknown composition is to be condemned, since it does more damage to the trees than good."

STRAWBERRY CROWN GIRDLER.

The Maine Agri. Exp. Sta. has sent out Bulletin 123 on insects. The strawberry crown girdler is discussed with reference to its tendency to enter houses, and data concerning its food plants and suggestions as to remedial measures are given. Notes on other insects which have been conspicuous during 1905 are recorded. Among these are the tussock moth, red-humped caterpillar, stalk borer, mourning cloak butterfly, chain dotted geometer, rosechafer, carpet beetle, wire worms, and a grey snout beetle. A list of insects sent to the station in 1905 for identification is appended.

It is pointed out that the strawberry crown girdler in the larvæ or grub stage feeds on the roots of grasses and other plants. Strawberries are especially susceptible to attack and should not be set in or very near soil infested by these grubs. The only known practical remedy is clean cultivation. The adult beetles feed upon the leaves of the strawberry and many other plants. When they are numerous enough to cause much injury, arsenate of lead should be used as a spray.

Send us two new subscriptions to THE CANADIAN HORTICULTURIST, and we will extend your own subscription one year. Send us one, and we will extend it six months. The more subscriptions, the greater influence behind the editorial chair