

At first glance, the nest of a colony of red meat ants looks a careless affair, resembling a spill of gravel from a passing truck. Yet some nests are almost certainly veritable antiques, whose age can only be guessed at but must be measured in centuries.

This is the surprising conclusion that Dr John Greenslade of the CSIRO Division of Soils reached after examining nests in the Mount Lofty Ranges near Adelaide.

The red meat ant lives throughout south-eastern mainland Australia, where it is easily recognized by its long columns of workers commuting to and from a food supply, and by its characteristic nest.

These ants live in burrows that they excavate underground. They dump little lumps of waste soil on the surface, together with gravel fragments collected from nearby. Gradually the roof of the nest becomes a low mound up to 10 metres across, punctured by any number of holes from about 10 to 1000, each leading to a separate gallery of underground tunnels.

Some of the Mount Lofty nests stand proud of the surrounding soil surface, and the only explanation Dr Greenslade could find for the arrangement of clay and other layers in the mounds was that the nests had been built before the local soil was eroded.

The nests survived thanks to their gravel tops, and wellpacked interiors

A worker meat ant. A more than the second se

incorporating clay the ants had mined from deeper below ground.

If Dr Greenslade's interpretation is correct, the nests are remarkably old. Erosion has lowered the local soil by more than 20 cm, a process that must have taken several centuries at least.

Dr. Greenslade made his observations during a detailed study of the ecology and distribution of meat ants. He concluded that these ants are dominant members of the soil surface fauna.

For convenience, he grouped all ants as large, medium, or small. Meat ants are large, and active by day. They do not compete with the other large species, which forage in twilight or after dark.

Meat ants and mediumsized species do compete for food and even attack one another, and the meat ant usually wins. As a result, medium ants are scarce near a meat ant mound, although abundant elsewhere.

The small ants seem to be held in check where medium ants abound, but they are too small and too specialized in their habits to come into ecological conflict with meat ants. The vicinity of a meat ant nest is therefore a sanctuary for small ants, where they meet few of their 'oppressors', the mediumsized ants.

For example, in a field study in Oraparinna National Park in South Australia's Flinders Ranges, Dr Greenslade collected in pitfall traps remote from meat ants' nests only 46 small ants and other similarsized predators, belonging to five species. Near a nest the catch was far richer: 146 individuals of 18 species.

Ecologists believe that, in general, diversity promotes stability. The invertebrate community near a meat ant nest is more diverse than in the 'outback' between colonies, and the combined effect of so many smaller species seems to restrain the growth of meat ant colonies, a phenomenon ecologists term diffuse competition.

Meat ants thus create around them a stable community, which in turn stabilizes meat ant numbers.

Exclusive to mainland Australia, meat ants are widespread and abundant but not all alike, for they turn up in several distinct 'colour forms'. The studies of nest age and of ecological dominance involved the red form.

Traditionally all the forms have been lumped as *Iridomyrmex purpureus*, but Dr Greenslade believes there are at least ten species. This is the number of forms so far discovered, each with its unique geographical range and habitat preference, colour, size, and nest.

Under the microscope, the forms can be distinguished by differences in their male genitalia, an important sign to an entomologist that he is probably looking at different species.

Genetic support for this idea comes from a series of biochemical studies. Dr Bruce Halliday, working partly at the CSIRO Division of Soils and partly on a CSIRO Studentship at the University of Adelaide, determined the frequencies of alternative versions of two enzymes in meat ants, and concluded that different colour forms living together did not interbreed. This is strong evidence that the ants are separate species.

Dr Halliday studied five of the colour forms found in South Australia; the other forms await similar investigation. There is also much still to be uncovered about the ecology of meat ants, and researchers are continuing to investigate the ants' relations with the rest of the soil surface fauna and with plants.

Meanwhile Dr Greenslade and Dr Halliday are preparing accounts of the general biology of meat ants and, as the finishing touch to 10 years' work, writing formal descriptions of the ten species.

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