

teo also benefit from rain; they catch swifts weakened by inability to hunt in cold, wet, windy weather (Elkins 1983).

We urge caution in assuming that in raptors reproductive failure associated with inclement weather is due solely to an inability to hunt. A number of factors come into play and their effect will differ according to species and circumstance.

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A Population of Rainbow Lorikeets *Trichoglossus haematodus flavicans* Roosting and Nesting on the Ground

Mary LeCroy¹, W.S. Peckover² and Karol Kisokau³

¹ Department of Ornithology, American Museum of Natural History, New York, NY 10024, USA

² 14 Balanda Street, Jindalee, Qld. 4074

³ P.O. Box 850, Boroko, NCD, Papua New Guinea

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Rainbow Lorikeets regularly rest and roost communally in thickly foliated trees and nest as single pairs in deep, unlined holes in limbs or trunks of large trees (Coates 1985; Forshaw 1989; Ulrich, *et al.* 1972; Utschick & Brandl, 1989; and pers. obs.). Activity at presumed nesting holes has been recorded in most months of the year and juvenile specimens have been taken in September and November (Coates 1985; Ulrich *et al.* 1972).

In contrast, one of us (KK) has long known that this

species nests and roosts on the ground on Poy-yai (= Parta-uw, 2°11.5'S, 147°07.5'E) and at least two other islets, Tuluman and Niakuni, in the Admiralty Islands, Manus Province, Papua New Guinea. Poy-yai has an area of less than 0.5 ha and rises no more than 10 m above high water level. This rocky islet, 5.5 km west of Peré Village, is entirely covered by thick tree, palm and shrub vegetation to the high water level. In July 1988, two of us (ML and WSP), at the suggestion of KK,

were able to make observations of the Poy-yai population.

Two visits were made to Poy-yai. On 27 July, ML and WSP spent about two hours on the islet late in the afternoon and on 28 July ML and a guide were left there from 0720-1800 h. There were many apparent excavations, from bare areas sheltered at the base of a tree or within a rock crevice, to 'burrows' 0.6 m deep under a rock overhang or 1 m deep in a rock crevice. These burrows were horizontal or sloped slightly downward from ground level at the front. It was obvious that some excavation had been necessary and dirt trampled in front of the entrance was probably deposited there by the excavating bird; actual digging was not observed. No sign of tree-hole nesting was apparent; few trees on the islet were large enough to provide suitable cavities for the birds.

We found two nests containing eggs, one with one egg and the other with two. In both cases the eggs were lying on the bare ground in a natural rock cleft and we left them undisturbed. There was no evidence of nesting material in any of the excavations. Our guides informed us that birds roosted in the clefts and crevices even when there were no eggs. We observed that by the time we left the islet at 1800 h, many birds had flown in from Manus and had begun to descend into the lower vegetation. Presumably they entered the ground crevices after our departure, for two of our guides visited the islet during the night of 29/30 July and returned soon after dawn with seven live birds trapped in burrows. These were photographed and released.

Throughout our visits to the islet, Rainbow Lorikeets were moving about in the foliage and regularly flying back and forth to the coast of Manus, about 0.5 km away, presumably to forage. We were unable to estimate numbers due to the thick vegetation but, judging by the amount of noise, numbers were high in the morning, decreased during the day and then increased again toward dusk. As long as we were within sight of a nest, the birds were wary and no bird visited it. Individuals, however, did come within 1.5 m of the entrance on several occasions.

The Rainbow Lorikeets were very noisy and were usually in pairs in the vegetation. Occasionally there were moments of almost complete silence — quite strange intervals of perhaps 15 seconds' duration.

One unusual behaviour, which is perhaps part of courtship or pair-bonding, was seen on many occasions and was termed *wing-whirring*. The wings are held half open and beat very rapidly. The sound is like a small

boat motor starting up, lasting 1-3 seconds. It seems particularly to be a feature of their coming to roost. One or both members of a pair may *wing-whir*. It may take place when a pair is stationary on a limb, when one is hanging upside down or when they fly from one perch to another. In the latter case, one follows the other, the flight is slow and the body is held vertically — they seem to hover from one branch to another.

Serpell (1981, 1989) has described numerous visual displays in *Trichoglossus* lorikeets. None of these seem to correspond to *wing-whirring*. *Crouch-quivering* (Serpell, 1981) seems closest, but this display was always stationary (perhaps because observations were of captive birds) and was accompanied by vocalisations we did not hear. The sounds reported above were almost certainly mechanical. Serpell (1989, Fig. 5) shows 'exaggerated fluttering' as a derivative of 'flying' but this activity is not further described.

