

NOTES

Sakalava weaver (*Ploceus sakalava*) nesting association with raptors: An alternative hypothesis

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Résumé

Trois observations de colonies de Tisserin sakalave (*Ploceus sakalava*) associés à des nids des rapaces et autres grands oiseaux agressifs sont présentées, ainsi qu'une observation de la prédation d'un nid du tisserin sakalave par un Polyborioide rayé (*Polyboroides radiatus*). Sur la base de nos observations et de la littérature, nous avançons l'hypothèse que le Tisserin sakalave cherche à établir ses colonies en association avec des nids d'oiseaux agressifs comme adaptation contre la prédation par le Polyborioide rayé. Des méthodes pour tester l'hypothèse sont présentées.

Rene de Roland (2010) reported an observation of a Madagascar buzzard (*Buteo brachypterus*) nesting in a tree occupied by a colony of Sakalava weavers (*Ploceus sakalava*) numbering approximately 75 nests. The isolated tree was found in an area of degraded habitat approximately 150 m from the nearest forest fragment. The author hypothesized that the Madagascar buzzard occupied this tree due to a lack of suitable nesting habitat in the area, in which few large trees remain; this implies that the Sakalava weaver colony pre-dated the establishment of the Madagascar buzzard nest. No aggressive or predatory interactions were observed between the species.

Here we report four separate observations of Sakalava weaver interactions with raptors and other large, aggressive birds, and suggest an alternative hypothesis for the nesting association:

- 1) On 2 November 2005, in an area of fragmented dry forest known as Manondro (12°27'34"S, 49°01'17"E) in northern Madagascar, CJG observed a small Sakalava weaver colony of around five nests immediately beneath an active nest of Henst's goshawk (*Accipiter henstii*).
- 2) On 27 December 2010, in Mangily Forest (23°05'45"S, 43°36'48"E) within the PK 32-Ranobe New Protected Area, CJG and LDJ observed a colony of approximately 20 Sakalava weaver nests in a baobab tree (*Adansonia rubrostipa*), underneath the active nest of a Madagascar buzzard. Several weaver nests appear to be suspended directly from the buzzard nest, while others hang from neighbouring branches (Figure 1).
- 3) On 20 April 2011 in the Tsimanampetsotsa National Park (24°04'57"S, 43°45'28"E), LDJ observed a colony of five Sakalava weaver nests suspended directly from a large stick nest (Figure 2) in a tree of *Pachypodium geayi*. The nest was most likely constructed by a pied crow (*Corvus albus*) (Rene de Roland, pers. comm.). None of the nests were active at the time of the observation.
- 4) On 31 March 2011, in Mangily Forest (23°07'18"S, 43°39'36"E), XV observed the successful predation of a Sakalava weaver nest, placed in a small colony within an *Adansonia rubrostipa* tree, by a Madagascar harrier hawk (*Polyboroides radiatus*). The harrier hawk was observed suspended upside down from a branch, and extending its head into the nest, whereupon it emerged clutching a weaver nestling in its bill and flew away.

In cases 1-3, the nesting tree was an emergent with a crown several meters higher than the surrounding vegetation, but trees of similar stature were widespread at all three sites. No interactions were observed between the species at any time. In case 4, the Madagascar harrier hawk, which has elongated tarsi and a flexible intertarsal joint, appears to specialise in removing prey from within crevices and tree holes (Thorstrom & La Marca, 2000), including a variety of different lemurs (Goodman *et al.*, 1993;



Figure 1. Nestling Madagascar buzzard from Mangily, with a colony of Sakalava weaver suspended directly from the nest (photograph taken by Louise D. Jasper).



Figure 2. Probable pied crow nest from Tsimanampetsotsa National Park, with Sakalava weaver nests suspended directly from the nest (photograph taken by Louise D. Jasper).

Karpanty, 2006), frogs and geckos (Thorstrom & La Marca, 2000), and birds (Karpanty & Goodman, 1999; Thorstrom & La Marca, 2000). Birds, particularly nestlings, make up an important component of the diet during the nesting season. From observations of a single nest on the Masoala Peninsula, Thorstrom & La Marca (2000) estimated birds comprise 26.9% of

dietary items, of which nestlings made up 86%, while Karpanty & Goodman (1999) found birds to comprise 23.9% of prey items brought to a nest in the Androy region. The species has been observed preying the nests of Henst's goshawk (Rene de Roland *et al.*, 1996), Bernier's vanga *Oriolia bernieri* (Thorstrom & Rene de Roland, 1999), and Madagascar fody

Foudia madagascariensis (Craig 2003a), and has been reported to 'often' raid the nests of *Ploceus sakalava* (Goodman *et al.*, 1997; Craig, 2003b). The specialised foraging technique of the raptor may render it one of the few avian predators capable of preying on Sakalava weaver nests.

