

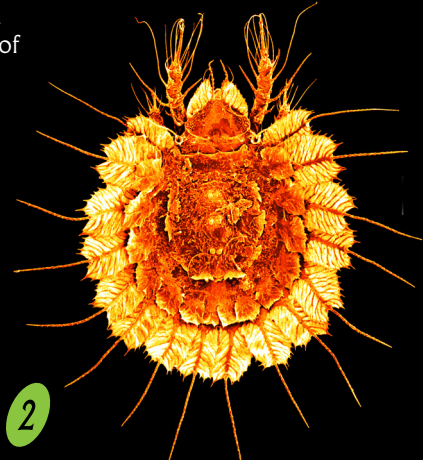
Mites in the rainforest

A wealth of unexplored diversity

Rainforests are renowned as storehouses of terrestrial biodiversity. The rich array of plants, birds, reptiles and insects in a rainforest habitat like that of Lamington National Park is immediately apparent to a human visitor. But the more closely one looks at the rainforest, the more astounding this biological diversity becomes. For tiny animals like mites (Arachnida: Acari), most around half a millimetre long, a rainforest is not a single habitat, but a complex mosaic of thousands of potential homes. A single mossy branch in the forest canopy provides homes to fungus mites, orchid mites, bark mites, and fern mites. Beetles and parrots that visit the branch also carry their own mite cargo. The forest floor and streams, and the other animals found in the rainforest, all house specific groups of mites. But despite their occurrence in most habitats, almost nothing is known of the behaviour, ecology, or true diversity of mites in Australia. Here we present just a small sample of the beautiful and mysterious mites that can be found in Lamington's rainforest.



1 A similar box mite (Oribatida: Euphthiracaridae) once featured on the Australian \$50 note as an example of Australian biodiversity. The box mite's common name results from its ability to fold legs and mouthparts into its body for protection from predators. Found in suspended pockets of soil and mosses.



2 Many mites have highly modified dorsal hairs, such as this mite from the family Cepheidae (Oribatida). These leaf-like hairs may protect the mite from predators, trap humidity, or shed rain. Lichens are a common home.



3 This species of *Cosmochthonius* (Oribatida: Cosmochthoniidae) of tree holes and similar sites, is well protected from predators by its body armour and the erectile 'pincushion' hairs that keep predators from getting close enough to bite.



4 Species of *Scapheremaeus* (Oribatida: Cymbaeremaeidae) are found on leaves and branches of trees, up to the top of the canopy. The ancestors of these mites lived in the soil and long ago lost their eyes, but *Scapheremaeus* have evolved a dorsal eye spot that helps them to climb sunwards.



5 Uropodid mites (Mesostigmata: Uropodidae) are extraordinarily diverse in Australian rainforests, in soil pockets, moss carpets and ferns, but are virtually unstudied. Nothing is known about this species, beyond it looking rather like a hat than an elf has left behind.



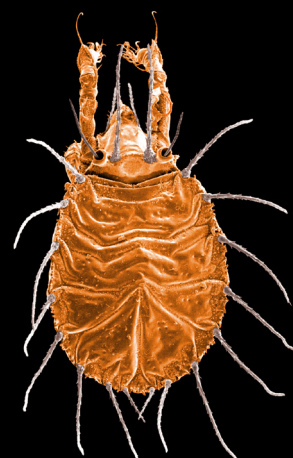
6 *Saltiseius hunteri* (Mesostigmata: Saltiseiidae) is a recently described example of one of Australia's rich store of primitive mites. This predator, found in rotting wood, has evolved the ability to jump - an ability otherwise unknown in the order Parasitiformes - presumably to escape its own predators.



Researchers: Dr. David Walter is a senior lecturer in the Department of Zoology & Entomology, University of Queensland. Dr. Heather Proctor lectures in the Australian School of Environmental Studies at Griffith University. Both are members of the Cooperative Centre for Rainforest Ecology, and Dave Walter is also associated with the Cooperative Research Centre for Tropical Plant Protection.



8 Nymphal and adult mites usually have eight legs, like their relatives the spiders and scorpions; however, mites start their active life as larvae with only three pairs of legs like this parasite of insects (Prostigmata: Microtrombididae).



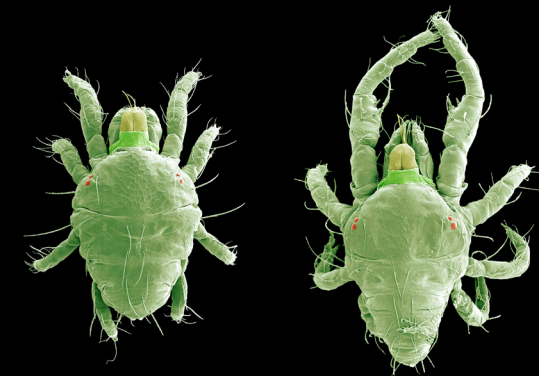
9 Like all higher oribatid mites (Euoribatida), this nymphal *Nesopelops* (Phenopelopidae) looks quite different from the adult, which is rounded and fully armoured. Prefers soil pockets and moss carpets.



10 *Promegistus armstrongi* (Mesostigmata, Promegistidae) lives on the bodies of beetles and is possibly a kleptoparasite - it may steal food from the mouth of its beetle host.



11 Species of *Raphignathus* (Prostigmata: Raphignathidae) are usually bright red in colour, but as is true of many Australian mites, this is essentially all we know of its biology. This species is found in drier lichens and soil pockets.



12 Scrub itch mites, such as this species of *Guntheria* (Prostigmata: Trombiculidae), can turn a pleasant bush walk into two weeks of itchy red weals. Species in a related genus (*Leptotrombidium*) are reservoirs and vectors of the rickettsial disease scrub-typhus in northern Australia.



13 Spider mites (Prostigmata: Tetranychidae) are major plant pests and cause massive economic loss to our crops every year. This undescribed species of *Schizotetranychus* forms tent-like webs along the midvein of *Backhousia* leaves.



14 Enarthronote oribatid mites are known from fossils in early Devonian times, almost 400 million years ago. Most living species, such as this *Sphaerochthonius* (Oribatida: Sphaerochthoniidae), are all female parthenogens. This mite is found in soil.



15 The Endeostigma is a grab-bag of very primitive mites most of which are related to the Oribatida. Many, such as this species of *Terpnacarus* (Terpnacaridae) feed on fungi and are all female parthenogens.



16 Ticks (Ixodidae) are large and familiar blood-sucking mites. Like all mite larvae, this larval tick (*Ixodes*) has only three pairs of legs. They ambush passing prey from leaves and vegetation.



17 Many cunaxid mites (Prostigmata: Cunaxidae) are ambush predators that sense prey passing by using long hairs sensitive to minute air currents.



18 Armoured mites have evolved in all of the major mite lineages. This well protected *Labidostomma* (Prostigmata: Labidostommatidae) is a predator, found in soils.

19 Most vertebrates are habitats for mites, but birds - parrots in particular - are especially mitey. This pair of rosella mites (Astigmata: Proctophyllodidae) live between the barbs of the wing feathers. The male (top left) is guarding a female nymph in preparation for mating.



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Artist: Janet Hauser Micro photography: David Evans Walter
Artwork & design: Extreme Graphics Printing: InPrint

The Australian Biological Resources Study (ABRS) supports research and publications on the taxonomy (classification, identity, biology and relationships) of Australia's rich biodiversity. It is a Program of Environment Australia. As one of its projects, ABRS is supporting research on the rainforest mites in Lamington National Park, Queensland.

