

Ants

and their control



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“Those blasted ants! Where did they come from?”

There's no doubt that even the early cavemen would have uttered those very words in the Neanderthal tongue – maybe as they were sitting down to have a picnic feast on some woolly mammoth steaks.

When it comes to ants themselves, we humans have developed a “love/hate” relationship with them. We can admire them for their industry, their social behaviour, their ability to change their environment to suit themselves and their ability to defend themselves. We are not so fond of them when we find them inside our pantries, power points, electrical motors and even in our pants! They can be an economic pest in agriculture by attacking crop seed-beds or, more importantly, by guarding and transporting aphids and coccids harmful to crops and orchards.

We spare no efforts to rid them from our homes and immediate surroundings but can tolerate them when they confine their activities to the areas away from our dwellings. We can even watch them in admiration as they go about their business, removing dead animal carcasses from the environment and generally cleaning up. No matter what you think of ants, much time and effort has been expended studying them and also studying ways to eradicate them.



BIOLOGY

Social insects

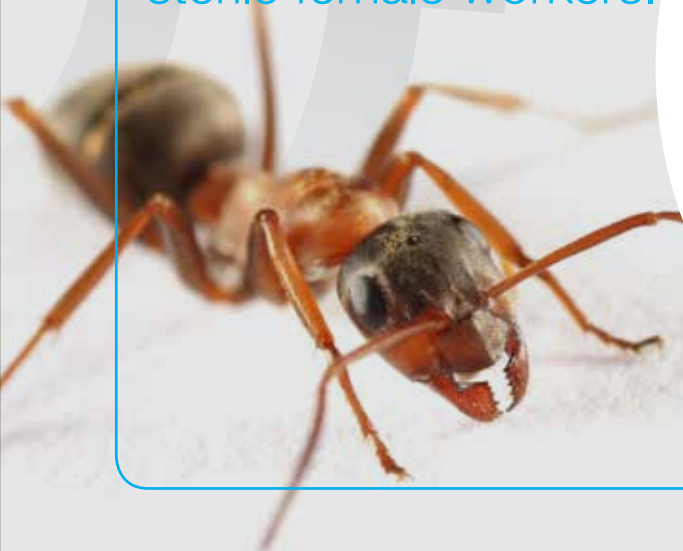
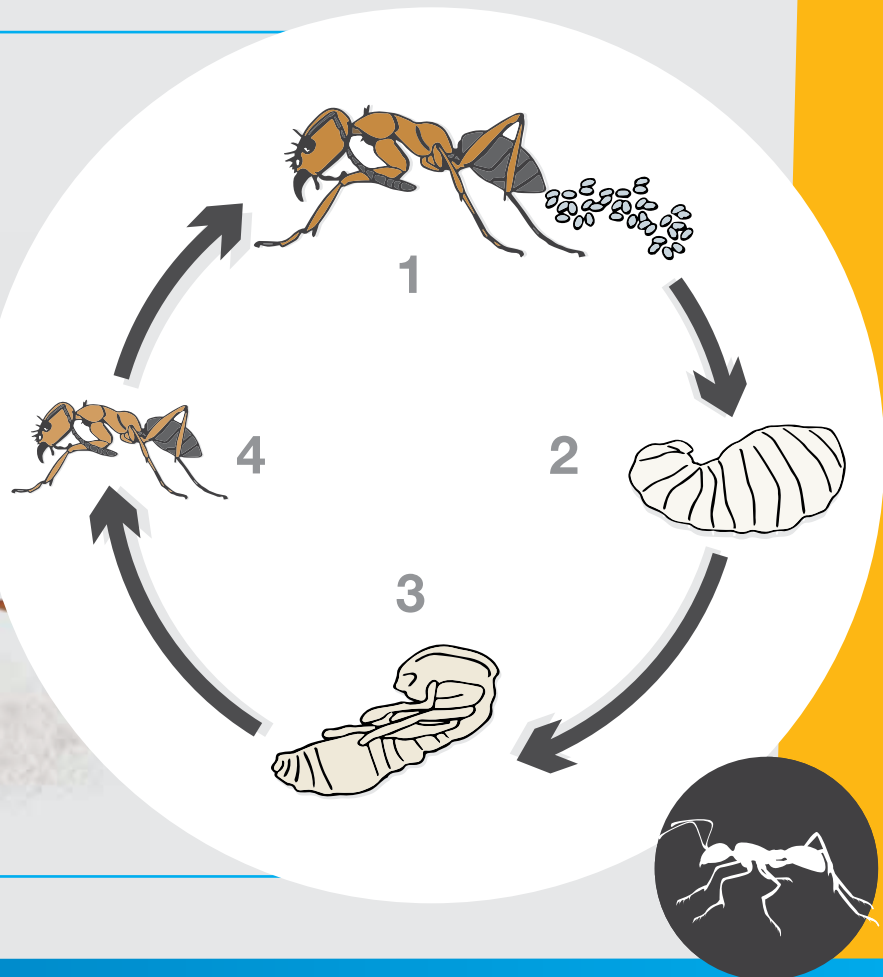
Ants belong to the Order Hymenoptera (Superfamily Formicoidea, Family Formicidae) along with bees and wasps. Many species from these three groups are “social insects,” living together in colonies. In fact, the highest level of both communication and defence occur in the social groups. Communication via odours plays a part in sex attraction and territorial behaviour in the case of bumble bees. Ants use pheromones for trail making. To our distress, many ants, bees and wasps also “pack a punch” when it comes to stinging and/or biting. On the plus side, a large number of Hymenopterans play an important role in pollinating flowering plants with the honey bee (*Apis mellifera*) being the best known.

