First record of the characteristics of the nest of *Glaucis dohrnii* (Apodiformes: Trochilidae): biometry of the bird and environmental aspects of the nesting site

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**Abstract.** The article describes the nest of *Glaucis dohrnii* (Bourcier & Mulsant, 1852 - Passeriformes: Trochilidae) and characteristics of the “vine forest” (mata de cipó) in the municipality of Boa Nova, Bahia, where the bird and its nest were evaluated. The area is considered a transition zone between the biomes of the Caatinga and Atlantic Forest, rich in the biodiversity of bromeliad species, whose inflorescences are the principal food source of this species. The nest of *Glaucis dohrnii* was recorded on a bromeliad leaf (*Bromelia* sp). The municipality of Boa Nova is 80 kilometers from Jequié, the locale where the *G. dohrnii* was observed by Oliveira Pinto in 1932, and both of these municipalities are composed of the Caatinga and Atlantic Forest biomes and ecotonal areas.

**Introduction**

The Hook-billed Hermit, *Glaucis dohrnii* (Bourcier & Mulsant, 1852) is considered to be one of the rarest species of Brazilian fauna (Grantsau 2010). Historically, *G. dohrnii* is recorded from the north of Rio de Janeiro to the south of Bahia, passing through the state of Espírito Santo and the eastern corner of Minas Gerais (Birdlife 2017) (Figure 1). *G. dohrnii* occurs in the tropical forests of the Atlantic Rainforest (Mata Atlântica) particularly along rivers with flowering *Heliconias*, and is seen within the forest as well as in areas adjacent to the forest visiting ornamental flowers (Ruschi 1982). There is a historic record of *G. dohrnii* made in the southern region of the state of Bahia in 1932 by Oliveira Pinto in the munici-
The Gongogi river basin encompasses the municipalities of Gongogi, Nova Canã, Iguai, Itagibá, Dário Meira, Ibicui and Aurelino Leal. A specimen of *Glaucis hirsuta* hunted in Espirito Santo and described as *G. dohrnii* was deposited in the Paulista Museum by E. Gaber in January 1906 (Pinto 1935, 1964, 1978, Collar et al. 1992). Sick (1985, 1997) reported that the *G. dohrnii* is restricted to the primary forests of Espirito Santo and located a population in the Monte Pascoal National Park (Bahia) in 1977.

Historic records also occur from the eastern corner of Minas Gerais (Sick 1997). In Bahia, there are recent reports in three localities: Estação Vera Cruz, Monte Pascoal National Park and Serra de Itamaraju (Birdlife 2017). *G. dohrnii* appears on the red list of extinction (Birdlife 2016), and due to deforestation throughout all its distribution area it has been reduced to some fragmented sub-populations, probably in decline, as a result of this continual loss of habitat.

*G. dohrnii* suffers from settlements pressures, fires, road construction and very little protection of waterways which reduces suitable habitat for this species (Brasil 2008, BirdLife 2017). *G. dohrnii* lives in virgin forests, over-flying streams and rivers looking for nesting sites; it reproduces from September to February (Ruschi 1982, 1986). According to our knowledge there is no record of the characteristics of the nest of *Glaucis dohrnii*, and there are few descriptions of the biometry of this bird (Ruschi 1982, Grantsau 1989), as well as scarce information on the aspects of the nesting site of this species. The objective of this study was to describe the characteristics of the *G. dohrnii* nest found in the municipality of Boa Nova, Bahia, the biometry of the bird and environmental aspects of the nesting site.

Figure 3. Vine Forest in the municipality of Boa Nova (BA), the habitat of *Glaucis dohrnii*, rich in bromeliad species. Photo: Pedro Lima

Figure 4. (A) The nest of *G. dohrnii* constructed on a Bromelia sp leaf (B) *G. dohrnii* registered in Boa Nova, Bahia on 04/07/2014, latitude: -14 21’ 38,58398” and longitude: -40 11’ 24,47571”. Photos: Pedro Lima.
Material and methods

Study area

Fieldwork was carried out in the municipality of Boa Nova, which is composed of two biomes: the Caatinga and the Atlantic Rainforest. The transition zone between the biomes is where the Vine Forest occurs. Macedo (2009) reports that this vine forest has a large number of species from both the Atlantic Forest and the Caatinga as well as its own species. This fact qualifies these vine forests as natural corridors to establish genetic flow between populations of plants and animals, which assures the conservation in situ of several species of flora from the northeast of Brazil (Figure 3).

The current study is part of research on the reproductive behavior of birds in Bahia that has been ongoing since 1989. From 1989 to 2017, more than 200 species of birds have been evaluated and the nests of 12 specimens described. The study occurred in the Boa Nova National Park (12,065 hectares) and was created in June of 2010 together with the Wildlife Refuge (15,024 hectares) with the goal of protecting an important area of transition between the Caatinga and Atlantic Rainforest (Brazil 2017). The high altitude forest where the nest was located is between these two important biomes and is locally known as “vine forest” (mata de cipó).

