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Insect pests: aphides

Clee Francis Howard Jenkins

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THE members of the aphis family are remarkable creatures both in structure and habits. They are practically world-wide in their distribution and despite their small size and apparent fragility they thrive under a wide variety of conditions and are among the most prolific breeders in the animal kingdom.

All the pest species in Australia have been introduced from other parts of the world, and there are only a few rare forms actually native to this continent. The introduced species, however, have thrived so well that they can be counted among the most serious pests with which the gardener and horticulturist have to contend.

Although one species of aphis will often attack quite a wide variety of hosts, generally a single species or group of plants is favoured, thus the different species are known as cotton aphis (Aphis gossypii Glov.); cabbage aphis (Brevicoryne brassicae (L.)); green peach aphis (Myzus persicae (Sulz.)); rose aphis (Macrosiphum rosae (L.)); strawberry aphis (Capitophorus fragariae (Theob.)); black citrus aphis (Toxoptera aurantii (Boy)); according to the particular plant usually attacked.

On account of their delicate structure aphis do not thrive under extreme conditions of heat, or cold, neither do they like heavy rain. This accounts for the fact that in most districts it is mainly in the spring and autumn that heavy aphis plagues appear. No one can observe the occurrence of a severe aphis infestation without marvelling at the astounding rapidity with which the creatures reproduce. This rapid rate of reproduction renders the aphis a particularly difficult insect to combat and means that control measures must be very thoroughly applied if rapid reinfestations are not to occur.

GENERAL DESCRIPTION

Although differing in size and colour according to species, aphisides, often known as plant lice, can be easily recognised by their soft delicate structure and other characteristics. They are sluggish in their movements, have rather long legs, and are usually found clustered on the host plants. The wings when present are clear. The abdomen is usually rather swollen and often carries a pair of horns or cornicles from which a sweet honey-dew much prized by ants is excreted.

The mouth parts are produced into a long thin sucking tube, rather like the proboscis of a mosquito, and by means of this thin tube the plant tissue is pierced and the sap imbibed.

This method of feeding should be carefully noted for it is a knowledge of an insect's feeding habits and mechanism that is most essential in determining control measures.

LIFE HISTORY

In order to understand how the remarkable rate of reproduction is accomplished
it is necessary to have a detailed knowledge of the general life history of the aphis. After examining a cluster of aphides on a rose or cabbage leaf, one will notice that all the insects are not identical. Some are larger than others, some are winged and some are wingless. The large wingless ones are known as stem-mothers. They are females capable of giving rise to living young without having previously been fertilised. The power to reproduce in this manner is known as parthenogenesis. The young from these parthenogenic stem-mothers grow rapidly and in a few days can in turn produce more living young. Every now and then, winged females are developed, and have the same unusual reproductive powers as their wingless parents. These fly to other plants and so spread the infestation.

In cold countries, as winter approaches, male and female aphides are developed, and fertilised eggs are laid on the host plants. These eggs last over the winter and give rise to stem-mothers next spring. In Western Australia it is doubtful whether the weather is ever severe enough
to bring about egg-laying, and the insects carry over from one season to another by means of the few females which survive in sheltered spots.

The life history of many aphides in Europe is complicated by the inclusion of alternate host plants into the cycle, or by a migration of the population to a subterranean life on the roots. Two local species, the black peach aphis (Anuraphis persicae-niger (Smith)) and the woolly aphis (Eriosoma lanigerum (Housm.)) have root-infesting forms but the relatively simple life history of most Western Australian aphides can be attributed to the mild climate of this State.

CONTROL

Due to the fact that the aphid is a sap-sucking insect and that it does not actually eat the foliage, ordinary poisonous sprays and dusts are useless as controls. On account of the insect's soft and delicate structure, however, contact insecticides are very effective.

Sprays.

