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NESTING BIOLOGY OF THE GRAY-HOODED FLYCATCHER (*MIONECTES RUFIVENTRIS)*

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Resumo. Mionectes rufiventris ("Abre-asa-de-cabeça-cinza") é um Passeriforme frugívoro de matas tropicais, cuja ecologia reprodutiva é muito pouco conhecida. O objetivo deste estudo foi descrever diversos detalhes da sua biologia da nidificação em fragmentos florestais localizados nos municípios de Belo Horizonte e Nova Lima, MG, Brasil. Ninhos (N = 17) foram monitorados a cada 3–5 dias de agosto a janeiro de 1995, 1996, 1997 e 1998. *Mionectes rufiventris* constrói ninhos fechados em barrancos e em folhas secas de *Pteridium* ao longo de córregos utilizando fibra vegetal seca e fungos (*Marasmius*). As ninhadas foram invariavelmente de três ovos (N = 11), sendo estes de cor branca (N = 12) e possuíram os seguintes parâmetros: massa = 2,4 ± 0,1 g (N = 12); largura = 14,8 ± 0,1 mm (N = 15); e comprimento = 20,8 ± 0,2 mm (N = 15). As estimativas do tempo de incubação e o período que os filhotes permanecem no ninho foram de 22 dias (N = 1) e de 19,3 ± 1,3 dias (N = 3), respectivamente. O sucesso reprodutivo foi de 24,4%, com 47,1% dos ninhos tendo sido predados, 11,8% sendo abandonados e 11,8% perdidos por outras causas.

Abstract. The Gray-hooded Flycatcher (*Mionectes rufiventris*, Tyrannidae; Elaeninea) is a frugivorous Passerine of tropical forests, but little is known about its reproduction. Its nest was described only a short time ago. Here, we described some aspects of its breeding biology in forest fragments of Belo Horizonte and Nova Lima counties, Minas Gerais State, southeastern Brazil. Nests (N = 17) were monitored every 3–5 days from August to January, in 1995, 1996, 1997 and 1998. The Gray-hooded Flycatcher constructs closed nests over water, fixed to tree roots under stream beds or attached to dry *Pteridium* leaves over water, using mostly "dry grass" and fungus (*Marasmius*). Clutch size was of three (N = 11) eggs, white (N = 12) in color, with the following morphological parameters: mass = 2.4 ± 0.1 g (N = 12), width = 14.8 ± 0.1 mm (N = 15), and length = 20.8 ± 0.2 mm (N = 15). The incubation and nestling periods were of 22 (N = 1) and 19.3 ± 1.3 days (N = 3), respectively. Nest success for the four years was of 24.4%, with 47.1% of nests being depredated, 11.8% being abandoned, and 11.8% lost from other causes. *Accepted 14 September 1999.*

Key words: Gray-hooded Flycatcher, Mionectes rufiventris, *nesting biology, nest, breeding, reproductive success, Brazil.*

INTRODUCTION

Mionectes is the only genus of flycatchers with a lek system (Snow & Snow 1979, Sherry 1983, Sick 1996, Pizo & Aleixo 1997), and has the highest degree of frugivory in the family Tyrannidae (Willis *et al.* 1979, Ridgely & Tudor 1994). The breeding biology of the Gray-hooded Flycatcher (*Mionectes rufiventris*) is mostly unknown, but for the recent description of its pendent covered nest (Bencke 1995), which is an elongated pyriform structure covered with moss. Here, we describe and compare several aspects of its breeding biology based on 19 nests found in two forest fragments in southeastern Brazil.

