

Distance[®] **PLUS** ANT BAIT



Intelligent colony control



SUMITOMO CHEMICAL





What is Distance[®] PLUS and how does it work?

Distance[®] PLUS Ant Bait is based on the insect growth regulator Pyriproxyfen and relies on the novel impact that this juvenile hormone analogue has on queen fecundity and larval growth. By interrupting the hormonal balance in ants, Pyriproxyfen both prevents the queen from laying viable eggs and prevents metamorphosis of larvae into new workers and reproductives. Eventually the colony collapses as worker ants are not replaced.

Since the discovery of red imported fire ants (*Solenopsis invicta* - RIFA) in Brisbane in 2001, Distance[®] Ant Bait has been the key bait product used in the Biosecurity Queensland eradication program. Expanding on this technology Sumitomo Chemical has now developed a new modified version of Distance[®], aptly called Distance[®] PLUS Ant Bait that is designed to be attractive and efficacious on a much wider range of ant species. Under special permits Distance[®] PLUS Ant Bait has been used for eradication programs on yellow crazy ant and African bigheaded ant.

Distance[®] PLUS provides long-lasting ant control. However, it is important to understand that IGRs work slowly, causing a gradual reduction in worker numbers. Other granular baits may reduce ant numbers more quickly but often the queen (or queens) will survive and begin reproducing again. The end goal should be elimination of the colony. This is the strength of Distance[®] PLUS.

Many of the hard to kill ants have complicated social structures involving multiple queens. Others form

multiple interconnected nests which might house either a single or multiple queens in different nests. Some species can form supercolonies involving multiple queens and nests spread over a large area. Argentine ants and yellow crazy ants are two good examples and both are notoriously difficult to eradicate. In fact Argentine ants are believed to have queen hierarchies, with subordinate queens kept on "care and maintenance" only, ready to replace primary or secondary queens. Argentine ant colonies also have another unusual twist – once a year they ritually sacrifice the queens ready for a new cohort of queens to develop.

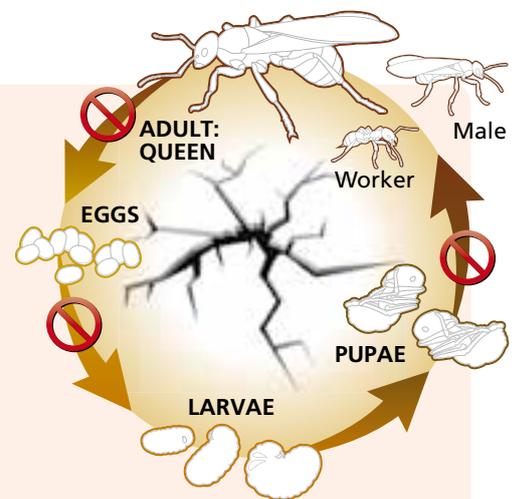
Baiting can often be ineffective because of these complicated social structures – sometimes only the current reproductive queens or a portion of them are affected, and the developing queen larvae happily grow through to reproductive maturity. Baiting may be ineffective for a lot of other reasons all related to ant biology. For instance, while ants may collect the bait when applied, they may not actually process this as food immediately and cache it in the nest until required. Ultimately the decision maker in the colony is the queen and she may decide to reject the bait as suitable food, even though it has been collected by workers and returned to the nest.

Knowledge of the biology of ant species therefore helps in understanding why some species are difficult to eradicate.

What are IGRs? – Breaking the reproductive cycle

Insect growth regulators mimic natural hormones in insects that regulate reproduction and development. Pyriproxyfen is in a group of IGRs called juvenile hormone mimics which interfere with the normal cycle of juvenile hormone in the insect. Juvenile hormone controls the progression from larval stage to adult and exposure to Pyriproxyfen during pupation kills the pupae. Similarly, the queens ability to lay viable eggs is affected by the presence of Pyriproxyfen.

As a juvenile hormone mimic, Pyriproxyfen is not a toxin in a classic sense. Juvenile hormone does not occur in mammals or birds. Therefore it is considered non-toxic and is not scheduled as a poison by the APVMA.



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Bait application and timing

Distance® PLUS Ant Bait should be applied at 2-4 kg/ha for broadcast application using hand held or motorised spreaders or by aerial application. For specific nest treatments, 2-10 g should be applied over and around the nest (depending on species and nest size).