All ants are social insects with a number of castes: males, fertile females or queens and wingless and usually sterile female workers. The workers, all sterile females, may be subdivided into soldier castes sometimes major and minor types. There are more than 15,000 known species and subspecies throughout the world with around a tenth of those species found in Australia. They are found in all Australian states and territories with numerous species being found in bushland and rainforests.

Life cycle

Ants may vary in length from about 1 – 30 mm and are typically black, brown, red, yellow or a combination of these colours. They have a typical appearance with a “waist” between thorax and abdomen and a large metapleural gland opening on each side of the metathorax. They have elbowed antennae and mandibulate mouthparts. Some have a sting at the tip of the abdomen. They exhibit complete metamorphosis with the first eggs being laid by the queen in a small chamber. These eggs hatch into larvae which are white and grub-like. In some species the larvae spin a pupal cocoon but some remain naked. After pupation, the adult castes emerge. Males and females are usually produced at a fixed time of the year depending upon the species. When both males and females are winged, a mass nuptial mating flight or flights may occur. After mating, the unfortunate male staggers away and dies while the female sheds her wings and finds a suitable location to begin a new colony. There is a very high degree of mortality with these flying ants which is lucky for us otherwise we would be neck deep in ants. At the time of the nuptial flights, the ants are sometimes confused with termites, causing consternation in the hearts of many a homeowner and the pest manager who may be looking after the property!

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WHY?

Most ant species are not considered to be pests with only a few native and introduced species causing some concern.

Some nest in decaying timber and may be suspected of actually destroying it whereas they will only infest decaying timber. Most foraging workers come from the exterior of premises but it is not particularly uncommon to find nests in roof voids, cavity walls, behind skirting boards, inside motors, inside window screens, under bath tubs, behind tiles in bathrooms and kitchens and behind taps.

In short, they like similar locations to cockroaches and as a result, control methods are very similar. Because of their nesting

habits, it is common to find piles of gritty material on the floor or other horizontal surfaces or around door and window frames. On closer inspection, these piles may be found to contain dead ants which have been thrown out of the nest. No matter how often you sweep up the mess, it will re-appear as long as the ants are active.

This habit of making a little mess is not a mammoth problem but ants do become a nuisance when they are spotted walking inside pantries and getting into food containers, trailing along bench tops, window sills, skirting boards, bath tubs and invading shower recesses.

