

New records of *Phibalura flavirostris* Vieillot, 1816 (Aves: Cotingidae) in Minas Gerais, southeastern Brazil, with notes on its natural history and a review of its historical occurrence

Helberth José Cardoso Peixoto^{1*}, Gustavo Bernardino Malacco², Marcelo Ferreira de Vasconcelos³, Luiz Gabriel Mazzoni³, Alyne Perillo³, Kassius Klay Santos⁴ and Bruno Garzon⁵

1 Universidade Federal de Viçosa, Pós-Graduação em Biologia Animal, Museu de Zoologia João Moojen. CEP 36570-000, Viçosa, MG, Brazil.

2 Associação para Gestão Socioambiental do Triângulo Mineiro (ANGÁ). Avenida Anselmo Alves dos Santos, 118 SL 04, Santa Maria. CEP 18408-008, Uberlândia, MG, Brazil.

3 Pontifícia Universidade Católica de Minas Gerais, Pós-Graduação em Zoologia de Vertebrados and Museu de Ciências Naturais. Avenida Dom José Gaspar, 500, Coração Eucarístico. CEP 30535-610. Belo Horizonte, MG, Brazil.

4 Universidade Federal de Lavras, Departamento de Biologia, Setor de Ecologia. Rua Coronel Alvim de Menezes, 357, Jardim Floresta. CEP 37200-000, Lavras, MG, Brazil.

5 Pontifícia Universidade Católica de Minas Gerais, Museu de Ciências Naturais. Avenida Dom José Gaspar, 500, Coração Eucarístico. CEP 30535-610. Belo Horizonte, MG, Brazil.

* Corresponding author: E-mail: helberthpeixoto@gmail.com

ABSTRACT: We present new records of *Phibalura flavirostris* for the state of Minas Gerais, a little known and endangered species in the state, including notes on feeding and breeding behavior. We also present a review of records of the species in this state based on specimens housed in ornithological collections. It was noted the consumption of fruits belonging to five different plant families and reproductive evidence in a new state locality. The species proved to be rare in Minas Gerais, being relatively common in a few localities. *P. flavirostris* proved to be resident in the Quadrilátero Ferrífero region and were not found evidence of altitudinal migration. However the available records are inconsistent to affirm about the migration patterns of this species. The preservation of certain areas and new studies on the natural history are important for the conservation of the species in Minas Gerais state.

The Swallow-tailed Cotinga *Phibalura flavirostris* Vieillot, 1816 ranges in eastern Paraguay, northeastern Argentina and eastern Brazil, from southern Bahia through Espírito Santo, southern Goiás and Rio Grande do Sul; (Pinto 1944; Sick 1997; Snow *et al.* 2004), where it lives in forest edges and open woodlands (Snow 1982; Snow *et al.* 2004; Kirwan and Green 2011).

The species is rare along its entire range (Snow *et al.* 2004; Perlo 2009) and is considered near-threatened globally (BirdLife International 2012) and vulnerable in the state of Minas Gerais, southeastern Brazil (Silveira *et al.* 2008). Having in mind the scarcity of records reported in the literature for the state (*e.g.* Machado *et al.* 1998), together with the little knowledge about its habits, we present new localities of occurrence of *P. flavirostris* in Minas Gerais, including notes on behavior and diet, as well as a review of previous state records.

The data presented in this manuscript are based on an extensive bibliographic review, checking of specimens deposited in Brazilian museums (see acknowledgments), information from online museum databases (<http://www.ornisnet.org> and <http://splink.cria.org.br>), and online photographic collections (<http://www.wikiaves.com.br>), including consultation with the respective authors of the photos (Table 1). New records were gathered during field work conducted by the authors in Minas Gerais, between 1994 and 2011. Identification was performed by observations, using binoculars and, whenever possible,

birds and the fruits eaten by them were photographed for subsequent identification of plant species. Some voucher specimens of the plants consumed by the birds were also collected and deposited in the herbariums of the Departamento de Botânica, Universidade Federal de Minas Gerais (BHCB) and of the Empresa de Pesquisa Agropecuária de Minas Gerais- EPAMIG (PAMG), both in Belo Horizonte, Minas Gerais, Brazil.

Distribution

The new records of *P. flavirostris* for the state of Minas Gerais (Figure 1) and a brief description of the habitats where the species was recorded are described below.

Padre Viegas, municipality of Mariana (20°24'56" S, 43°21'18" W – 860 m). One individual observed by BG on 3 October 1994 in a secondary semideciduous forest.

