

Natural history notes on parrots feeding on fruits of *Myracrodruon urundeuva* (Anacardiaceae) in three South American dry forest regions

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Nós apresentamos observações sobre psitacídeos alimentando-se de frutos da aroeira *Myracrodruon urundeuva* (Anacardiaceae) em três regiões distintas de florestas decíduas da América do Sul. As espécies de aves observadas alimentando-se de frutos de *M. urundeuva* foram: Maracanã-de-colar *Primolius auricollis*, Jandaia-de-testa-vermelha *Aratinga auricapillus*, Periquito-rei *Aratinga aurea*, Periquito-da-caatinga *A. cactorum*, Periquito-de-cabeça-preta *Nandayus nenday*, Tiriba-de-cara-suja *Pyrrhura molinae* e Tuim *Forpus xanthopterygius*. Observamos que as aves atuam como predadoras de sementes da aroeira, sendo encontrados fragmentos de frutos e de sementes nos papos e nos estômagos de exemplares coletados, além de diversos pedaços de sementes na base das árvores onde as aves se alimentavam. Frutos da aroeira representam um importante recurso alimentar para psitacídeos nas florestas decíduas da América do Sul, especialmente porque o período de frutificação ocorre durante a estação seca.

Myracrodruon urundeuva (Anacardiaceae) is a typical tree of dry areas and fertile soils^{18,26} (Fig. 1). The species is popularly known as *aroeira* or *urundeuva* and ranges in north-east South America, through central and south-east Brazil, reaching the dry forests of the Paraguay/Paraná rivers systems and the sub-Andean region^{12,18,26,28,32}. Flowering occurs in June–September and the fruiting period is August–November^{12,18,26}. The fruit is a globe-shaped drupe, with slightly fleshy exocarp and mesocarp, and a firm and consistent endocarp^{2,12,18,32}. Since natural history observations on the interactions between birds and fruits of *M. urundeuva* are virtually unknown, the aim of this note is to present observations on the feeding behaviour of parrots in this tree species in three distinct dry forest areas in South America: Caatinga, central Brazil and Chiquitano dry forests.

Material and methods

Occasional observations in the Caatinga region were conducted by SDN in 1998–2005 in dry-forest areas in the environs of Francisco Sá (16°27'S 43°28'W) and Montes Claros (16°43'S 43°53'W), Minas Gerais, Brazil. Other observations were conducted on 24–25 August 2002 by MFV and SDN, in an area of arboreal *caatinga* mixed with limestone outcrops at Cavernas do Peruaçu National Park (15°09'S 44°15'W), Januária municipality, Minas Gerais, Brazil. The vegetation of the dry forests of northern Minas Gerais was detailed by some authors^{3,4,10,24}, whilst the avifauna of this important region was surveyed and studied by Kirwan *et al.*^{15,16}.

Observations in central Brazil were conducted by MFV, DH and HBG on 8–10 October 2005 in the rio Cipó Valley (19°20'S 43°37'W), 'Cardeal Mota' region, Santana do Riacho municipality, Minas Gerais. The sampled area is characterised by dry forest on limestone outcrops at the right bank of the rio Cipó. Birds of this area were previously surveyed by Melo-Júnior *et al.*²⁰ and more recently by Rodrigues *et al.*³⁴.

Chiquitano dry forests were sampled by MFV and DH on 16–21 September 2005 at Fazenda Monjolo (19°19'S 57°34'W), in the 'Maria Coelho' region, Corumbá municipality, Mato Grosso do Sul state. This area is on the southern slope of Maciço do Urucum, and is characterised by Chiquitano dry forests with some typical plant species of the Chaco^{27,35}. A bird checklist of this area was recently presented by Mauro & Campos¹⁹.

