

## Temporal Variation in the Frequency of Vocalisations of the New Guinea Harpy-Eagle

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The New Guinea Harpy-Eagle *Harpyopsis novaeguineae* is an uncommon raptor found throughout mainland Papua New Guinea from sea level to 3200 m (Beehler *et al.* 1986). This eagle is widely reported to soar high above the forest canopy (Iredale 1956; Peckover & Filewood 1976; Rand & Gilliard 1967; Brown & Amadon 1967). However, no individuals of this species were observed in this manner during the present study and such sightings have been attributed to the Gurney's Eagle *Aquila gurneyi* (Bell 1984) or the Long-tailed Buzzard *Henicopernis longicauda* (pers. obs.). Instead the New Guinea Harpy-Eagle possibly never soars but rather spends much of its time perched inconspicuously in the forest canopy making occasional short flights below or just above the canopy level (Bell 1984; Beehler *et al.* 1986; pers. obs.). Consequently, it is difficult to observe. The first indication of this species' presence in a tract of forest is usually its characteristic call, described as 'Bung! buk-buk-buk-buk-buk' (Diamond 1972). This low vibrating sound carries for over a kilometre and can be used to locate the calling bird.

During this study (18 September to 16 December 1986, with the exception of 11 days between 4 and 14 November) the New Guinea Harpy-Eagle was seen on 28 occasions. Of these sightings, only twice was a Harpy-Eagle seen without hearing its call beforehand. On all occasions ( $n = 26$ ), tracking down calling Harpy-Eagles resulted in a sighting of the bird(s). Calling individuals were only observed whilst perched on large boughs in the upper rainforest canopy. No vocalisations were heard from individuals in flight. All calling birds were on ridgelines or no more than 200 m downslope from ridgeline crests.

The New Guinea Harpy-Eagle has been reported to call both during the day and at night (Diamond 1972; Beehler *et al.* 1986). To determine when Harpy-Eagles call most frequently, I recorded the time individual Harpy-Eagles were heard in a 1000 ha area on the south-western slopes of Mt. Missim, Morobe Province, Papua New Guinea (7°16'S, 146°47'E). Vocalising individual Harpy-Eagles were scored for each half-hour period that a call sequence was heard (Fig. 1). The collection of data on calls was to some extent dependent on the location of my activities within the study area but Harpy-Eagles were recorded calling from all prominent ridgelines within the area and consequently the data presented provide a realistic picture of the temporal variation in the frequency of vocalisation of this species.

The characteristic call was frequently given as a duet ( $n = 17$ , 65% of call sequences heard when New Guinea Harpy-Eagles were under observation) with the 'Bung!' part uttered by one bird and the 'buk-buk-buk-buk-buk' given by another bird. When the call was given as a duet the two birds were always perched within 100 m of one another. The second part of the call was never given by an individual perched in the rainforest canopy on an adjacent ridgeline separated by a deep valley. I did not determine whether the two sections of the call were given by a pair or by two birds of the same sex. On five occasions single birds were observed to utter the combined sequence or gave the first ( $n = 3$ ) or second parts ( $n = 1$ ) of the call only. Consequently, when the call was heard in its entirety it could not be assumed that two birds were participating and therefore this was scored as one bird.

Three to five New Guinea Harpy-Eagles of unknown age and sex frequented the study area. They were heard calling on 65 out of 80 days (81%) and were not heard on days of continual rain and/or strong winds (in excess of 15 knots). While the detection of bird calls is difficult under such conditions, the low-pitched, penetrating and carrying qualities of the Harpy-Eagles call made it more readily detectable than most bird calls. Calls were most commonly heard around dawn and to a lesser extent before or during dusk, producing a bimodal frequency distribution (Fig. 1). No birds were heard between 1900 and 0300 h and only four calls were recorded in the middle of the day between 1000 and 1600 h. The calls recorded between 2200 and 0500 h may not be a true indication of calling frequencies as I usually rested during this period. However, on 27 nights when working from dusk until 0200 h, or later, the pattern was confirmed with no calls heard from after nightfall until less than three hours before dawn.