Black Leaf 40 or Nicotine Sulphate is still extensively used for the control of aphids although it is being supplanted by the newer organic phosphates such as Hexone, Parathion, Malathion and the systemic insecticides. The formula recommended for Nicotine Sulphate is as follows:

Nicotine Sulphate—1½ pints (2 teaspoonfuls).
White Spraying Oil—1 gallon (3 tablespoonfuls).
Water—100 gallons (1 gallon).
Soap—4 pounds (1 ounce) may be used instead of white spraying oil.

(The quantities shown in brackets are those which may be used conveniently for small quantities of spray.)

When citrus and other hardy trees are requiring treatment the White Oil strength may be increased from 1:100 to 1:40. Such a concentration will also prove effective against most scale insects found infesting oranges and lemons.

New Insecticides.

Under this heading may be grouped DDT, Benzene-hexachloride (BHC) or Gammexane, HETP or "Hexone" (Hexaethyltetraphosphate), Parathion or E.605 ("Folidol" and "Phosphone") and the systemic insecticides ("Systox" and "Metasystox").

Of the list outlined, Hexone, Malathion and Metasystox are probably the most generally useful against aphids. The use of DDT for aphid control is not to be recommended except under special circumstances as the insecticide kills many useful parasites and may lead to an increase in some scale insects and mites. Where for any reason DDT is desired for aphid control, emulsion types are recommended. Several workers have reported them superior to the wettable powders and the concentration suggested is 0.1 per cent.
A combination of insecticides particularly useful to market gardeners is a dust consisting of 2 per cent. DDT and 2 per cent. BHC. The former satisfactorily controls chewing insects such as cabbage caterpillars and the BHC reduces the aphid population.

Hexone and Parathion were both developed during the war to alleviate a world shortage of nicotine sulphate and have proved most effective substitutes for the tobacco extract.

Systemic Insecticides.

The systemic insecticides depend for their efficiency on the fact that the materials enter the sap stream and accumulate in the vigorously growing portions of the plant. Systemic materials may be sprayed on the foliage or watered around the roots. They are extremely selective in their action and, of course, only affect sap-sucking insects. This is of great importance as it allows ladybirds and wasp parasites to go unmolested and continue their work of scale and aphid control.

One of the most readily available systemic insecticides on the local market is Metasystox which has been effectively used for the control of aphids and various mites.

Safety Precautions.

The insecticide group (organic phosphates) to which Hexone, Parathion and Metasystox belong is very toxic to the higher animals and so must be used with great caution. Gloves should be worn when mixing the sprays to prevent any concentrates coming into contact with the bare skin. When spraying, precautions should be taken to see that the spray mist is not inhaled and that clothing does not become saturated with spray liquid. Although a very effective contact insecticide, Hexone has little residual effect and the toxicity deteriorates rapidly once it is diluted and exposed to the air. Parathion
on the other hand has an appreciable residual action and also some of the properties of a systemic insecticide. This renders Parathion the more dangerous of the two preparations and means that it should not be applied to fruits or vegetables later than a month before picking.

Biological Control.—There are many excellent examples of the biological control of aphides. Ladybirds feed readily upon most species, and a number of tiny wasps lay their eggs into and develop within the aphis. The cabbage aphis is one variety largely controlled by a wasp parasite introduced into this State in 1907. The parasitised aphides may be distinguished from the healthy insects by their bloated appearance and light colour, and later by the tiny hole in the back from which the wasp has emerged.

Cultural Methods.—All weeds likely to harbour aphis should be destroyed and especial attention given to weeds closely related to the crop being grown. For instance, wild radish and wild turnip will harbour cabbage aphis, and may easily be responsible for starting an outbreak in a commercial crop.

When cutting cabbages and cauliflowers the whole plant should be destroyed, so that the butt is not left to breed further pests. Similarly when any crop is finished the old plants should be got rid of as soon as possible, for carelessness in this direction leads to the dissemination of diseases and insect pests of all kinds.

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