Revista Brasileira de Ornitologia, 16(3):256-259
setembro de 2008

NOTA

The parrotlet *Forpus xanthopterygius* scrapes at clay nests of the ovenbird *Furnarius rufus:* tasting or testing a new home?

Ivan Sazima

Museu de Zoologia, Caixa Postal 6.109, Universidade Estadual de Campinas, CEP 13083-970, Campinas, SP, Brasil. E-mail: isazima@unicamp.br (retired and associated as voluntary researcher).

Recebido em: 27/02/2008. Aceito em: 10/09/2008.

RESUMO: O tuim *Forpus xanthopterygius* raspa ninhos do joão-de-barro *Furnarius rufus:* saboreando ou testando um novo lar? A dieta de papagaios (Psittacidae) é baseada em frutos, sementes, flores e folhas, que podem incluir compostos tóxicos. Relato aqui sete episódios de raspagem e ingestão de terra de ninhos de joão-de-barro *(Furnarius rufus)* pelo tuim *(Forpus xanthopterygius).* Tanto machos como fêmeas foram registrados raspando ninhos recentes, completos e desocupados. Raspagem em ninhos velhos ou apenas no início não foi registrada. Além disso, alguns indivíduos entraram no ninho e aí permaneceram por algum tempo. Consumo de terra (geofagia) auxiliaria na redução da toxidez de alguns dos compostos das plantas ingeridas, além de fornecer nutrientes. Como tuins podem ocupar ninhos vazios do joão-de-barro, apresento duas possíveis explicações para o comportamento de raspagem dos ninhos. A primeira seria a de que o tuim obtém barro para suas necessidades fisiológicas e/ou nutricionais, e a segunda seria a de que, assim, avalia a condição geral da estrutura do ninho antes de aí procriar. A primeira explicação é mais fácil de aceitar devido ao conhecimento corrente sobre psitacídeos, porém a segunda é plausível e merece estudos adicionais. As duas explicações não são mutuamente exclusivas, podendo ser complementares.

PALAVRAS-CHAVE: Psittacidae, Furnariidae, alimentação, geofagia, necessidades fisiológicas e nutricionais, nidificação.

KEY-WORDS: Psittacidae, Furnariidae, feeding behaviour, geophagy, physiological and nutritional requirements, nesting.

The diet of parrots (Psittacidae) is based on fruits, seeds, flowers, and leaves (*e.g.,* Forshaw 1989, Pizo *et al.* 1995, Sick 1997, Collar 1997). As these birds consume some fruits and seeds while unripe, toxic or otherwise noxious compounds are ingested as well. It is generally assumed that one way to cope with this problem is to consume earth (geophagy), which would help detoxify the noxious compounds (*e.g.,* Diamond *et al.* 1999, Gillardi 1999). However, nutritional or other requirements may be involved in geophagy as well (Sick 1997, Brightsmith and Aramburé 2004), and the function of this behaviour remains to be properly explained (Collar 1997).

I report here on the Blue-winged Parrotlet *(Forpus xanthopterygius),* one of the smallest Neotropical parrots (Sick 1997, Collar 1997) scraping with its bill on the surface of clay-made nests of the Rufous Hornero *(Furnarius rufus:* Furnariidae) and ingesting the dirt. As this parrotlet often occupies vacant nests of the hornero (Barros 1995, Sick 1997, Collar 1997, IS pers. obs.), I comment here on two possible explanations for this behaviour.

Records were made at the urban reserve "Parque Ecológico Prof. Hermógenes F Leitão Filho" (22°48.643'S, 47°04.504'W), Campinas, São Paulo state, southeastern Brazil (see Sazima 2007 for a brief description of the study site). A few additional records were made on two other vacant hornero nests built on an electrical pole in the street of a nearby quarter (22°49.456'S, 47°04.159'W). I recorded feeding and other activities of the parrotlets over 52 days (27 mornings and 25 afternoons) from 17 August 2007 to 02 February 2008. The birds were observed with naked eye, through binoculars, and a 70-300 mm photographic autofocus camera lens at a distance of 2-11 m. "Ad libitum" and "behaviour" sampling rules (Martin and Bateson 1986) were used throughout observational sessions that lasted 5-65 min, totalling 835 min between 06:20-18:25 h (morning: 430 min; afternoon: 405 min). A series of digital photographs was taken as vouchers, a few representative ones presented here. Although Collar (1997) treats *Forpus xanthopterygius* as a synonym of *Forpus crassirostris,* I follow Whitney and Pacheco (1999) and apply the former name to the parrotlet dealt with here.

The Blue-winged Parrotlets foraged throughout the day as solitary individuals, couples, or groups of up to 10 birds. During this study they were recorded to feed on ripe and unripe seeds of *Turnera ulmifolia* (Turneraceae, N = 38) (Figure 1), ripe seeds of *Partenium hysterophorus*

(Asteraceae, N = 2), ripe and unripe seeds and leaves of *Malvastrum coromandelianum* (Malvaceae, N = 3), and unripe seeds of *Albizia lebeck* (Mimosaceae, N = 2).