Serra do Capanema, between the municipalities of Itabirito and Santa Bárbara (20°10'29" S, 43°37'34" W – 1620 m). Two individuals observed by MFV on 4 May 2002, in a cloud forest located on the western slope of the Serra do Batatal (see Vasconcelos *et al.* 2008).

Rio Araguari valley, municipality of Uberlândia (18°48'42" S, 48°07'26" W – 595 m). One individual observed by GBM on 7 August 2005 in the canopy of a riparian forest fragment. On 12 August, an individual was observed moving among forest fragments near the site of the previous record (18°48'36" S, 48°07'15" W - 599 m).

Monte Carmelo Farm, municipality of Araguari

(18°45'45" S, 47°54'57" W – 914 m). Three individuals observed by GBM on 27 May 2006 in a gallery forest along Ribeirão Piçarrão. On 27 July, another individual was observed and photographed in an area of *cerrado sensu stricto*, near the site of the previous record (18°45'59" S, 47°55'08" W – 930 m).

Serra da Gandarela, municipality of Santa Bárbara (20°03'30" S, 43°40'14" W – 1272 m). Two individuals were observed by GBM on 4 and 7 June 2008, in semideciduous forest on the eastern slope of this mountain.

Municipality of Bias Fortes (21°32'01" S, 43°48'26" W – 1140 m). Two adults (a couple) and two young were observed and photographed by LGM and AP on 15 June 2010 on the edge of a small fragment of semideciduous

forest in the rural area, close to the MG-135 highway.

Serra da Moeda, municipality of Brumadinho (20°11'25" S, 43°59'34" W – 1090 m). A group of five individuals, including one adult male and at least one young, was observed by HJCP on 27 June 2010 (Figure 2), on a stretch of semideciduous forest within the residential area of Condomínio Retiro do Chalé, on the western slope of the mountain.

Mata Grande, between the municipalities of Carrancas and Luminárias (21°33'25" S, 44°47'49" W – 1190 m). One individual was observed and photographed by KKS on 11 July 2011. It was perched on a dry tree in a pasture amidst a great forest remnant, located on the eastern slope of the Serra de Santo Inácio, also known as Serra do Navio.

TABLE 1. Localities with records of *Phibalura flavirostris* Vieillot, 1816 in Minas Gerais state, with their respective dates and sources. Geographical coordinates and altitude are displayed when they are clearly indicated in the respective sources or personal information provided by the authors of photographic records in Wikiaves site (WA). For records without geographic coordinates available, we either give the coordinates from the central urban areas of the municipalities as plotted in Figure 1 (marked with *) or give approximate coordinates when the localities mentioned are currently unrecognized (marked with "ca.").