Bait should be applied in early spring or summer during the colony build-up phase when ants are actively foraging.

Do not apply during the heat of the day when ants are not foraging. Under hot conditions, best to apply early to mid morning and then late afternoon.

Do not apply if rainfall is expected and do not irrigate until ants have harvested the bait (usually within 24 hours). Bait granules easily absorb moisture and become less attractive to ants.

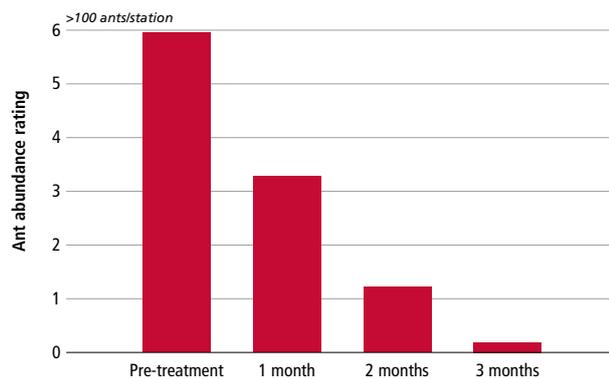
Always ensure that bait containers are tightly sealed after use to maintain freshness. Oil may become rancid over time and become less attractive to ants.

Distance® PLUS Ant Bait has a proven record against fire ants and the improvements to the formulation now make it attractive to a wide range of nuisance and invasive ants. African bigheaded ant (*Pheidole megacephala*) (commonly known as coastal brown

ant) is a significant pest, particularly in coastal areas in Australia. Trials have shown that Distance® PLUS Ant Bait is highly attractive to African bigheaded ant and highly efficacious. Various trials in northern Australia where African bigheaded ant is also a significant ecological and agricultural pest have shown a dramatic and consistent decline in abundance following bait application. Similarly, a comparison trial conducted on Lord Howe Island with a competitor product showed not only a decline in abundance to zero following treatment with Distance® PLUS but also a much reduced resurgence in abundance from either colony re-invasion or invasion from nearby infested areas.

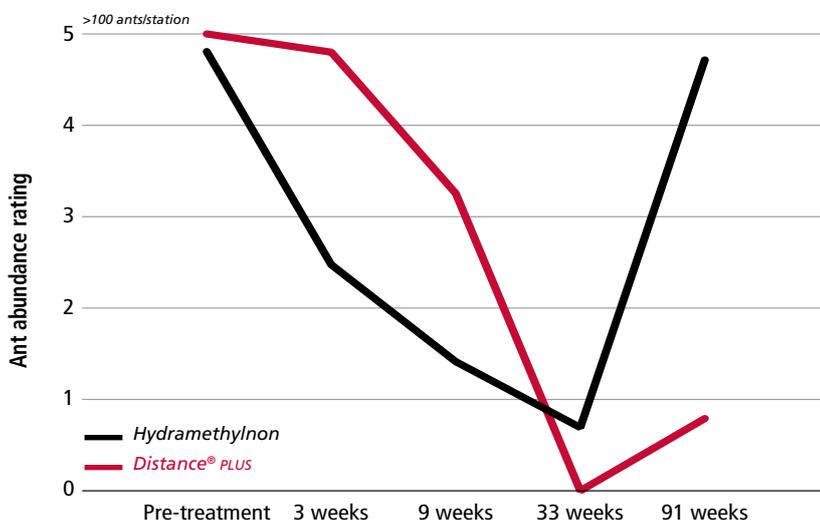
Distance® PLUS Ant Bait has also been tested on a wide range of other species including those normally less attracted to typical corn and oil-based baits.

Decline in populations of bigheaded ant in northern Australia (mean of 13 sites)



Decline in bigheaded ant abundance following treatment using various baits on Lord Howe Island (2 applications 3 weeks apart)

(2 applications 3 weeks apart)



Species tested on:

Red Imported Fire Ant (*Solenopsis invicta*),
Tropical Fire Ant (*Solenopsis geminata*),
Bigheaded Ant (Coastal Brown Ant) (*Pheidole* spp.),
Yellow Crazy Ant (*Anoplolepis gracilipes*),
Little Fire Ant (Electric Ant) (*Wasmannia auropunctata*),
Black Ants (*Iridomyrmex* and *Ochetellus* spp.),
Singapore Ant (*Monomorium destructor*) and other *Monomorium* spp.,
Pony Ants (incl. Greenheaded Ants) (*Rhytidoponera* spp.),
Meat Ants (*Iridomyrmex* spp.),
Tyrant Ants (*Iridomyrmex* spp.),
Green Tree Ants (*Oecophylla smaragdina*),
Longlegged Ants (*Paratrechina* spp.),
Sugar Ants (*Camponotus* spp.),
Pennant Ants (*Tetramorium* spp.)



