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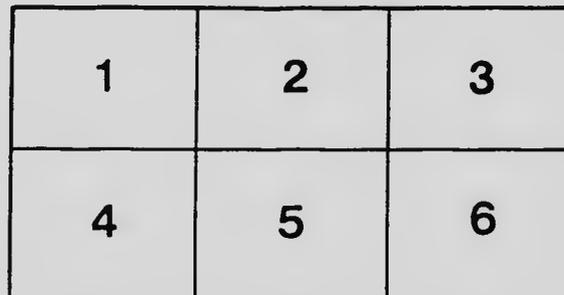
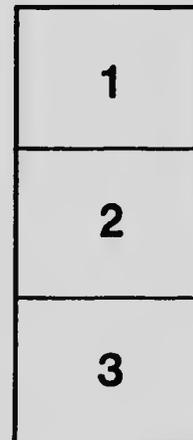
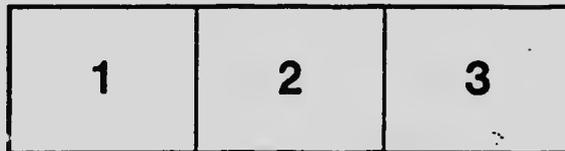
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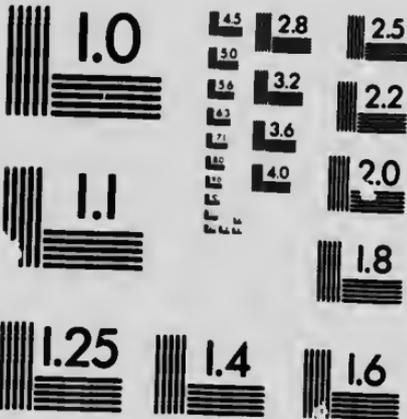
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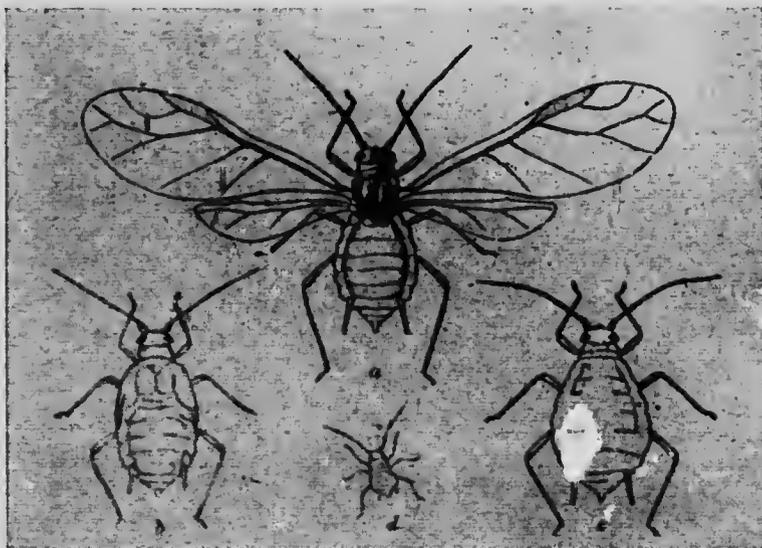
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PROVINCE OF BRITISH COLUMBIA.

DEPARTMENT OF AGRICULTURE
(HORTICULTURAL BRANCH).

APPLE-APHIDES.

THERE are four different species of aphides which occur on apple-trees in British Columbia. They are known as the European grain-aphis, the rosy aphis, the green apple-aphis, and the woolly aphis. The general external characteristics of the first three species are similar, and although differing in certain phases of their life-histories,



Winged and wingless forms of the green apple-aphis. (From U.S. Dept. of Agr. Bur. of Ent. Circ. No. 81.)

they are sufficiently alike, for the purpose of this circular, to be taken collectively. The woolly aphis of the apple will be treated in a separate circular.

Occasionally these pests are controlled by parasites, predacious enemies, or other natural agencies to such an extent that they cause little injury. In commercial orchards, however, annual sprayings are necessary to ensure the crop against any possible loss.

Apple-aphides, in general, pass through four distinct stages during their life-histories. They are as follows:—

(1.) *The Egg Stage*.—The winter is passed in this stage in our latitude, the eggs being attached to twigs or being placed under bud-scales and flakes of bark of apple-trees.