MUNICIPALITY / LOCALITY	COORDINATES – ELEVATION (M)	DATE	SOURCE
Sapucaí-Mirim			
Fazenda Pedra Azul	(*) 22°44' S, 45°45' W	XI/1953	MZUSP-36293; MZUSP-36294
Catas Altas			
Serra do Caraça	(*) 20°06' S, 43°29' W	10 /V/1973	DZUFMG-1166
Reserva Particular do Patrimônio Natural Santuário do Caraça	20°05'42" S, 43°29'02" W – 1.345	XII/1996	Vasconcelos and Melo Júnior (2001)
	(ca.) 20°05'53" S, 43°29'18" W – 1.285	10/IX/2009	MZUSP-88683
Belo Horizonte			
Museu de História Natural and Jardim Botânico da UFMG	(ca.) 19°53' S, 43°55' W – 850	12 /X/1979	DZUFMG-1167
Mata da Baleia	(ca.) 19°55' S, 43°53' W – 900	21/III/1993	Melo Júnior (1996)
Monte Santo de Minas			
Fazenda Barreiro	21°11'23" S, 46°58'49" W – 900	16/IX/1986	ZUEC-AVE-1482
Itamonte			
Garganta do Registro	(ca.) 22°22' S, 44°45' W – 1.790	II/2008	Lombardi et al. (2012)
Fazenda Pinhão Assado	22°21'11" S, 44°47'45" W – 1.435	31/VIII/2010	
Uberlândia			
-	(*) 18°56' S, 48°18' W	-	Carnevali (1988) <i>apud</i> Machado et al. (1998)
Monte Belo			
Fazenda Lagoa	(*) 21°19' S, 46°21' W	-	Andrade (1991) <i>apud</i> Melo Júnior (1996)
Congonhas			
-	(*) 20°29' S, 43°50' W	IX/1994	Melo Júnior (1996)
Lavras			
Parque Ecológico Quedas do Rio Bonito	(ca.) 21°19' S, 44°59' W – 1.050	15/VIII/1995	Machado et al. (1998) e Lombardi et al. (2012)
-	(*) 21°14' S, 45°00' W	-	(Vasconcelos et al. 2002)
Araponga			
Fazenda Neblina, Parque Estadual da Serra do Brigadeiro	20°42' S, 42°29' W – 1.375	X/1996	(Simon et al. 1999)
Ouro Preto			
Parque Estadual do Itacolomi	(ca.) 20°26' S, 43°30' W	-	Andrade (1998)
Floresta Estadual Uaimii	(ca.) 20°17'33" S, 43°34'21" W – 1.040	23/III/2013	WA919149
Minduri			
Mata Triste	(ca.) 21°40' S, 44°36' W – 1.500	X and XI 2009	Lombardi et al. (2012)
Patrocínio			
Fazenda União	(*) 18°56' S, 46°59' W	17/VIII/2010	WA187739
Bom Despacho			
Horto da Garça	19°43' S, 45° 22' W – 660	18/VIII/ 2010	WA186264
Marmelópolis			
Pousada Maeda	22°28'09" S, 45°07'54" W – 1.350	15/XI/2010	WA242260
Caeté			
Serra das Cambotas	19°55'40" S, 43°33'55" W – 1.170	09/IX/2011	WA739388
Congonhas do Norte			
Entre a Fazenda Mamoneira e o distrito de Tombadouro	18°45'55" S, 43°37'38" W -1.270	10/IX/2011	WA442595

Feeding

Phibalura flavirostris feeds mainly on fruits, but it also consumes insects, which are captured in flight (Pineschi 1990; Pizo et al. 2002; Snow 1982; Sigrist 2006; Kirwan and Green 2011). Birds recorded in the Serra da Moeda were feeding on fruits of *Schefflera morototoni* (Araliaceae). This group was observed in the tree canopy for c. 1 h. Consumption of fruits of *S. morototoni* was also described for *P. boliviana*, another species of the genus occurring in Bolivia (Snow et al. 2004). Other species of cotingas (*Carpornis cucullatus* and *Lipaugus lanioides*) were also observed feeding on another species of *Schefflera* (*S. angustissimum*) in the state of São Paulo (Pizo et al. 2002).

The individuals observed in the municipality of Bias Fortes were feeding on fruits of an unidentified species of Melastomataceae and also the fruits of *Mollinedia* sp. (Monimiaceae) (Figure 3). Consumption of Melastomataceae by *P. flavirostris* was also observed by Serpa and Gagliardi (2007) and by Parrini and Pacheco (2011). Pizo et al. (2002) recorded the consumption of fruits of *Mollinedia* spp. by three other cotingids (*L. lanioides*, *Carpornis melanocephalus* and *Pyroderus scutatus*).

In Itacolomi State Park, municipality of Ouro Preto, one individual of *P. flavirostris* was observed feeding on fruits of *Myrsine guianensis* (Primulaceae) on 18 November

2010 (Figure 4). The bird stayed perched for several minutes, while feeding, and allowed close approach of the observer (Christiane Lisboa pers. comm.). Consumption of *M. guianensis* by *P. flavirostris* has been reported for two other localities (Pineschi 1990; Lombardi et al. 2012). Pineschi (1990) and Pizo et al. (2002) also reported the consumption of fruits of three other species of *Myrsine* by *P. flavirostris*.

MFV observed two individuals feeding on fruits of *Ilex loranthoides* (Aquifoliaceae) in Inficionado Peak (1950 m), Serra do Caraça, between 11 and 14 April 2000. The consumption of fruits of a Lauraceae is also reported by Vasconcelos and Melo Júnior (2001).

The individuals recorded in the Mata Grande were observed capturing insects with short flights from twigs to catch the prey, a behavior also reported by Lombardi et al. (2012).

Breeding

The breeding season of *P. flavirostris* in southeastern Brazil is from September to February (Goeldi 1894; Sick 1997; Snow et al. 2004; Kirwan and Green 2011; Wikiaves 2012). In Minas Gerais, evidence of breeding is reported from the Santuário do Caraça Private Reserve (Vasconcelos and Melo Júnior 2001). The species also breeds in the Lavras region, southern Minas Gerais (Lombardi et al. 2012).