Cain (1955) and others have mentioned the prevalence of bronzing of the green in specimens of *T. h. flavicans* from the Admiralties and New Hanover. We found this to be very noticeable in the field, with many birds appearing quite brassy-green when seen beside normally colored birds. There is no known reason for this shift in green color in some individuals; it does not correspond to size or sex in museum skins. Ulrich *et al.* (1972) suggest that it is possible that this represents a juvenile plumage but there is no evidence in Poy-yai birds or in museum specimens to support this. This bronzing has also been found in *T. h. massena* (Diamond & LeCroy 1979) but in much lower numbers.

A few other species of birds were observed on Poy-yai but no interactions with the parrots were seen.

Both dark and white phase Reef Herons *Egretta sacra* roost on Poy-yai and sit in trees on the islet during the day. Their only sound was a low growling. They appeared to be solitary and no nests were present even though the birds had nuptial plumes. The Beach Kingfisher *Halcyon saurophaga* was seen several times — possibly only one individual. Singing Starlings *Aplonis cantoroides* were moving about in pairs and foraging in the outer branches of the trees. They were also feeding on red tree fruits, and one immature, streaked, individual had the throat and breast plumage stained red. Yellow-bellied Sunbirds *Nectarinia jugularis* were present in small numbers.

Comment

Ground nesting and roosting are quite rare in parrots. In

New Zealand, the flightless Kakapo *Strigops habroptilus* nests in a crevice between rocks or tree roots; the Kea *Nestor notabilis* nests on the ground among tree roots, in a hollow log or under rocks (Jackson 1963); the Antipodes Green Parrot *Cyanoramphus unicolor* nests in burrows under vegetation; and the Red-fronted Parakeet *C. novaezeelandiae* nests either in tree holes, holes in cliffs, crevices in rocks, or burrows in the ground or vegetation (Taylor 1985). In Australia, the Ground Parrot *Pezoporus wallicus* and the Night Parrot *Geopsittacus occidentalis* nest and roost on the ground in clumps of grass in areas devoid of trees, and the Rock Parrot *Neophema petrophila* nests in a crevice formed by an overhanging rock (Forshaw 1989). Recently, the Galah *Eolophus roseicapillus* has been reported nesting on the ground in the far north-east of South Australia (Teague 1987) in an area without suitable trees. An editorial note in *South Australian Ornithologist*, subsequent to the above reference, calls attention to old records of Galahs and rosellas *Platycercus* spp. nesting in rabbit warrens (Joseph 1988). The Galah may also nest in holes in cliff faces. The Sulphur-crested Cockatoo *Cacatua galerita* has been observed nesting in riverbanks (L. Joseph pers. comm.). In most of these cases either grass or bark is used as a nest lining.

In the New World, the Patagonian Conure *Cyanoliseus patagonus* breeds in colonies in burrows excavated in cliff faces in Chile and Argentina; and in the high Andes, *Bolborhynchus* parakeets, especially *aurifrons*, breed in burrows (Forshaw 1989; L. Joseph pers. comm.).

The most nearly comparable case to that of *T. h. flavicans* that has come to our attention is, however, the Bahama Parrot *Amazona leucocephala bahamensis* on Abaco Island. Rosemarie Gnam studied these birds in the field for six years and found that they nest in deep cavities in the ground; there is no nest lining material. Introduction of cats on Abaco has led to the near extinction of this endemic taxon (Gnam 1987, 1990, pers. comm.). The Bahama Parrot, and also the Kakapo, the Ground Parrot and Night Parrot, evolved in environments largely free of predators. The introduction of predators and habitat destruction have led to the near extinction of these forms.

While the Rainbow Lorikeet has a very wide range and is very numerous, it seems that at least some Manus birds have taken advantage of the lack of predators on the small offshore islets to move there to nest and roost. Because trees on the islets are small, ground roosting and nesting may be their only option. This subspecies is

restricted to the Admiralties and New Hanover and nesting on the main islands has not been described. It would be interesting to know whether nests and roosts are confined to trees on the large islands where cats and pigs are present, whether the nesting is 'colonial' there, or whether ground nesting and roosting occur only on offshore islets where predators are absent and is 'colonial' only because of the limited number of suitable islets.

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Opinion 1674 **THRESKIORNITHIDAE Poche, 1904 (Aves, Ciconiiformes): given precedence over PLATALEIDAE Bonaparte, 1838 and EUDOCIMIDAE Bonaparte, 1854.**