



Ant invasions

Natasha Mothapo and **Theresa Wossler** tell us about invasive ants in South Africa.

Ants dominate most ecosystems, are highly adaptable and can live in a wide range of environments and form 15 - 20% of the biomass of land animals. They play a very important role in the ecosystem, particularly through their symbiotic relationships with other organisms such as other arthropods (e.g. insects and spiders), plants, and fungi. Furthermore, they influence the surrounding vegetation through seed dispersal and various other ecosystem services.

Ants are social insects and form colonies characterised by one or several reproductive queens, some males which are produced seasonally (drones), and female workers. Some species also have a special 'caste' of workers that are adapted for defence, a soldier caste. Some ant species can disperse large distances and a single fertilised female can establish a very large colony in just a few years.

Invasive ants

Among the animal invaders, social insects such as ants, bees and wasps are important in terms of their distribution, ecological and economic damage. Invasive ants that are frequently associated with human presence are known as 'tramp' ants. Five ant species have made it to the list of 100 worst invasive species in the world. These include yellow crazy ant (*Anoplolepis gracilipes*), red imported fire ant

(*Solenopsis invicta*), Argentine ant (*Linepithema humile*), African big-headed ant (*Pheidole megacephala* which is native to South Africa), and the little fire ant (*Wasmannia auropunctata*). These ant species are successful because they prefer human-modified habitats such as our homes, gardens



Top and above: Argentine ants. Image: Nanike Esterhuizen and Eiriki Sunamura



A dead lizard being dragged away by yellow crazy ants in India.
Image: Wikimedia Commons



Red imported fire ants. Image: Wikimedia Commons

Why are some invasive ants so successful?

Ants live in large colonies and are highly adaptable. The queen can establish a colony on her own, and because she can fly, she can establish colonies at a great distance.

They are good competitors, efficient at finding and collecting food. They work cooperatively and rely on large numbers to outcompete native species.

They have a broad dietary spectrum that allows them to use a wide range of food resources.

We have made their life easier due to the high resource availability in our living environments. They can overwinter in our homes because it is warm and food is abundant.

What is a unicolony?

Unicoloniality is the term given to a social structure common in invasive ant species where aggression and territorial boundaries between colonies are absent. Ants from different nests freely mix, resulting in the formation of spatially vast supercolonies. Currently, the Argentine ant has the largest supercolony that spans across four continents (North America, Europe, Asia and Australia). This is one of the largest cooperative units known to man, paralleled only by human colonisation of the world.

and agricultural environments. These areas provide ants with abundant food and water resources and ample places to nest. Invasive ants tend to have very loose nesting habits, nesting in pot plants, under rocks and rubbish piles. This makes them easy to move around and they have used this to hitchhike across the world.

Change in social organisation

Aggression between ant colony members is usually very high, because colonies need to protect themselves from each other and from predators. This type of social structure is called multicoloniality. Invasive ants bring a new twist by changing their social structure in introduced environments to what is called unicoloniality. In this social structure, colonies are not aggressive towards each other and individuals from different colonies can freely mix. They can form colonies that span large geographic scales, known as supercolonies. This means that ants in Gauteng can be placed together with ants from Stellenbosch, and they would recognise each other as colony mates and not show aggression.

All invasive ant species share characteristics that are thought to contribute to their success, such as having multiple reproductive queens in a colony, which promotes rapid colony growth, a broad and generalist diet and the ability to survive in human impacted environments such as gardens and vineyards. When ants are introduced to a new area they are freed from their natural enemies, which allows colonies to reach extremely large sizes, and as a result exert pressure on native ants by competing with them for food and nesting sites. The large numbers of invasive ants makes them better competitors, resulting in the displacement of native ants.

Species	Description	Origin	Introduced range	Earliest records	Distribution in SA
Argentine ant (<i>Linepithema humile</i>)	Brown black	Argentina, Brazil	Africa, Asia, Europe, North America, oceanic tropical islands	1893	Gauteng, Eastern Cape, Western Cape, Northern Cape, North West, Free State
White-footed ant (<i>Technomyrmex diffilis</i>)	Jet black with pale legs	Madagascar	North America, South East Asia, oceanic tropical islands	Unknown	Western Cape, KwaZulu-Natal
Destroyer ant (<i>Monomorium destructor</i>)	Bi-colour (light brown body and dark brown black abdomen)	North Africa, Middle East and Asia	Africa, Australia, Panama, oceanic tropical islands	1862	Western Cape, KwaZulu-Natal
Tropical fire ant (<i>Solenopsis geminata</i>)	Yellow to light brown, hairy ant, polymorphic	South America	Africa, North America, Asia and Australia	Unknown	KwaZulu-Natal
Yellow crazy ant (<i>Anoplolepis gracillipes</i>)	Yellowish to reddish brown, long legs, slender body and large eyes	Africa or Asia?	Africa, Australia, oceanic tropical islands	Unknown	Gansbaai, Table Bay, Knysna

A table summarising ant invasions in South Africa.

Argentine ants in South Africa

The Argentine ant is the most widespread ant species in South Africa. It is thought to have been introduced during the Anglo-Boer War with horse fodder from Argentina. It has since successfully established in six of South Africa's nine provinces. Argentine ants mostly invade urban and agricultural land, but can also spread into natural environments. Their aggressiveness coupled with their large numbers, can reduce the abundance and diversity of other non-ant ground-living invertebrate species and other small mammals, reptiles and birds.

In the Cape Floristic Region, a globally renowned biodiversity hotspot, Argentine ants disrupt important plant-ant mutualisms, known as myrmecochory. A total of 29 families and 78 genera of fynbos plants have been identified as containing species that are ant dispersed. Over half the species of the plant family Proteaceae (53% or 1 300 species) in the Cape Floristic Region are reliant on ants for seed dispersal. Indigenous ants receive food rewards (elaiosome) attached to the seeds when they move them underground. In this way, when the indigenous ants feed on seeds, they also help them to disperse and protect them from fire and predation.

Argentine ants displace important seed-dispersing ants through competition for food and nesting space, only moving smaller seeds shorter distances, and they do not bury them underground. Argentine ants rob nectar from proteas, and compete with honeybees for this resource, and also aggressively drive other flower-visiting pollinators from the flowers. In this way, they may threaten the survival of some protea species that are a key feature of this biodiversity hotspot.

In agricultural systems, Argentine ants are economic pests. They help aphids and scale insects to survive and grow, leading to outbreaks of these pest species on crop plants, especially fruit trees. Aphids and scale insects can reduce plant fitness and fruit quality, as well as spread disease. Furthermore, Argentine ants can directly damage soft fruits. These damages can translate to millions of Rand in costs.

Other invasive ants and their status in South Africa

There have been very few scientific studies on invasive ants in South Africa, and studies on the current distribution and potential impacts of these species are imperative. Currently we have five alien ant species recorded in South Africa. Besides Argentine ants there is the white-footed ant (*Technomyrmex diffilis*) known as an agricultural pest in vineyards and households. On the other hand, the impacts of the destroyer ant (*Monomorium destructor*), tropical fire ant (*Solenopsis geminata*) and yellow crazy ant (*Anoplolepis gracillipes*) have not been demonstrated, despite their long history of presence in the country. This is surprising for these renowned invasive species, suggesting that the presence records need to be checked. **Q**

Theresa Wossler has been working with social insects for approximately 30 years and is currently focusing on different aspects of social insect invasion ecology, namely invasive ants, honey bee social parasitism and diseases. She is the editor of the journal African Zoology.

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