New records of Three-toed Jacamar *Jacamaralcyon tridactyla* in Minas Gerais, Brazil, with some notes on its biology

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São citadas novas ocorrências de *Jacamaralcyon tridactyla* no estado de Minas Gerais, ampliando o conhecimento de sua distribuição. Relata-se novos aspectos da sua biologia como vocalização, morfologia, comportamento social e reprodutivo bem como algumas considerações sobre o seu status atual. Algumas medidas que foram propostas para a sua preservação são comentadas, e discute-se a importância de barrancos como fator limitante para a distribuição da espécie.

Introduction

Three-toed Jacamar *Jacamaralcyon tridactyla*, a little-known species endemic to south-east Brazil[1,2], is classified as threatened[3,4]. Described in 1817 by Vieillot[10] and popularly known as cuitelão and violeiro[12], it is known from northern Minas Gerais south to north-west Paraná, with most records coming from the Paraíba do Sul valley, Rio de Janeiro[1]. Within its relatively large range, *J. tridactyla* is apparently rare and highly localised. Most recent records are from the states of Minas Gerais[5] and Rio de Janeiro, with older published records from other states (Espírito Santo in 1940, São Paulo in 1945 and Paraná in 1981)[1].

New records

We recently discovered *J. tridactyla* at four new localities in Minas Gerais: Belo Horizonte, Contagem, Guanhães and Pirapetinga, with additional records from Serra da Moeda by Mario Cohn-Haft (Fig. 1). Repeated observations were mostly made at Contagem (data also presented in congress[8]), although regular visits were also made to the other localities in an attempt to assess variability in the species' biology throughout the region.

The first record was from the municipality of Belo Horizonte (19°55'S 43°56'W) on 22 August 1993, during a field trip of the Clube de Observadores de Aves (COA-BH) to Manancial Barreiro, in the south-east of the municipality and an area belonging to the Companhia de Saneamento de Minas Gerais (COPASA). Two birds were seen by Ricardo R. Gontijo and identified by one of us (HRN). Subsequent visits, by the authors and others, failed to find the species.

The second record (of four birds) was made on 1 November 1993, during an ornitholgical survey of Parque Estadual Fernão Dias, Contagem municipality (19°55'S 44°03'W), by the authors and Luiz Guilherme M. Mendes. A third record, by Tadeu A. Melo Junior on 26 November 1993 at Parque dos Buritis, Belo Horizonte, involved one bird; it was not seen again in nine subsequent visits to the site.

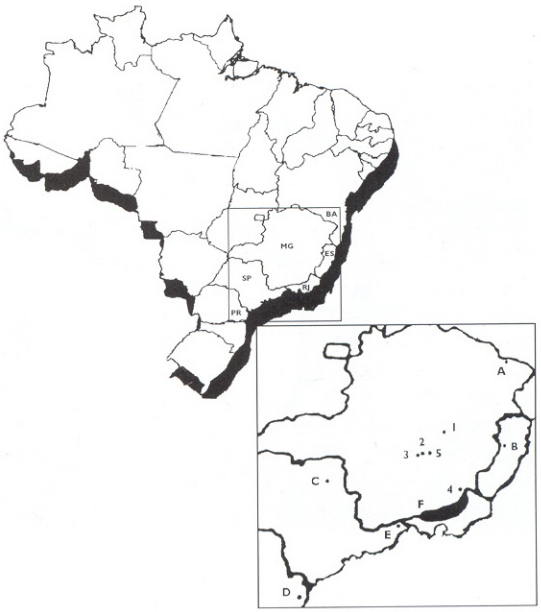

Figure 1. Map showing the new localities for Three-toed Jacamar *Jacamaralcyon tridactyla* mentioned in text (coordinates are taken from IBGE[3]): 1. Guanhães; 2. Belo Horizonte; 3. Contagem; 4. Pirapetinga; 5. Serra da Moeda. Selected localities are: A. Divisópolis (Minas Gerais—15°43'S 41°00'W); B. Itarana (Espírito Santo—19°52'S 40°52'W); C. Jaboticabal (São Paulo—21°15'S 48°19'W); D. Morretes (Paraná—25°28'S 48°50'W); E. Piquete (São Paulo—22°36'S 45°10'W). The shaded area (F) is that from which most records come, in the valley of Paraíba do Sul river.