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Ants in agriculture

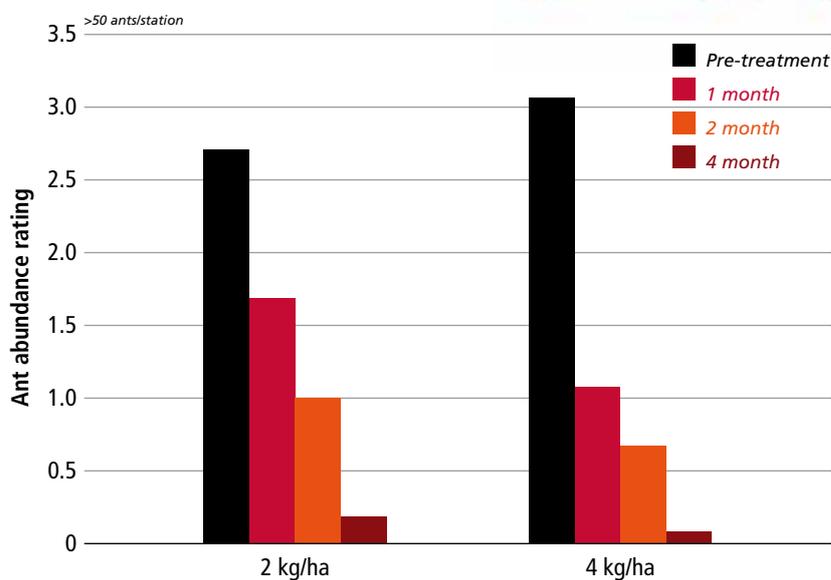
In agricultural markets there are three key segments for Distance[®] PLUS Ant Bait.

1. Controlling nuisance ants around homes, farm buildings, animal houses, etc.
2. Controlling ants which cause direct damage to crops and farm equipment such as irrigation lines and drippers.
3. Controlling ants that tend honeydew producing pest insects such as scale, mealybug, aphids and leafhoppers.

Ants can cause significant damage to growing crops. For instance, fire ants (*Solenopsis* spp.) are known to affect crops in a number of ways – seed harvesting, root pruning, hollowing out stems and direct feeding on fruit crops.

Ants may also have less direct effects on some crops. Some species may excrete formic acid or spray acid from mandibular glands and cause burning of plant tissue. Such damage is well known in bananas and can cause fruit rejection at harvest.

