

Distribution and natural history of the mangrove-dwelling Gray-necked Wood-Rail, *Aramides cajaneus avicenniae* Stotz, 1992, in southeastern Brazil

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ABSTRACT: We revise the distribution and habitat associations of *Aramides cajaneus avicenniae*, a localised Brazilian form of the widespread Gray-necked Wood-Rail, and provide data on its foraging and breeding behaviors. This rail is a mangrove specialist endemic to the coastal belt from São Paulo to Santa Catarina, with some insular populations off the northern coast of São Paulo. Crabs, especially *Uca* spp., are the main prey in mangroves while island birds feed on large ground-dwelling arthropods and scavenge fish dropped by seabirds. Breeding is tied to the rainy season and nests found in mangrove sites were built with twigs and leaves on trees overhanging rivers and tidal channels and had 1-6 eggs.

KEY-WORDS: Gray-necked Wood-Rail, *Aramides cajaneus avicenniae*, breeding biology, distribution, eggs, foraging, São Paulo state, Brazil.

INTRODUCTION

The Gray-necked Wood-Rail *Aramides cajaneus* occurs in many different habitats, usually near water, from sea-level to 2,000m, from southeastern Mexico through Central America and into South America, from southwestern Ecuador and eastern Peru, to the east across Brazil and south to northern Argentina and Uruguay, with nine recognized subspecies (Taylor 1998).

Although it is considered the commonest large rail in Brazil, with a wide distribution in swamps with dense vegetation, mangroves, river margins, lakes, tall swampy forests, rice fields, and sugarcane plantations throughout the country (Sick 1997), its biology remains poorly known (Taylor 1998). As Rallidae are usually secretive and rarely seen, few detailed studies have been made on most Neotropical species, and even the nest and eggs of some taxa remain undescribed (Ripley 1977, Taylor 1998).

The same is true for the Gray-necked Wood-Rail, with most of the available data coming from captive birds (Ripley 1977), from semi-tamed individuals living around a house (Skutch 1994) and from birds in an urban park in the municipality of Rio de Janeiro (Teixeira 1981). In Brazil, the only additional information was gathered by Johann Natterer, who collected two downy young at Barra do Rio Negro, Amazonas, on 20 October 1832

(NMW.38454 and 38455; Pelzeln 1871, E. Bauernfeind pers. comm.). Also in the Amazon, near Belém, Stone (1928) mentions “three nests found, two containing three eggs each and the other an addled egg” between February and May 1926 (Stone 1928). On Santa Catarina Island, Naka & Rodrigues (2000) recorded one adult followed by two young on 10 November 1997.

Two subspecies occur in Brazil, the nominate form *Aramides cajaneus cajaneus*, found throughout the country in habitats as different as the Pantanal, the Caatinga and the Amazon, and *A. c. avicenniae*, described only recently and apparently restricted to the mangrove swamps of the southern coast of São Paulo, Paraná and, possibly, Santa Catarina states (Stotz 1992, Bornschein & Reinert 1996, Taylor 1998). *Aramides cajaneus avicenniae* is distinguished by its gray occiput with a reduced or absent brown wash (blackish to brownish in nominate), plumbeous color from nape to back (olive in the nominate) and cinnamon underparts (richer rufous in the nominate; Figure 1).

Along the coast of São Paulo state, the Gray-necked Wood-Rail is found in some of the islands dotting the coast from 0.88 to 38 km from shore, including Búzios, Vitória, Alcatrazes (specimens in MZUSP, sight records at Búzios and Alcatrazes by FO), Palmas, Comprida, Rapada, Pesca, and Couves (Vieitas 1995). Specimens from the northern São Paulo coast, and offshore islands

(Vitória, Búzios and Alcatrazes) have been considered as intermediates between the nominate form and *avicenniae* (Stotz 1992). There are records dating from the 1960's from another island, São Sebastião (Ilhabela), where rails were not recorded in the early 1990's by Olmos (1996) but have been documented later (Silva 2007).

Here we review the distribution and habitat preferences of this taxon and present the first data on breeding biology, food habits and general ecology of this species in coastal São Paulo, as well on its distribution.



FIGURE 1. Gray-necked Wood-Rail specimens at Museu de Zoologia da Universidade de São Paulo, subspecies *avicenniae* (2 above, MZUSP 78725 and MZUSP 67212 holotype), and nominate form (2 below, MZUSP 74282 from Niquelândia-GO and MZUSP 32926 from Pau Grande-ES). Photo: Robson Silva e Silva.

