Horticultural Produce & Practice

Ministry of Agriculture and Fisheries

Wasps
Social Species
Description and Control

Four species of social wasp have become established in New Zealand. Of these, the German wasp, *Vespula germanica*, is the most abundant, and apart from being a general nuisance it can cause financial losses to beekeepers, orchardists, and berryfruit growers. The other three species are less frequently encountered although the common wasp, *V. vulgaris*, introduced in the late 1970's, is likely to spread throughout the country.

Keywords: ***Vespula vulgaris,*** common wasp, ***Vespula germanica,*** German wasp, paper wasps, ***Polistes*** spp., eradication, nests.

Species of Minor Significance

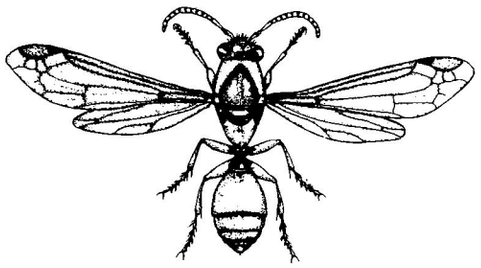
Two species of paper wasp of minor importance are established in New Zealand. Both are a general pest because of their painful sting, but neither has any effect on beekeeping.

The Australian paper wasp ***(Polistes humilis)*** is found only in the northern half of the North Island. Colonies make delicate paper nests, which hang by a single stalk from branches of trees and shrubs or from the eaves of buildings. The wasps are a little smaller than the honey bee and are brown in colour (see fig. 1).

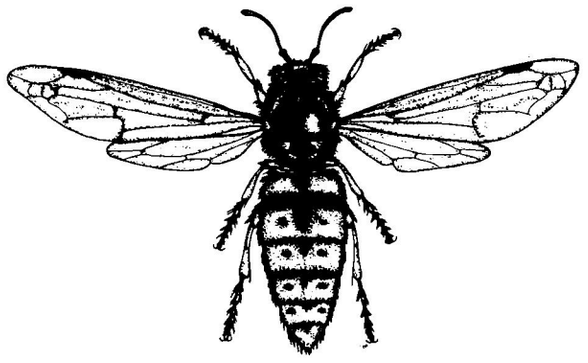
A related species ***(Polistes chinensis)*** has recently become established in the Whangaparaoa and Helensville areas north of Auckland. It is often confused with the German wasp because it has the same black and yellow colours, but in shape it is small and delicate like the Australian paper wasp.

Species of Major Significance

The German wasp ***(Vespula germanica)*** was accidentally introduced to New Zealand in 1944, and since then it has spread rapidly throughout the country. It is a serious nuisance in some places, and can cause financial loss in orchards, vineyards, and berryfruit gardens. The German wasp has a serious economic impact on beekeeping because it robs honey from hives, sometimes leading to the death of the colony.



Australian paper wasp



German wasp

Fig. 1: Comparison of German wasp and Australian paper wasp at approximately twice life size.

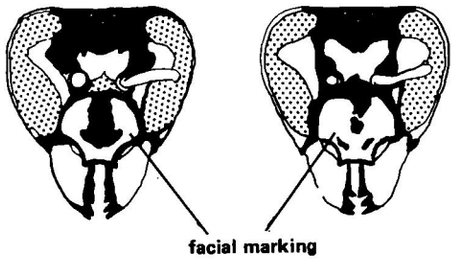
In the late 1970's another wasp was accidentally introduced into New Zealand. It is known as the common wasp, ***Vespula vulgaris***, and looks very similar to the German wasp ***V. germanica.*** Both species have a conspicuous pattern of black and yellow stripes on the abdomen. They are slightly larger than a honey bee and have a smooth, rather than hairy, body.

The three features that distinguish the two wasp species are: a black face marking, the colour of the nest, and black markings on the abdomen. Both species have a black marking on the face: in ***V. vulgaris*** this has a conspicuous anchor shape; while in ***V. germanica*** the marking is reduced and may only consist of a few dots (see fig. 2).