Decline in abundance of tropical fire ant in a melon crop in Darwin

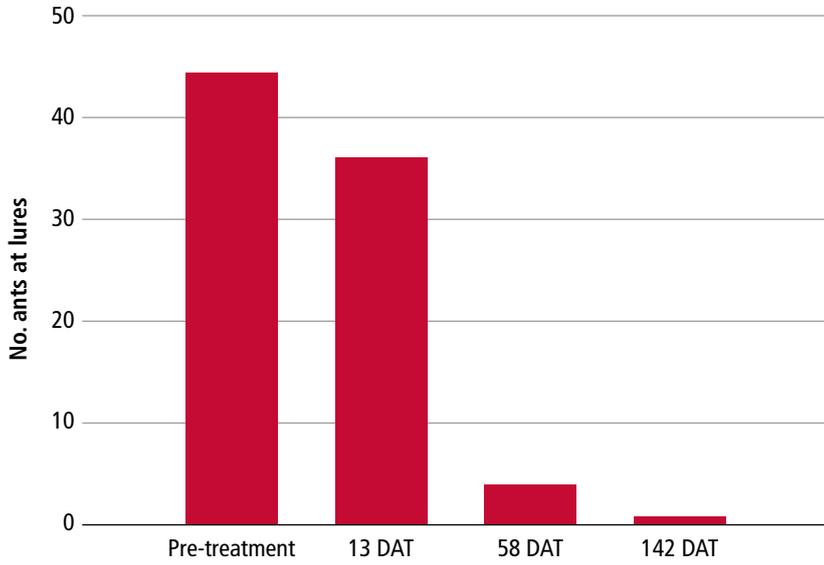


Crop damage



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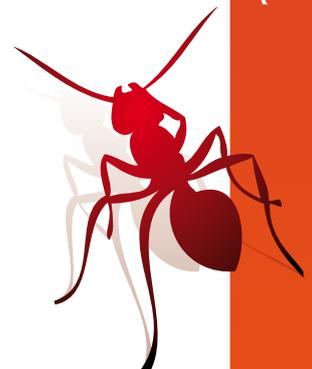
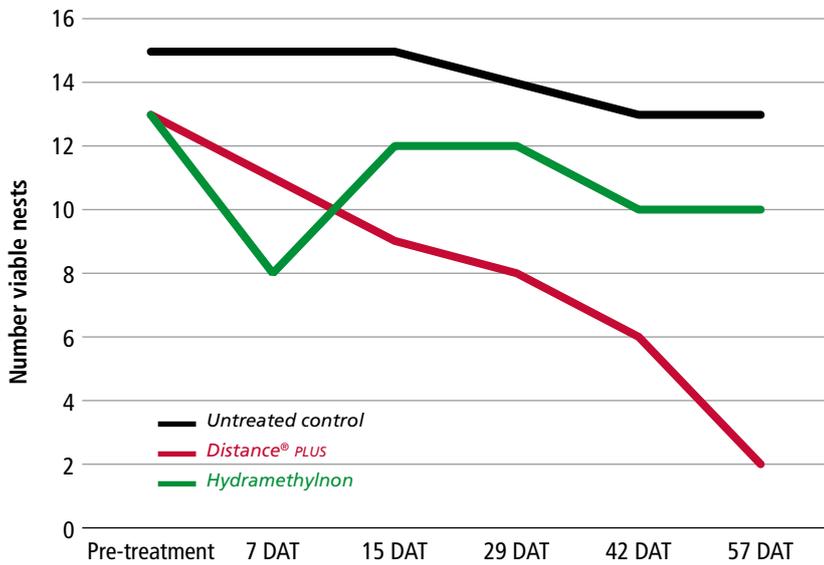
Decline in abundance of meat ants in a citrus orchard at Katherine (NT) following 2 applications of Distance[®] PLUS



Meat ants



Meat ant nest mortality in a sandalwood plantation at Kununurra (WA) following 1 application of Distance[®] PLUS





Ant-homopteran mutualism

Another important but often overlooked consequence of ants in crops is their protection of sap-sucking insects in return for honeydew reward, otherwise known as mutualism.

What is mutualism?

A wide variety of ants seek the honeydew produced by aphids, scale, mealybugs and leafhoppers, and in exchange, protect these pests from their natural enemies. Proliferation of these pests also promote sooty mould on the crop.

There have been a large number of studies worldwide showing the benefits of excluding ants from crops and the resulting reduction in pest populations resulting from