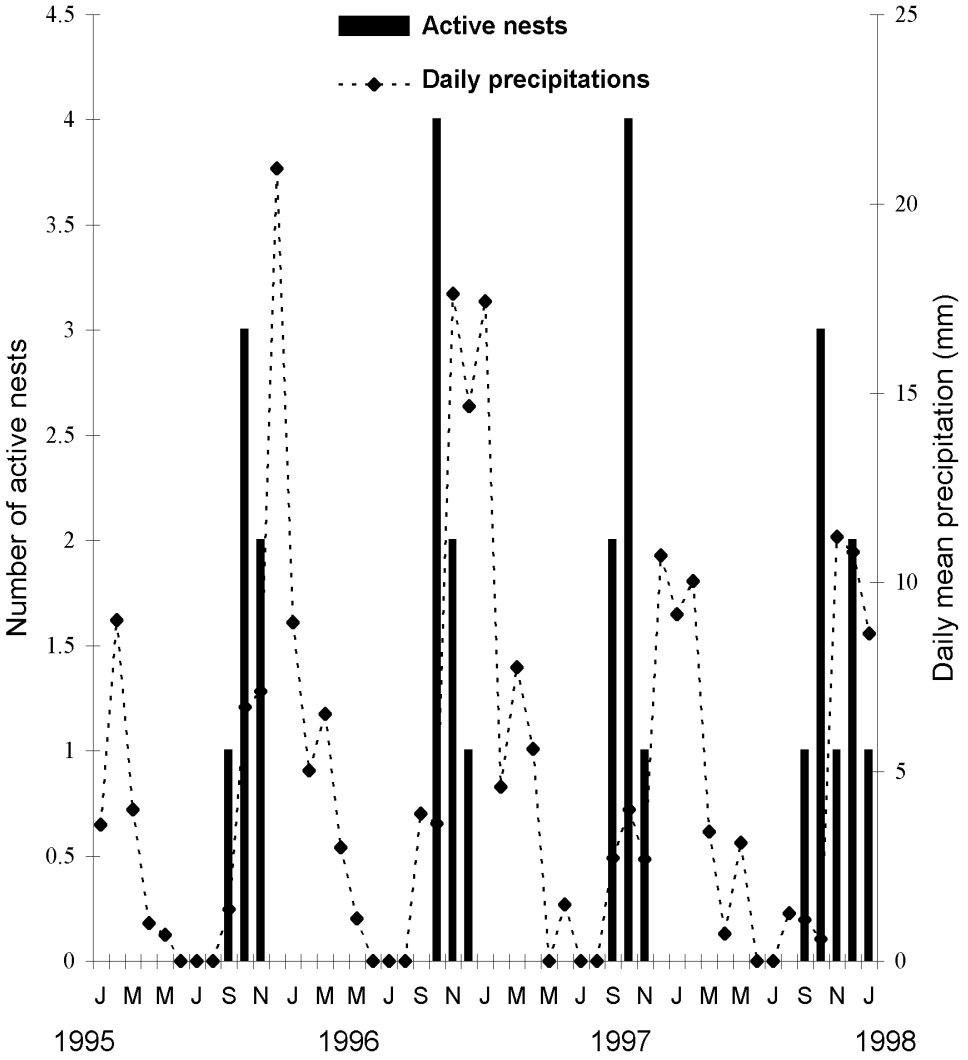

FIG. 1. Relationship between number of active *Mionectes rufiventris* nests and daily mean precipitation (mm) at study sites in 1995–1998.

MATERIALS AND METHODS

This study was conducted in the protected areas (APEs) of Mutuca and Barreiro, owned by the Minas Gerais Water Company (COPASA MG) and located in the respective municipalities of Nova Lima and Belo Horizonte, Minas Gerais State (20º02'–20º00'S, 43º59'–44º00'W). During 1995–1998 we searched for nests in two forest fragments of 50 and 200 ha at the Barreiro APE and in a 300-ha fragment at the Mutuca APE. These two APEs are located on the opposite sides of the Serra do Cachimbo.

TABLE 1. Morphometric parameters of *Mionectes rufiventris* nests found in 1995–1998.

	Mean ± SD	N
Nest height above ground (m)	1.36 ± 0.87	11
External nest length (cm)	47.5 ± 5.2	4
External nest width (cm)	11.9 ± 2.2	3
Height of nest entrance (cm)	4.5 ± 0.4	4
Width of nest entrance (cm)	4.2 ± 1.1	4
Depth of eggs room (cm)	6.9 ± 1.4	4

Vegetation. The Mutuca APE has dry semideciduous and gallery forests which were selectively logged in the past with a successional stage of *c.* 90 years. The Barreiro APE is more preserved with an estimated successional stage of *c.* 150 years (CETEC 1993).

Climate. The region has warm and rainy summers and cool and dry winters with most precipitation falling between November and March. During the study years, the annual precipitation varied between 1358 mm (1995) and 1690 mm (1996). The minimum temperature recorded was 9ºC (1996 and 1997) and the maximum was 37ºC (1997) (COPASA and MBR – Minerações Brasileiras Reunidas, unpubl. data).

Data collection. Nest searches began in July mostly along ravines and roadbeds, encompassed 5.1 km during 1995, 10 km during 1996, 6.4 km during 1997, and 8.7 km during 1998. The Mutuca APE was searched only during 1996. Nests were monitored through visits every 3–5 days after being marked with pink plastic tapes *c.* 5–10 m from the nests.