A parrotlet male was recorded courtship-feeding a female and mating with her afterwards in the afternoon of 30 October 2007, the whole process lasting 3 min (15:18-15:21 h). An extended allopreening bout was recorded for a presumably mated couple in the morning of 19 January 2008 (09:52-09:59 h) beside a vacant hornero nest, after which the female entered the brooding chamber to presumably inspect it (see below).

There were three recent Rufous Hornero nests in the reserve at the time of my records (one of them complete, one without the brooding chamber, and one with external walls but no roof). The complete one was occupied by a Rufous Hornero couple and later their brood from 21 July (nest finishing) to 19 November 2007 (fledglings left), whereas the other two remained unoccupied and

FIGURES 1-6: (**1**) A couple of Blue-winged Parrotlets *(Forpus xanthopterygius)* feed on the seeds of *Turnera ulmifolia,* the branches of which they bent to the ground; (**2**) a parrotlet male about to scrape clay from the entrance wall of a nest of the Rufous Hornero *(Furnarius rufus);* (**3**) a female scrapes clay at the nest entrance while perched on the nest top – a male is perched on a branch to the right; (**4**) a male opens its bill widely to scrap clay from the roof of the nest; (**5**) another male shortly after scraping, its bill open and tongue covered with clay dirt; (**6**) a mated female enters the nest to presumably inspect the brooding chamber.

untended throughout most of the study. On 18 December 2007 the hornero couple began to work on the roof of the incomplete nest, which was completed by 12 January 2008. Besides these three nests, there was a barely started one (base and two incomplete walls) and a very weathered one in the reserve.

Scraping on hornero clay nests by the parrotlets was first noticed on 2 November 2007 and the last record was made on 19 January 2008. A total of seven scraping bouts was recorded throughout the study period, six of them on complete nests (at which time vacant), and one on the nest with no chamber. The birds scraped on this latter when the two complete ones were occupied or tended by the horneros. No scraping by the parrotlets was recorded on the weathered or the barely started nests. Additionally, I recorded no scraping on nests that the parrotlets were already breeding within.

Scraping on the external walls of hornero nests (Figure 2) was recorded five times for presumably mated couples (male and female), and twice for two male couples. Habitually one of the birds scraped the clay while the other watched from a perch on a branchlet near the nest (Figure 3) or on the nest roof (N = 6), but both birds scraping at the same time were recorded as well (N = 1). The nest's entrance walls (Figures 2, 3) were the sites most preferred for the scraping bouts (N = 5), although the roof or other external walls were scraped as well (N = 2). While scraping the clay surface, the parrotlet grasped the corrugated surface of the nest with both feet, opened its bill broadly (Figure 4) and then closed it, at the same time gathering the scraped material with its tongue (Figure 5) and ingesting the dirt. Scraping bouts lasted 1-5 min and were recorded mostly in the morning (N = 6) and rarely in the afternoon (N = 1).

Besides scraping clay, the parrotlets were recorded entering vacant nests (Figure 6) on three occasions: a male on 27 November, a mated couple on 30 December 2007, and a female from a mated couple on 19 January 2008. The first three parrotlets left the chamber within 20-50 sec, whereas the latter female remained in the chamber for 23 min while the male perched on the nest and chirruped, or scraped at the entrance wall. For the following two weeks the female spent most of her time in this nest (presumably brooding an egg clutch), whereas the male was recorded entering briefly there several times, then flying off or sometimes briefly staying in the vicinity of the nest. In a 65 min observational session the female left the nest only twice and returned within 1-2 min, whereas the male entered and left the nest six times with intervals of 3-28 min. The second time the female left, she returned accompanied by the male, which fed the crouched female outside the nest – she entered the nest afterwards (see a detailed account on the reproductive behaviour of the Blue-winged Parrotlet in Barros 1995).

The wide diet of the Blue-winged Parrotlet includes fruit and seeds of several plant species of secondary vegetation formations (*e.g.,* Barros 1995, Collar 1997), including unripe seeds. The ingestion of clay scraped from hornero nests by the parrotlet studied here may be regarded as one way to cope with toxic or otherwise noxious compounds presumably ingested along with some of its food plants, which would thus be detoxified and their effect lessened (see Diamond *et al.* 1999, Gillardi 1999). The clayish earth consumed by psittacids was demonstrated to have detoxifying and cytoprotective functions (Gillardi 1999). However, there are minerals present in clay and mud that may be essential or at least important to the nutritional requirements of these birds (Sick 1997, Brightsmith and Aramburé 2004). For instance, high amounts of sodium and magnesium were found in a sample from a riverbank in Central Brazil where macaws were recorded to scrape clay (Sick 1997) and a similar result was obtained by Brightsmith and Aramburé (2004) in Peru. Thus, a complementary function of scraping Rufous Hornero nests by the parrotlets studied here would be ingestion of minerals and/or substances that meet some of their specific nutritional requirements.

