

COLLECTED DATA VARIOUS SOURCES



Vespula vulgaris queen.

10 Facts about Wasps

1. The German wasp (*Vespula germanica*) was first found near Hamilton in 1945; the common wasp (*Vespula vulgaris*) has been in New Zealand since 1978
2. The beech forests at the top of the South Island have the highest densities of wasps in the world; but wasps also occur in many other habitats across New Zealand
3. On average, there are 12 nests per hectare in beech forests, that's about 10, 000 wasps per hectare!
4. The highest number of nests recorded was 50 - 60 nests per hectare, the equivalent of 25 - 30 nests on a football field
5. The largest nest ever found was four metres high and contained about four million cells
6. There is a greater biomass of wasps (3.8kg/ha) in beech forest than all the native birds plus stoats and rodents put together
7. The public voted wasps as "most disliked wildlife" (along with rats), because they spoil enjoyment of outdoor recreational activities
8. Wasps destroy or seriously damage 8-9% of honeybee hives in New Zealand each year
9. Wasps affect native foodwebs, and negatively affect the behaviour of native birds
10. The predation rate of wasps on some native invertebrates is so high that the probability of their populations surviving through the wasp season is virtually nil

IDENTIFICATION

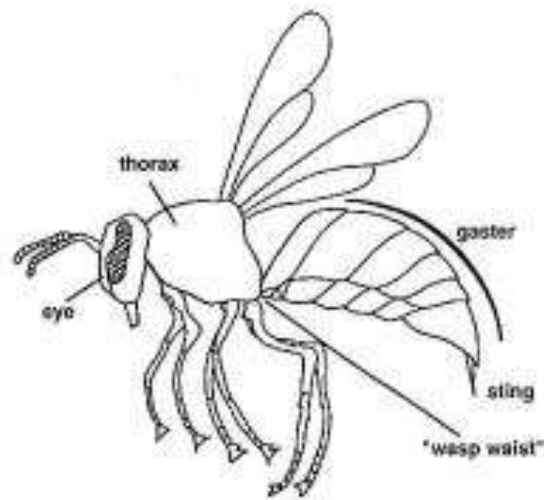


Diagram showing wasp body parts

Order: Hymenoptera

Family: Vespidae

Subfamily: Vespinae

Genus: *Vespula*

Species: *V. germanica*; *V. vulgaris*

Wasps, bees and ants (the order "Hymenoptera") differ from other insects by having two pairs of wings that are linked by a row of hooks, and by having a narrow "waist" that joins the abdomen to the thorax. The first segment of the abdomen is fused to the back of the thorax, so the part behind is not the whole abdomen — it is more strictly called the "gaster".

Social wasps can be distinguished from the rest of the Hymenoptera by:



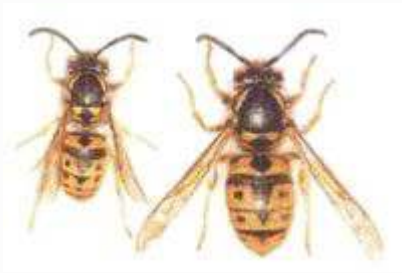
The way they fold their fore- wings back when they are at rest.



By the pattern of veins on their wings.



By having kidney-shaped compound eyes.



Worker wasps and queens look similar, although the queen is much larger. Both have a sting.



Drones do not have a sting, have more segments on the gaster, and have long curved antennae.

In New Zealand, German and common wasps are readily identified because there are very few other insect species which look similar. They could be confused with:

European Tube wasps (*Ancistrocerus gazella*); but these are not as large and robust as *Vespula*, and have a different pattern of colouration on the abdomen.



Asian paper wasps (*Polistes chinensis antennalis*): which are distinguishable from *Vespula* by have a different pattern of colouration on the abdomen. Paper wasps do not hold their legs close to their body, so when they fly they have "long dangly legs". Paper wasp nests are found above the ground and are not enclosed, so you can see into the cells (unlike *Vespula* nests where the layers of cells are enclosed in an envelope).



Australian Paper Wasp (*Polistes humilis*)



Paper Wasp Nests

- Honeycomb nest, made out of wood chewed and moulded by the wasps
- Small, usually less than 20 cm in diameter
- Cells are in a single layer
- Does not have an outer covering (i.e. you can see into the cells unlike Vespulid nests where the layers of cells are enclosed in an envelope)
- Roof is covered in a shiny secretion that acts as water-proofing
- Nests hang from small shrubs and trees, fences and walls. and often under the eaves of houses



KEY DIFFERENCES BETWEEN GERMAN AND COMMON WASPS

German and common wasps are very similar in appearance. The dorsal markings on the abdomen have often been used to distinguish these two species in New Zealand. However, these markings are variable and are not always accurate. The marking on the side of the head and face are more reliable.