V. germanica build their combs and nests of grey wasp paper, but in ***V. vulgaris*** nests the paper is light- or reddish-brown in colour.

The two species have different markings on the back of the abdomen, but these are quite variable in each species and are not a completely reliable guide. Generally, ***V. germanica*** has black spots separate from the black stripes, while in ***V. vulgaris*** these spots are usually joined to the stripes (see fig. 3).

So far (1983) ***V. vulgaris*** is only found in central Dunedin, Wellington, and the Hutt Valley. This species will probably spread quite rapidly throughout New Zealand, and will



facial marking

Fig. 2: Facial markings of ***V. vulgaris*** (left) showing the characteristic anchor shape, and ***V. germanica*** (right).

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Information Services, MAF, Private Bag, Wellington, N.Z.

cause problems for both beekeepers and the general public. Its life history is similar to that of ***V. germanica*** and the same control measures are effective.

Fig. 3: Abdominal markings of ***V. vulgaris*** (left) and ***V. germanica*** (right).

Life History of the German Wasp

Mated queen wasps hibernate in many sheltered positions, often in stacks of wood, piles of sacks, or beneath loose bark. In spring these queens emerge from hibernation and fly about looking for nesting sites in banks, hollow trees, or other suitable places. A queen wasp will construct a small nest, only 30 or 40 mm in diameter, in a cavity and start laying eggs almost immediately.

Until the first generation of young wasps emerge the queen is involved in building the nest, gathering food, and feeding the larvae. These jobs are taken over by the first worker wasps to emerge, and from this point on the queen restricts her activities to egg-laying.

During late spring and early summer the population of the nest increases. The workers continue to excavate the cavity if it is in the ground, and extend the nest with wasp paper (chewed wood fibres mixed with saliva).

In late summer and early autumn, drone or male wasps are produced in the nest. As the population of the colony has usually reached a high level by this time, foraging workers begin to collect more sweet (carbohydrate) foods. This supplements, but does not replace, the protein which up until now constituted their diet.

The dietary processes of a wasp colony are in fact very complex, with a great deal of mutual feeding (trophallaxis) being carried out. Worker wasps feed larvae with proteins (and some carbohydrates) and the larvae produce a type of saliva which is relatively rich in carbohydrates and breakdown products of proteins. This saliva is fed back to the adult wasps, including the queen.

New queen wasps are produced late in the autumn, and after mating and returning to the nest they seek another place in which to spend the winter. Normally the drones and workers continue to forage for food, but ultimately they feed on one another and any remaining brood, until the nest is empty. The life cycle is continued next year by queens emerging from hibernation.

Overwintered nests can cause serious damage to bee colonies. In places where severe frosts are uncommon, or where there is a constant supply of food, nests headed by a functional queen or even several queens may continue throughout the winter. In the following spring these colonies can increase to an enormous size, and may possibly remain active for a further season if conditions are suitable.

The size and population of wasp nests varies considerably. An ordinary single season nest about the size of an apple box might contain more than 12 000 wasps. Overwintered nests can become extremely big; one of the largest ever found had a volume of over 4 cubic metres.

Control measures

Wasp colonies become strong in autumn as honey bee colonies are diminishing in population. Wasps are also active earlier and later in the day than bees, and in worse weather conditions. They can most frequently gain access to a hive when the bees are clustering, or are otherwise unable to guard the full width of the entrance.

Entrance Reducers

Close down hive entrances when wintering down honey bee colonies, and certainly before the first frosts of the season. Use a strip of wood that completely covers the hive entrance except for a reduced central entrance about 75 mm wide and 9 mm high.

Using an entrance reducer makes it easier for bees to guard the hive. If a very weak hive is suffering a severe wasp attack, reduce the entrance right down to a few bee spaces or else move the hive to a new location.