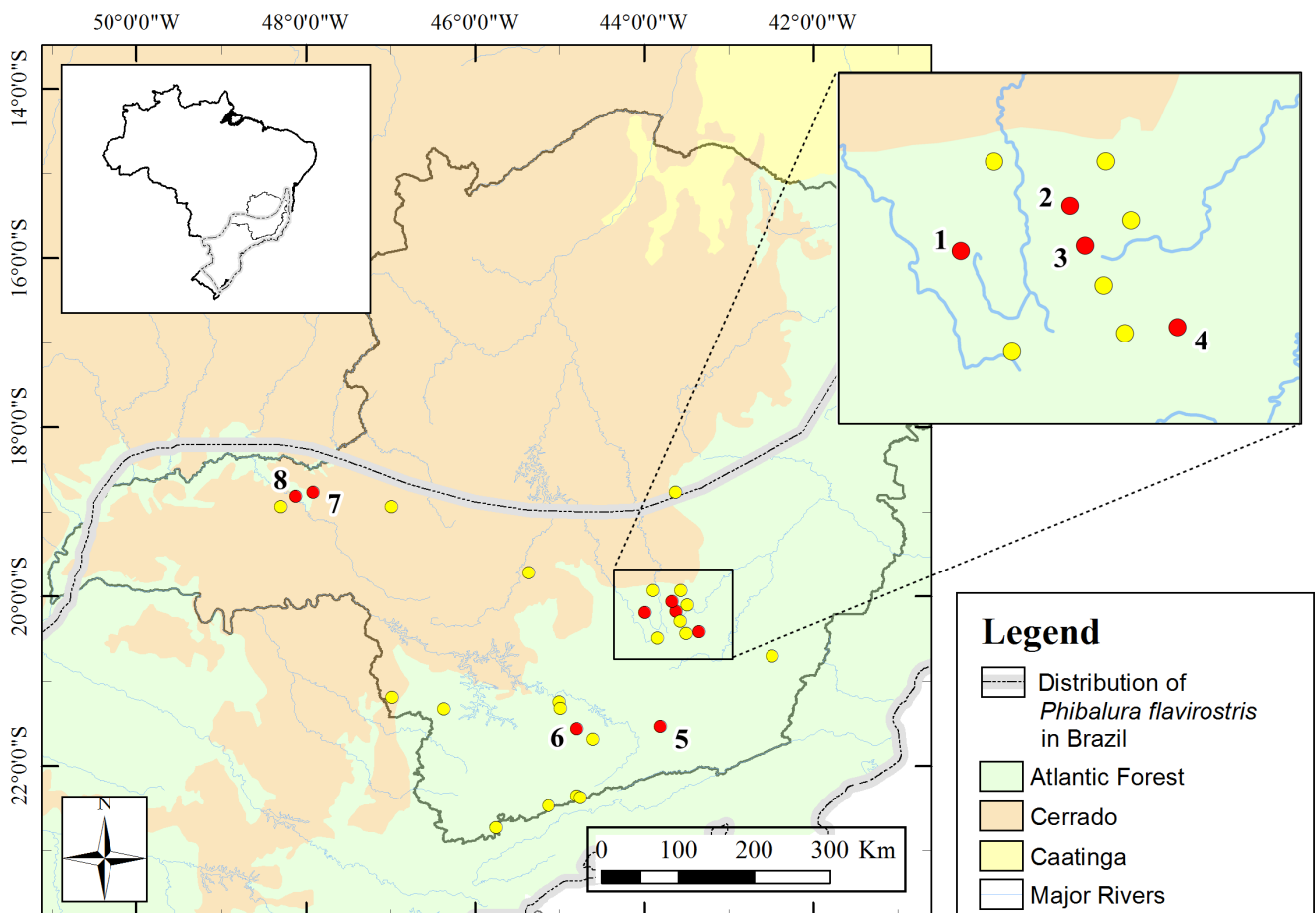


FIGURE 1. Records of *Phibalura flavirostris* Vieillot, 1816 in the state of Minas Gerais. The red circles represent the new records, as follows: 1- Serra da Moeda; 2- Serra da Gandarela; 3- Serra do Capanema; 4- Padre Viegas; 5- Bias Fortes; 6- Mata Grande; 7- Fazenda Monte Carmelo; 8- Vale do Rio Araguari. Yellow circles represent records obtained by literature review, museum specimens and online collections, described in Table 1. Records without geographic coordinates were plotted in the approximate coordinates when the localities mentioned are currently recognized, or in the central urban areas of the municipalities for illustration purposes (see Table 1). Dashed gray line represents the species' range in Brazil, according to van Perlo (2009). The phytogeographic domains follow IBGE (2012).