German wasps (*Vespula germanica*)

Common wasps (*Vespula vulgaris*)

Side of head



A complete yellow band behind the eye.



A black mark behind the eye.

Face



Black dots or a vertical black line.



Anchor-shaped mark.

Abdomen



Black dots on the abdomen, which are usually (but not always) separate from the black rings (variable).



Black dots and rings on the abdomen which are usually fused (variable).

Nest



Nest on the left: grey; fibre from sound wood.



Nest on the right: brown; fibre from dead or rotten wood.

Common wasps are very efficient at harvesting honeydew have consequently displaced German wasps from honeydew beech forest. Common wasps collect honeydew at a faster rate than German wasps, and spend less time lapping honeydew (which has often fermented) from the trunk when the standing crop of honeydew is low, so that fewer of them become lethargic and less effective feeders.



German Wasp

Vespula germanica

Common wasp

(*Vespula vulgaris*)

Australian Paper Wasp

(*Polistes humilis*)

Asian Paper wasp

(*Polistes chinensis*)



European Tube Wasp

Ancistrocerus gazella



Golden hunter wasp

WORKERS, QUEENS AND DRONES

Worker

Most of the wasps in a nest are infertile female workers.



Short antennae



Sting



Six segments visible on gaster

Queen



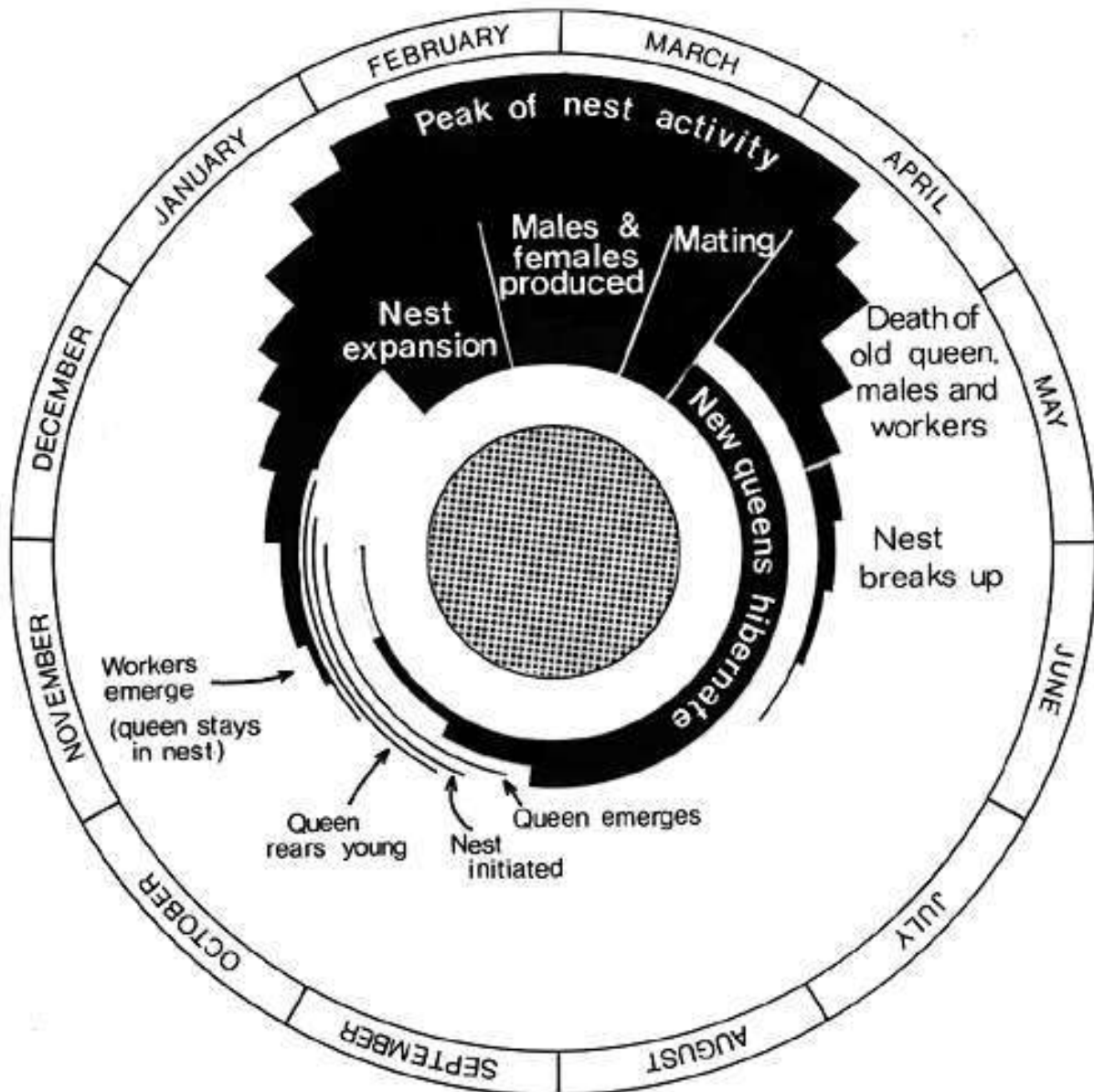
Queens, which are fertile females, look much the same as the workers, except they are about twice their size. They also have a sting.