Fortunately for us, they are not generally considered to be health pests although the relatively rare Pharaoh's ants which are often found inside hospitals are potential disease carriers as they can invade dressings of patients confined to beds and thus pose a real menace.

WHAT?

Pest ants can be divided in two ways: by colour and size i.e. small black or brown ants and larger miscellaneous species or, by food preference i.e. oily food eaters, protein feeders or sugary-type food eaters. No matter how you choose to

categorise ants, correct identification is essential if you choose to use ant baits for their control as some are specific for certain ant species.

The most common small black ants are:



White-footed black house ants or, black household ant in Victoria (*Technomyrmex albipes*) a species which will nest inside or outside. They are 2.5-3.0mm in size and black with pale amber tarsi. They will eat a range of food types but prefer sweet materials.



Black house ant (*Ochetellus glaber*) a species which normally nests in the ground, under bark or in decaying wood. They will also nest in roof voids or other building cavities. They are shiny black and 2.0-3.0 mm long. They prefer sweet foods.



The most common small brown pest ants found in Australia are:



Coastal brown ants (*Pheidole megacephala*) a species which can usually be found within buildings and under paths or in rockeries, throwing out piles of soil and debris. They are 1.5-3.0 mm in length and light brown to brown in colour. They have both major and minor soldier castes with the major caste having a relatively huge head. They eat proteins and fats.



Brown house ant (*Doleromyrma darwiniana*) a species with similar nesting habits to coastal brown ants. They are 2.0-3.0 mm in size and brown in colour. There is a distinct odour of formic acid when they are crushed. They prefer high protein foods.



Pharaoh's ants (*Monomorium pharaonis*) a species which is rare in Australia but fairly common in Europe and the USA. They commonly nest inside buildings especially near warmer areas e.g. heating ducts. They form large colonies with multiple queens which can take a number of workers with them and start new colonies if disturbed by insecticides. The ants are 1.5-2.0 mm in size, light yellowish brown to darker brown in colour. They will eat protein foods plus fatty or sweet foods.



Argentine ants (*Linepithema humile*) a species which was introduced from South America and is regarded as a very serious pest which has been the target of eradication campaigns since the 1950's. They may nest in exposed soil or concealed by plants or logs. They are 1.5-3.0 mm in size and light brown to brown in colour. They are very aggressive ants and drive out other ant species and other animals from their nesting areas. They will consume a wide range of foodstuffs - sweet foods, meat, insects, seeds and honeydew.



Odorous ants (*Tapinoma minutum*) a species which will nest inside buildings and in wall voids and sub-floors. They are 2.0-3.0 mm in size and brown to dark brown in colour. They will eat sweet foods but will also feed upon meat and household scraps.



Singapore ants (*Monomorium destructor*) a species with similar nesting habits to coastal brown ants but has also been found nesting in electrical switch boxes and can chew through plastic and rubber. They are 2.0-3.0 mm in size and light brown with a darker posterior abdomen. They can bite and sting. They will also feed upon both animal and sweet foods

Miscellaneous species include:

Carpenter ants, Jumper ants, Bulldog (Bull) ants, Greenhead ants, Meat ants and Imported Red Fire Ants. Details on these ants can be found in our old friend, "Urban Pest Management in Australia" or on the CSIRO or your State Museum website. Pest managers do carry out control measures on these species but not as commonly as with the foregoing species.



HOW

In the “good old days,” control measures were unsophisticated to say the least. The “pestie” would back up his truck into the driveway, unroll a long hose and proceed to deluge the front and backyard with around 60 litres of an organochlorine insecticide. This was termed a “blanket spray.” The spray would be applied to all lawns, gardens, pathways, fence lines and the base of the house. It may have been applied to the subfloor area where there was one. The roof void would have been dusted with a synthetic pyrethroid powder and maybe even a space spray with Dichlorvos carried out to the interior.

Was this an effective form of treatment?

Well, despite what you would suppose, it often wasn't and many a call-back was carried out because the ants were still trailing up the back wall.

Why wasn't it effective?