FIGURE 2. Group of *Phibalura flavirostris* at Serra da Moeda, municipality of Brumadinho, Minas Gerais, Brazil. Photo by Marco Rocha.



FIGURE 3. *Phibalura flavirostris* feeding on fruits of *Mollinedia* sp. (Monimiaceae) at Bias Fortes municipality, Minas Gerais, Brazil. Photo by Luiz Gabriel Mazzoni.



FIGURE 4. *Phibalura flavirostris* feeding on fruits of *Myrsine guianensis* (Primulaceae) at Itacolomi State Park, Ouro Preto municipality, Minas Gerais, Brazil. Photo by Christiane Lisboa.

In September 2011, a male was reported catching lichens from the trunk of a tree emerging on a forest edge besides a dirt road, in a transition area between a semideciduous forest and a “campo rupestre” in the municipality of Congonhas do Norte (18°45’55” S, 43°37’38” W – 1265 m), while the female remained perched

on a nearby branch. After collecting the material, the couple moved toward the forest (Wagner Espescht *pers. comm.*). Lichens are one of the most widely used nesting material by *P. flavirostris* (Goeldi 1894; Snow *et al.* 2004). Based on the observed behavior and due to the time of the year known for the breeding of the species, Congonhas do Norte is an additional locality where *P. flavirostris* breeds in Minas Gerais.

Migratory behavior

The migratory habit of *P. flavirostris* is mentioned by some authors, mainly to the coast in the states of Rio de Janeiro and São Paulo (Goeldi 1894; Snow 1982; Sick 1997; Sigrist 2006; Kirwan and Green 2011), but the routes and the reasons for migration are virtually unknown. It is known that such movements are performed out of the breeding period (Snow 1982; Sick 1997; Snow *et al.* 2004), when the species is usually observed in small flocks (Sigrist 2006; Ridgely and Tudor 2009). Snow (1982) and Sick (1997) report that *P. flavirostris* performs altitudinal movements, moving to low-elevation areas in the southeastern Brazilian mountains, after the breeding period. According to Snow (1982), the specimens registered in the state of Goiás may be migrants. Snow *et al.* (2004) further state that populations that breed in the state of Rio Grande do Sul migrate north after the breeding season.

However, the information currently available to the state of Minas Gerais are inconsistent to understand migration patterns, or even if *P. flavirostris* can perform long distance migrations in this state. The elevation (at sea level) and month of records in the state are presented in Figure 5. The altitudinal range varied from 595 m to 1950 m and altitudinal migration pattern was not observed. In the Quadrilátero Ferrífero region, including the Serra do Caraça and Itacolomi State Park (localities with the greatest number of records), *P. flavirostris* was found in all months of the year, shown to be a resident species (Figure 5). However, more studies are required to understand if the species does some altitudinal or seasonal movement in the region. It is noteworthy that the records reported in this study for western Minas Gerais occurred in lower altitudes, such as the Araguari valley, ca. 600 m, as well as in areas of plateau, around 900-930 m.

Records for Central Brazil are scarce, and the only available information is based on a collection by W. Garbe, on 14 May 1941 in Fazenda Transwaal, at Rio Claro, and other collection in Goiânia, in January 1965, state of Goiás (Pinto 1944; Kirwan and Green 2011) and undocumented observations presented by Carnevalli *et al.* (1988) (unpublished data, quoted in Machado *et al.* 1998) conducted during the environmental impact study of Nova Ponte hydroelectric plant. Forest fragments along tributaries of River Paranaíba may be important conservation sites for populations of the species, but currently these sites are threatened by dozens of hydroelectric projects (e.g., in the lower River Araguari), where the species was recorded and where important forest fragments were reduced by a hydroelectric project.