METHODS

We recorded the presence of the Gray-necked Wood-Rail especially from its characteristic voice, during a medium-term study of the bird fauna of the mangrove swamps of Santos-Cubatão, in the central coast of São Paulo (Olmos & Silva e Silva 2001) and in several trips to the mangroves of the southern coast between Iguape and Cananéia. Data on wood-rails were gathered between March 1994 and February 2003 during 259 field trips to Santos and Cubatão and seven to the southern coast, including areas in Iguape, Ilha Comprida and Cananéia, including Ilha do Cardoso.

These two mangrove systems are the most extensive in São Paulo state (Lamparelli 1998), and 145 km apart in a straight line. The mangroves grow along river and channels of the coastal plain of São Paulo, bounded westwards by the Serra do Mar massif. While most of the lowland forests ("restinga" forests) on the plains have been lost to agriculture, urban expansion and industrial development, the Serra do Mar and associated hills remain mostly covered by forest in different successional stages. We also visited a few smaller areas of mangroves between both systems at Itanhaém (Rio Itanhaém and Rio Preto),

Estação Ecológica Juréia-Itatins at Peruíbe (Rio Guaraú and Rio Una) and Iguape (Rio Verde), but with little success in getting more than site records of the species.

Channels and rivers crossing the mangroves were explored with small boats with an outboard motor while we searched for wood-rails and their nests, especially in smaller channels less than 10 m wide. Behavioural data were recorded *ad libitum*. When a nest was located we recorded its position with a GPS and measured its dimensions and height with rulers and a measuring tape. Eggs and hatchlings were measured with a caliper and weighed with a Pesola spring scale.

Additionally, we examined specimens housed at Museu de Zoologia da Universidade de São Paulo (MZUSP), Brazil, and American Museum of Natural History (AMNH), New York, USA and photographic records stored at Wikiaves (<http://www.wikiaves.org>).

RESULTS AND DISCUSSION

Distribution

Specimens collected at the islands of Búzios, Vitória and Alcatrazes (Table 1) were considered intermediate between nominate *cajaneus* and *avicenniae* by Stotz (1992), although their bluish mantles look closer to *avicenniae* and are considered as so here. Birds photographed in Bertioiga (Souza 2010) and Ilhabela (Silva 2007) show the plumbeous/bluish mantle of *avicenniae*, while birds recorded at São Sebastião and Ubatuba, further up the coast, show green mantles typical of nominate birds (Cardoso 2013, Cisneros 2013).

Further down the coast, observations and photos of living birds in the mangroves of Santos-Cubatão (Figure 2) showed a color pattern agreeing with *avicenniae*, with plain gray crowns lacking a brown tinge, plumbeous (not greenish) backs and pale rufous to cinnamon underparts. This and four specimens from Santos and Cubatão (Table 1) confirm that birds there belong to *avicenniae*.

Besides Santos-Cubatão, we found *avicenniae* in the mangroves along the southern coast of São Paulo, at Iguape (including the well-known collecting locality of Icapara), Ilha Comprida and Cananéia (including Ilha do Cardoso), the same region where most specimens, including the holotype, came from (Stotz 1992). Farther south in Paraná state, Johann Natterer collected specimens (now in the Naturhistorisches Museum Wien, and Natural History Museum, Tring) in 1820 at Rio do Borraxudo and Rio da Villa, Paranaguá (Pelzeln 1871, Straube 1993; Table 1).

Also in Paraná, Bornschein & Reinert (1996) confirmed the presence of *avicenniae* in Caiobá-Passagem, municipality of Guaratuba, with a specimen now at Museu de História Natural Capão da Imbuia, Curitiba. Towards the edge of mangrove distribution in Brazil,

Bangs (1907) and Stotz (1992) mention one specimen at the USNM from Santa Catarina matching *avicenniae* and Rosário (1996) and Naka & Rodrigues (2000) mention the species occurring in mangroves.

The presence of *avicenniae* in that state is confirmed by photos from São Francisco do Sul (Cremer & Grose 2010) and Florianópolis (Licco 2010, Serrão 2012).

The data show the subspecies has a fairly small range along the narrow coastal area between Bertioaga and Ilhabela (aprox. 23°50'S), São Paulo, in the north, and Florianópolis (about 27°40'S), Santa Catarina, in the south. Since birds along the coast of Rio Grande do Sul have green backs, the contact zone between them and *avicenniae* must be somewhere south of Florianópolis.