Basically because there was never any effort to locate the nests and the insecticide would have killed many workers but left the nest and all the larvae and pupae untouched, ready to emerge as adults. The insecticide emulsion would be absorbed by porous surfaces and not readily available for pick up by the insects. However, it was the only method used and nobody ever questioned it (apart from the clients who still had ants of course!). Later modifications involved reducing the quantity of insecticide by only spraying a “grid pattern” across the property. By this time, organochlorines were not available and organophosphates, primarily, chlorpyrifos, were used. This was more toxic and much more smelly and possibly most importantly, much more expensive than the organochlorines. The saviour of the pest management world was the introduction of very effective ant baits – solids, liquids or viscous gels. Finally, we could control ants!



So, what are the rules for successful ant control?

As you may guess, the first rule is to carry out a: Thorough Inspection A good starting point is to talk to the clients. Their children might be more knowledgeable on the ants' activities as they are more likely to spend time looking at them.

You may use questions such as: “Where have you seen them?” “When?” “How often?” “Are there any moisture problems in the house?” As usual, they may not be able to offer anything of value but they may surprise you.

If you can obtain a floor plan, mark the areas where the ants are tracking. This may help you in establishing the site of the nest and will be helpful when planning baiting strategies. If you can't obtain any assistance from the occupants, you will need to inspect the following areas:

- **Kitchens** – bench tops, along skirting boards, window sills, inside cupboards, inside refrigerator motors, behind taps and wall tiles and under the sink;
- **Other interior areas** – along skirting boards, under carpet edges, window sills, around power points (be careful of electricity), along electrical cables and behind taps and tiles in the bathroom. Look for small piles of grit, sand and dead ants. These piles will form directly underneath ant activity, so look above and you will hopefully see ants tracking;
- **Exterior** – ants could be almost anywhere. They might be trailing along fence rails, on paths, in the lawn or in garden areas. Some species e.g. *Camponotus*, may be more active during the night and you may need to leave some food out to see if it has been taken. Following an indoor ant trail that seems to disappear suddenly, you may find them appearing outside near the point of disappearance. If not, they could be nesting inside a cavity wall or roof void.

Since they are social insects, all ants require a nest from which to operate. Some species will nest in decaying wood, some in soil, some in soil beneath items and some will readily nest inside dwellings in a wide range of locations. Some (black ants) have been found nesting in vehicles – the First Aid kit in a glove box and inside the wing mirror of a pest control vehicle! When you are searching for nests, look for small piles of grit, sand and dead ants. These piles will form directly underneath ant activity, or directly adjacent so look above and you will hopefully see ants tracking.

If you can find the nest, it makes your job easier as you can treat it directly. If not, you will have to rely upon sprays, dusts or baits. These will take longer but, when used correctly, will still provide good control. When using baits, the key is to correctly identify the ant species so that you can use the right bait.

CONTROL MEASURES

Effective control depends upon a number of factors:

1. The particular species involved,
2. The location of the nest site(s) and,
3. The degree of concern they are causing the occupants.



It may be easy to control a colony with a single queen (*Camponotus* spp), or difficult in the case of species with multiple queens and multiple “homes” and which do not display aggression to workers from other nests (Argentine ants, Odorous house ants and Pharaoh’s ants). That is why correct identification is essential before you begin your campaign.

Too many pest managers do not bother to discriminate between species or simply class them as “black” or “brown” ants. On some occasions, Pharaoh’s ants have been misidentified as coastal brown ants and attempts have been made to eradicate the infestation by spraying the ant trails with a synthetic pyrethroid or even just with a pyrethrin aerosol.

The resultant disturbance to the colony meant that the multiple queens in the nest split off from the main colony, taking a number of workers with them. The end result was

that the pest manager had a lot of nests to contend with and the hospital staff had a lot of complaints from the patients! The nursing staff had to place the bed legs into jars of water to stop the ants crawling up them and they had to take the bell cords from the beds to prevent the ants crawling down them! One poor unfortunate lady, who was still semi-comatose after an operation, had an eyelid eaten away by the rampaging ants. All of this fiasco simply because the pest manager was too lazy to obtain a correct identification!