In the present study, we were able to obtain records of only six specimens of *P. flavirostris* from the state of Minas

Gerais deposited in scientific collections. The occurrence of this species in Minas Gerais was documented for the first time in November 1953, based on two specimens (skins) held at the Museu de Zoologia da Universidade de São Paulo- MZUSP. These specimens, an adult male (MZUSP-36293) and a young female (MZUSP-36294), were collected in Sapucaí-Mirim, in the Serra da Mantiqueira mountain range, southern state. Two decades later, a male specimen was collected in the Serra do Caraça on 10 May 1973 and deposited in the ornithological collection of the Departamento de Zoologia da Universidade Federal de Minas Gerais- DZUFMG 1166. Another male (DZUFMG-1167) was obtained on 12 October 1979, at the Museu de História Natural e Jardim Botânico da Universidade Federal de Minas Gerais, in Belo Horizonte, the state capital. The Museu de Zoologia da Universidade Estadual de Campinas- ZUEC-AVE holds a specimen (ZUEC-AVE-1482) from Monte Santo de Minas, southwestern Minas Gerais, collected on 16 September 1986. To our knowledge, the most recent specimen is an adult female from Serra do Caraça (MZUSP-88683), found dead after striking against a window on 10 September 2009.

The few records of *P. flavirostris* in Minas Gerais, since its first collection in 1953, may reflect the species' rarity in the state. The species appears to be locally frequent only in Itatiaia National Park and in the Serra do Caraça (Vasconcelos & Melo Jr., 2001; pers. obs.). These two sites probably shelter the largest populations in the state. The Serra do Caraça, together with the region of Serra da Gandarela and adjacent areas of the municipalities of Ouro Preto and Mariana (including Itacolomi State Park, Tripuí Ecological Station and Uaimi State Forest), in the Quadrilátero Ferrífero region, harbor a large and continuous preserved forested area. Thus, we recommend the preservation of these areas as well as the connection of the remnants and the formation of forest corridors, especially in the Quadrilátero Ferrífero region, which is one of the areas with the highest population density, being key for the conservation of the species in Minas Gerais. Furthermore, we suggest further studies focusing on the natural history and migratory behavior of *P. flavirostris*.

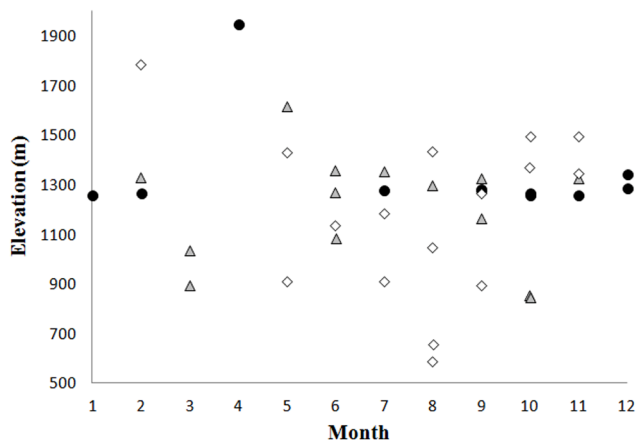


FIGURE 5. Altitudinal distribution of Swallow-tailed Cotinga *Phibalura flavirostris* in the state of Minas Gerais along the months. Data are taken from Table 1, Appendix 1 and new records presented in this paper. Black circles represent records in the Serra do Caraça, gray triangles represent records in other locations in the Quadrilátero Ferrífero region and white diamonds in other areas of the state.

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APPENDIX 1. Additional records employed in Figure 5. The exact or approximate location of the records were obtained by personal communication the authors (see acknowledgments). The months are indicated from 1 (January) to 12 (December).

MONTH	LOCALITY	ELEVATION (M)	SOURCE
1	RPPN Santuário do Caraça	1260	WA102070
2	RPPN Santuário do Caraça	1270	WA76
3	PE do Itacolomi	1335	WA873864
5	Fazenda Pinhão Assado	1435	V. Lombardi, <i>pers. comm.</i>
6	PE do Itacolomi	1360	W.Estevão, <i>pers. comm.</i>
7	PE do Itacolomi	1360	WA825528
7	RPPN Santuário do Caraça	1280	WA699567
8	PE do Itacolomi	1300	W.Estevão, <i>pers. comm.</i>
9	RPPN Santuário do Caraça	1280	WA760023
9	PE do Itacolomi	1330	WA740665
10	RPPN Santuário do Caraça	1260	WA47384, WA469430, WA82345
10	RPPN Santuário do Caraça	1270	WA85756, WA70027
11	RPPN Santuário do Caraça	1260	WA519569
11	PE do Itacolomi	1330	WA276346
12	RPPN Santuário do Caraça	1290	M. Vasconcelos, <i>pers. obs.</i>