Drones (male)



The males (called drones) have long antennae which often curve backwards. Their gaster has seven visible segments and is more evenly-shaped and longer than that of the females, and they have no sting.

LIFE CYCLE



http://www.landcareresearch.co.nz/_data/assets/image/0003/80985/lc_dia.JPG

Social wasps are one of the most complex animal societies known where all members of the nest co-operate. Workers help raise the offspring of the reproductive queen, but also collect food and defend the nest.

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.

There are general components of the wasp lifecycle:

In spring, queens emerge from hibernation and make a new nest;

Over summer the nest expansion and the number of workers increases;

In autumn the nest produces males (drones) and females (new queens) which can reproduce;

In winter, new queens fly away from the nest and hibernate and the nest usually dies (sometimes nests can survive winter and thus skip the 'new nest' phase).

BACKGROUND

Social wasps are those species that construct a nest (colony) in which a caste system develops; typically with a queen laying eggs and 'workers' taking care of the developing larvae, foraging for resources, and nest defence. Other insects with complex social systems include ants and some bees (which are both closely related to social wasps), and also termites.

Social wasps are pests in many temperate regions of the world. Consequently, a sizeable amount of research effort has been focused on developing control strategies. However, despite these efforts, wasps continue to be a major problem.

There are no native social wasps in New Zealand – a very unusual situation compared with other parts of the world. However, there are four introduced species of social wasps established: two introduced species of paper wasps (*Polistes*) and two *Vespula* species.

The German wasp (*Vespula germanica*) is native to Europe and northern Africa. It was first found at an air force base near Hamilton, in 1945, and it has been suggested that hibernating queens arrived in New Zealand in crates of aircraft parts from Europe after the Second World War. Although considerable efforts were made to eradicate nests, German wasps spread very quickly, and within a few years were found in most of the North Island and parts of the upper South Island.

The common wasp (*V. vulgaris*) is native to Europe and parts of Asia (e.g. Pakistan and northern China). This species has also become introduced in Australia and, most recently, Argentina. Single specimens of the common wasp were recorded in New Zealand in 1921 and 1945 but these apparently did not establish. The common wasp was confirmed as established in Dunedin in 1983, although, examination of museum specimens showed that queens had been collected from Wellington as early as 1978. It rapidly spread throughout New Zealand and almost completely displaced the German wasp from beech forests in the upper South Island because of its superior competitiveness.

In general, wasp populations are large in New Zealand because of the mild climate, lack of natural enemies, and very abundant food sources (especially honeydew). However, recent reviews of invasive invertebrates continually point to social insects as one of the top problems around the world because of their high level of 'ecological plasticity' (i.e. flexibility to adapt and utilise resources). Factors such as nest size and longevity, a very wide diet range, feeding at different trophic levels, and ability to reach very high densities, all contribute to the successful invasion of social wasps.

Both the German and common wasp are now widespread throughout New Zealand. In some habitats, they can be some of the most common insects encountered. As a result, wasps have had detrimental impacts on native ecosystems, and human health, cause economic losses for beekeepers, and disrupt recreational activities.

