Central North Field Naturalists

CNFN the Natural News

Winter 2001

Patron - Dennis Morris

Contacts

Ron Nagorcka, President
Ph. 6396 1380
E-mail: Ron__Sarah@vision.net.au
Jim Nelson Secretary
Ph. 6368 1313
E-mail: jcnelson@southcom.com. au

Program & Events

June 3, 9:30 am Meet at Jim Hunter's on the N. slope of Mt Roland for a bird and fungi walk. Take Claude Rd. towards Gowrie Park and turn on Rysavy Rd. (Silver Lodge sign). The Hunters are on the left and will be marked with red tape.

July 1, 10 am Meet at Paton Park Scout Camp on Forth River. Travel to Forth, then take the road up the East side of the river which ends at the camp. We are to assist the scouts in suggesting some rehabilitation work they can carry out, and we will be looking at the area's natural values.

August 5, 10 am Meet at Narawntapu (Asbestos) National Park entry parking lot for a winter's walk in the Park. In case of bad weather, an alternate event will be held at Jim Nelson's studio at 68 Dysan's Bridge Rd, Weegena. Ring Jim on the morning if in doubt.

September 2, 9:30 Weymouth. Meet at the turnoff to Bellingham B52 off B82 (Bridport Rd). We will be looking at coastal heath and hoping to find an Engaeus Burrowing Crayfish that only occurs in a few niches along the coast.

September 21-23 Federation Weekend at Arm River Ed. Centre. Sponsored by the CNFN. Book early with Sarah. Can you help with organisation??

Flying ants, fire ants and fungi gardeners. Order Hymenopters, Family Formicidae

by Sarah Lloyd

In March this year, participants in the Bushcare and Land for Wildlife programs joined members of the Central North Field Naturalists for a field trip to the Kelcey Tier where we were hoping to see various species of reptiles. The cool conditions did not favour too many reptiles, instead, many of us observed what looked like winged ants walking on the ground. As these fast moving insects resembled winged Jack jumpers (Myrmecia sp) no one volunteered to take a really close look to make sure that they were indeed ants.

To be absolutely sure, there are three features that separate ants from other members of the order Hymenoptera to which they, along with wasps and bees belong.

The principal characteristics of ants are the waist, which is usually composed of one or two knobs rather than the single petiole of other hymenopterans, and the elbowed antennae. The third feature is the metapleural gland. This small opening, located on the body, is only visible with the aid of a microscope so it's not great for field ID. However it is notable for the important role it plays in the ant colony. Ants live in colonies of from less than 100 to more than a million individuals either underground or in rotting logs - perfect habitats for the proliferation of bacteria or fungi. But ants are rarely affected by these organisms because the metapleural gland secretes a substance that renders these organisms ineffective. (It is interesting that in the underground dwelling ants that cultivate fungi, the secretions protect the ants against

all fungi except the ones they cultivate)

What we witnessed that day at Kelcey Tier was the final stage of the nuptial flight, when large numbers of winged ants take to the air to enjoy their one-day of nuptial bliss. This pattern of behaviour is characteristic of most, but not all, ant species.

The event usually takes place in the evening of a warm spring, summer or autumn day and is preceded by hours or days of frantic activity by the workers.

First the workers must enlarge the entrance to the nests to allow the passage of the virgin queens. (In one extreme case the queen is 7,000 times larger than her worker offspring). Then the workers must keep the large numbers of winged males and virgin queens apart to ensure members of the same nest don't mate before taking to the air. In nearby areas, other colonies are simultaneously undergoing the same process ensuring that there is an interningling of males and queens from different nests thus avoiding the dangers of inbreeding.

All winged ants then fly high into the air and mate before falling to the ground. Here the males, having fulfilled their role in life, die. The mated females seek out a place in which to shelter, vigorously shake off their wings and prepare to found a new colony. But for every queen that starts a colony, hundreds or thousands die in the attempt.

Leaf Cutting Ants (Genus Atta)

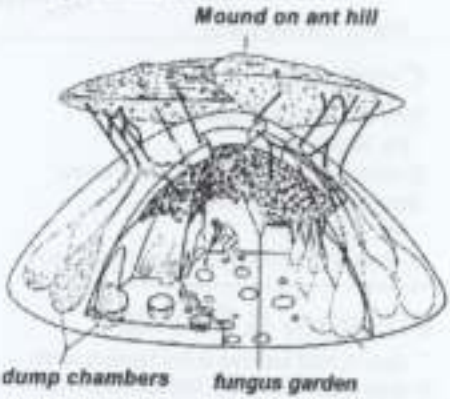
During the nuptial flight of the leaf-cutter ants that form super colonies in the tropical forests of South America, a virgin queen may mate with five or more males in succession. She receives 200 million or more sperm that are physiologically inactivated and remain in her spermatheca in suspended animation until required.

The queen has the ability to control the sex of her offspring. To produce daughters, the vast majority of which become sterile workers, she incorporates a reactivated sperm when laying the egg. Some of these daughters become queens that will eventually leave and attempt to form colonies of their own. Male ants have only half the genetic material that females possess and arise from unfertilized eggs.

The newly inseminated leaf-cutter queen carries with her a wad of fungus mycelium that she brings from the previous colony. When she finds a suitable place for a new colony, she spits the mycelium onto a piece of plant material where, as soon as the fungus starts growing, she lays her eggs.

Egg laying continues at a rate of 50 per day for the next three months. During this time the queen subsists on energy obtained from the breakdown and metabolism of the wing muscles and from her own body fat. Initially 90% of the eggs provide food for both the queen and the larvae. The few eggs that do survive each day eventually become larva and then workers. By the end of the second year the nest may have seventy-five different entrances and by the end of the third, over a thousand. Eventually the nest may have up to seven million individuals.

