



In the rainforests of northern Queensland, seed dispersal by animals has led to the development of large, brightly coloured fruit. These dark red *Syzygium* fruits, up to 5 cm long, are eaten by cassowaries.

yellow fruits predominate. Of rainforest trees in southern Queensland and New South Wales, 72% produce fleshy fruits: since there are no cassowaries there, most fruits are dispersed by bats, other birds, or mammals such as rats.

Black, red, or two-coloured fruits are most common in these forests, which have fewer blue fruits than their northern Queensland counterparts. In temperate Australian forests, red and orange/yellow are the most common fruit colours (25% each), followed by black and green/brown (19% each).

Notwithstanding the caution that the fruit humans see as red may appear an entirely different colour to other

animals (at least some species of birds can see ultraviolet), more than 50% of bird fruits are red or black. Orange, red, yellow, or mixed colours seem to be preferred fruits for mammals, and it may be that the predominance of red and orange colours could have arisen both to attract the attention of potential seed-dispersers and — because many insects cannot see red — to make fruits less conspicuous to potential seed-destroyers.

Nature, however, has a habit of turning such easy interpretations upside down: *Coprosma*, the Australian currant-bush, can bear whitish yellow, orange, red, blue, and black fruits!

Carson Creagh

Vertebrate dispersal syndromes in some Australian and New Zealand plant communities, with geographic comparisons. M.F. Wilson, A.K. Irvine, and N.G. Walsh. *Biotropica*, 1989, 21, 133-47.

For a plant, life in the rainforest offers many advantages. Tall trees protect smaller species and saplings from rain, sunlight, and destructive winds.

But there is also intense competition for space, nutrients, water, and light. Protection from unfiltered sunlight reduces the amount of light reaching the ground, which means growing trees must race each other to reach what light is available. And protection from wind, while reducing the stress on spindly saplings, means one of the natural world's commonest and most effective seed-dispersal methods simply isn't available.

Instead, many rainforest trees encase their seeds in fleshy fruits. The fruits are eaten by birds and mammals, pass through the animals' digestive systems, and germinate within a ready-made 'potting mix' of dung.

Only 50% of temperate

forest trees use this strategy, and fewer than 30% of species in open woodlands or heaths — environments in which wind can play a greater role in seed dispersal. Mr Tony Irvine of the CSIRO Division of Wildlife and Ecology's Tropical Forest Research Centre in Atherton, Qld, has been looking at what makes one kind of fruit more likely to be eaten than another (see *Ecos* 43).

Colour is a more important factor than odour, for two reasons. First, if natural selection favoured odour as a means of attracting potential seed dispersers, it might actually reduce plants' chances of having their seed dispersed: the odour that attracts one kind of animal may repel many others. After all, some humans swoon with delight at the merest whiff of a durian, while others faint with disgust at its dead-cat-in-turps odour (not to mention its equally individual taste and texture).

Second, birds are the main seed-dispersers and most have

a poor sense of smell. Only nocturnal mammals such as rats and fruit bats use smell as their primary means of locating food. In the relatively still environment of the rainforest floor, colour can be detected at greater distances than odour, so odour is more 'useful' only at night.

In northern Queensland, 84% of 774 species of rainforest trees have fleshy fruits dispersed mainly by vertebrates. Bird fruits (small fruits 2 cm in diameter or less) outnumber larger fruits (2-3 cm) eaten by cassowaries and mammals 33 to 1. Black is the most common colour (28%) of bird-dispersed fruits, followed by red (16%) and blue (12%). About 65% of trees bear fruit that are black, red, or both, and some fruits are temporarily two- or three-coloured.

Among the 91 or so northern Queensland trees whose seeds are dispersed by cassowaries or mammals, red, green/brown, and orange/