(2.) *Stem-mothers*.—Forms known as stem-mothers hatch in spring from the over-wintering eggs. These are all functional females, which, without direct fertilization, give rise to living young. These young, in turn, reproduce in a similar manner, so that if climate and food conditions are favourable there will be a constant succession of new generations produced throughout the growing season.

(3.) *Spring Migrants*.—Winged forms may be produced in the early summer. These also are females which migrate to other host-plants, where new colonies are produced.

(4.) *Fall Migrants*.—In late fall winged forms may again appear. These migrate to new host-plants, where they give birth to young which develop into true males and egg-laying females. The eggs laid by these sexual aphides form the over-wintering stage.

The eggs of these three species of aphides begin to hatch within a few days of each other, commencing about the time the apple-buds are showing green and continuing over a period of about fourteen days. The appearance of the three species on the leaves and buds of the fruit-trees is so similar that they can only with difficulty be told apart. Their life-histories, however, vary. Consequently, for the purpose of illustration, their habits may be briefly mentioned.

The European grain-aphides are the first to become abundant in the spring. They remain on the apple, curling the foliage to some extent, until the end of June. They then migrate to their summer host-plants, which are the common grains and grasses. The fall migrants return in the autumn to the apple, thus completing their life-cycle.

The rosy aphid appears at about the same time in the spring as the European grain-aphid, but does not develop quite so rapidly. A peculiarity of this species which renders it especially injurious is its preference for the leaves of the fruit-clusters. Although the fruit is rarely directly attacked, the effect on the apples from the injury caused to the adjoining leaves is such as to produce a remarkable stunting and malformation. The leaves are also more tightly curled by this species and the fruit-clusters are frequently so badly injured that they may entirely fail to develop. About June this aphid

migrates to its summer host-plants, and by the end of July it has completely left the apple. In the autumn winged fall migrants return to the apple and deposit eggs.

The green apple-aphis begins to hatch a few days later than the European grain-aphis. It does not appear to develop as rapidly, only reaching its highest point of infestation during the summer months. In contrast to the two preceding species this aphid remains on the apple during its entire life-cycle, the migrants in summer and autumn going from apple to apple. This aphid also affects the hawthorn, quince, and, to some extent, the pear.



Showing typical injury to apples by the rosy aphid. Frequently at the season of the year when the above is noted no aphides are seen in the cluster of leaves or apples. This is accounted for by the fact that the aphides have migrated from the apple-trees to some other food-plant. The injury, as seen, is a result of an early spring attack. (After Treherne, B.C. Ent. Soc.)

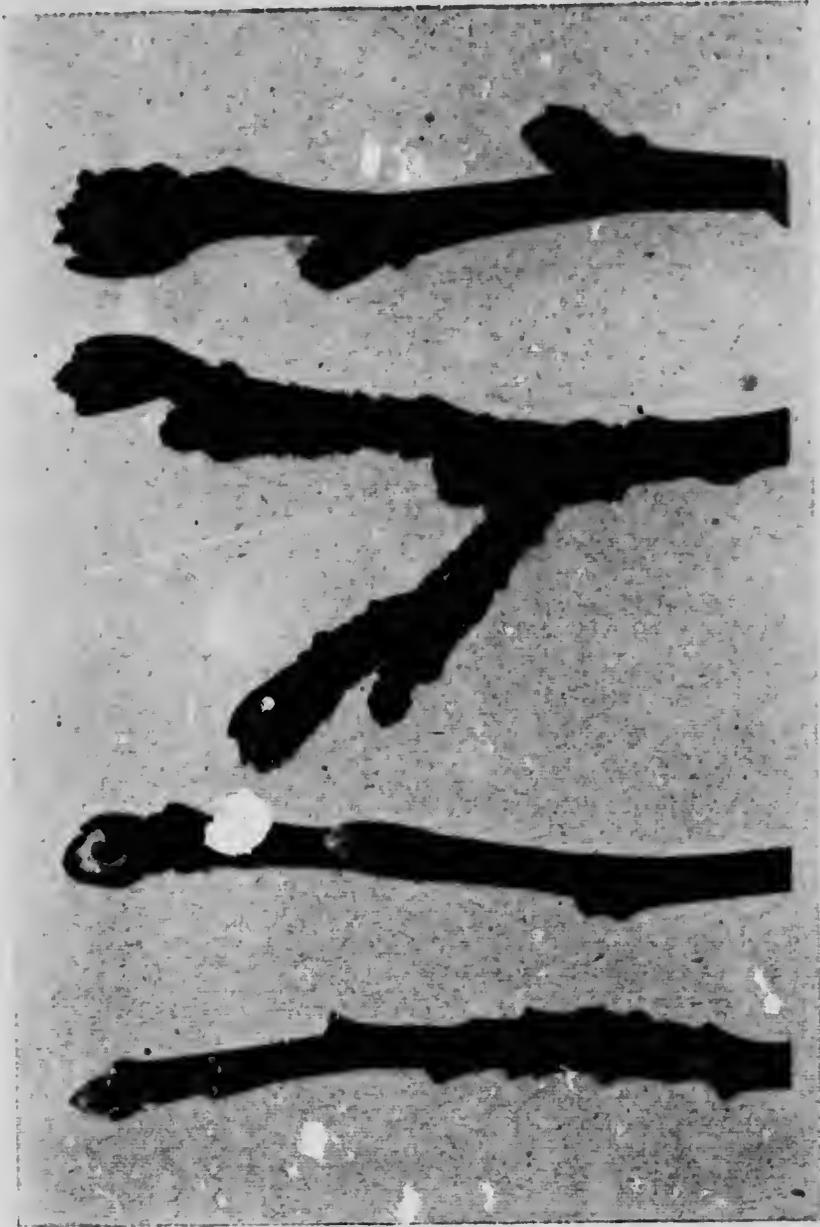
Control Measures.