NEST EXPANSION AND THE WORKERS

Successive layers of comb are added underneath the existing layers, so that the nest grows downwards. Sometimes as many as 20 layers of comb are formed, held apart by pillars just high enough to allow the workers to get in between to feed the growing larvae.

The nest envelope is extended to enclose new comb, and pockets formed within it trap air to insulate the nest and keep it warm. Wasp nests function at a temperature of 31°C.

For the first three or four days after they emerge, new worker wasps stay in the nest and help to feed the developing larvae. As they get older they perform different tasks, for example, leaving the nest to collect water and wood fibre to expand the nest. The water is used to carve out and enlarge the nest entrance. Wasps spit the water onto the area to be enlarged and mix it with the material to be disposed of to form pellets. The pellets are then carried from the nest.

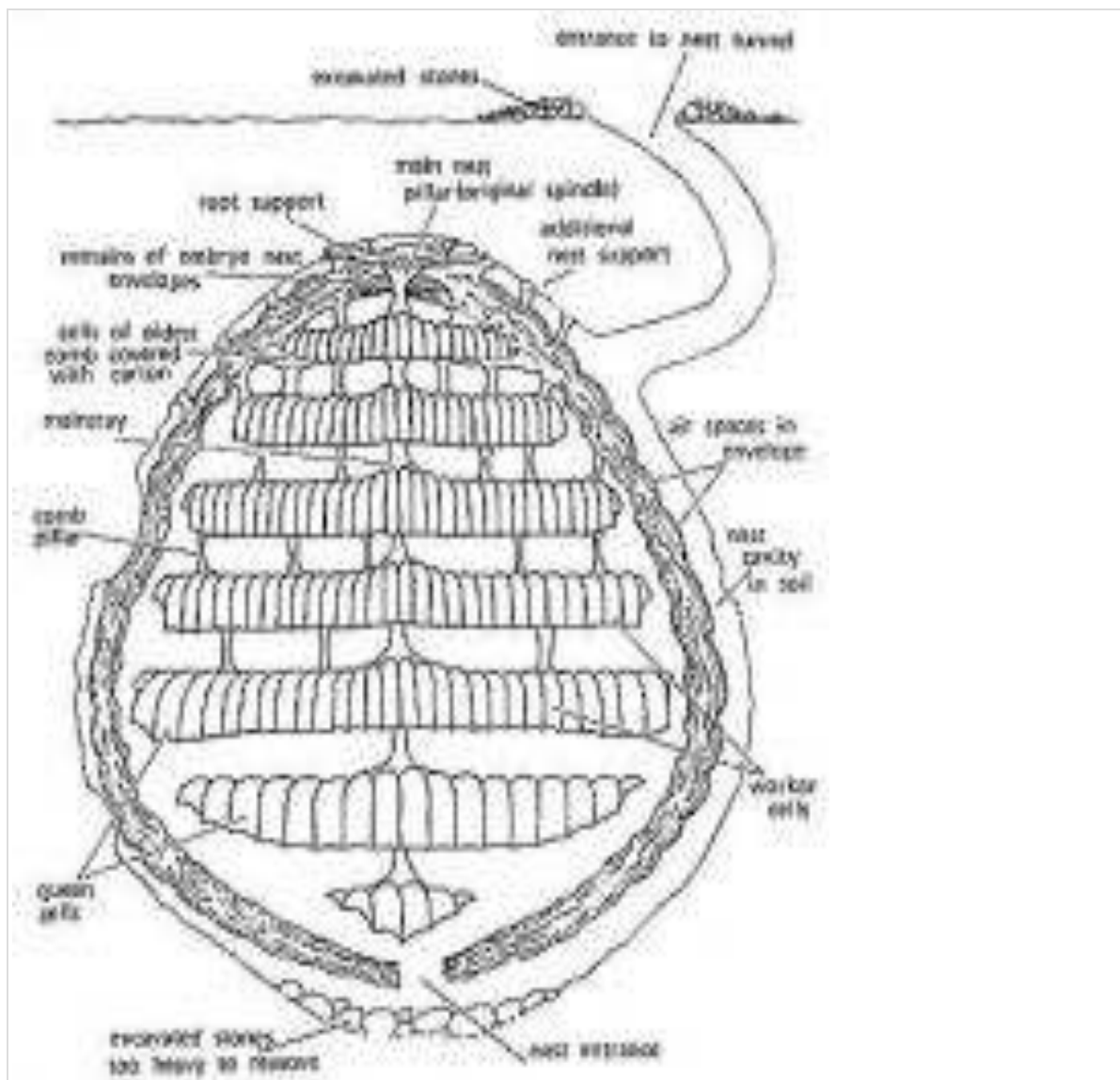
After working on nest-building for a while, the worker wasps then switch to food gathering. They get energy from nectar or honeydew, and, protein from insects or dead animals.