Data collection

Observations were made with the naked eye, binoculars, playback and audio recognition. Mist nets measuring 12 meters in length 2.5 meters in height and with 10 mm mesh size were used to capture the specimens. They were placed in areas of the bird’s potential food sources in order to increase capture rates.

Ten nets were set up in each of the forested areas of the Caatinga biome, the Atlantic Forest biome and the Vine Forest. Each net remained set up for approximately 11 hours (from 5:30 a.m. 5:00 p.m.) for three consecutive days, with the total sample time of 330 hours per net. The nets were inspected at intervals of 20 to 30 minutes in order to minimize the amount of time birds were in the net and therefore stressed.

The captured birds were identified, placed in cloth sacks and weighed, banded and measured to gather standard biometric data. The birds were subsequently released in the same places they had been captured. Individual records were made, specifying the name of the species, sex, age (when possible), measurements of beak, tarsus, wing and tail, verification of the reproductive period through the presence of brood patches, the presence of ectoparasites and anomalies. Colored metallic bands of a diameter suitable for each species were attached to each captured bird. The methodology proposed in the Banding Manual of the National Center for Research for Conservation of Wild Birds – Cemave (Brasil 1994) was followed in all banding activity.

Figura 5. Glaucis dohrnii nest built on a bromeliad leaf and containing two eggs. Almeida (2012b).

Figure 6. Glaucis dohrnii nest with two chicks close to fledging, photographed on December 16, 2012. Photo: Josafá Almeida.
Measurements of the birds, the eggs and the nests were made using millimetric and pachymetric rulers. Dynanometers of 0.5 kg, 1.0 kg and 5.0 kg and spring scales of 10.0g, 30g, 100g and 300g were used. Material was collected from the nests after the birds had abandoned them to identify their compostion, and the plants, fruits and inflorescences which are part of the bird’s diet were identified by specialists.


Results and discussion

Characteristics of the nest of Glaucis dohrnii

On July 4, 2014 we located a nest of G. dohrnii which had been abandoned on the same clump of Bromelia sp where the first nest had been observed. The construction of the nest starts at around 150 mm from the tip of the drooping leaf (which has an average width of 35 mm) and extends down vertically to the tip of the leaf. It is built around the leaf, taking advantage of its concave shape (Figure 4). Small pieces of leaves are affixed to the external walls. It has the general form of a funnel or coffee filter, with a small caudal appendage, distinguishing it from the nest of the G. hirsutus (Figure 5) in that it is relatively short and has neither leaves nor lichens affixed.

Grantsau (1989) reports that the nests of the Glaucis genus are affixed to the underside of a palm leaf and are very loose. Santos (2013) and Dias (2017) recorded G. dohrnii nests on two occasions, one built on a bromeliad leaf and the other on a leaf of a Shrub species in December 2013 and December 2016 in Poções and Porto Seguro, Bahia, respectively. The records of these G. dohrnii nests in the state of Bahia, as well as those recorded by Josafá Almeida (Almeida 2012a, 2012b, 2012c), were entered into the WikiAves database, which is the most important source for consulta-
tion due to the absence of photographic records of *G. dohrnii* nests in the scientific literature.

On November 26, 2012, *G. dohrnii* was observed in the vine Forest of Boa Nova, Bahia, during a bird watching expedition led by Josafá Almeida for Pedro Ávila, Marcus Mello and Rafael Furtado (Almeida 2012a). On December 1, 2012, Josafá Almeida discovered a nest containing two eggs built on a bromeliad leaf (Almeida 2012b) (Figure 5).

On December 16, 2012 there were two feathered chicks which were almost ready to fledge (Almeida 2012c) (Figure 6).

In this study, it was observed that the nest of *G. dohrnii* is affixed to bromeliads’ leaves taking advantage of the plants’ form, and the nest material is woven around the leaf which provides rigidity and balance, so that a long caudal appendage as seen in the nests of *G. hirsutus* and the genera of *Ramphodon* and *Therenetes* (Figure 7) is not necessary.

The nest structure of *Ramphodon*, *Glaucis* and *Therenetes* is elongated in form, ending in an appendage like tail. The nests hang from a palm tree leaf, or heliconia etc. Some lichens and plant debris are affixed to the external walls of the nest, and the caudal appendage provides equilibrium and stability. It is composed of fibers taken from palm tree pinnules which allows it to be seen through its fork (Ruschi 1982) (Figure 8). Ruschi (1982, 1986) reports that *G. dohrnii* reproduces from September to February and that it lives in virgin forests, over-flying streams and rivers looking for nesting sites which always occur in the pinnule of palm leaf, and they affix the nest on the extremity of the pinnule. However, in the present study the characteristics of the nest of *G. dohrnii* were different from Ruschi’s (1982) description. Specifically, it was much smaller than the nest of *G. hirsutus* and was built on the dorsal tip of a Bromelia sp leaf at a height of 1.5 meters from the ground.