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CONTROL BY BAITS AND SPRAYS

With the advent of specific ant baits, both solid and gel type, our problems were nearly over when it came to ant control inside or outside premises.

Ant granules were perfect for the control of some ant species to exterior areas. One formulation even controls pest cockroaches just for good measure!

Most insecticide manufacturers suggest that a two-pronged approach with both baits and liquid sprays be used in order to obtain best results. These manufacturers all supply bulletins with complete instructions on how to use their products. The product labels and these bulletins should all be studied before using any of the materials.



The basic rules for the use of baits are:

- The basic premise is that bait should hopefully be consumed within 1 to 2 days when their palatability and moisture content are highest. The ants should die within 3 to 4 days.
- **Correct identification (which can't be stressed enough!)** – by knowing the species, you can choose the right bait for the job and can also help you find their feeding, trailing and nesting sites.
- **Find the trails** – you must place the bait where the ants are otherwise you are wasting time and bait. If the ants aren't active at the time, you can pre-bait first with non-toxic foodstuffs. This will help you determine where the ants are feeding and what type of food they prefer.
- **Choose the correct bait formulation** – ants are more finicky feeders than the average two year old child. They may prefer sweet foods or protein based materials. Sometimes the same species will change food preferences depending upon seasons or other conditions. Therefore, you need to have a range of baits in your kit bag. If you just put a small blob of each bait in the ant trails, you will very soon find which they prefer. They will usually jump on the bait within seconds! Using ant baits has a number of similarities to using rodent baits and that shouldn't be a surprise to anybody. Some key rules to observe are:



“Why waste money by applying two formulations?” and that is probably a good rule to live by.

- Place the bait as close as possible to ant trails which are usually near feeding or nesting sites.
- Place adequate amounts of bait out to ensure that they will continue to feed until your next visit. By placing the bait in purpose designed “ant cafes,” you will extend the life of the bait.
- Avoid food competition by asking the client to remove available foodstuffs and liquids.
- Avoid placing gel baits near sources of heat as the gel matrix may become liquefied and moisture loss may increase. Also, avoid placing them on dry or porous surfaces which may increase water loss and make them less palatable to ants.
- Some baits lose their potency after only a few days exposure to sunlight. Make sure that you know which they are and replace them as required.
- Some granulated baits lose their potency around three months after the container has been opened. Make sure that you write on the container the date on which it was opened.
- A common piece of advice is that you mustn't place baits on surfaces that have or will be treated with liquid or powder insecticides. Studies carried out by some

researchers have indicated that this is not the case and the baits are still palatable. Some pest managers have stated, “Why waste money by applying two formulations?” and that is probably a good rule to live by.

You may be able to control the ant problem without the use of insecticidal sprays and dusts but, all manufacturers recommend that bait applications are supplemented by the use of such formulations when treating free standing buildings. These insecticidal barriers will serve to prevent future ant activity to the interior.

The basic rules for the use of residual insecticide sprays are:

- Non-repellent formulations are considered superior to repellent formulations e.g. synthetic pyrethroids, as the ants will track through the non-repellent insecticide unknowingly. Examples of non-repellent actives and formulations are Bendiocarb (Ficam), Fipronil (Termidor), Indoxacarb (Arlon), Chlorfenapyr (Phantom).
- The sprays should be applied as a barrier to the base of foundation walls, fence lines and garden beds.
- Re-application of the sprays may be necessary after rain.
- Insecticidal dusts should be applied to roof voids where practical.



SUMMARY

Ants are generally considered a nuisance when they invade your home or workplace but tolerated when they confine their activities to the exterior (except when you're having a picnic!).

Ants are little creatures whose infinite capacity for hard work inspires admiration from observers.

Ant control used to be quite difficult before the advent of effective gel/liquid baits but is now relatively straightforward if you follow all the rules.

Ants perform a very useful function in nature by generally cleaning up the environment and aerating the soil.

Ants should not be killed unless there is a good reason to do so e.g. they nest inside your First Aid kit

REFERENCES

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<http://australianmuseum.net.au/Ants-family-formicidae/>

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