TABLE 1. Specimens of *Aramides cajaneus avicenniae* and intermediates.

Collections: **BMNH** (British Museum of Natural History, Tring, UK); **LACM** (Los Angeles County Museum of Natural History, Los Angeles, USA); **MCZ** (Museum of Comparative Zoology, Harvard University, Cambridge, USA); **MHNCI** (Museu de História Natural Capão da Imbuia, Curitiba, Brazil); **MNHN** (Museum National d' Histoire Naturelle, Paris, France); **MZUSP** (Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil); **NMW** (Naturhistorisches Museum Wien, Wien, Austria); **USNM** (United States National Museum, Washington, USA).

State: **PR** (Paraná); **SC** (Santa Catarina); **SP** (São Paulo).

Collection	Number	Date	Locality	State	Sex	Collector	Remarks
NMW	38446	23 Dec 1820	Rio de Borraçudo, Guaraqueçaba	PR	F	Johann Natterer	
NMW	38447	28 Dec 1820	Rio de Borraçudo, Guaraqueçaba	PR	M	Johann Natterer	
NMW	38448	13 Dec 1820	Rio da Villa, Paranaguá	PR	M	Johann Natterer	
BMNH	89.11.20.57	24 Dec 1820	Rio de Borraçudo, Guaraqueçaba	PR	F	Johann Natterer	
USNM	24124	?	?	SC	?	Lemuel Wells	
MHNCI	187	?	Caiobá-Passagem, Guaratuba	PR	F	?	
MZUSP	14967	20 Aug 1934	Cachoeirinha, Cananéia	SP	M	Carlos Otaviano da Cunha Vieira	
MZUSP	14968	1 Sep 1934	Tabatinguara, Cananéia	SP	F	Eurico Alves de Camargo	
MZUSP	14969	1 Sep 1934	Morrete, Cananéia	SP	F?	Eurico Alves de Camargo	
MZUSP	14970	1 Sep 1934	Morrete, Cananéia	SP	M	Eurico Alves de Camargo	
MZUSP	14971	28 Sep 1934	Tabatinguara, Cananéia	SP	M	Eurico Alves de Camargo	
MZUSP	67212	13 Jul 1969	Iguape	SP	M	Alfonso Maria Olalla	Holotype
MZUSP	67213	13 Jul 1969	Iguape	SP	F	Alfonso Maria Olalla	
MZUSP	66527	11 Jul 1970	Icapara, Iguape	SP	?	Alfonso Maria Olalla	
MZUSP	68386	11 Jul 1970	Icapara, Iguape	SP	M	Alfonso Maria Olalla	
MZUSP	69411	11 May 1969	Barra de Icapara, Iguape	SP	M	Alfonso Maria Olalla	
MZUSP	70639	4 Sep 1991	Rio Cachoeira Grande, Ilha do Cardoso, Cananéia	SP	F	Paulo Martuscelli	
MZUSP	73724	Oct 1994	Ilha do Cardoso, Cananéia	SP	?	Paulo Martuscelli	
MZUSP	78725	5 Jul 2007	Rio Sândi, Santos	SP	F	Robson Silva e Silva	
MZUSP	91802	31 Dec 2010	Cubatão	SP	M	Luís Fábio Silveira	
MZUSP	99605	7 Apr 2014	Canal Piaçaguera, Cubatão	SP	M	Luís Fábio Silveira	
MZUSP	99606	7 Apr 2014	Canal Piaçaguera, Cubatão	SP	F	Luís Fábio Silveira	
MNHN	1971.301	Jul/Aug 1970	Icapara, Iguape	SP	M	Alfonso Maria Olalla	
MNHN	1971.302	Jul/Aug 1970	Icapara, Iguape	SP	M	Alfonso Maria Olalla	
MNHN	1971.303	Jul/Aug 1970	Icapara, Iguape	SP	M	Alfonso Maria Olalla	
MNHN	1971.304	Jul/Aug 1970	Icapara, Iguape	SP	F	Alfonso Maria Olalla	