Eggs and nestlings were counted, weighed with a 0.1 or 0.2 g spring dynamometer, and measured with a 0.05 mm precision caliper. Some of the nests found were measured with the caliper after the nests were considered inactive. All measurements provided below represent the mean ± 1 SE.

RESULTS

We found 19 nests of which 17 were followed until their final fate, including four nests in 1995, four in 1996, four in 1997, and five in 1998.

Reproductive period. During those four years, nest construction began in August, active nests were found between September and January, and peaked in October (Fig. 1). Incubation occurred mostly in the late dry season and early rainy season.

Nest characteristics and nest sites. The nests found by us were closed and had an elongated pyriform shape with a lateral entrance, and were covered with dry vegetable fibers and moss, like those described by Bencke (1995). In some nests the egg chamber was covered with *Marasmius* fungus. Morphometric parameters of the nests are presented in Table 1. All 19 nests were found over water, fixed to tree roots under stream beds or attached to dry *Pteridium* leaves above the water. The mean distance between any two active nests within a breeding season was of 221 ± 38 m (N = 7), and ranged from 90–350 m. Even though we searched for nests along dirt roads and randomly in the forest understory, no nests were found in these places.

Eggs. Clutch size was always three (N = 11). Eggs were white (N = 12), with the following characteristics: mass = 2.4 ± 0.1 g (N = 12), width = 14.8 ± 0.1 mm (N = 15) and length = 20.8 ± 0.2 mm (N = 15). Incubation was asynchronous beginning with the first egg laid. Incubation, as estimated from one nest, lasted 22 days and nestlings remained in the nest for 19.3 ± 1.0 days (N = 3).

Nest fate and reproductive success. Only five

TABLE 2. Fate of *Mionectes rufiventris* nests during the incubation and nestling phases in 1995–1998.

			Nest fate			
Year	Nesting phase	Number of nests	Predated	Abandoned	Succeeded	Other causes
1995	Incubation	4	0	1 (25%)	3 (75%)	0
	Nestling	3	2 (66.7%)	0	1 (33.3%)	0
	Total	4	2 (50%)	1 (25%)	1 (25%)	0
1996	Incubation	4	2 (50%)	1 (25%)	1 (25%)	0
	Nestling	1	1 (100%)	0	0	0
	Total	4	3 (75%)	1 (25%)	0	0
1997	Incubation	4	1 (25%)	0	3 (75%)	0
	Nestling	3	1 (33.3%)	0	2 (66.7%)	0
	Total	4	2 (50%)	0	2 (50%)	0
1998	Incubation	5	1 (20%)	0	3 (60%)	1 (20%)
	Nestling	3	0	0	2 (66.7%)	1 (10%)
	Total	5	1 (20%)	0	2 (40%)	2 (40%)
Total	Incubation	17	4 (23.5%)	2 (11.8%)	10 (58.8%)	1 (5.9%)
	Nestling	10	4 (40%)	0	5 (50%)	1 (10%)
	Total	17	8 (47.1%)	2 (11.8%)	5 (29.4%)	1 (11.8%)

(29.4%) of the 17 nests monitored were successful, with 13 birds fledging. Predation was responsible for 47.1% (N = 8) of the nest losses, while 11.8% (N = 2) were abandoned and two (11.8%) nests were lost due to rain or unknown causes (Table 2). During the incubation phase, four (23.5%) nests were depredated and two (11.8%) were abandoned. During the nestling phase, four (40%) nests were lost by predation and none were abandoned (Table 2). Nestling mortality varied between 33.3% and 100%, and female fecundity varied from 0.75 to 2.25 (Table 3).

DISCUSSION

The reproductive period of the Gray-hooded Flycatcher, August to January, is similar to that of other Passeriformes in southeastern Brazil (Oniki & Willis 1982, 1983a,b,c, Cavalcanti & Pimentel 1988, Marini 1992, Borges & Cardoso 1995, Pichorim *et al.* 1996, Vasconcelos & Lombardi 1996, Marini *et al.* 1997). It differs, however, with respect to the period found by Bencke (1995) for the same species in Rio Grande do Sul State. He found a nest with eggs in mid February, when this species has already stopped reproducing in the Belo Horizonte region. This difference is probably related to differing environmental conditions in the two regions. Another possibility is that the February nest reported by Bencke (1995) is a late nest, as is the April nest reported for *Herpsilochmus* (Formicariidae) by Marini *et al.* (1997).

