ANTS OF THE KIMBERLEY RAINFORESTS AND OTHER ECOSYSTEMS

On 5 February 2003, Jonathan Majer, Professor of Invertebrate Conservation at Curtin University, spoke to the Kimberley Society.

Jonathan began by stressing the importance of terrestrial invertebrates to us. In one of his many overheads, Jonathan showed us the Species Scape showing diagrammatically by size the numbers of individuals in each animal group and the arthropods (including insects) was by far the largest, especially the insects themselves which are so very varied. “They are the little things that run the world,” said one famous biologist.

When we look at invertebrates, they are the drivers of the world:

(a) Leafcutter ants consume the bulk of solar energy captured by plants in the Amazon, and,
(b) They consume more per unit area than the average cow!

We need invertebrates, but they don’t need us!

(a) If humans disappeared, the world would go on with little change, but,
(b) If invertebrates disappeared, human species would not last more than a few months.

Why is this so?

· Most fish, amphibians, birds and mammals would die of starvation,

· Flowering plants would die out due to lack of pollination, and,

· The world would become covered in detritus.

The case of detritus:

· In the USA, humans produce 130 million tons of excreta per year,

· livestock produce 12 billion tons of manure per year,

· 99% of this is decomposed through the actions of invertebrates, and,

· without them, we would be up to our eyeballs in it.

Jonathan then described exactly what an ant is—by going through its classification and characteristics, again illustrated with very clear overhead diagrams and a key, which I will not reproduce here.

The sub-phylum *Insecta* is divided into orders and the ants, bees and wasps belong to *ymenoptreaHH*Hthe *Hymenoptera* which have two pairs of transparent wings hooked together during flight, a waist between the thorax and abdomen, and a complete metamorphosis, i.e. go through stages of development comprising egg, larva, pupa and imago or adult. The ants, *Formicidae* have a petiole between thorax and gaster (abdomen) and geniculate antennae, having an elbow.

They are divided into castes, workers, soldiers, drones, females and minors. The workers are wingless, (some wasps also) and are sterile females. The soldiers and minors have different nutrition. The sexual females are winged initially for the nuptial flight then lose their wings before laying their eggs.

We identify them by first dividing them into sub-families, of which there are seven, using a dichotomous key. Has it a sting or not? Has it two nodes or one? Is the waist one or two segments? And so on.

There are two books on Australian ants at present: *Ants in Australia* by Steve Shattick, and *Ants of the Top End* by Alan Andersen, and one being written by Brian Heterick on *Ants in the South West* (about 350 species and 700 from all WA).

Having dealt with ants in general, Jonathan then described the Survey of Rainforest Patches in the Kimberley in 1987 and 1988. This section he illustrated with 22 colour slides showing typical sites and activities involved. The scientists were divided up into three groups, transported by helicopter for three days to each site to sample plants by collecting, animals by trapping, soils, spiders, ants, birds and snails. Thus it was a very comprehensive survey of 83 marked rainforest patches, though ants were only sampled from 8 representative patches, ranging in size from 5 hectares to 100 hectares. These small remnant patches are surrounded by savannah (dry woodlands) but need moisture themselves, so are usually in the shadow of a cliff, or riverine patches along wet rivers, or on islands above the mangrove belt.

Sampling was focused on two 50 metre transects in a “T” configuration. They trapped ants using a plastic cup buried in the ground and filled with alcohol so ants would fall in as they passed by. They also hand collected with forceps, using knives for removing bark and opening nests. They used a beating tray, like an umbrella, at the base, hit the tree or bush hard and then collected the dropouts. Leaf litter was collected later in the Wet, sent back to Perth and placed in Tullygren funnels to be

separated out. They were identified at Curtin University or in Darwin from the reference collections held there.

The results are set out in a table showing the 8 patches, their area, shape, size, distinctiveness of edge, perennial plant species richness, % canopy cover, presence of gaps in the canopy, litter depth in cms, litter moisture, soil moisture, % ground covered by trunks or roots, by soil, by rocks.

The number of ants collected in each of the 8 sites formed another table telling us:

1. Total individuals in pitfall traps, ranging from 336 to 69.

2. Total species in pitfall traps = 24 to 12.

3. Total species overall = 41 to 19, average = 33.

4. Total tropical species = 13 to 6.

They also noted the two wettest sites and that one had been burnt and one trampled by cattle. The total number of species of ants in Kimberley Rainforest was 150. This was not as great as in NE Queensland or Kakadu. There was less biodiversity due to distance, isolation and size of patches. As yet, only 15% are named to species level from this survey.

Jonathan also spoke of his background in West Africa, working on “Ants in cocoa Plantations”. There, ants are used as a biological control for pests of tree crops, e.g. aphids in citrus trees.

There followed a very popular question time after which we thanked Jonathan in the usual manner for a most interesting talk.

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