The injury caused by aphides in favourable seasons is very severe. The curling of the leaves and the subsequent withering of the parts affected prevent the proper conversion of the plant-food into available form. In severe cases this greatly retards development and acts as a serious detriment to the vitality of the tree. Control is not difficult, provided that sprays are thoroughly applied at the right times. In apple-orchards the first application should be made when the buds have developed as shown in the accompanying illustration. The second application should be made just before the blossoms open, or shortly after that stage in the development of the apple commonly referred



Curling of leaves and defoliation by green apple-aphis. (From Bulletin No. 413, Geneva, N.Y.)

to as the "pink stage." These two applications will usually be found sufficient to give thorough control. At times a reinfestation of the green apple-aphis occurs from outside points in the early summer. In



Stages of development of buds of mixed varieties of apples when first spray should be applied for aphides. (From Bulletin No. 415, Geneva, N.Y.)

such an event an extra spray would be desirable when they are observed.

Thorough and well-directed sprays, applied at the proper times, before the leaves curl, are the essentials for successful aphid-control.

The following formulae will be found very efficient and easy to prepare:—

Formula 1 (recommended for all aphides)—

Nicotine sulphate, 40%1½ pints.
Whale-oil soap10 to 12 lb.
Water200 U.S. gallons.

Formula 2—

Nicotine sulphate, 40%1 pint.
Lime (fresh slaked)6 to 8 lb.
Water200 U.S. gallons.

Formula 3 (recommended combination spray for fungous diseases and many insects)—

Nicotine sulphate1½ pints.
Arsenate of lead4 to 6 lb.
Lime-sulphur dilution200 U.S. gallons.

For requisite dilutions of lime-sulphur *see* Spray Calendar, issued separately by Department of Agriculture.

N.B.—Soap must not be used in combination with lime-sulphur owing to the resulting adverse chemical action.

Some Important Suggestions in Aphis-control.

In commercial orchards, use a power spraying-machine, a fairly coarse nozzle, preferably elbowed, and plenty of force—150 to 180 lb. pressure.

Do not spray trees in full bloom. Apply the second spray just before the blossoms open.

Do not neglect to make a second application. It is cheaper, in the end, to spray twice.

Do not wait until the leaves curl before you make the applications.

Direct the spray well, remembering that individual aphides not touched are liable to survive.

Trees should be well pruned before spraying. Water-sprouts should, in particular, be removed as they carry most of the eggs.

Burn all prunings before the aphides hatch.

Keep sucker-growth from the trees. They make excellent breeding-places for many insect pests and are a constant menace to the trees where fire-blight exists.

Victoria, B.C., issued March, 1918.

This circular has been prepared by M. H. Ruhman, Assistant Entomologist, Provincial Department of Agriculture, at the request of the Horticultural Branch.

Copies of this circular may be obtained free of charge on application to the Horticultural Branch, Department of Agriculture, Victoria, B.C., or from local branch offices of the Department.

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