Worker wasps have very few enzymes in their guts, so they cannot digest much of the food they gather. They bring the raw food into the nest and pass it to other workers who feed the hungry larvae. In return, the larvae release a creamy blob of predigested 'soup' which contains all the sustenance the worker needs. This type of food exchange is called 'trophallactic feeding', and is a key part of the social contact between workers and the developing young.

On most foraging trips the workers gather food within a few hundred metres of the nest entrance, but they can make occasional journeys up to a kilometre away. Wasps may follow one another to good food sources, but they cannot tell one another about the location of foods, as bees do. They are also forced to feed in cold or rainy weather because they do not store honey or pollen like bees.

After a period of foraging for food, the worker wasps again turn to spending most of their time in the nest, this time as guard wasps by the nest entrance. Nearly all worker wasps die before they are 3 weeks old.

The workers are sterile female wasps. The queen releases a pheromone that blocks the reproductive development of the workers. If the queen dies, the workers start to develop ovaries within a couple of weeks, and can eventually lay eggs. The wasps that hatch from these eggs, however, are always males.



A NEST BEGINS

1. The queen wasp awakes from hibernation in the spring. After a short period of feeding and exploring, she begins to build a nest in a dark and dry place. She usually chooses a warm spot, often in a bank with a sunny aspect, but also in attics, house roofs, eaves, or walls, and can fly up to 70 km in search of the perfect nest site.
2. She builds a honeycomb-like cell structure out of wood fibre. The wood fibre is chewed and glued together with wasp saliva to form a sort of paper mâché material.
3. In each cell of the new nest, the queen then lays a single egg, which hatches into a larva in 5-8 days. The queen gathers sugary substances and catches other insects (for protein) to feed the larvae. After five moults over about 15 days each larva spins a silken cap over the cell and pupates. Pupation takes 8-18 days before an adult worker wasp emerges. In total it takes approximately 28-48 days from egg to adult, although the length of time spent in each stage is determined by environmental conditions.

Sometimes another queen tries to steal the nest instead of working to make her own. There are many prolonged fights between queens for the ownership of nests. This is one of the reasons why a large proportion of founding nests (where the queen is still working alone) fail to become established. Also, cold, wet springs reduce the number of nest which establish. Once the queen has five to seven worker wasps to help her, she stays in the nest and lays eggs for the rest of her life. The nest then grows rapidly, and the nest is likely to survive for several months.



Queenie hypes across the perfect spot to set up rule for the season...

1 The queen looks for a location for a new nest



2 Building honeycomb-like cell structure

PRODUCTION OF DRONES AND QUEENS

In late summer and autumn the wasp nest starts to produce fertile wasps, called 'gynes'. The males (drones) usually hatch from worker cells, and they appear about 2 weeks before the queens. Drones are fertile males that are only present in late summer or autumn.

The queens are produced in specially enlarged cells, in comb near the bottom of the nest and an average wasp nest produces between 1000 and 2000 queens a season. The queens may remain in the nest while they build up fat for winter. The drones remain in the nest until the queens force them out. From then on they stay away from the nest and feed while they wait for an opportunity to mate with the queens.

Drones that have left the nest tend to gather around trees or prominent objects on high ground. They fly continuously back and forth around such objects, and rush in to mate with any queen that flies into the mating swarm. The male's sperm is stored by the queen within a small sac (called a spermatheca) in her reproductive tract until she needs it to fertilise eggs for a new nest in the spring.



Drone



Swarm of drones around a queen



Queen

HIBERNATION AND OVERWINTERING NESTS

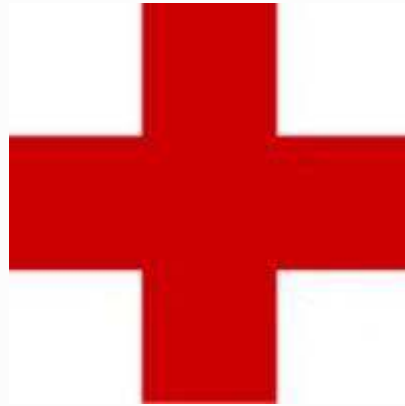
Once the queen has mated she goes to find a dark, dry place to hibernate for the winter. When the queens hibernate, they tuck their antennae neatly between their legs, and bite the substrate in order to hang on. Hibernation uses up very little of their stored fat, and most queens survive this resting period.

