

## FRUITS OF THE FOREST: KIMBERLEY RAINFOREST PLANTS, FRUITS AND BIRDS

At the meeting of 3 December 1997 our first speaker was the Society's President, Kevin Kenneally, world authority on Kimberley flora and Scientific Coordinator of CALM's *Landscape* Expeditions. Kevin discussed the plants and fruits of the rainforest before Ron Johnstone, Assistant Curator of Ornithology at the WA Museum, spoke on the birds.

Firstly, Kevin showed two books relevant to the topic, *Kimberley Rainforests, Australia*, edited by McKenzie, Johnstone & Kendrick (published by Surrey Beatty & Sons), and *Fruits of the Rainforest; a guide to fruits in Australian Tropical Rainforests*, illustrated beautifully by William T. Cooper, with text by Wendy Cooper (published by RD Press).

Rainforests in WA have been known only from the 1960s onwards. Ours are not evergreen, as in tropical South America, but 'rain green'. They depend on the wet season for their rainfall. The south-east monsoons bring the heavy rain with onshore squalls and thunderstorms. There may also be additional rain from cyclones, often with associated damage. Unlike the dry fruits of the typical Australian plants of the savanna, the rainforest plants have fleshy, brightly coloured fruits that attract birds and arboreal animals such as bats.

Kevin showed us many slides illustrating the typical rainforest patches, sometimes called vine thickets because they are dominated by vines and creepers in the green closed canopy. We were also shown vine thickets growing behind the coastal sand dunes near Broome, the mangroves and the riparian forests lining river banks all of which have closed canopies. All rainforests are very susceptible to fire, especially in the dry season, when the majority of trees are deciduous. Feral cattle use them for shelter which results in damage.

Ferns are common in the shaded, sheltered forests of high humidity, for example, the climbing maiden hair fern, *Lygodium microphyllum*. Kevin showed slides of representative plants with colourful fleshy fruits, such as: *Polyalthia australis* in the Annonaceae, related to the Custard Apple. The Native Nutmeg, *Myristica insipida*, related to the true nutmeg, the spicy *M. fragrans*, whose aril is mace. *Syzygium eucalyptoides* of the Myrtaceae, has a large white flower with showy stamens, related to the cultivated lily pillilly, and *S. angophoroides* with fleshy black fruits. These are sweet to eat but grow on trees up to 30 metres tall. *Micromelum minutum* of the Rutaceae (citrus family) has clumps of small red fruits. *Aglaia elaeagnoidea* is a common rain forest species with large red fruits, in the Meliaceae. *Cyathostemma* is a vine in the Annonaceae. Favoured by Aborigines for its dark purple fruit is mangarr (*Pouteria sericea*), a widespread tree species. A relative of

the passion fruit is *Adenia heterophylla*, a vine bearing bright red fruits. *Terminalia petiolaris* is a Nutwood producing a fruit very high in Vitamin C. *Luffa graveolens* belongs to the melon family and some species are favoured by bats. One of the ebonies is *Diospyros bundeyana*, a plant related to the persimmon. The euphorbia or spurge family includes *Flueggea virosa* with white succulent fruits, and *Phyllanthus* with red fruits turning black on ripening. Figs are common and there are many different ones which feed many animals. *Celtis* in the Ulmaceae has sweet fruits.

Ron Johnstone has made many trips to the nearby islands of Indonesia, finding links between the avifauna there and in the Kimberley. He also studies reptiles and frogs in the two areas. Ron showed us a map of Indonesia, the islands of the Lesser Sundas and Maluku Islands where a grant has enabled a group of zoologists to visit islands from Bali to West Irian. During the late Pleistocene, the closest of these islands, Timor, was only about 75 kilometres from the Australian coast. Also in this string of islands is Sabu, Aru, Sumba, Banda, Flores and Roti which were the last to separate from Australia. They share our plants – some eucalypts, casuarinas and *Banksia dentata*.

There have been various zoogeographic lines demarked such as the Wallace Line, Webers Line and Lydekkers Line and, more recently, the Kitchener Line, about 2,000 kilometres to the east near Tanimbar, which more correctly demarks the change between the Oriental and Australian faunas. The first of these three lines is shown on a map presented by Dr D. Kitchener and others in 'Wild Mammals of Lombok Island' (published in 1990 in the *Records of the WA Museum*, Supplement No.33).