The Blue-winged Parrotlet is one of the habitual occupants of vacant hornero nests (Barros, 1995, Collar 1997, Sick 1997, IS pers. obs.). Since the hornero's complex construction is negatively influenced by rain and wind, it tends to weather in a few months if not tended by the original builders (Sick 1997). Additionally, the hornero does not use the same nest for consecutive breeding (Sick 1997, Remsen 2003), which means that a given nest may be weathered to such extent that it is no longer usable for breeding by other birds (IS pers. obs.). Thus, another possible explanation for scraping hornero nests by the Blue-winged Parrotlet may be an assessment of the general condition of the clay construction this bird may use in the near future. Presumably, the greater the force the parrotlet applies to its scraping, the lesser weathering the nest experienced and thus would be safer for breeding use for the about 6-8 weeks of nest occupancy (Barros 1995, Collar 1999, IS pers. obs.). The above suggestion seems to lend some support from the records of scraping behaviour only during the parrotlet's breeding period at the study site (this paper). Moreover, the parrotlets were not recorded scraping on the weathered or very incomplete nests, as well as those they already occupied for breeding purposes.

The detoxification and nutritional roles of geophagy (Diamond *et al.* 1999, Gillardi 1999, Sick 1997, Brightsmith and Aramburé 2004) would account for an acceptable explanation for the scraping behaviour of clay nests here reported, given our current knowledge of psittacid biology. However, the idea of assessing the general conditions of a future nest (this paper) cannot be ruled out. Indeed, the two explanations here presented

for geophagy by the Blue-winged Parrotlet may be taken as complementary. I suggest that scraping on hornero clay nests and breeding in the vacant ones may be related to each other, as the Blue-winged Parrotlet would have the opportunity to occasionally "taste" the nest material while inspecting a prospective new home. From this viewpoint, the clay-scraping behaviour of the parrotlet is vaguely reminiscent of termite-feeding by the Peach-fronted Parakeet *(Aratinga aurea),* as the opportunity to taste these insects might have arisen while the parakeets excavate their nests in termitaria and eventually this behaviour might have been the starting point to foraging on termites untied to a nest-excavating context (Sazima 1989). Additional records of scraping clay nests of ovenbirds and termites by parrotlets and other small psittacids would be particularly enlightening to this issue.

ACKNOWLEDGMENTS

I thank my family for supporting love and help; J. Y. Tamashiro for identification of the leguminous species; the CNPq for essential financial support.

REFERENCES

Barros, Y. M. (1995). *Biologia comportamental de* Forpus xanthopterygius xanthopterygius *Spix (1824) – (Aves, Psittacidae): alimentação e reprodução. Dissertação de mestrado.* Rio Claro: Instituto de Biociências, Universidade Estadual Paulista.

Brightsmith, D. J. and Aramburé, R. (2004). Avian geophagy and soil characteristics in southeastern Peru. *Biotropica,* 36(4):534-543.

Collar, N. J. (1997). Family Psittacidae (parrots), p. 280-477. In: J. del Hoyo, A. Elliot & J. Sargatal (eds) *Handbook of the birds of the world.* Vol. 4. Sandgrouses to cuckoos. Barcelona: Lynx Edicions.

Diamond, J.; Bishop, K. and Gillardi, J. (1999) Geophagy in New Guinea birds. *Ibis,* 141(2):181-193.

Forshaw, J. M. (1989). *Parrots of the world.* 3rd ed. Willoughby: Landowne Ed.

Gilardi, J.; Duffey, S.; Munn, C. and Tell, L. (1999). Biochemical functions of geophagy in parrots: detoxification of dietary toxins and cytoprotective effects. *J. Chem. Ecol.,* 25:897-992.

Martin, P. and Bateson, P. (1986). *Measuring behaviour, an introductory guide.* Cambridge: Cambridge University Press.

Pizo, M. A.; Simão, I. and Galletti, M. (1995). Diet and flock size of sympatric parrots in the Atlantic forest in Brazil. *Ornitol. Neotrop.,* 6:87-95.

Remsen, J. V. (2003). Family Furnariidae (ovenbirds), p. 162-357. In: J. del Hoyo, A. Elliot & J. Sargatal (eds) *Handbook of the birds of the world.* Vol. 8. Broadbills to tapaculos. Barcelona: Lynx Edicions.

Sazima, I. (1989). Peach-fronted parakeet feeding on winged termites. *Wilson Bull.,* 101(4):656-657.

Sazima, I. (2007). Frustrated fisher: geese and tilapia spoil bait-fishing by the Green Heron *(Butorides striata)* in an urban park in southeastern Brazil. *Rev. Bras. Ornitol.,* 15(4):611-614.

Sick, H. (1997). *Ornitologia brasileira, uma introdução.* Rio de Janeiro: Editora Nova Fronteira.

Whitney, B. M. and Pacheco, J. F. (1999). The valid name of the Blue-winged Parrotlet and designation of the lectotype of *Psittaculus xanthopterygius* Spix, 1824. *Bull. BOC:*211-213.