The Sakalava weaver has previously been noted nesting in association with a range of species, including Madagascar buzzard, pied crow, and yellow-billed kite (*Milvus aegyptius*) (Rand, 1936), and the Madagascar fish eagle (*Haliaeetus vociferoides*) (Tingay & Gilbert, 1999). In at least two of the cases reported here, some or all weaver nests were built directly on material from the larger nests, indicating that the raptor nest was established before the weaver colony. Given this, and the known predation of Sakalava weavers by Madagascar harrier hawks, we hypothesise that Sakalava weavers actively seek to establish colonies under the nests of certain raptor species, or other large, aggressive birds, in order to avoid predation by Madagascar harrier hawk.

Many raptors, including the Madagascar buzzard, may re-use nests over successive years (Berkelman, 1996) and would presumably display highly agonistic behaviours to other raptor species approaching their nests, thus providing a deterrent to avian nest predators. The Madagascar harrier hawk is a relatively common raptor in Madagascar, and frequently occurs in relatively open or degraded dry forests in the west and south (Thorstrom *et al.*, 2003) – typical habitat of the Sakalava weaver (Craig, 2003b). Given the abundance of the species, selective pressure may have been sufficiently high over time to have resulted in Sakalava weavers choosing such sites as an anti-predator behavioural adaptation.

The hypothesis can be tested in two ways. Surveys of Sakalava weaver nesting colonies are required to test whether they occur more frequently in trees occupied by raptor nests than would be expected by chance, and to confirm that the raptor nests predated the establishment of the colony. Secondly, investigations of predation pressure on weaver colonies both in raptor-occupied trees and raptor-unoccupied trees are required to test any predator deterrent effect as a result of the association.

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References

- Berkelman, J. 1996.** Breeding biology of the Madagascar buzzard in the rainforest of the Masoala Peninsula. *The Condor*, 98: 624-627.
- Craig, A. J. F. K. 2003a.** *Foudia madagascariensis*, Madagascar fody, fody, fodimena. In *The natural history of Madagascar*, eds. S. M. Goodman & J. P. Benstead, pp. 1145-1146. The University of Chicago Press, Chicago.
- Craig, A. J. F. K. 2003b.** *Ploceus sakalava*, Sakalava weaver, fodisahy, zaky, tsiaka. In *The natural history of Madagascar*, eds. S. M. Goodman & J. P. Benstead, pp. 1144-1145. The University of Chicago Press, Chicago.
- Goodman, S. M., O'Connor, S. & Langrand, O. 1993.** A review of predation on lemurs: Implications for the evolution of social behaviour in small, nocturnal primates. In *Lemur social systems and their ecological basis*, eds. P. M. Kappeler & J. U. Ganzhorn, pp. 51-66. Plenum, New York.
- Goodman, S. M., Pidgeon, M., Hawkins, A. F. A. & Schulenberg, T. S. 1997.** The birds of southeastern Madagascar. *Fieldiana: Zoology*, new series, 87: 1-132.
- Karpanty, S. M. 2006.** Direct and indirect impacts of raptor predation on lemurs in southeastern Madagascar. *International Journal of Primatology*, 27: 239-261.
- Karpanty, S. M. & Goodman, S. M. 1999.** Diet of the Madagascar harrier-hawk, *Polyboroides radiatus*, in southeastern Madagascar. *Journal of Raptor Research*, 33: 313-316.
- Rand, A.L. 1936.** The distribution and habits of Madagascar birds. A summary of the field notes of the Mission Zoologique Franco-Anglais-Américaine à Madagascar. *Bulletin of the American Museum of Natural History*, 72: 143-499.
- Rene de Roland, L.-A. 2010.** Madagascar buzzard (*Buteo brachypterus*) nest in association with the colonial-nesting Sakalava weaver (*Ploceus sakalava*). *Malagasy Nature*, 4: 65-66.
- Rene de Roland, L.-A., Thorstrom, R. T. & Watson, R. T. 1996.** Breeding records and nestling predation of Henst's goshawks on Masoala Peninsula, Madagascar. *Ostrich*, 67: 168-170.
- Thorstrom, R. & Rene de Roland, L.-A. 1999.** Première description du nid de l'Oriole de Bernier *Oriolia bernieri*. *Working Group on Birds in the Madagascar Region Newsletter*, 9: 21-26.
- Thorstrom, R. & La Marca, G. 2000.** Nesting biology and behaviour of the Madagascar harrier-hawk (*Polyboroides radiatus*) in northeastern Madagascar. *Journal of Raptor Research*, 34: 120-125.
- Thorstrom, R., Rene de Roland, L.-A. & Watson, R. T. 2003.** Falconiformes and Strigiformes: Ecology and status of raptors. In *The natural history of Madagascar*, eds. S. M. Goodman & J. P. Benstead, pp. 1080-1085. The University of Chicago Press, Chicago.
- Tingay, R. & Gilbert, M. 1999.** Annotated list of the birds of Lacs Soamalipo, Befotaka and Ankerika ('Three Lakes') and surrounding Tsimembo Forest, western Madagascar. *Working Group on Birds in the Madagascar Region Newsletter*, 9: 26-30.