The fourth record was from Guanhães municipality (18°46'S 42°55'W), at Fazenda Vista Linda, on 15–16 January 1995. A total of 14 individuals,

Figure 2. Three-toed Jacamar *Jacamaralcyon tridactyla*; note the red spot on the upper iris and the broken mandible tip (HRN).

Figures 3–5 (right and below). Three-toed Jacamar *Jacamaralcyon tridactyla* (Graeme Green).

two of them juveniles still being fed by their parents, were located during an ornithological survey of the area. Three were mist-netted, photographed and then released.

In Pirapetinga municipality (21°39'S 42°20'W), at Fazenda Boa Esperança, we recorded this species on 26–27 September 1996, estimating the local population to be c.30 individuals, in at least five groups.

Mario Cohn-Haft (*in litt.* 1998) observed the species regularly at Vargem de Santana, near Belo Vale (20°24'S 44°01'W), between 1993–1997. He saw up to two birds on the forest edge and frequenting an earth bank near a road construction.

Biological observations

Our observations refer mostly to the population found at Parque Fernão Dias, Contagem. In the three studied populations (Contagem, Guanhães and Pirapetinga), *J. tridactyla* was found in groups of from three (Contagem) to 10 individuals (Guanhães), although individuals did temporarily leave their group. Birds rarely moved when perched, and might easily pass undetected, especially if in shade or facing away from the observer, concealing the conspicuous white underparts. They sometimes remained perched in the same position for up to 15 minutes, often giving a fast side-to-side head movement, almost always with the bill raised slightly above the horizontal (occasionally held horizontally) giving the bird a proud look.

As in many other bird species, *J. tridactyla* cleans its bill by rubbing it against the perch, but we also observed it twice cleaning its bill with its feet. The perch is left very quickly, usually in silent fast flight. Flights are generally short, usually to hunt or join other individuals to sing. *Jacamaralcyon tridactyla* prefers horizontal or

slightly inclined perches, usually bare or sparsely vegetated, although it sometimes used leafy tree canopies. It forages on small insects in flight, by sallying from the perch and usually returning to the same perch or tree.

Feeding observations indicated a preference for small cryptic Lepidoptera, as well as Diptera and Hymenoptera. Capture success was observed to be 24% (173 attempts and 42 captures). The insect's wings are usually removed by beating it against a perch and by bill action. On occasion, insects are swallowed whole. Birds were also observed offering prey to other individuals perched nearby. This behaviour was most frequently observed in October–January and was interpreted as being part of pair formation and courtship, or possibly care of older young.

Contrary to the behaviour of Rufous-tailed *Galbula ruficauda*, Yellow-billed *G. albirostris* (pers. obs.) and Coppery-chested Jacamars *G. pastazae*[11], which prefer lower vegetational strata, *J. tridactyla* was normally found between 8–15 m above ground and near the canopy, where the vegetation is generally less dense.

The observed increase in vocalisations and other courtship behaviour coincide with the rainy season (September–February). Birds usually call in groups of 2–6, and some elements of the voice are reminiscent of Yellow-bellied Elaenia *Elaenia flavogaster*. The voice is shrill and hard to describe (as many of the birds in a group are usually calling simultaneously), being composed of various short, ascending whistles, lasting c.20 seconds (recordings deposited at Arquivo Sonoro Elias Coelho, Universidade Federal do Rio de Janeiro). Group song is apparently rare among the Galbulidae and more closely resembles *Monasa* spp. than the jacamars, which are more frequently observed alone.

Jacamaralcyon tridactyla roosts in cavities in earth banks, excavated by removing the soil with one foot at a time (G. T. Mattos pers. comm.). Cavity location, at the three study sites, did not appear related to the presence of protective vegetation, but rather to ease of access to the bank and presence of small branches by the burrow entrance, facilitating entrance and exit. This was verified at Pirapetinga, where a bank, c.6 m high with four cavities, devoid of vegetation except for a small tree in front of it, was used briefly by birds prior to entering the burrow. At Parque Fernão Dias, where two banks were used, one of them (80 cm high with two cavities) had protective vegetation while the other, 4 m high with three cavities, was bare. The same situation was found at Guanhães, where one bank with cavities lacked any protective vegetation. The species is consistent in its roosting habits; in 17 observations it arrived between 17h35–18h05 (i.e. always before sunset).

The depth of two cavities, 80 cm up a heavily vegetated bank at Fernão Dias, was measured by introducing a long straight rod through the opening. Height and width of the opening were also measured:

Cavity 1—62 cm deep, 9 cm high and 6 cm wide.

