

COOPERATIVE BREEDING IN THE PUFF-THROATED BULBUL *ALOPHOIXUS PALLIDUS* IN THAILAND

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ABSTRACT. – Cooperative breeding in birds is known from less than 3% of all species although this number is increasing as more detailed studies are undertaken. During a study of Puff-throated Bulbul *Alophoixus pallidus* at Khao Yai National Park, Thailand, three nests were found in which at least three individuals provisioned the nestlings. We suspect that this behaviour either occurs frequently or is the norm for this species. These observations are among very few records of cooperative breeding in the bulbul family (Pycnonotidae).

KEY WORDS. – Cooperative breeding, Puff-throated Bulbul, *Alophoixus pallidus*, nest, nestling.

INTRODUCTION

Cooperative breeding, whereby individuals other than the genetic parents assist in raising offspring, has been recorded in many bird families. There are several types of cooperation including assisting in feeding nestlings, nest construction, incubation and defence against predators or territory intruders (Brown, 1987). An individual may become a helper instead of dispersing to breed independently due to lack of available territories. In the mean time it can gain indirect fitness benefits by increasing the productivity of the nests of its parents or close relatives (Stacey & Koenig, 1990). Proving that cooperation occurs can be particularly difficult in dense tropical forests, where nest visits by adults are infrequent and distinguishing individuals is problematic. Although cooperative breeding has been recorded in less than 3% of all bird species (Ligon & Burt, 2004), this number is increasing as more detailed studies of a greater range of species are undertaken (e.g. Gill, 2004; Round, 2006). Of the 137 species in the family Pycnonotidae only two African species, the Spotted Greenbul (*Ixonotus guttatus*) and the Swamp Greenbul (*Thescelocichla leucopleura*), have been reliably documented as regular cooperative breeders (Grimes, 1976). McClure (1970) reported an observation made in Bangkok, Thailand, of a juvenile from an earlier brood of Streak-eared Bulbul (*Pycnonotus blanfordii*) feeding fledglings of a later brood of possibly the same parents, however, the identities of the adults and parentage of the fledglings were not elucidated beyond question. Here we

report on the apparently regular provisioning of nestlings by more than two individuals in the Puff-throated Bulbul (*Alophoixus pallidus*) in Thailand.

METHODS

This study took place at Khao Yai National Park north-eastern Thailand (14°26'N 101°22'E) on the Mo-Singto permanent forest plot (Brockleman, 1998). The plot is situated in mature, seasonally-wet evergreen forest at 723–817 m elevation.

Puff-throated Bubluls are omnivorous, eating a wide range of fruits and insects, and are strongly social, usually encountered in groups of 3–6 individuals throughout the year. (Round et al., 2004; Sankamethawee, unpubl. data). They build cup-shaped nests between 0.5–15 m above the ground between February and July (Pierce et al., 2004 & unpubl. data). Observations of adults provisioning nestlings recorded visitation rates of less than two visits per chick per hour. From January 2003 to June 2005, 79 adult Puff-throated Bubluls were caught using mist-nets and ringed with unique combinations of one aluminium and two plastic colour rings. Breeding birds caught during the breeding season could usually be sexed, with males having a distinct cloacal protuberance and females an obvious brood patch. By observing marked individuals of known sex we were able to determine that only one female of a group (in all of 21 groups where a known female was colour-ringed) built the nest

incubated the eggs and brooded the chicks. Previous studies (Pierce et al., 2004; Sankamethawee, unpubl. data) suggested the possibility of co-operative breeding in this species due to their regular occurrence in groups of three or more and an unconfirmed sighting of visits by three individuals to a nest in 2003. This could not, however, be proven as insufficient numbers of adults had been colour-ringed.

RESULTS

During the 2005 breeding season 47 active nests of 29–31 breeding units (pairs or groups) of Puff-throated Bulbul were found and monitored. By observing individually marked birds we were able to determine that at least three of these groups engaged in cooperative provisioning of nestlings.

Nest 1. Found with two c. 4 day old chicks and one unhatched egg on 10 May. During 1545 – 1745 on 11 May three different colour-ringed birds brought food to the nest, while during a brief check of the nest on 13 May a fourth (unringed) bird was seen to feed the nestlings. During detailed observations from a blind, 0630 – 1330 on 14 May, all three ringed adults and at least one unringed adult fed the nestlings. The breeding female brought food eight times and a known male made nine trips with food during this period. The other birds made a total of eight feeding visits between them while on two other visits the individuals were not identified. As well as provisioning the nestlings, all the adult birds either ate or removed faecal sacs. The nest was depredated sometime before 0930 on 15 May, when last visited.

Nest 2. Found with two c. 3 day old chicks on 14 May. Continuous observation during 1325 – 1415 on 15 May revealed three different ringed individuals (one male, one female and one of unknown sex) feeding the chicks, which eventually fledged on 22 May.