Nests of leaf-cutter ants are completely underground, sometimes to depths of six meters. Within each nest there may be one thousand or more interconnecting chambers, each about the size of a grapefruit, where the functions of the colony are carried out.



Worker ants become one of four castes, each with its own task within the colony. (See Picture below)

The largest are the soldiers (20mm) which patrol the colony. The next, the 'maxima' (8mm) are the most numerous and spend their time foraging for plant material, especially leaves which they cut into pieces before returning them to the colony. There, the 'media' (5mm) reduce the plant debris into still smaller pieces which they move into the chambers where the smallest of the castes, the 'minima' (2mm) clean the leaf pieces, inoculate them with bits of fungus mycelium and tend both the fungus gardens and the larvae.

These ants are the dominant herbivores in the tropical areas of central and South America and consume up to

17% of the total leaf production by surrounding vegetation. Understandably, they are considered to be pests by some agriculturists. But their nests are important areas of species diversity in tropical areas. Many other invertebrates, including springtails, mites and other ants live in the nests. Some snakes and lizards find the constant temperature inside the nests ideal for the incubation of their eggs. Predators such as army ants, toads, armadillos and tamanduas (a kind of anteater) depend on ants for food and native people find the plump, egg-filled queen a delicious snack.

Identification of the fungus has proved difficult as the fungus doesn't fruit or produce spores but is transported as mycelium from one colony to the next. Most experts agree that it is a basiodomycete (related to mushrooms) and have named it *Attamyces bromatificus*.

There is some question as to the benefits the ants may derive from the fungus. Adult ants seem to be able to get all the nutrients they need from the sap exuded from the plant material as they cut and transport it.

The larvae, however, depend entirely on the fungus to render the leaves suitable for food, and the fungus needs the ants to provide them with food in the form of leaf fragments.

Fire Ants (Solenopsis sp)

As early as the thirteenth century, the Chinese recognised the ability of ants to eradicate soft bodied insects and a special class of labourers called ant gatherers collected and reared ants (Polyrachis sp) to destroy caterpillars which caused damage in their plantations of mandarins and oranges. The trees were linked together with bamboo rods to ensure the ants could have access to every part of the orchard. Similarly, in Japan, ants were used to control beetles that infested mango trees. In Arabia, a species of hill ant was used to destroy another species of ant that was doing untold damage to their date palms.

The first recorded European attempts to use ants as pesticides occurred in France and was directed against termites which, after being introduced into France in 1780, started doing considerable damage to important buildings such as the prefecture and arsenal. The ability of ants to control termites is as well known as the termites' ability to undermine man-made structures and for centuries it has been the custom of Indians in Madras to encourage ants including fire ants (Solenopsis sp) to live in and around warehouses to help keep termites at bay.

But encouraging ants to live in dockland areas risks the spread of these opportunistic insects. The dreaded Argentine ant *Linepithema humile* has since the days of steamships spread throughout the world. In Australia they are known to cause damage to native plants by interfering with germination and the survival of young plants. They also reduce numbers of native ant species by dominating food sources and preventing other ants from feeding and nesting.

Fire ants (*Solenopsis geminata*) have also the potential to do considerable damage in Australia. They were much in the news earlier this year but were first recorded in the Brisbane area several years ago.

Any newly arrived foreign organism in a country is bad news, especially when it is likely to have an adverse impact on the local fauna. And the Fire ants' ability to inflict a very painful sting is not the only reason their presence may be undesirable. Their preference for sunny pastures on prime agricultural land causes interruptions to farming activities. They have been known to injure and even kill livestock, poultry and small birds and they heavily predate local invertebrate fauna. They can strip fruit trees and are attracted to electrical wiring stripping it of insulation.

In the wet and dry sclerophyll forests of Tasmania, native Solenopsis species are some of the most common ants in terms of numbers of nests. Fortunately the introduced pest species Solenopsis geminata prefers the warmer coastal areas, but there is concern that it may have the ability to breed with local species posing yet another threat to our native wildlife.

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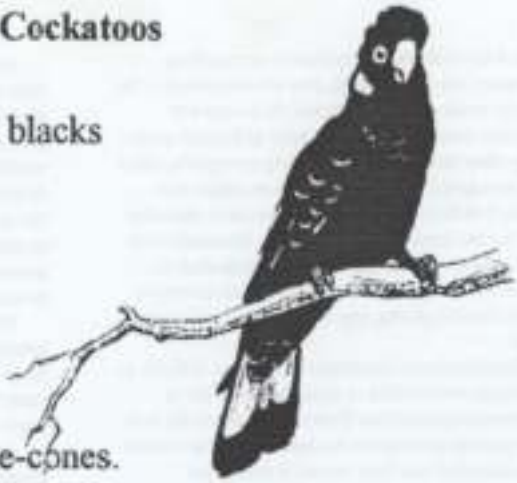
Attention: **This Newsletter Needs Contributions**

Yellow-tailed Black Cockatoos



A shriek of yellow-tailed blacks
Riddle the radiatas.
They deliberate noisily.
Slow clambering,
Twenty or more,
Selecting the hardest pine-cones.
Power beak.
Prehensile claw.
Pattering the ground below
With a rain of shards.

Satisfied,
They erupt into the evening calm;
As if emergent, aeons ago,
From some unimaginable ark.
Fragments of wind-flung black umbrella,
Archeoptering home to the old plateau.
Anticipating the dark.

- Peter Bamford