Green tree ants and mealy bugs on mango

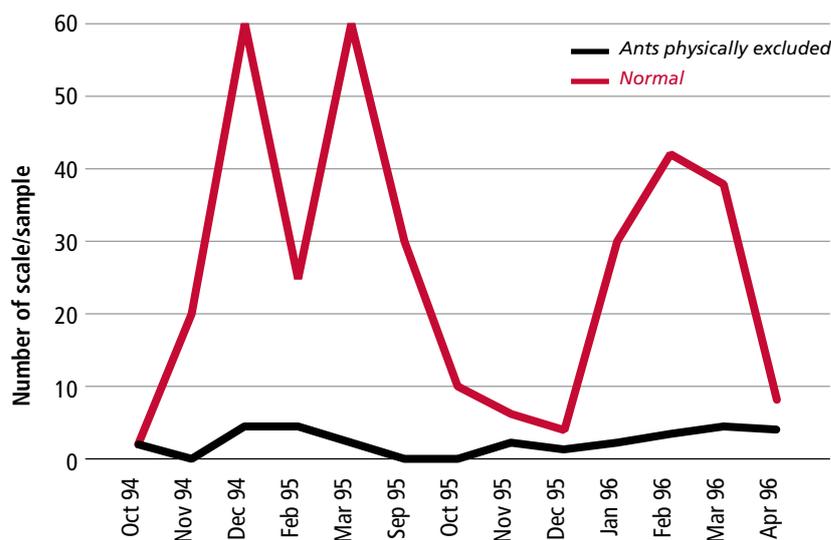


Yellow crazy ant and mealybugs on rambutan

increased numbers of beneficial insects and easier access to their sap-sucking prey. For instance, Australian researchers have shown that by physically excluding ants from citrus canopies they can dramatically reduce the number of live soft scale (*Coccus hesperidum*). Baiting is an effective option to reduce ant abundance in canopies.

Olives is another crop where ants feature greatly in the population dynamics of a key pest, the black scale (*Saissetia oleae*). Natural control agents include coccinellid lady beetles, lacewings and parasitic wasps. Ants interfere with their ability to control populations of black scale but tending and protecting the scale in return for honeydew reward.

Impact of ants on the incident of soft brown scale in citrus



James et al. (1997). The impact of foraging ants on populations of *Coccus hesperidum* L. (Hem. Coccidae) and *Aonidiella aurantii* (Maskell) (Hem. Diaspididae) in an Australian citrus grove. *J. Appl. Ent.* 121:257-259.

Citrus scale



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Key predators of scale

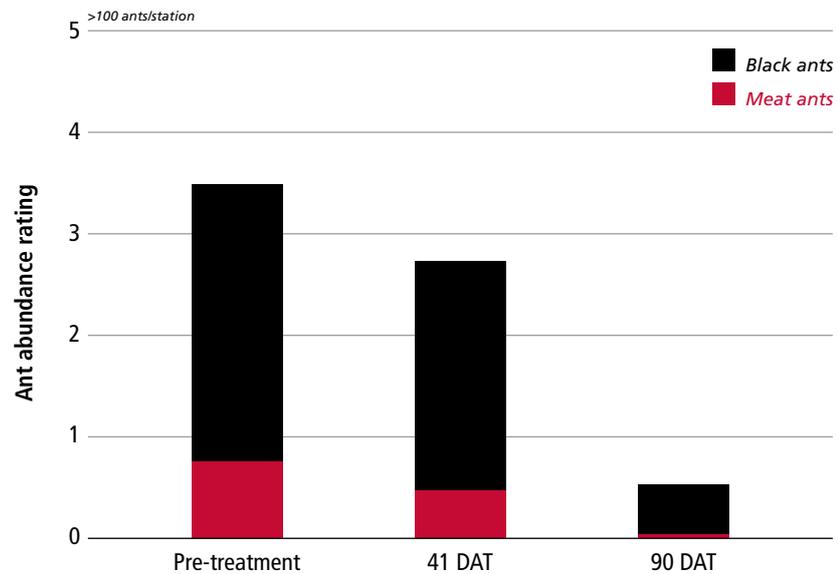


In trials in western Victoria, Distance[®] PLUS Ant Bait has been very effective in reducing the populations of scale tending ants, mostly meat ants (*Iridomyrmex purpureus*) and black ants (*Iridomyrmex rufoniger* and others). These ants aggressively tend and protect black scale and reduce the effectiveness of natural predators such as coccinellid and lacewing larvae and parasitoid wasps.

The use of Distance[®] PLUS Ant Bait as part of the program to reduce sap-sucking insects such as black scale in olives, fits very nicely with the IPM approach increasingly being adopted by Australian farmers.