Natural history observations were made with binoculars (feeding bouts, following Galetti^{7,8}). We took notes on the numbers of parrots present in each flock and also observed their behaviour when visiting *M. urundeuva*. Bird species were identified with binoculars and by reference to field guides^{14,31}. Voucher specimens of *M. urundeuva* were collected and deposited in the herbariums of Universidade Estadual de Montes Claros and Universidade Federal de Minas Gerais. Bird vocalisations were tape-recorded with Sony TCM-5000EV tape-recorders and Sennheiser ME-66 microphones. Copies of tape-recordings have been deposited in the Arquivo Sonoro Prof. Elias Coelho (ASEC), Department of Zoology, Universidade Federal do Rio de Janeiro. Voucher specimens of some parrot species were deposited in the ornithological collection of the Department of Zoology of the



Figure 1. *Myracrodruon urundeuva* tree growing on limestone outcrop in the rio Cipó Valley (Diego Hoffmann)



Figure 2. Yellow-collared Macaw *Primolius auricollis* feeding on fruits of *Myracrodruon urundeuva* (Diego Hoffmann)



Figure 3. Pair of Yellow-collared Macaws *Primolius auricollis* perched in dry forest (Diego Hoffmann)



Figure 4. Peach-fronted Parakeets *Aratinga aurea* feeding on fruits of *Myracrodruon urundeuva* (Diego Hoffmann)



Figure 5. Black-hooded Parakeets *Nandayus nenday* feeding on fruits of *Myracrodruon urundeuva* (Diego Hoffmann)

Universidade Federal de Minas Gerais (DZUFMG). We also analysed crop contents of the collected specimens (see Galetti⁸). Systematics and nomenclature follow the Comitê Brasileiro de Registros Ornitológicos⁵.

Results

Seven parrot species were observed feeding on fruits of *M. urundeuva* in the sampled areas. Details of these observations are presented below.

Yellow-collared Macaw *Primolius auricollis*

Observed feeding on fruits of *M. urundeuva* in the Corumbá dry forests. Once, a flock of six was observed in the canopy of a *M. urundeuva*. Birds perched feeding on fruits whilst a single individual was alert to the observers and vocalising, perhaps acting as sentinel. It was tape-recorded. During another observation, a single Yellow-collared Macaw was observed feeding on fruits together with c.20 Black-hooded Parakeets *Nandayus nenday*. Yellow-collared Macaws fed on fruits of *M. urundeuva*, stretching their necks upwards, downwards or to the sides, reaching for the fruits (Fig. 2). Fruits were taken using the bill and were eaten. When not feeding, several pairs were observed perched in shady areas within the dry forest (Fig. 3).

Golden-capped Parakeet *Aratinga auricapillus*

Six Golden-capped Parakeets were observed at Cavernas do Peruaçu National Park, feeding on fruits of *M. urundeuva* with four Cactus Parakeets *Aratinga cactorum* (see below). These birds were perched in the canopy of a tree at the base of a limestone outcrop. Fruits were taken with the bill and were eaten. These birds were tape-recorded while feeding.

Peach-fronted Parakeet *Aratinga aurea*

Flocks of 2–9 Peach-fronted Parakeets were observed feeding on fruits of *M. urundeuva* in a dry forest growing on a limestone outcrop in the rio Cipó Valley. Perched, they took fruits with their bills (Fig. 4). Sometimes, birds cut infrutescences with their bills and held them with their feet, whilst feeding on the fruits. One specimen was collected (DZUFMG 4533) and its crop and stomach contained small fragments of fruits and seeds of *M. urundeuva*, and other pieces of unidentified seeds.

Cactus Parakeet *Aratinga cactorum*

On 4 September 2004, a flock of 11 Cactus Parakeets was observed feeding on fruits of *M. urundeuva* in the environs of Montes Claros. These birds were perched in the tree branches and took the fruits with their bills, sometimes stretching their necks towards the fruits. Fragments of seeds of *M. urundeuva* were found at the base of the tree.

Nine individuals were observed feeding on fruits of the same tree on 22 September 2005. On both occasions, one bird probably acted as sentinel. It perched higher in the canopy and surveyed the surroundings. Four individuals were also observed feeding on fruits of *M. urundeuva* at Cavernas do Peruaçu National Park, with six Golden-capped Parakeets.