Destroying Nests

Very high wasp numbers indicate a nest or nests within several hundred metres. Efforts should be made to locate these nests and destroy them, as large numbers of wasps have a great effect on the hives in an apiary.

Flying wasps can be tracked in early morning or at dusk when other insects such as bees and flies are not flying. Wasps can be dusted with flour or icing sugar to make them more conspicuous.

Wasps can be dangerous, so take the following precautions:

- Carry out the work in the evening, after the wasps have ceased flying.
- Wear gloves and a veil.

Nests in the ground: Flying wasps entering and leaving a small hole in the ground usually indicate that an underground nest lies beneath. There are various ways of exterminating ground nests, the more successful of which are:

- Petrol: If the hole slopes downward, pour in about 2 litres of petrol. A bottle, sack or dirt sod should be left in the hole as a plug. **Do not light the petrol** as it is the fumes that kill the wasps. Diesel fuel is also effective if it can reach the nest itself. The oil saturates the nest, which will eventually collapse.

For very large nests there may be more than one entrance, so be sure to block them all. Petrol should not be used near buildings or valuable shrubs.

- Insecticides: If the ground is dry and cracked, allowing petrol fumes to escape, a powdered insecticide can be used. Carbaryl (Sevin) is recommended.

Dust around and into the entrance of the nest after dark when all the wasps have returned to the nest for the night. Use 50 g (about 2 tablespoons) or more of the insecticide powder, and **do not** plug the hole.

It may take a few days to kill all the wasps by this method, as young wasps will continue to emerge from the brood combs. It may be necessary to repeat the operation after about 7 days. When all adult wasps have died, the hole should be blocked to prevent newly-hatched wasps from emerging.

Always follow the label instructions; all modern insecticides demand respect for their toxic properties when being handled.

Nests in roofs and basements: Methods of wiping out nests include:

- Where nests are readily accessible: Use a "borer bomb". Simply place the "bomb" in a tin (to reduce fire risk), place near the nests in the evening, and ignite. Notify the fire brigade to prevent false alarms.

- Where nests are not readily accessible: Make an applicator from a can with a removable lid such as a

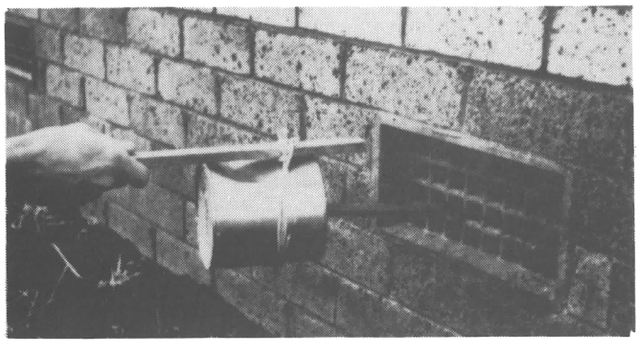

Fig. 4: Applicator in use.

milk powder or baking powder tin. Fit a length of pipe into the lid (Fig. 4). This fitting should be tight to prevent wastage of insecticide smoke. Use the older rubberised type of hose or a length of metal piping, as plastic hose pipes can melt. Tape a wooden handle to the can.

Place a smoke generator into the can, light it, tightly replace the lid and put the nozzle into the hole. Hold the apparatus by the wooden handle as the tin will become very hot.

Where the basement of a house is built with a concrete or brick wall containing ventilation blocks, smoke generators can be used in the container described. Block off all ventilators (other than the one the wasps are using) with damp newspaper to confine the fumes, and put the smoke generator nozzle into the remaining ventilator. Ensure that the cubic capacity of the basement is within the limitations of the smoke generator.

When the construction of the basement allows too much ventilation and makes a smoke generator impracticable, the nest must be sprayed until it is thoroughly saturated with an insecticide solution. Chlordane, carbaryl or maldison are suitable for this. Either of the Boracure aerosol insecticides should also prove suitable. (Fly sprays are usually ineffective because of their poor residual action).