Most wasp nests die off in late autumn after the queens and drones have been produced. In New Zealand, about 10% of German wasp nests are able to survive the winter. When conditions improve again in spring, such nests already have a strong worker force and an existing nest structure. This means that they can grow very rapidly, and reach an enormous size by the end of their second autumn.

The largest German wasp nest ever found was about four metres high and contained about four million cells. In nests like these the original queen is replaced by several new queens to lay eggs in the second season.

Common wasp nests do occasionally survive the winter, but the overwintering nests found so far in New Zealand had not produced queens in their first autumn.

FIRST AID



What to do if you or someone with you is stung:

- 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 (unless you have to avoid these medicines for medical reasons). If you don't have a commercial antihistamine cream common household products are useful, e.g. for bee stings apply bicarbonate of soda, for wasp stings apply vinegar, on 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.

If you have been stung 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.

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

Treat by:

- Keep the sting area lower than the level of the heart
- 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
- Monitor patient continually
- **Seek medical help urgently**

Wasp Stings

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.

You can be stung several times and think that you 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.

A suspected anaphylactic reaction requires prompt medical treatment. A reaction that may initially seem mild, may progress to being more severe.

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

Your first wasp sting 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.

If you've ever had an allergic reaction to an insect sting in the past you should also wear a medic alert bracelet that lets others know you are allergic to insect stings. People who have had severe reactions in the past to bee or wasp stings should ask their doctor about immunotherapy (allergy shots).

Immunotherapy

Immunotherapy is also referred to as hyposensitisation or desensitisation. Treatment of increasing amounts of pure venom is usually administered once a week by subcutaneous injection until the equivalent of two stings can be tolerated. After that the patient must have monthly maintenance injections for several years.

Disclaimer of Liability for Health-Related Advice

This information is not intended to be comprehensive or to provide medical advice to you. 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.

FAQ: FREQUENTLY ASKED QUESTIONS

The most frequently asked questions are:

What wasp is this?

How do I kill it?

Other FAQs are:

How are wasps different to bees?

How many stings does a wasp have?

What is the venom that the wasp injects into you?

What is the first aid for a wasp sting?

Can wasps sting you if they are dead?

Why do wasps sting people?

Why are wasps black and yellow?

How many kinds of wasps are there?

What is the life cycle of a wasp?

How long do wasps live for?

Why are queen wasps bigger than worker wasps?

How many wasps can there be in a colony?

Where do wasps build their nests?

What do wasps eat?

Do any other animals eat wasps?

Are wasps good fliers?

What are wasps wings made of?

How many times does a wasp beat its wings every second?

How do wasps communicate?

Answers to your questions

How are wasps different to bees?

Wasps and bees both belong to the order "Hymenoptera" and have many features in common.

The most obvious differences are:

wasps do not collect pollen, bees do

wasps do not store food, bees do

wasps do not make honey, bees do

wasp nests are made of paper, bees nests are made of wax

wasp mouth parts are designed to chew food, bees mouth parts are designed to lap liquid

wasps can sting more than once, bees can only sting once

What is the venom that the wasp injects into you?

The principal component of venom is protein — it is the protein that causes allergy reactions in people. Several different proteins have been demonstrated in wasp venom, the total number and relative proportions vary among the different genera. Other components of venom include an acetylcholine-like substance, histamine, serotonin, and kinin. Kinins are peptides that cause slow contractions of isolated smooth muscle, lower arterial blood pressure, and increase capillary permeability.

Can wasps sting you if they are dead?

Yes — the venom sac at the end of a wasp sting keeps pulsing for a short period after a wasp dies, so if you come in contact with the sting you may still be injected with venom.

Why do wasps sting people?

Unprovoked wasp attacks are very rare, a wasp will normally only use its sting to defend itself or to subdue prey. Many wasp stings are the result of people squashing wasps, either deliberately or by accident. Wasps are attracted to food (especially fish sandwiches) and sweet drinks. People have been stung while they are eating because they have not seen the wasp that is also sharing the food. Or, in the case of drinks, they have not seen a wasp enter their drink container and are stung as they take a drink by a wasp who wants to escape being swallowed. Wasps also sting intruders to defend their nest. When a wasp nest is disturbed, wasps will fly out with a wing beat frequency that stimulates 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.