Cavity 2—72 cm deep, 6 cm high and 6 cm wide.

Care was taken not to destroy the cavity and this precluded collection of further details of size and shape and the preparation of a sketch like that in Sick[12] for *Baryphthengus ruficapillus* or *Chelidoptera tenebrosa*. It is, therefore, impossible to discuss the existence or shape of a brooding chamber or the angle of the burrow's mouth. Measured burrows continued to be used normally by birds following measurement.

Analysis of 22 *J. tridactyla* specimens (one unsexed, seven male and 14 female) at the Museu de Zoologia da Universidade de São Paulo (MZUSP) revealed an interesting phenomenon concerning bill shape. Among males, just one (no. 36799) has the mandible tip broken and all six have maxillas of equal length. However, among the females, just three have maxillas of equal length (nos. 24915, 31241 and 36804) and 11 have the mandible tip broken, the length missing being between 2–6 mm. This phenonomen was also noted in birds in the G. T. Mattos (GTM) collection (all from Divisópolis, Minas Gerais—see map) and our mist-netted individuals (Fig. 2). Except for the three unsexed mist-netted birds, the birds with broken mandibles examined at the GTM collection were female. Mandible tip fracture may possibly be associated with burrow excavation. The fact that all sexed individuals which exhibited fractures were female suggests either a higher degree of burrow excavation by females, weaker bills or a combination of both factors. Additional evidence to support the excavation hypothesis is provided by the fact that all broken bills were dirty and the evidence suggests that these were dirty prior to collection. However, it should be noted that damaged bills are common amongst all bird specimens as shot often damages the bill.

Another interesting characteristic of *J. tridactyla* is the existence of a small spot on the upper iris, varying from red (Fig. 2) to yellow (G. T. Mattos pers. comm.). In five individuals (three mist-netted and two from G. T. Mattos' field diary) only one mist-netted bird did not exhibit such a spot. Although the sample is insufficient to draw firm

conclusions, we suspect it may be age-related (appearing in young individuals raised in a dark nest) or possibly a geographical variation, since the two specimens at the G. T. Mattos Collection showed yellow spots, while the two individuals analysed by us were red (Fig. 2).

At Parque Fernão Dias, one group of birds held a territory in an area heavily used by people on weekends, with large amounts of refuse (partially deposited near one of the banks) and loud music. The birds were apparently not sufficiently affected to vacate the area. Of the three studied populations, only that at Pirapetinga occurred in an area with patches of primary and secondary forest. This site also supported some larger and even threatened birds, eg. Blue-winged Macaw *Ara maracana* and Vinaceeous Parrot *Amazona vinacea*. The other two areas were greatly disturbed, with most original vegetation replaced with *Eucalyptus* sp., although a native understorey persisted at Contagem. At Guanhães, most of the area is now pasture with small forest patches persisting only along water courses. The presence of an understorey associated with *Eucalyptus* appears to be an important factor in the occurrence of *J. tridactyla*, as stated by Machado *et al.*[5,6].

The presence of earth banks, suitable for excavation, also appears to be a decisive factor in the species' distribution. The two single-day sight records of singletons from Belo Horizonte (see above) were made in areas without such earth banks, increasing our impression that earth banks are very important for the species' survival (given that no further records were made at either of these two localities). *Jacamaralcyon tridactyla* was not recorded at otherwise similar nearby sites lacking earth banks. In the three study areas, *J. tridactyla* preferred open forest edges, near water and/or banks.

One problem faced by the species is bank erosion. This was observed during the rainy season, when c.20% of a bank collapsed, destroying three existing burrows. Bank subsidence due to rainstorms may be a factor limiting the species' breeding success. The species can persist in degraded areas where the original vegetation has been replaced, but requires a native understorey associated with the new vegetation and is dependent on the occurrence of suitable banks for breeding.

Although all three populations discussed here are protected, only Parque Fernão Dias has an official designation.

Conclusions

These records widen the species' known range[1,5,6,7,8,12,13], highlight the need for further surveys in other localities, including areas away from the most common areas of occurrence, and give credence to Burmeister's 1856 observation at Lagoa Santa, Minas Gerais[9], a municipality close to Belo Horizonte, previously considered too distant from the species' known range to be true[1]. New localities for *J. tridactyla* should be searched for and documented, in order to provide better understanding of its distribution, status and environmental requirements, directing efforts towards its conservation. Protection of forest understorey in disturbed areas with nearby earth banks suitable for the species may secure its survival.

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