**Biometry of *Glaucis dohrnii***

The egg of the *G. dohrnii* weighs 0.75 g and measures 16 mm x 10 mm, and incubation is performed over 14-15 days. The young fledge at between 20-22 days old (Ruschi 1982, 1986). Another report of *G. dohrnii* describes two eggs weighing an average of 0.75g, measuring 17 mm x 10 mm and incubated by the female for 15 days, with the chicks fledging at between 20-27 days of age (Del Hoyo et al. 1999), and 27 days (Grantsau 1989). On December 1, 2012, a nest of *G. dohrnii* was found containing two eggs and on December 16 there were two feathered chicks (Almeida 2012b) (Figure 5) which fledged a few days later. Assuming that the chicks were born on December 2, it would have been 14 days later when they were photographed and fledged in less than 18 days.

Table 1 shows the biometric differences between *Glaucis dohrnii* captured on July 4, 2014 in the municipality of Boa Nova, Bahia, with the acknowledgments other authors. According to Grantsau (1989) the female *Glaucis dohrnii* is a little smaller and the male’s beak is more curved.

**Environmental aspects of the nesting site of *Glaucis dohrnii***

Between 2006 and 2017 an inventory of the bromeliad species of the vine forest in the municipality of Boa Nova was performed, and six species which are visited by the *G. dohrnii* were identified: *Aechmea alba* (Mez.,1894), *Aechmea multiflora* (L.B.Sm. 1970) a species endemic to Bahia whose inflorescence is heavily used (Figure 9), *Bilbergia Saundersii* (Bull 1874), *Vriesea* sp, and *Bromelia* sp., all considered Atlantic Rainforest species (Martinelli et al. 2008) (Figure 10) and (*Cryptanthus boanovensis* Leme., 2015), a species described as endemic to the vine forest in

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**Table 1. Biometric data of the *Glaucis dohrnii* gathered by different authors.**

<table>
<thead>
<tr>
<th>Weight (g)</th>
<th>Total length (mm)</th>
<th>Tail (mm)</th>
<th>Wing (mm)</th>
<th>Beak (mm)</th>
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<tr>
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<td>43</td>
<td>70</td>
<td>28</td>
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</tbody>
</table>

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**Figure 9. (A) Aechmea multiflora. The flowers of this species are heavily relied upon by *Glaucis dohrnii*. It is the most abundant species in the vine forest, and locales with high density of this bromeliad are the preferred habitat of the Slender Antbird (*Rhopornis ardesiaca*) and (B) Bilbergia Saundersii. Photos: Pedro Lima.**
the municipality of Boa Nova (Leme 2015) (Figure 11).

The relevance of the vine forest in the municipality of Boa Nova where the *G. dohrnii* was recorded is heightened by the fact that the Slender Antbird (*Rhopornis ardesiaca*) (Wied, 1831) occurs there, a species endemic to the Vine Forest and more frequently observed in locales with the bromeliads from the *Bromelia* genus. The Slender Antbird (Figure 12) is on the red list of Brazilian birds and is threatened with extinction (Brasil 2008).

The transition or vine forest in the municipality of Boa Nova, Bahia, has acted as a refuge for endangered species of birds, and larger studies about the forest’s extension and the risk of degradation in the municipality and the

Figure 10. (A) *Aechmea alba* and (B) *Bilbegia porteana*, bromeliad species whose inflorescences are visited by *Glaucis dohrnii*. Photos: Pedro Lima.

Figure 11. (A) *Bromelia* sp., the genus on which *Glaucis dohrnii* constructs their nests and (B) *Cryptanthus boanovensis* by Leme (2015), a species described in 2015 and endemic to the vine forest of Boa Nova; the flowers of this species are also visited by the *Glaucis dohrnii*. Photos: Pedro Lima.

Figure 12. *Rhopornis ardesiaca* perched on a bromeliad leaf (*Aechmea multiflora*). This species is endemic to the vine forest and prefers forests with large densities of bromeliads of this species. Photo: Pedro Lima.
region are needed, as are programs that bolster its maintenance and expansion in order to preserve and multiple areas favorable to species such as Rhopornis ardesiaca and Glaucis dohrnii.

Figure 2 shows the watershed of the Gongogi River, the region where the nest of G. dohrnii described in this study was found (the red dot on the map). Teixeira et al. (2012) characterize the river basin of the Gongogi River both physically and socio-economically and concluded that the land use in the river basin correlates directly with its climatic conditions since the area where cacao is cultivated closer to the river has a more humid climate, while pastures are drier areas. The substitution of cacao areas and forests closer to the river with drier pastures needs to be monitored in the river basin so that the refuges of G. dohrnii will not be further degraded.

The nest of G. dohrnii offers good camouflage in the forest and difficult access for predators. However, since it is built on the leaves of palm trees, bromeliads and bushes, it depends on the occurrence cycles of these plant species with these characteristics and is vulnerable to the environmental degradations of the Atlantic Rainforest, the forests near rivers as well as ecotone regions of the biomes of the Caatinga and Atlantic Rainforest, such as the locale where the nest of the G. dohrnii for this study was located (Figure 2). More research and preservation of ecotone areas and river basins, such as those suggested for the Gongogi River basin, favor the preservation of the G. dohrnii.

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References


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