The New Guinea Harpy-Eagle has been reported as both a diurnal and nocturnal hunter foraging on possums, tree kangaroos, terrestrial macropods, small pigs, other mammals and birds (Diamond 1972; Peckover & Filewood 1976). Neither of these authors had direct observational evidence on nocturnal hunting but used indirect evidence such as the vocalisations of Harpy-Eagles at night and the presence of a distinct facial disc to facilitate detection of prey at night. Bell (1984, p. 212) reported 'knowledgeable hunters among the Koiari people of the Central Province' as denying that the eagle hunted at night and suggested that the facial disc was related 'to detecting prey, largely

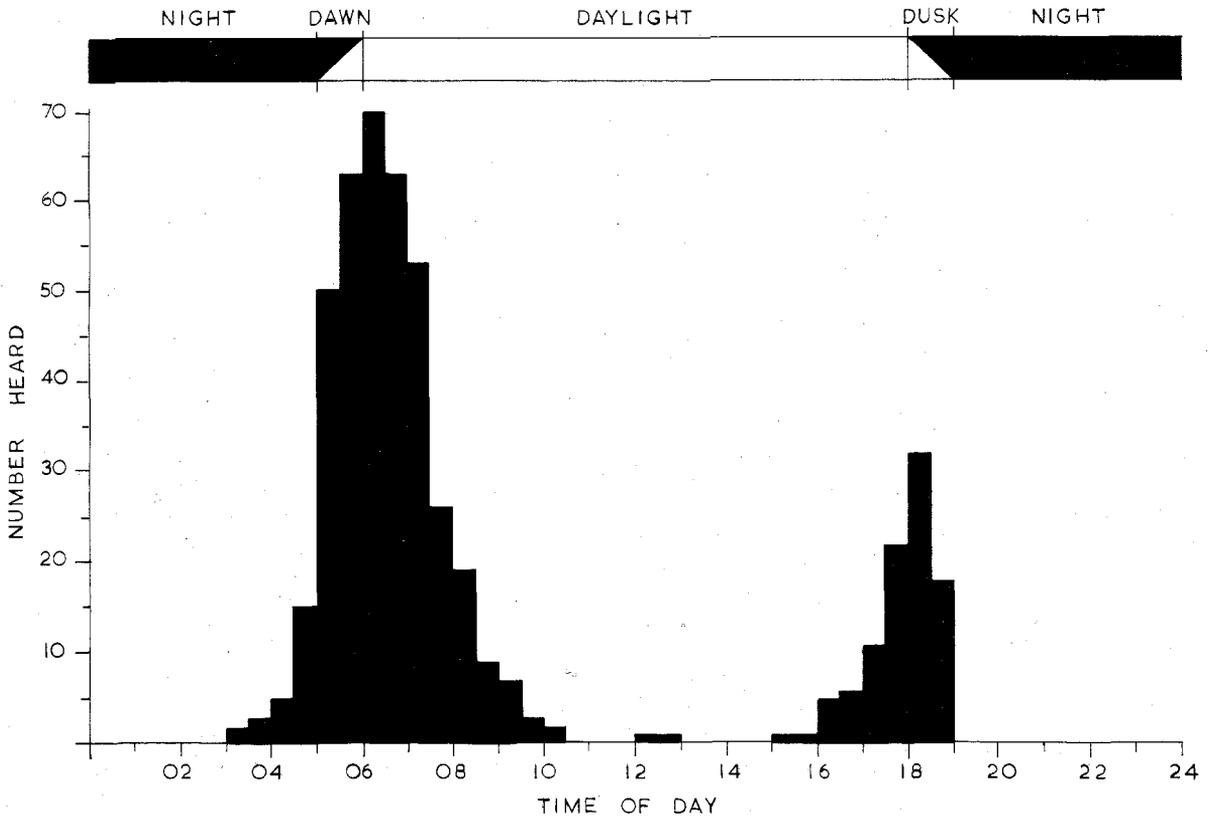


FIGURE 1 Frequency distribution of calls given by the New Guinea Harpy-Eagle during a 24 hour cycle between 18 September and 16 December 1986 at Mt. Missim, Morobe Province, Papua New Guinea. All months are combined.

terrestrial, moving out of sight under the forest canopy' (p. 212).

This study provided no evidence as to whether vocalisations were used to aid hunting. However, if calling is related to activity, then the New Guinea Harpy-Eagle appears to be crepuscular. Incidental observations tend to support this. For example, during the study period individuals were twice (0615 and 1810 h respectively) observed with prey (Phalangeridae) that appeared freshly captured (i.e. presence of non-coagulated blood). However, of interest is the marked cut-off directly after dusk when no individuals were heard. This period is a time of activity for most nocturnal mammals and is the period when other crepuscular raptors such as the Bat Hawk *Macheiramphus alcinus* and hobbies are active (Brown & Amadon 1968).

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