Why are wasps black and yellow?

Bright colours are a sign of danger. Many species that are venomous, like snakes, spiders and wasps, are brightly coloured, and this colouring warns potential predators that they are dangerous. A predator, that attacks a wasp and is stung will link pain associated with a sting with the yellow/ black colouration and avoid animals with this colouration in future.

Different colours are produced by the differential absorption and reflection of light. Absorption of light is due to pigments — the black colouration is produced by the pigment melanin, which occurs in granular form within the cuticle, while the yellow colours are created by the pigment xanthopterin.

How many kinds of wasps are there?

The term 'wasp' means different things to different people. There are several thousand species of Vespidae (vespid) wasps, a group which contains all of the social wasps (about 800 species), and many more solitary wasps which do not form colonies.

How long do wasps live for?

In social wasps, workers (sterile females) have an average lifespan of 12-22 days, drones (fertile males) have a slightly longer lifespan than workers, and queens (fertile females) have an average lifespan of 12 months. Check our [The Life History of Social Wasps](#) page for more details.

Why are queen wasps bigger than worker wasps?

Queen wasps are bigger because they have to produce and store large quantities of eggs. Being bigger also means that they can store more fat, which is essential if they are to survive winter hibernation — by the time queens leave the colony, fat reserves account for nearly 40% of their total dried weight.

The differences in size result primarily from variations in quantity and quality of food received during the larval stage — queens receive almost twice as much food as workers.

How many wasps can there be in a colony?

An average common or German wasp nest produces between 11 000 and 13 000 workers and from 1000 to 2000 queens a season.

Where do wasps build their nests?

German and common queen wasps usually choose a warm spot, often in a bank with a sunny aspect, but also in attics, house roofs, eaves, or walls in which to build their nests.

What do wasps eat?

Wasps eat a wide range of invertebrates including spiders, caterpillars, ants, bees, and flies. It has also been suggested that wasps may prey on nestling birds. Wasps also collect honeydew. Honeydew is produced by a native scale insect. The insect inserts its mouth-parts into the trunk of the beech tree to siphon the sap. The excess sap, modified by the scale insect, forms a sugary droplet at the end of a waxy anal filament. Wasps reduce the standing crop of honeydew by more than 90% for 5 months of the year and so compete with native species (such as birds and invertebrates) that also consume honeydew.

Do any other animals eat wasps?

Yes. In the countries where wasps originate, a wide range of natural predators have been recorded including invertebrates (dragonflies, robber flies, hornets, centipedes, and spiders), birds (at least 24 species are known to eat wasps, including blackbirds, magpies, starlings) and mammals. In Britain, badgers are the chief predator: they destroy entire colonies to obtain the brood-filled comb. Stoats, weasels and mice also disrupt colonies in the early stages. However, in New Zealand, one reason wasps have so successfully established is that most of their natural predators are not present.

Are wasps good fliers?

Yes, workers can fly many hundreds of metres searching for food. In spring, queens can fly many kilometres when searching for sites to make new colonies.

What are wasps wings made of?

Chitin. Wings are platelike extensions of the integument (outer skeleton), strengthened by a framework of hollow tubes known as veins.

How many times does a wasp beat its wings every second?

Wing beat varies between 117 and 247 beats per second.

How do wasps communicate?

Virtually any contact between two wasps can be considered a form of communication. Visual and audible signs are used to attract the opposite sex for mating, and size and posture displays are used in courtship or aggression.

Exchanges of food and pheromones among the members of a colony are also very important in maintaining the social hierarchy and tasking of the colony members.

Worker wasps have very few enzymes in their guts, so they cannot digest much of the food they gather. They bring the raw food into the nest and pass it to other workers who feed the hungry larvae. In return, the larvae release a creamy blob of predigested "soup" that contains all the sustenance the worker needs. This type of food exchange is called "trophallactic feeding", and is a key part of the social contact between workers and the developing young.

Queens produce a pheromone (insect-produced chemical substances that release certain specific behaviour patterns) that regulates worker behaviour and inhibits the development of their sexual organs. Wasps also produce an "alarm pheromone" that stimulates a general state of alarm in the colony and releases aggressive behaviour towards an intruder. Rapid wing beats also function as an alarm signal stimulating other wasps to defend the nest.