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**NEWS 2–3**

- Tourism in Gulf
- Productivity Commission

**FIRE 4–5**

- Indonesian project

**LANDSCAPE 6**

- Photos needed
- Animal impacts
- Cape York strategy

**CONSERVATION 8–9**

- Mystery macropod

**PESTS 10–12**

- Exotic ants in Top End

**SAVANNA BITES 12–13**

Online resources | Landcare coordinator | ACF & the north | East to west linked | Tourism in parks | Riparian research |

**READING 14**

Burdekin | Agroforestry review | Small-town strategies | Social atlas | Tax effects | Social capital | Seed guide |

**CALENDAR 15–16**

Photo: CSIRO



In 2001, outbreaks of African big-headed ants, left, infested 30 hectares of Kakadu National Park. Below, exotic ants “farm” scale insects, for their sugary secretions, protecting them from their natural predators, which in turn results in canopy dieback.



Photo: Federal Dept. Environment & Heritage

Exotic ants cost Aboriginal communities in northern Australia \$1 million annually. *Ben Hoffmann* describes the main culprits, and efforts to control them.

## Exotic ants threaten Indigenous lands

Some of the world’s most successful invaders are ants. Indeed, five ant species are among the world’s top 100 worst invasive pests. Some of these ants have managed to spread worldwide through human commerce to such an extent that their native distributions remain unknown.

Australia now has 13 exotic ant species, 11 of which are found across the northern tropics. Six of these species are of particular concern: red imported Fire ant (*Solenopsis invicta*), Yellow crazy ant (*Anoplolepis gracilipes*), Argentine ant (*Linepithema humile*), Tropical fire ant (*Solenopsis geminata*), African big-headed ant (*Pheidole megacephala*) and Singapore ant (*Monomorium destructor*). All but the first two species were probably introduced around 100 years ago, and as such their populations are widespread and firmly established.

The most recent incursion into Australia was that of the red imported fire ant, arguably the world’s worst invasive ant. Two outbreaks were discovered in Brisbane in February 2001, invoking this country’s most expensive ant eradication program. So far more than 50,000 hectares have been systematically treated at a cost of more than \$150 million.

At about the same time, African big-headed ant and the tropical fire ant were found within the World Heritage Listed Kakadu National Park. An intensive detection and mapping program throughout the Park identified 24 outbreaks of African big-headed ant covering about 30 hectares and two infestations of tropical fire ant covering another 3 hectares. All infestations were associated with human settlements and other infrastructure. Every infestation has been chemically treated, and post-monitoring surveys indicate successful eradication.

These high-profile discoveries and subsequent actions have greatly improved public awareness of exotic ants, and as a result there now appears to be a renewed emphasis on their management in Australia. In particular,

a number of indigenous land management organisations have actively searched for exotic ant species, revealing incursions in many remote communities of northern Australia.

While not all exotic ants are significant pests, some could be described as stereotypical invasive species in that they are highly aggressive and numerous, and have environmental as well as economic impacts. It is these species that should be the focus of management action.

### Environmental impacts

Invasive ants can have severe environmental impacts, with their effects cascading through ecosystems. A recent example is the incursion of yellow crazy ant on Christmas Island, which has now killed an estimated two million red land crabs (*Gecarcoidea natalis*). The elimination of these crabs has resulted in major structural change to the rainforest vegetation. These terrestrial crabs are voracious consumers of young plants, leaf litter and seeds, thereby keeping the ground layer extremely bare.

A dense understorey has developed in areas where crabs were killed by crazy ants, which changes ecosystem processes and modifies the habitat of all other endemic plants and animals. In addition, the ants “farm” scale insects for their sugary secretions, even taking them to new locations when they reproduce. This protects the insects from their natural predators, which in turn results in canopy dieback. The new gaps in the rainforest canopy then pave the way for a new suite of ecological changes.

The demise of rare and localised invertebrate animals due to exotic ant invasion is already evident in northern Australia, particularly in small isolated rainforest patches that are scattered throughout the savanna. The recently described Gove crow butterfly (*Euploea alcatheae enastri*) is known from only four small locations in north-eastern Arnhem Land, one of which is now infested by yellow crazy ant. No specimens of the Gove crow butterfly have



Photos this page: Ben Hoffmann

Left, Singapore ants on a power point—recent estimates of electrical damage on the Tiwi Islands caused by Singapore and African big-headed ants was around \$100,000 each year. Below, Junior (David) Guy places ant poison Amdro on a Tropical fire ant nest at Milikapiti (Melville Island)



now been seen in the infested location for a few years, and it seems likely that they are now locally extinct.

Australia's invertebrate fauna is poorly known, especially in remote Indigenous lands. For example, in a recent survey of Aboriginal land near Katherine, one-third of the ant species recorded had never previously been collected. Given the remoteness of many Aboriginal communities, there is a real threat that locally endemic species may become extinct as a result of exotic ant invasion, even before these species can be described by science. Biological invasions also threaten the traditional food resources of Aboriginal people.

### Economic impacts

Invasive ants have economic impacts ranging from reduced agricultural production to damage to electrical circuits and equipment. Ultimately, ongoing control measures become a further economic burden if pest ants are not eradicated at the early stages of invasion.

In a recent survey of the Tiwi Islands it was estimated that the Singapore ant and African big-headed ant were causing electrical damage costing approximately \$100,000 per year. Using population and infrastructure data provided in the latest Community Housing and Infrastructure Needs Survey, this equates to \$43 per person or \$221 per permanent dwelling. Discussions with residents of many other communities throughout the Top End indicate that these ants and their associated problems are widespread. Using the costings from the Tiwi Islands, these ants can be estimated to cost Top End Aboriginal communities about \$1 million annually.

### Health concerns

There are often health implications for people co-existing with pest ants. Species such as the tropical fire ant and the pharaoh's ant (*Monomorium pharonis*) are known to carry pathogenic bacteria making them vectors for the spread of disease. Direct interaction with other species such as red imported fire ant and yellow crazy ant also results in painful stings or acid burns, often requiring medical attention.

### Managing exotic ants

Most exotic ant species occurring on mainland Australia have become so widely established that they can't be eradicated. However, these ants could still be prevented from spreading to remote Aboriginal communities.

The control and even eradication of pest ants from small and isolated locations has been successfully demonstrated. For example, all known infestations of African big-headed ant and tropical fire ant were recently eradicated from Kakadu National Park and associated leases. This project involved the collaboration of CSIRO, Parks Australia North, traditional Aboriginal owners and all residents of Aboriginal outstations within the park, Environmental Resources Australia (the owners of the Ranger Uranium Mine) and all residents and businesses within the township of Jabiru. This project clearly demonstrated that people from multiple agencies, cultures and languages, with cooperation from public and private sectors, are able to eradicate established populations of some of the world's worst invasive ant species over substantial areas.

### Vigilance needed

While conspicuous invaders such as cane toads (*Bufo marinus*) and giant sensitive plant (*Mimosa pigra*) receive much public attention and therefore attract government funding, the less conspicuous exotic ants are spreading largely unabated throughout the country. The spread of these species should be of concern to us all, and thus vigilance and timely management is all that will keep these exotic invaders from infesting remote communities, and from there to potentially sensitive habitats throughout Australia. Where they are found to be present, their eradication should be given priority before their environmental, economic or social impacts are realised.

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