Sometimes all these methods may fail for no apparent reason. If this does happen, the only consolation is that the nest will usually die out over the winter, and that next season's nests will be built in another place.

Nests in walls: If the wasps are entering a wall through a small hole several methods can be used to destroy the nest.

- Cut off about 100 mm of a hose which can fit in the hole. Pack powdered insecticide into it and tap the hose until the powder has compacted to one side. Place the hose in the hole. Wasps must then walk over the insecticide to gain access to their nest. Other possible exits must be blocked.
- Blow insecticide in. Pack one end of a suitable length of garden hose with about 50 g (2 tablespoons) of insecticide. Place the end with the powder in the entrance to the nest, the other end in the mouth, and then blow sharply (fig. 5).
- Pour several tablespoonsful of liquid insecticide into the hole, or paint the liquid around the entrance so the wasps have to walk through it to reach the nest.
- If the nest is close to the entrance hole, cut sections off a yellow dichlorvos pest strip and insert them into the hole. The strip slowly releases insecticide fumes that will eventually destroy the wasps.
- Use a smoke generator in the applicator described above. Bore a hole through the wall near the nest, taking care that structural timbers are not between the nest and the hole. Plug the hole with newspaper or grass immediately the drill is withdrawn to prevent wasps escaping. Light the smoke generator, remove the plug and insert the nozzle of the applicator. Use this method in the evening.

In all cases, make sure alternative holes are blocked.

Nests in the open: In the evening, thoroughly soak exposed nests with concentrated insecticide solutions. Where the fire risk is not high, petrol, diesel or kerosene may be used. Do not set fire to the nest (it is the fumes which kill the wasps). After the wasps are dead move the nest to a safe place and burn it.

Poison Bait

This can be used in an apiary if wasps are numerous. Mirex is the only insecticide suitable for mixing with bait, as others usually repel wasps.

Following the instructions, mix the powder with a protein bait (such as fish), and put it out for the wasps in a bait station. This should be located where it cannot be interfered with by children or household pets. Used tear-top drink cans are suitable for this purpose.

Fig. 5: Blowing insecticide into an underground nest.

If wasps are feeding on carbohydrates (sweet food) to the exclusion of protein, then Mirex may be mixed with dry icing sugar and placed in a bait station. Provided the mixture is kept dry at all times, honey bees will not be attracted to it.

Poison baits give mixed results, mainly because each wasp forages individually and does not communicate the location of a food source as does the honey bee.

Shifting Hives

If destroying nests around the apiary does not reduce wasp numbers, then it is best to move the hives to another site for the winter.

Insecticides

Powders: Carbaryl, maldison (Malathion), and lindane are available in powdered form at most hardware or garden shops. Many of the flea powders on the market for treating dogs, pigs and cattle contain enough insecticide to be effective. The multi-purpose insecticide/fungicide preparations used for spraying fruit trees may also be suitable.

Liquids: Most powdered insecticides can be made up into solutions. Some insecticides can be purchased as a liquid concentrate, e.g. maldison (Malathion), dichlorvos, lindane, and pyrethroids (e.g. permethrin, bioresmethrin, fenvalerate).

Smoke generators: Borer bombs can be bought from hardware stores.

Pest strips: Dichlorvos (Vapona) strips are available from hardware or grocery stores, and some service stations.

Aerosols: Many home garden aerosol insecticides and residual insect sprays are useful for killing wasps. Ordinary fly sprays are usually ineffective.

Disclaimer

Use of trade names does not imply recommendation by MAF or endorsement in preference to other products not mentioned.

Acknowledgements:

Fig. 1 is taken from Ferro, D.N. (ed.) 1982. New Zealand Insect Pests. Lincoln University of Agriculture. Used by kind permission of Lincoln College.

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A.G. Matheson
Apicultural Advisory Officer
MAF Advisory Services
Nelson

MAF Information