

Big-headed ants march on Darwin

Imagine an alien ant species that dines on native ants and insects, lives in super-colonies with hundreds of queens, breeds all year round, and appears to rate Australia's monsoonal rainforests as the most agreeable in the world. On top of all that, it has a really big head.

You'd think that after years of studying this fearsome creature, PhD student Ben Hoffmann would have nightmares about its invasive potential. After all, it has killed most of his beloved native ants where it has invaded. But instead he's helping to develop efficient ways of controlling it. 'Unless we do something about it now, this nasty little ant could cost millions of dollars,' he says.

Hoffmann began studying the big-headed ant, *Pheidole megacephala*, in 1996 for his Honours project at the Northern Territory University. He had noticed the ants spreading through Darwin, and knew from overseas accounts that they were highly aggressive, displacing or eliminating all native ants, apart from cryptic species that live under litter, or underground. It was also a major pest of crops such as pineapple and citrus, and a general household nuisance.

The big-headed ant belongs to a group called the tramp species, notorious for their ability to wreak havoc worldwide. It is capable of forming enormous super-colonies, containing millions of ants and hundreds of queens. (Most native ant colonies have only one queen.)

There are two sizes of workers, the major worker (with the big head) and the minor worker, both of which are particularly aggressive. The minor workers pin down other ants or insects by the legs and the major workers dissect the prey into bits with their two large mandibles.

Hoffmann says the big-headed ant, originally from Africa, was accidentally introduced to Australia, probably in imported goods. It has since infested a 25-hectare patch of rainforest at Howard Springs Nature Reserve, 35 kilometres south-east of Darwin, posing a serious threat to the Top End's biodiversity. It has also become a major pest of Australia's citrus industry.

By comparing numbers of native insect species at Howard Springs with that of uninfested natural sites, Hoffmann found the big-headed ant has virtually exterminated some 40 species of native ants in the most heavily infested areas. It has also displaced other native insects and spiders, reducing their numbers by up to 85%. 'The ground is carpeted with them,' he says. 'Their numbers are up to 110 times that of native ant levels.'

One of the mysteries surrounding big-headed ants is how they sustain such high populations once they've killed most of the insects. Hoffmann and his colleagues believe they are eating the root hairs of plants, causing the plants to slowly die of starvation. Already trees are looking sick and are dying in infested areas at Howard Springs.

Hoffmann says the abundance of the ants at Howard Springs is among the highest of anywhere in the world. It appears that the rainforests in Australia's monsoonal tropics are its optimum conditions: moist, shaded environments with high humidity and coolish temperatures. Nowhere else in Australia are its populations so high.

Many rainforest patches similar to the one at Howard Springs occur throughout Kakadu National Park, only 150 km away. If big-headed ants reached these rainforest patches, they could have a severe impact on the biological diversity of Kakadu, Hoffmann says. The

greatest danger is that they may be carried there, unintentionally, by humans.

There appear to be no real predators of this ant in Australia, leaving its abundance unchecked. 'In southern Africa following disturbance this ant has been shown to increase to 95% of total ants, but then to decline,' Hoffmann says. 'We have to find out what keeps it under control in its natural habitat.'

Hoffmann is now working on his PhD thesis with CSIRO Wildlife and Ecology. His focus is the response of native ant communities to disturbance and their use as biological indicators of sustainable development. At the same time, he is investigating the possibility of controlling the big-headed ant, with support from the Northern Territory University and the Parks and Wildlife Commission of the Northern Territory.

'We are trialling specific poisons developed for tramp species in the United States where millions of dollars are spent each year on control programs,' he says. 'The poisons, called formicides, are distributed in baits.'

'In trials with the chemical hydramethalnon, the big-headed ant population has been eradicated from plots, and native ant populations have been returning. If the ant were successfully eradicated from Howard Springs, it would be a world-first.'

'If we can spend a few thousand dollars on nipping the problem in the bud now, it will save millions of dollars on continuous future control programs.'

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