



# KiwiTech Bulletin N99

## Wasps

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New Zealand has several kinds of native wasps which are not pests. However the four accidentally introduced social wasps are becoming an increasing nuisance in some kiwifruit orchards around the country.

Social wasps live as colonies in nests of honeycomb-like cells. They form complex social groups and all members of a colony help raise the young. Two of these social wasps are *Vespula* species and the other two are *Polistes* wasps or paper wasps.

### Vespid wasps (*Vespula* Species)

The German wasp (*Vespula germanica*) is native to Europe and northern Africa, while the common wasp (*V. vulgaris*) is native to Europe and parts of Asia (around Pakistan and northern China).

German and common wasps build nests of honeycomb-like cells, which are about the size of a soccer ball, but they can become much bigger if they survive over winter.



Both these species are now widespread throughout New Zealand. In some habitats, they can be some of the most common insects encountered.

### Nests

Both Vespid wasps usually build extensive underground or protected nests in a variety of places, often in sunny spots or along the banks of streams. Vespid nests are also built in hollow trees.

An average common or German wasp nest produces between 11,000 and 13,000 workers and from 1,000 to 2,000 queens in a season.

### *Polistes* Species

Asian Paper Wasps (*Polistes chinensis*) are black and yellow, and males are smaller than females. The Australian Paper Wasp (*P. humilis*) is reddish-brown in colour.

Paper wasps (*Polistes* spp.) are longer and more slender than vespid wasps and have a different pattern on the abdomen. Also, unlike vespid wasps, when paper wasps fly, they do not hold their legs close to their body. Seeing a wasp flying with "long dangly legs" identifies it as a paper wasp.

Paper wasps have a simple social structure, with both females and males undertaking food gathering, nest building, and producing and rearing young.



### Nests

- Paper wasp nests are usually small, less than 20 cm in diameter and found 1-5 metres above the ground, hanging from posts, vine structures or trees.
- The nest appears like a honeycomb which is constructed from wood chewed and moulded by the wasps. The nest does not have an outer covering so you can see into the cells, unlike vespid nests where the layers of cells are enclosed in a separate layer or envelope.

### Typical Life Cycle

1. In spring, queens emerge from hibernation and start a new nest.
2. Over summer the nest expands and the number of workers increases.
3. In autumn the colony produces males (drones) and females (new queens) to reproduce;

- In winter, new queens fly from the nest to mate and hibernate and the nest usually dies. Sometimes nests survive winter.

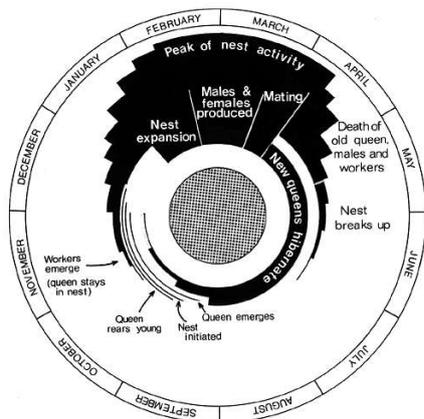


Figure 1: Wasp lifecycle. Courtesy of Landcare Research

## Natural enemies

New Zealand has some of the highest densities of German and common wasps in the world. This is because they have no natural predators here, the winters are mild and there is plenty of food for them.

## Impacts

Wasps have detrimental impacts on native ecosystems, and human health, cause economic losses for beekeepers, and disrupt recreational activities.

Wasps collect honeydew which is produced by a number of insects. The recent arrival of the giant willow aphid onto willows in NZ orchards may be responsible for an increase in wasp numbers in many orchards where willows are used for shelter belts.

## Impact on Orchard Workers

Wasps are a nuisance to orchard workers, however unprovoked wasp attacks are rare: a wasp will normally only use its sting to defend itself or to subdue prey.

When a wasp nest is disturbed, wasps will fly out with a wing-beat frequency that brings other wasps to fly out the nest and attack. They will attack an intruder within 7 metres of the nest and pay special attention to moving targets.

The venom from a wasp sting contains several toxins that can cause a hypersensitive or allergic reaction in some people. A small proportion of the population will have a severe allergic reaction (anaphylactic shock), which can be fatal unless treated promptly. The more common reaction is localised swelling around the sting site which can be uncomfortable and itchy for a number of days.

Advice on the First Aid Management of Wasp Stings is given in the Appendix.

Where wasps are an issue, orchard workers should have easy access to a Wasp Sting First Aid Kit (see Appendix for details).

## Impact on Beehives

*Vespula* wasps are a major pest of the beekeeping industry in New Zealand. They cause direct financial loss by robbing beehives of honey and by killing bees.

