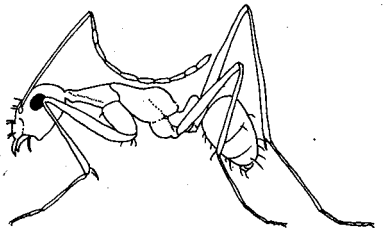
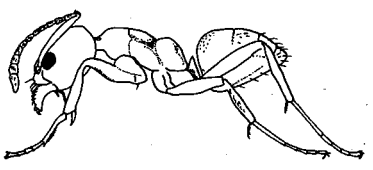
Alien ants of the Pacific Islands

Pheidole megacephala



Anoplolepis gracilipes



Linepithema humile

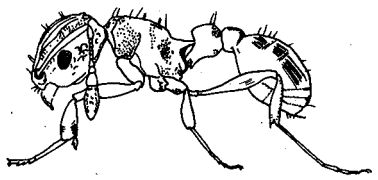
Alien ants are spreading throughout the Pacific, moving from island to island, wiping out native species. They are ubiquitous, yet they go largely unnoticed, as do the great losses they inflict. Perhaps due to their small size, they are not usually taken very seriously. This is a big mistake.

These alien ants are "tramp" species that associate with humans and are spread by human commerce. They travel the world hidden in our plant products, packaging material, building supplies, and in heavy machinery such as logging and military equipment. For the most part, tramp ants thrive only in disturbed environments and do not penetrate intact natural habitats. But as humans and their disturbance spread, so do the tramp ants. More than thirty-five species of tramp ants have invaded the Pacific. The ecological importance of most species remains undocumented. Several, however, are known to have dramatic impacts in the Pacific. These include the big-headed ant (Pheidole megacephala), the long-legged ant (Anoplolepis gracilipes, formerly Anoplolepis longipes), the Argentine ant (Linepithema humile, formerly Iridomyrmex humilis), the little red fire ant (Wasmannia auropunctata), and the crazy ant (Paratrechina longicornis).

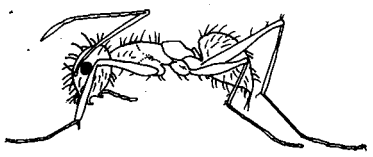
When these ants invade, the entire biological community is transformed as native invertebrate species are replaced by an impoverished set of ant-tolerant, and usually non-native species. Loss of native invertebrates that serve key functions in the natural community (e.g. important prey species, pollinators, seed dispersers, scavengers, and decomposers) may have cascading effects leading to severe disruptions of natural nutrient cycling and the subsequent loss of additional native plant and animal species. Humans tend to kill off the largest of the native animals. The accompanying ants help eradicate much of what remains. Most of these losses go unappreciated and unrecorded.

The big-headed ant and the long-legged ant, both African natives, are now widespread pests throughout the islands of the Pacific. In lowland Hawaii, these two species have been implicated in the extermination of much of the endemic fauna. In Tonga, the big-headed ant was not found as recently as the 1970s, but it now dominates vast areas where it occurs in high densities under every rock and log, and eliminates all native ants, literally tearing them apart. Although the long-legged ant does not seem to be as destructive as the big-headed ant, it is still an important threat. For example, long-legged ants swarm over and kill the hatchlings of the native Tongan incubator bird, attacking their soft tissues, particularly their eyes.

The Argentine ant, a native of South America, is an important pest ant of subtropical and temperate regions, including Australia and the southern U.S., where it attacks native species; invertebrates and vertebrates alike. The Argentine ant has also invaded



Wasmannia auropunctata



Paratrechina longicornis

Jourdan, H. 1997.
Threats on Pacific Islands: the spread of the Tramp Ant Wasmannia auropunctata (Hymenoptera: Formicidae).
Pacific Conservation Biology
Vol. 3 No. 1: 61-64

Human, K. G. and D.M. Gordon 1997
Effects of Argentine ants on invertebrate biodiversity in northern California
Conservation Biology
Vol. 11 No. 5:1242-1248

Hawaii, where it is the major pest ant in highland areas. The Argentine ant has recently established itself in New Zealand.

Perhaps the greatest threat in the Pacific is the little red fire ant. Although it is not yet widespread outside its native range in tropical America, it has tremendous destructive potential due to its virulent attacks on vertebrates. In the Galapagos Islands, it attacks the native wildlife, including the giant tortoises. The ants not only damage the tortoises' eyes, but also attack their cloacas, and may render them infertile. The little red fire ant has recently invaded New Caledonia and the Solomon Islands where its impact has been catastrophic. Locals report that most dogs are blinded by the ants' venom and rarely live more than five years. The little red fire ant also attacks native vertebrates, including the incubator bird of Savo Island. With the export of logs and other products from infested areas, there is great risk of a rapid spread of the little red fire ant to other parts of the Pacific.

Tramp ants have numerous characteristics that contribute to their international success. Tramp ant colonies generally have multiple queens, allowing new colonies to be founded from small fragments of the original colony. In addition, tramp ants typically lack territoriality between neighbouring colonies of the same species, and can form "super colonies" covering large areas. This allows the ants to reach much higher densities than native ants with individual territorial colonies. Tramp ants have an additional advantage over native species; in coming to new lands, the invaders leave behind most of their natural parasites and predators.

Chemical control of invasive pest ants may be possible on small islands or for localised infestations. Large-scale chemical control however, appears to be highly undesirable for several reasons. In addition to the toxicity to non-target organisms (including ourselves) and the financial cost of repeated application, chemicals actually often increase the spread of tramp ants, which are more tolerant than competing native species. Several research groups are currently investigating the use of host-specific parasites to control invasive pest ants.

Tramp ants have even invaded Biosphere 2, a 1.28-hectare greenhouse structure built in the Arizona desert as a model for a space colony and as a microcosm for understanding the world of the future. The structure is now overrun with extremely high densities of the crazy ant, an Old World tramp species that is common in the Pacific. The originally diverse animal community of Biosphere 2 is now greatly impoverished. The only animals that thrive are species that are ant mutualists (scale insects and mealy bugs tended by ants), highly ant resistant (isopods and millipedes), or too small to be attacked by the ants (mites). Biosphere 2 appears to be a surprisingly good ecological analog for a small, highly-disturbed subtropical island. Unless we start taking tramp ants more seriously, this may be an all too accurate glimpse at the world of the future.

For more information on alien ants visit: http://research.amnh.org/entomology/social_insects/introduced.html

James K. Wetterer
Assistant Professor
Center for Environmental Research and Conservation (CERC)
Mail Code 5557
1200 Amsterdam Avenue
Columbia University
New York, New York 10027

Tel: +1-212-854-8060
Fax: +1-212-854-8188
E-mail: jw272@columbia.edu

http://www.columbia.edu/cu/cerc/faculty/wetterer.html