Black-hooded Parakeet *Nandayus nenday*

The commonest parrot species observed in the Corumbá region feeding on fruits of *M. urundeuva*. Flocks of 8–60 were seen feeding in isolated trees in pastures or at the edges of dry forest. Sometimes, flocks split into one or more adjacent trees. Birds fed on many fruits while perched in *M. urundeuva* (Fig. 5). Many times they stretched their necks or hung upside-down to reach the fruits with their bills. When a Turkey Vulture *Cathartes aura* flew over a tree with c.40 Black-hooded Parakeets, all of them flew off, vocalising noisily, but returned to the same tree after c.1 minute. The crops and the stomachs of the two that were collected (DZUFMG 4531–4532) contained several small fragments of fruits and seeds of *M. urundeuva*.

Green-cheeked Parakeet *Pyrrhura molinae*

A flock of c.35 Green-cheeked Parakeets fed on fruits of *M. urundeuva* at Corumbá. Some perched in adjacent trees and acted as sentinels, vocalising and watching the observers. Feeding behaviour was similar to that recorded for other species of *Aratinga* and *Nandayus*. A voucher specimen was collected (DZUFMG 4534).

Blue-winged Parrotlet *Forpus xanthopterygius*

Five Blue-winged Parrotlets were observed feeding on fruits of *M. urundeuva* in the environs of Francisco Sá on 19 August 1998. Six were feeding in the same tree on 24 August and 9 September 2000. The birds perched in branches of the canopy, sometimes in the axis of the infrutescences to reach the fruits. Small pieces of seeds were found at the base of the tree.

Discussion

Dubs⁶ mentioned that the range of Black-hooded Parakeet is related to the occurrence of the *carandá* palm *Copernicia alba* (Arecaceae), a typical palm of the eastern Chaco region and south-west Pantanal^{6,29,33}. The fruits of *carandá* appear to be important in the diet of Black-hooded Parakeet^{6,14,31}. Although the area visited in Corumbá had stands of *carandás*, we did not see this palm with fruits during the dry season. Nevertheless, MFV observed Black-hooded Parakeets feeding on fruits of *carandá* in the study area during the wet season (on 17–22 November 2005 and 12–23 January 2006). Fruits of *M.*

urundeuva represent an important food resource for Black-hooded Parakeet during the dry season. Since almost nothing is known as to the diet and the ecology of the species⁸, our observations provide more data on its natural history. It should also be mentioned that Ragusa-Netto³⁰ observed Black-hooded Parakeet feeding on the nectar of flowers of *Erythrina dominguezii* (Fabaceae), near Corumbá, during the dry season.

Observations on the diet of the Peach-fronted Parakeet do not mention fruits of *M. urundeuva* as a food resource for this species^{1,9,11,36–38}. The presence of fragments of seeds of *M. urundeuva* on the forest floor and in the crops and stomachs of the specimens suggest that parrots act as seed predators of this plant species, and perhaps not as seed dispersers. However, Peach-fronted Parakeet probably accidentally disperses some seeds of *M. urundeuva*, as birds let infructescences fall to the forest floor. Several birds are important seed dispersers of *Schinus terebinthifolius* and *Pistacia lentiscus*, two other species of Anacardiaceae^{13,17}. Young leaves of *M. urundeuva* were also consumed by Pfrimer's Conure *Pyrrhura pfrimeri*, an endemic of central Brazilian dry forests²³.

Although it has a wide range in South America, *M. urundeuva* is much exploited for its valuable timber^{12,18,23,26–29,32,39} and is considered a threatened species by IBAMA, the Brazilian environmental agency²¹. As the fruits of this tree are an important food resource for at least seven parrot species during the dry season, we suggest that more detailed ecological observations be conducted on the interactions between these birds and *M. urundeuva*. Interesting studies could focus on the feeding ecology of parrots, variation in flock size and seasonal variation in visitations by parrots related to the phenology of *M. urundeuva* throughout its geographic range^{8,22,25}.

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