However, wasps also reduce honey production and out-compete honeybees for honeydew resources.

Wasps destroy or seriously damage 8-9% of honeybee hives in New Zealand each year.

## Wasp Control

### a) Managing Giant Willow Aphid

The presence of sooty mould from giant willow aphid feeding can provide a major summer food source for wasps. Replacing willow shelter with more desirable species (e.g. sheoak *Casuarina cunninghamia*) will assist with long-term control. Monitoring willows in late spring / early summer and trimming them before aphid numbers build may also prove effective.



Figure 2. Giant Willow Aphid

As the entire biology of social wasps is dependent on the nest, direct poisoning of wasp nests is the most effective control method.

The best way to reduce a local wasp population is to find and destroy all the nests in the area. Usually wasps fly no further than 200 metres.

### b) Wasp Nest Destruction

#### 1. Finding the nest

Wasp nests are usually found by watching for 'lines of flight' of worker wasps returning to their nest. Workers should report observations of big wasp numbers to their supervisor.

Search for the nest on a sunny day, near dawn or dusk, the low light angles will highlight the flight path as wasps enter and leave the nest. This requires some skill and can be quite time consuming. It is also impractical over large areas.

Commonly, there is one entrance to a wasp nest but they can also have two or three other entrances. A nest entrance will have a constant stream of wasps coming in and out.

If the wasps are hard to follow because you cannot see them well, try the following:

- a) place an ice-cream container near where the wasps are seen
- b) place a large tablespoon of jam in the container
- c) feed the wasps for one or two days then place a lid on the container. Cut a small hole (40mm) in the centre of the lid. Spread flour or talcum powder around the edge of the hole. As the wasps come in and out they will get covered in the white powder, making them easier to see.

Once the nest is found, it can be destroyed using an insecticide – see Insecticide options below.

## 2. Destroying a German wasp or common wasp nest

### **Caution**

- If you are not confident about destroying a wasp nest do not proceed.
- Do not treat the nest if you think you are allergic to wasps.
- Only treat nests that are easily accessible and allow a quick and easy retreat. All nests should be treated at night when wasps are less active.
- Cover yourself fully with clothing and use a red-covered torch — wasps cannot see red light. Don't shine the beam of your torch at the nest entrance for too long as wasps will fly up the beam and possibly sting you.

When a nest is found, approach the nest quietly, and carefully place a spoonful of insecticide in or at the nest entrance or use a puffer bottle to direct the powder into the nest (see Insecticide options below). If the nest is disturbed and wasps emerge during treatment, quickly retreat and wait for the wasps to settle down before approaching again.

Worker wasps flying in and out of the nest will spread the insecticide through the nest, and the colony usually dies within a day. If activity continues repeat the treatment until wasp activity ceases.

Do not pour fuel or water into the nest.

## 3. Destroying a Paper wasp nest

Paper wasps around the nest can be killed using a spray or aerosol such as a household fly spray. Avoid spraying fruit. Once activity ceases, remove the nest (which will contain larvae) by snipping it off at the base. Put the nest in a plastic bag, seal the bag and put it in the rubbish.

### **c) Baiting**

The use of baits has long been recognised as an effective control method for wasps. However, to date

there is no commercially available bait that is selective to wasps only.

### **d) Trapping**

Trapping is not an effective method of reducing wasp numbers in nearby nests, even when wasp numbers are high.

## **Insecticide options**

### **a) Commercially available wasp products**

A number of products are sold in New Zealand for wasp control, but all target the home market through sales in hardware stores, supermarkets and garden centres. These products contain broad spectrum insecticides of older types with proven effectiveness. Although other, more recent, active ingredients are highly toxic to wasps, the lack of commercial products targeting wasps makes their use somewhat contentious and not recommended.

### **b) Dusts**

Dusts containing carbaryl should be applied dry into the entrance of a vespid nest in the ground. The dry dust gives better redistribution. Products are available ready to use in small applicators or as a more concentrated powder. Avoid wet weather as the powder only works as a dry dust.

### **c) Liquids**

Liquid products are similarly available in ready to use formulations and for mixing. Most of these contain synthetic pyrethroids (e.g. permethrin, deltamethrin, or allethrin plus phenothrin). The same active ingredients are used in most aerosol fly sprays.

### **d) Sprays and aerosols**

Sprays and aerosols can be used on paper wasp nests and any adult wasp.

## **Acknowledgements**

The majority of the content of this bulletin has utilised information from the LandCare Research website. Zespri acknowledges Landcare Research and in particular Darren Ward for permission to use LandCare Research resources.