Different species of *Mionectes* seem to

TABLE 3. *Mionectes rufiventris* female fecundity and nestling mortality in 1995–1998.

Year	Nestlings born	Female fecundity[1]	Nestling mortality
1995	8	2.00	5 (62.5%)
1996	3	0.75	3 (100%)
1997	9	2.25	5 (55.6%)
1998	9	1.80	3 (33.3%)
Mean ± SD	7.3 ± 1.4	1.7 ± 0.3	4.0 ± 0.6

[1]Female fecundity is defined as the number of nestlings born divided by the number of females.

coordinate their reproductive period with the rainfall of their breeding areas. Willis *et al.* (1979) cite January-March as the reproductive period of *M. macconnelli* in Manaus, Brazil and Snow & Snow (1979) report March-September as the reproductive period of *M. oleagineus* in Trinidad. Similar correlations between the reproductive period and the peak of the rainfall period have been reported for other Neotropical species (Ramo & Busto 1984, Robbins *et al.* 1994, Best *et al.* 1996). The start of the rainfall coincides with a peak in insect abundance (Tanaka & Tanaka 1982), which may favor nestlings' growth and increase their survival after leaving the nest. Young (1994), for example, studied *Troglodytes aedon* (Troglodytidae) in Costa Rica, and observed that the peak of arthropod abundance coincided with the time of nest abandonment by the nestlings.

The Gray-hooded Flycatcher appears to be a nest-site specialist, since all nests were found at very similar nesting sites over streams, coinciding with Bencke's (1995) description of the two nests found in Rio Grande do Sul. The nest site and nest height of *M. rufiventris* are also similar to those of *M. macconnelli* (Willis *et al.* 1979) and *M. oleagineus* (Snow & Snow 1979).

The clutch size of *M. rufiventris* in Minas Gerais is the same as two reported by Bencke (1995) for this species in Rio Grande do Sul, and is also the same as that reported by Willis *et al.* (1979) for *M. macconnelli*. Snow & Snow (1979) for *M. oleagineus* report a clutch of 2–5 eggs, mean 2.7 eggs. Also, *M. rufiventris* clutch size is close to the mean of 2.7 found by Yom-Tov *et al.* (1994) for the Tyrannidae.

The incubation period for *M. rufiventris* (22 days) was similar to that of its two congeners: 19 days for *M. macconnelli* (Willis *et al.* 1979) and 19–21 days for *M. oleagineus* (Skutch 1960, *fide* Sherry 1983). However, the latter two species have been reported to have synchronous incubation, differing from the asynchronous incubation showed by *M. rufiventris* at our study site. Nestlings of *M. rufiventris* were fed at the nest for 19.3 days, i.e., longer than the nestlings of *M. macconnelli*, which remained in the nest for 18.5 days (Willis *et al.* 1979). Brood size reduction, from three to one nestling, occurred in only one nest of *M. rufiventris*, just as reported by Willis *et al.* (1979) for *M. macconnelli*. They attributed this nestling loss to two days of heavy rain, which may have caused nestling death due to hunger or low body temperature. Rain may also have been a cause of nestling loss in our nest of *M. rufiventris* since this loss occurred in early November 1997, when rainfall was high at our study area.

Predation was the main cause of nest loss in *M. rufiventris*, being higher during the nestling than during the incubation period. Nests were abandoned only during the incubation phase, while nest losses due to other causes (heavy rain) caused nest losses in both phases. Snow & Snow (1979), however, reported higher nest losses for *M. oleagineus* during the incubation phase (52%) than during the nestling phase (3%). They suggested nest predation, egg infertility, flooding and nest abandonment as potential causes of nest losses. Higher nest losses during the nestling phase, though, may be related to the higher

activity of the parents around the nest during this phase, which would increase the attraction of predators (Rodrigues & Crick 1997).

The high nest site specificity showed by *M. rufiventris* demonstrates the importance of the preservation of stream beds and their associated forests for the conservation of this species. Also, knowledge of whether a species has synchronous or asynchronous incubation (see theoretical review in Stenning 1996) may be important for its conservation planning since the reproductive success of synchronous and asynchronous species may differ in fragmented forests. Our poor knowledge of the natural history of most Neotropical birds and the high deforestation rates of all the region necessitate more such studies in the short term. Results such as the ones presented here, even though preliminary may help in the design of conservation strategies and management programs for potentially endangered species.

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