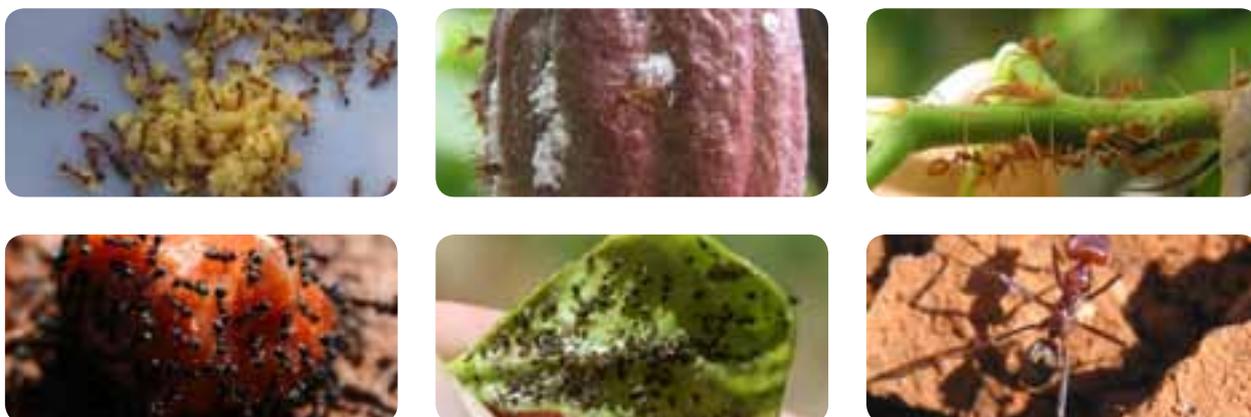


Decline in key ants following two applications of Distance[®] PLUS at 2 kg/ha in olives





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Product label

| SITUATION | PEST | RATE | CRITICAL COMMENTS |
|---|---|--|---|
| <p>DOMESTIC AND PUBLIC SERVICE AREAS, COMMERCIAL AND INDUSTRIAL AREAS Including parks, golf courses, sports grounds, paths and walkways, gardens, lawns and turf.</p> <p>CROPPING AREAS Plantations and orchards including Olives, Citrus and tropical fruits and tree nuts; Other fruits and vegetables, herbs, spices; Pasture; Native and managed forests.</p> <p>ENVIRONMENTAL MANAGEMENT AREAS National parks and reserves where invasive ants are a threat to ecosystem values.</p> | <p>INVASIVE AND NUISANCE ANTS</p> <p>List of ant species: Red Imported Fire Ant (<i>Solenopsis invicta</i>) Tropical Fire Ant (<i>Solenopsis geminata</i>) Bigheaded Ant (Coastal Brown Ant) (<i>Pheidole</i> spp.) Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>) Electric Ant (<i>Wasmannia auropunctata</i>) Black Ants (<i>Iridomyrmex</i> and <i>Ochetellus</i> spp.) Singapore Ant (<i>Monomorium destructor</i>) and other <i>Monomorium</i> spp. Pony Ants (incl. Greenhead Ants) (<i>Rhytidoponera</i> spp.) Meat Ants (<i>Iridomyrmex</i> spp.) Tyrant Ants (<i>Iridomyrmex</i> spp.) Green Tree Ants (<i>Oecophylla smaragdina</i>) Longlegged Ants (<i>Paratrechina</i> spp.) Sugar Ants (<i>Camponotus</i> spp.) Pennant Ants (<i>Tetramorium</i> spp.)</p> | <p>2-4 kg per hectare</p> <p>2-4 g per 10m²</p> | <p>Distance[®] PLUS Ant Bait should be applied in the early spring or summer at the first sign of ant activity. Application is most effective when ants are actively foraging.</p> <p>For most situations the lower rate is adequate. However, in northern Australia and where heavy infestations occur then use the higher rate. Multiple applications may also be required for heavy infestations. Multiple applications may also be required for certain species that have multiple reproductive females inhabiting the same nest, to ensure that all reproductive females are exposed to the juvenile hormone mimic. These include Argentine ant (<i>Linepithema humile</i>) and Pony ants (<i>Rhytidoponera</i>).</p> <p>DO NOT exceed 3 applications per year and a minimum of 3 months between each treatment.</p> <p>Avoid exposure to terrestrial arthropods such as land crabs. Apply only in areas of high ant density with zero or low crab density.</p> <p>Vegetables: DO NOT apply directly to crop plants. Apply to inter-row areas only.</p> <p>Poultry: Do not apply in pasture or other areas where poultry are or are intended to be feeding and/or grazing. Baits may only be laid in situations where direct access to the bait by poultry is not possible, e.g. in situations with maintained caged poultry above the ground/area to be baited.</p> <p>NB: The product contains vegetable oil as a primary attractant for ants. After prolonged exposure to air, vegetable oil may become rancid and less attractive to ants. Ensure the container is always tightly sealed.</p> |

For further information on **Distance PLUS Ant Bait**, please contact:

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