Collection	Number	Date	Locality	State	Sex	Collector	Remarks
MNHN	1971.305	Jul/Aug 1970	Icapara, Iguape	SP	F	Alfonso Maria Olalla	
MNHN	1971.306	Jul/Aug 1970	Icapara, Iguape	SP	F	Alfonso Maria Olalla	
MNHN	1971.307	Jul/Aug 1970	Icapara, Iguape	SP	F	Alfonso Maria Olalla	
MCZ	177528	1 Sep 1934	Morrete, Cananéia	SP	M	Eurico Alves de Camargo	
MCZ	177529	1 Sep 1934	Morrete, Cananéia	SP	M	Eurico Alves de Camargo	
MCZ	177530	1 Sep 1934	Morrete, Cananéia	SP	M	Eurico Alves de Camargo	
LACM	28678	1946	Rio da Avó, São Vicente	SP	F	José Leonardo Lima	
MZUSP	63644	21 Oct 1963	Ilha dos Búzios	SP	F	Mzusp expedition	Intermediate
MZUSP	63645	18 Oct 1963	Ilha dos Búzios	SP	F	Mzusp expedition	Intermediate
MZUSP	63646	20 Oct 1963	Ilha dos Búzios	SP	M	Mzusp expedition	Intermediate
MZUSP	63647	21 Oct 1963	Ilha dos Búzios	SP	M	Mzusp expedition	Intermediate
MZUSP	63648	20 Oct 1963	Ilha dos Búzios	SP	M	Mzusp expedition	Intermediate
MZUSP	63947	27 Oct 1963	Ilha dos Búzios	SP	F	Mzusp expedition	Intermediate
MZUSP	6574	12 Jul 1906	Ilha Vitória	SP	F	Francisco Günther	Intermediate
MZUSP	5550	Mar 1905	Ubatuba	SP	F	Ernst Garbe	Intermediate
MZUSP	10492	Oct 1920	Ilha Alcatrazes	SP	F	José Pinto da Fonseca	Intermediate
MZUSP	10493	Oct 1920	Ilha Alcatrazes	SP	M	José Pinto da Fonseca	Intermediate



FIGURE 2. Adult Gray-necked Wood-Rail at low tide in the mangroves of Canal Piaçaguera, Cubatão-SP, on 1 April 2014. Photo: Robson Silva e Silva.

Habitat

Alcatrazes Island has no permanent human occupation and lacks perennial watercourses. It is a mosaic of forests dominated by the palm *Syagrus rommanzoffiana*, exposed rocks covered by bromeliads and cacti and grassy areas resulting from man-made fires. Along four trips to Alcatrazes in 1992-93, FO found pairs or family groups of Gray-necked Wood-Rail throughout the island wherever there was denser vegetation, especially along ditch lines. Palmas, Comprida, Rapada, Pesca and Couves are small islands where rails have been recorded and show a drier vegetation, while at Ilha do Mar Virado, which has a flat area with swampy forest ("caixetal", dominated by the tree *Tabebuia cassinoides*) it is among the commonest birds (Vieitas 1995).

Both Búzios and Vitória have been long inhabited by artisanal fishermen ("caíçaras") who have destroyed large areas of the original forest and reportedly caused water resources in Vitória to dwindle to a single spring. During two trips to Búzios in 1993-94, FO found forest limited to an obviously secondary patch on the steep southern face of the island, which lacks running water, the remainder being covered by grass, young second-growth, manioc and bean fields and orchards. A pair of Gray-necked Wood-Rails was sighted in the forest remnant in 1994.

Island populations of Gray-necked Wood-Rails can be described as a forest ground bird able to live in areas where water is limited to a few springs dripping from rocks and where there are no perennial creeks or swampy areas.

This situation contrasts with the mainland. In Santos-Cubatão it is by far the commonest rail in the mangrove swamps, living in mangrove forests dominated by *Rhizophora mangle*, *Avicennia schaueriana* and *Laguncularia racemosa* reaching 12 m high. The same is true in southern São Paulo, where in the belt between Iguape and Cananéia it is easily found in mangrove forests, foraging on mudflats during the low tide.

Gray-necked Wood-Rails living in coastal São Paulo are also found in transitional areas between the mangroves and restinga forests, but are replaced on the lower slopes of the Serra do Mar massif by the Slaty-breasted Wood-Rail (*Aramides saracura*) (Olmos & Silva e Silva 2001). The possibility of competitive exclusion between the species leading to habitat segregation deserves further research.