## **Further information**

Wasp information

<http://www.landcareresearch.co.nz/science/plants-animals-fungi/animals/invertebrates/invasive-invertebrates/wasps>

Giant Willow Aphid Management

<https://canopy.zespri.com/EN/industry/news/Pages/gwa.aspx>

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# Appendix – First aid

(Information provided by LandCare Research)



## Sting - Typical Reaction

### Treatment

- Apply a cold compress to relieve pain. Put ice in a cloth, plastic bag or plastic wrap. Don't put ice directly on the skin. Hold the cold compress on the site for 15-20 minutes.
- Take an antihistamine or apply antihistamine cream (available at a pharmacy) for the itching and swelling. An alternative treatment for wasp stings is to apply vinegar to the affected area.
- Monitor the patient's symptoms. If the patient's condition deteriorates, treat as for a severe allergic reaction. It is better to treat the patient early and maybe unnecessarily than wait until they are in anaphylaxis.
- If pain and swelling persist for a few days, seek medical aid.

## Sting in or near the Mouth/Throat:

- Seek medical advice as soon as possible
- Reducing the swelling — give ice to suck or rinse the mouth with cold water.
- Take an antihistamine or apply antihistamine cream (available at a pharmacy) for the itching and swelling (unless you have to avoid these medicines for medical reasons (talk to your pharmacist).
- If swelling continues, and casualty begins to cough or wheeze, treat as a severe allergic reaction.

## Sting - Severe Reaction

- For most people, a sting means initial pain followed by localised swelling and itching. However, 2–3% of the general population may be at risk of systemic hypersensitivity — reactions to insect stings. Hypersensitivity reactions range from large localised swelling to sudden death from anaphylaxis.
- Someone can be stung several times and think that they are not allergic, but the next sting may result in anaphylaxis. The body's response is to pump blood to the peripheral parts such as the arms and legs, and in severe cases the result is rather like a heart attack. Studies have shown that about 10% of people stung more than once become allergic to wasp venom.

### Symptoms and signs of severe allergic reaction

- Symptoms of a severe allergic reaction usually happen soon after or within an hour of the sting. These need to be dealt with immediately.

#### Early Symptoms

- Generally feeling "strange" or "off"
- Flushed
- Rapid pulse (> 100 per minute)
- Fullness in throat
- Tightness in chest
- Cough

#### Progressing symptoms

- Rash
- Hypotension (low blood pressure), patient feeling faint
- Stridor — raspy breathing

- Wheeze
- Abdominal pain, cramps, diarrhoea or vomiting

#### Late symptoms

- Feelings of impending doom
- Severe swelling, all over and/or of the face, tongue, lips
- Cardiac arrest
- Airway obstruction
- Respiratory arrest

### Treatment

- A suspected anaphylactic reaction requires prompt medical treatment. A reaction that may initially seem mild, may progress to being more severe.
- Administer emergency care as per instructions in wasp sting first aid kit — it is better to treat the patient early and maybe unnecessarily than wait until they are in anaphylaxis
- Keep the sting area lower than the level of the heart
- Monitor patient continually
- **Seek medical help urgently**
- Adrenaline
  - Severe anaphylactic reactions need immediate treatment with a medication called adrenaline, given in the form of an injection. The main action of adrenaline is to strengthen the force of the heart's contraction and to open up the airways in the lungs.
  - Adrenaline is usually sufficient to reverse the reaction, though more than one dose may be required to achieve this. Other medications that may also be used to further reduce the allergic reaction include corticosteroids and antihistamines.
  - Self-injectable adrenaline kits (eg: EpiPen) are available. The injection device is filled with adrenaline and is administered into the large muscle in the front of the thigh when an anaphylactic reaction is experienced. The device holds only one dose, so medical assessment after the adrenaline has been administered is crucial in case the reaction worsens and further doses of adrenaline are required.

## Wasp Sting First Aid Kit

A wasp sting first aid kit should include:

- Self-injectable adrenaline (eg: EpiPen (a medicine that stops the body-wide reaction). Check expiry dates annually. Keep cool and out of the sun
- Antihistamine tablets
- Antihistamine cream
- An inhaler that contains Ventolin
- Instruction sheet that explains how to use the kit.

Those who have had an allergic reaction to an insect sting in the past should wear a medic alert bracelet to let others know they are allergic to insect stings.

## Disclaimer of Liability for Health-Related Advice

This information is not intended to be comprehensive or to provide medical advice. While all care has been taken to ensure the accuracy of the information, no responsibility or liability is accepted for any actions taken in reliance on it. Specific advice on medical issues should be sought from a health professional.