There has been faunal exchange between elements of the Australian and Oriental fauna since at least the late Tertiary. The nature of this faunal exchange is poorly known for most species, although several zoogeographic lines (eg Wallace 1910) attempted to demark elements of the vertebrate fauna that are Australian to the east and Oriental to the west. The interchange of fauna depends largely on several key historical events involving the formation of the current Indonesian archipelago and Australia/New Guinea, which provided a migration pathway for Oriental and Australian fauna.

Between 1920 and 1950 little research occurred in the Lesser Sunda and Maluku Regions. However a series of recent expeditions involving the WA Museum and the Museum Zoologicum Bogoriense have visited Nusa Tenggara and the Moluccas to study the interzone.

Many of these islands have volcanoes and rainforest patches. On Flores there are active craters, but much of this island was cleared to cultivate rice, as were many

of the others. There is also cloud forest on Flores where the species are very different from ours, though *Ficus*, *Randia*, *Celtis* and *Melia azederach* are all there. The island is difficult to work as there are steep slopes, many palms with heavy fruit, and many bamboos including prickly ones and epiphytes galore. There is a high crater montane lake and large wet fern gullies. Many of south-east Asia's animals and large fruit-eating birds, e.g. the Sumba thornbill and some large fruit pigeons, don't get through to Australia. They have many mammals such as macaques, palm squirrels, and civets, and many more bats than the Kimberley; they even have bat-eating bats! All these animals mentioned were illustrated by slides.

On Aru there are sago swamps with malaria-carrying mosquitoes and crocodiles in the mud, so it's very like a large mangrove swamp in northern Australia. There are large orb spiders in the sago swamps. The famous Komodo Dragon occurs on the island of Komodo. It is the largest lizard in the world, a formidable creature indeed. Draco is a flying dragon and *Gecko gecko* screams out on islands ranging from Bali to Timor. Why haven't they colonised northern Australia, since at one time only 75 kilometres separated them? One gecko, *Hemidactylus frenatus*, which is very common on the Lesser Sundas, has colonised Kununurra, and other species have moved across the Torres Strait.

The Cuscus lives in the forest canopy and feeds on fruits, also the Bandicoot on Kay Island. The flying possums are getting through to here. The Flying Fox, a fruit bat from the West Papuan group feeds on figs. The Reticulated Python grows to 26 feet and is large and powerful to feed on pigs, deer, bats and swifts. Up to 60,000 of them have been shipped out for food, bags and shoes through to Timor. The Death Adder, a common snake on many eastern Indonesian islands, also lives in the rainforest and is found in similar habitats in Australia. A new species of death adder has been found in east Indonesia. So far scientists from the WA Museum and Bogor Museum have discovered 40 new species of mammals, 25–30 new species of frogs including new species of *Rana* and *Litoria*.

Ron was looking at the inter-island variation between many species and subspecies, including Torres Strait Pigeons and had brought with him some study skins—stuffed specimens mounted on sticks for ease of handling. The birds in the rain forest are all fruit eaters and the very extensive patches of vine thicket yield plenty of fruit. The largest is the Imperial Pigeon of Western Papua. It feeds on large nutmegs, and one was found to have 37 fruits in its gut! The Spice Imperial Pigeon also feeds on nutmegs. The Nutmeg Pigeons from Banda Island, called the "Nutmeg Island", are powerful fliers but don't move out of the rainforest. Ron had a black-naped fruit dove, a Nicobar Pigeon caught from oil rigs in the Timor Sea, which is a new record and a range extension. The Orange-legged Scrub Fowl is a Kimberley megapode which makes mounds to incubate its eggs a little like our

Mallee Fowl. The Bee eaters migrate to south-east Asia from here as do many others including Tree Martins. Seabirds also migrate between Australia and Indonesia but one common rainforest species, the Kimberley Greater Bower Bird, doesn't get through to Indonesia.

Many birds have evolved in Australia and have poured out to colonise islands further north, including some of the honeyeaters. A number of Asian species have colonised Australia via New Guinea and the Torres Strait Islands, moving down to invade the south-eastern states of Australia. So from Bali to the Tanimbar Group there is blending of Australian and Asian faunas. The strong, warm Leeuwin Current has enabled many seabirds to extend their ranges southwards down the Western Australian coast.

Ron illustrated his interesting talk with excellent slides of the various birds mentioned and of different localities of rainforest, as well as many study skins of local and Indonesian birds for comparison. The 64 members present thanked Ron and Kevin in the usual manner for their fascinating insight into birds and fruits of the rainforest.

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