Foraging behavior

The first data on food habits of *A. c. avicenniae* in the mangroves came from specimens taken by Natterer in Paraná and described by Pelzeln (1871): "Paranagua between mangroves on the bank of Rio da Villa in December, Rio do Borrauxudo between mangroves in

December,... lives on crabs (R. Borrauxudo)..." (translated by E. Bauernfeind).

We witnessed the same behavior several times in the mangroves between Iguape and Cananéia, at Ilha do Cardoso and in the mudflats along Canal de Ararapira, where several birds, mostly in pairs, foraged for small crabs. Rails foraging along mudflats are a common sight in the Iguape-Cananéia mangroves along the sheltered mangroves of the Mar de Dentro and along smaller rivers such as the Sorocabinha.

The situation is different in the mangroves of Santos-Cubatão, where rails are rarely seen foraging in the open mudflats and keep close to the vegetation. Rails were seen foraging for the many small Fiddler Crabs (*Uca rapax*, *U. mordax*, *U. leptodactyla*, and *U. uruguensis*) (Figure 3), snails *Melampus coffeus* and *Littorina* sp. and, once, a dead Blue Crab *Callinectes danae* taken by a pair of rails into the mangrove forest. Rails are a common presence in mixed nesting colonies of Little Blue Herons (*Egretta caerulea*), Snowy Egrets (*E. thula*), Scarlet Ibises (*Eudocimus ruber*), Yellow-crowned Night-herons (*Nyctanassa violacea*), Black-crowned Night-herons (*Nycticorax nycticorax*) and Great Egret (*Ardea alba*) scattered in the area where the rails forage for fallen regurgitates, fallen eggs and nestlings. Once we saw them feeding among young Little Blue Herons foraging on the mud exposed below their nests during low tide.

At Alcatrazes Island, where there is a large colony of Magnificent Frigatebirds (*Fregata magnificens*) nesting on trees and bushes, rails have been seen scavenging for fallen regurgitates. It is likely they will also feed on fallen eggs and nestlings. Alcatrazes and most coastal islands off São Paulo have large populations of big ground-dwelling roaches *Hormetica scrobiculata*, centipedes *Otostigmus* sp. and spiders (mainly the wolfspider *Ctenus medius* and the tarantula *Vitalius wacketi*). It is probable those provide the main prey for rails together with the local frogs and lizards, some of them endemic. For a description of the island and its biota see Mercadante & Moura (2006) and Muscat *et al.* (2014).



FIGURE 3. Feeding on a Fiddler Crab (*Uca* cf. *leptodactyla*), at Rio Cascalho mangroves, Cubatão-SP, on 15 April 2011. Photo: Robson Silva e Silva.

Breeding Behavior

The observations suggest that the rails tie their nesting to the rainy season (see Table 2), which in the region starts in late September-early October. This agrees with the nesting of several other waterbirds (Olmos & Silva e Silva 2001) and may be due to increased prey availability, including small crabs recruiting at this season.

We first recorded nesting by *A. c. avicenniae* at Cananéia, when a nest with an incubating adult was found on a mangrove tree leaning over a narrow tidal channel (Figure 4). Since then, we found another 20 nests (see Table 2 for details and localities). The nest is a high bowl of twigs and intertwined leaves, with a leaf-covered chamber. It is usually built on the leaning branches of a mangrove tree over water, commonly using a parasitic Loranthaceae bush as camouflage and support. One pair was also seen carrying nesting material to an unfinished nest at the Rio Quilombo on December 2000.

Clutches had 1-6 eggs (Figure 5) (mode = 5), with a mean of 3.4. Nests found with only 1 egg probably had incomplete clutches. 27 eggs from 10 nests measured 49.4 ± 1.7 mm (52.22 to 45.5 mm) x 35.6 ± 0.7 mm (36.6 to 34 mm) and weighted 32.9 ± 2.3 g (36.5 to 26.5 g), and do not seem to differ from published measurements of other subspecies (Taylor 1998). The eggs were oblong,

creamy or whitish with brown to cinnamon spots. Five just-hatched young were found on their nest in Cananéia on 8 January 1998. They weighted 23.6 ± 0.9 g (23 to 25 g), had culmens 11.26 ± 1.2 mm long (9.5 to 12 mm) and tarsi 20.44 ± 2.1 mm (17.2 to 22.5 mm) (Figure 6).