Nest 3. Found while under construction on 24 May. The first of three eggs was laid on 28 May and all eggs hatched on 11 June. During a total of four hours of observation between hatching and fledging on 22 June, two ringed individuals (including the breeding female) and at least one unringed individual were seen to feed the nestlings. All the adults also ate or removed faecal sacs.

At these and other nests, during the nest construction, incubation and nestling period, birds would make harsh “chack” calls in the vicinity of the nest just prior to a nest visit. This was heard coming from birds other than just the breeding female, who would often enter the nest silently, and may have been a form of nest vigilance as suggested by Ricklefs (1980).

DISCUSSION

Our observations demonstrate the occurrence of cooperative breeding in the Puff-throated Bulbul through the participation of helpers in the provisioning of nestlings and in maintaining nest hygiene. Helpers did not contribute to nest construction, incubation or brooding, but were probably involved in nest defence.

Four other species of bulbul (Black-crested Bulbul *Pycnonotus melanicterus*, Stripe-throated Bulbul *P. finlaysoni*, Ashy Bulbul *Hemixos flavala* and Grey-eyed Bulbul *Iole propinqua*) regularly breed at the study site, and although encountered in flocks when bathing or feeding at fruiting trees were otherwise usually seen singly or in pairs and were thought unlikely to be cooperative breeders (Gale et al., unpubl. data).

Although cooperative breeding may be genuinely infrequent in some species, such as in the well-studied Hooded Warbler (Tarof & Stutchbury, 1996), it may merely have gone undetected in many others due to insufficient observation. Even though we only proved cooperative breeding in three instances out of 47 nesting attempts we suspect that it is a common trait in Puff-throated Bulbuls. Of 47 nests only 15 reached the nestling stage, and most of these failed before any observations were made. Further, nest visits by adults were infrequent (less than two visits per chick per hour) so that it was often not possible to distinguish one unringed bird from another. In the detailed watches at Nest 1, it was five hours before all four birds of the group were seen to feed the nestlings, further emphasising the labour intensiveness of proving cooperative breeding. Other than at the three nests described, observations were either of insufficient duration, or there were not enough ringed individuals to prove whether or not more than two birds were involved in feeding nestlings.

Further studies involving the colour ringing of nestlings, combined with nest observations to determine group composition and relatedness, and sampling of genotypes of both adults and young are being conducted to determine the role and the kin relations of helpers. While none of the other bulbul species at Khao Yai are likely to be cooperative breeders it would be interesting to know whether any other *Alophoixus* species exhibit this mating system.

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LITERATURE CITED

- Brockelman, W. Y., 1998. Long term ecological research plot for the study of animal diets in Khao Yai National Park. In: Poonswad, P. (ed.), *The Asian hornbills: ecology and conservation. Thai Studies in Biodiversity. No. 2.* Pp. 307-310.
- Brown, J. L., 1987. *Helping and communal breeding in birds: ecology and evolution.* Princeton University Press, Princeton, New Jersey. 354 pp.
- Gill, S. A., 2004. First record of cooperative breeding in a *Thryothorus* wren. *Wilson Bulletin*, **116**: 337-342.
- Grimes, L. G., 1976. The occurrence of cooperative breeding behaviour in African birds. *Ostrich*, **47**: 1-15.
- Ligon, J. D. & D. B. Burt, 2004. Evolutionary origins. In: Koenig, W. D. & J. L. Dickinson (eds.), *Ecology and Evolution of Cooperative Breeding in Birds.* Cambridge University Press, Cambridge, U.K. Pp. 5-34.
- McClure, H. E., 1970. Three notes on Thai birds. *Natural History Bulletin of the Siam Society*, **23**: 332-343.
- Pierce, A. J., Tokue, K., Pobprasert, K. & P. D. Round, 2004. Observations on the breeding of the Puff-throated Bulbul *Alophoixus pallidus* in north-east Thailand. *Forktail*, **20**: 100-101.
- Ricklefs, R. E., 1980. Watchdog behaviour observed at the nest of a cooperative breeding bird, the rufous-margined flycatcher *Myiozetetes cayanensis*. *Ibis*, **122**: 116-118.
- Round, P. D., 2006. Cooperative provisioning of nestlings in the White-crested Laughingthrush *Garrulax leucolophus*. *Forktail*, **22**: 89-90.
- Round, P. D., G. Gale, A. Pattanavibool, A. J. Pierce, K. Tokue, K. Pobprasert, W. Sankamethawee, Y. Warren, W. Y. Brockelman & P. Wohandee, 2004. Avian abundance and diversity: an assessment of monitoring methods for forest birds at the Mo-singto Long-term Biodiversity Research Plot, Khao Yai National Park. Interim report to the Biodiversity Research and Training Program of Thailand.
- Stacey, P. B. & W. D. Koenig, 1990. *Cooperative breeding in birds: Long-term studies of ecology and behaviour.* Cambridge: Cambridge University Press. 633 pp.
- Tarof, S. A. & B. J. Stutchbury, 1996. A case of cooperative breeding in the Hooded Warbler. *Wilson Bulletin*, **108**: 382-384.