Besides nests, we recorded a pair of adults together with five young with 1/3 of the adult size foraging under a heron colony in the Rio Saboó, Santos; another pair with five $\frac{3}{4}$ grown young in Cubatão in October 1997 and one adult followed by one young in washed plumage on 22 November 2000.

Predation seems an important factor accounting for nest failures, but we could not identify predators. Crab-eating Raccoons *Procyon cancrivorus* are common throughout the visited areas and are likely predators. The strategy of building nests on thin trees tilted over rivers and channels is a likely deterrent for terrestrial predators.

Gray-necked Wood-Rails in coastal southeast Brazil seem to be less generalist compared to their conspecifics elsewhere, and more restricted in their habitat choices (Taylor 1998). Nevertheless, their success in colonizing coastal islands and becoming locally common invites further research on their ecology in this specific habitat and on their interactions with prey species quite unlike the ones found in their preferred mangroves on the mainland.



FIGURE 4. Adult incubating at nest # 02. Mangroves of Cananéia-SP, on 8 January 1998. Photo: Robson Silva e Silva.

TABLE 2. Nests characteristics of *Aramides cajaneus avicenniae* found in mangroves of São Paulo. Measurements are in centimetres, except for nest height measured from the water surface, in meters.

Tree species: A – *Avicennia schaueriana*; L – *Laguncularia racemosa*; R – *Rhizophora mangle*

Content: E – egg; C – chick

Nest	Date	Locality	Coordinates	Lenght	Width	Heigth	Depth	Height from Water	Tree Species	Content
01	12 Jan 1995	Rio Quilombo, Santos	23°52'44"S, 46°21'05"W	-	-	-	-	1.2	R	1E
02	7 Jan 1998	Cananéia	24°53'00"S, 47°49'30"W	36	22	17	7	2.2	L	2E + 3C
03	2 Nov 1998	Rio Saboó, Santos	23°55'28"S, 46°20'52"W	33	26	21	6	1.7	A	3E
04	13 Jan 1999	Cananéia	24°52'36"S, 47°48'23"W	-	-	-	-	2.3	L	1E
05	17 Dec 1999	Icapara, Iguape	24°41'54"S, 47°31'25"W	27	13	10	5	1	L	5E
06	17 Dec 1999	Icapara, Iguape	24°41'50"S, 47°31'22"W	23	21	12	3	1.5	L	5E
07	9 Nov 2000	Rio Quilombo, Santos	23°52'52"S, 46°21'07"W	26	28	22	5	3.3	R	6E
08	16 Nov 2000	Rio Quilombo, Santos	23°52'36"S, 46°21'05"W	31	24	16	4	3.5	A	1E
09	16 Nov 2000	Rio Quilombo, Santos	23°53'07"S, 46°21'37"W	29	25	22	5	2.2	R	1E
10	27 Nov 2000	Rio Morrão, Santos	23°52'36"S, 46°21'35"W	40	24	11	5	2.3	R	5E
11	29 Nov 2000	Rio Quilombo, Santos	23°52'41"S, 46°21'22"W	-	-	-	-	2.4	R	0
12	9 Jan 2003	Iguape	24°42'59"S, 47°33'28"W	34	29	19	7	0.9	L	0
13	9 Jan 2003	Iguape	24°42'11"S, 47°31'36"W	27	25	15	5	1.1	L	0
14	9 Jan 2003	Iguape	24°42'11"S, 47°31'27"W	32	31	13	6	0.8	L	0
15	9 Jan 2003	Iguape	24°42'11"S, 47°31'27"W	31	24	12	6	2.3	L	0
16	9 Jan 2003	Iguape	24°42'13"S, 47°31'23"W	32	31	12	4	0.7	L	0
17	9 Jan 2003	Iguape	24°42'13"S, 47°31'23"W	32	31	14	5	1.3	L	0
18	9 Jan 2003	Iguape	24°41'52"S, 47°31'08"W	36	26	15	4	1.7	L	0
19	9 Jan 2003	Iguape	24°41'43"S, 47°28'48"W	38	26	20	8	0.9	L	0
20	9 Jan 2003	Rio Sorocabinha, Iguape	24°44'13"S, 47°35'43"W	39	25	22	-	2.1	L	0



FIGURE 5. Nest # 03 at Rio Saboó, Santos-SP, on 9 November 1998. Photo: Robson Silva e Silva.



FIGURE 6. Just-hatched young (nest # 02), Cananéia-SP, on 8 January 1998. Photo: Robson Silva e Silva.

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