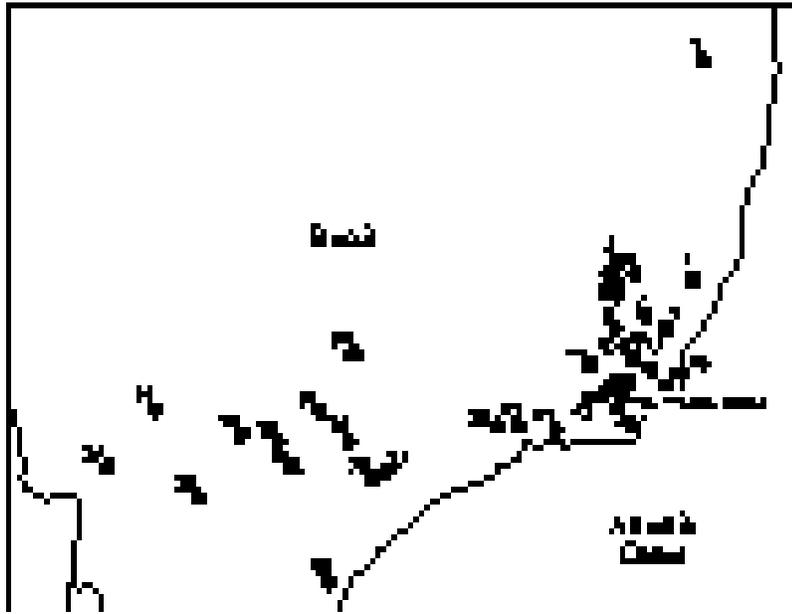


Although capable of surviving in badly degraded small woodlots, this distinctive aerial feeder and bank nester has undergone a major decline in overall abundance and a contraction of range in south-east Brazil, where it survives now chiefly in the rio Paraíba valley in Rio de Janeiro state. Much urgent work is needed to clarify its status and needs, and to establish suitable sanctuaries.

DISTRIBUTION The Three-toed Jacamar (see Remarks 1) is endemic to south-eastern Brazil in Espírito Santo (no records since 1940), eastern Minas Gerais, Rio de Janeiro (these two states holding the bulk of modern records), São Paulo (no records since 1945) and northern Paraná (no documented record since 1961). The evidence is that this is a species of the western slopes of the coastal serras and drier interior plateaus. A wholly untraced locality is Estrado de S. Domingos, Conceição, August 1933 (specimen in USNM; see Remarks 2). Specimens from “the vicinity of Bahia” (in BMNH) and “Bahia” (in MNHN) are too vague to trust, but may indicate a (former) extension of range north of Espírito Santo.



Espírito Santo Three males and two females were collected on the rio de Santa Joana, near Itarana¹, 400 m, 27 August 1940, and one male is from Estação de [Engenheiro] Reeve² (= Rive), December 1924 (specimens in MNRJ).

Minas Gerais In the last century birds were found throughout the eastern part of the Serra do Espinhaço (Reinhardt 1870). Specific records (north to south) are: two males collected on the Serra da Mombuca³, Divisópolis, 930-1,000 m, November 1973 (in CGTM; also G. T. de Mattos *in litt.* 1987); one male and three females from the rio Doce⁴ on the lower rio Piracicaba, left bank (i.e. near to the present Rio Doce State Park), August and September 1940 (in MZUSP); Caratinga Reserve⁵ (Fazenda Montes Claros), 1977, March, April and July 1983, April and July 1984 (A. Brandt *in litt.* 1987), October 1986 (M. A. Brazil and D. R. Waugh *in litt.* 1986); rio Matipó⁶, July and October 1919 (specimens in MZUSP; also Pinto 1938), 1979 (A. Brandt *in litt.* 1987); one pair from Santa Bárbara do Caparaó⁷ (now Caparaó: see Naumburg 1935), 900 m, August 1929 (specimens in AMNH); São Pedro dos Ferros⁸, Presidente Bernardes; Serra do Brigadeiro, all in 1979 near Araponga⁹ (A. Brandt *in litt.* 1987); two males and one female from Muriaé¹⁰, November and December 1926 (specimens in MNRJ); Rio Novo¹¹, June 1898 (specimens in MNRJ; also Ribeiro 1927); three males and one female from Volta Grande¹², October 1943 (specimens in MNRJ), with birds observed in January 1980 (J. F. Pacheco *in litt.* 1986); Além Paraíba¹³, January 1980 (J. F. Pacheco *in litt.* 1986); Santa Fé¹⁴, 22°06'S 43°09'W (specimen in BMNH; also Sclater 1891). A record from Lagoa Santa in the centre of the state (Burmeister 1856) seems too anomalous to regard as certain (see Reinhardt 1870).

Rio de Janeiro Goeldi (1894) observed the species in the hot lowlands of both margins of the rio

Paraíba do Sul valley¹⁵, but not in the forests of the Serra dos Órgãos; there are, however, nineteenth-century records from Nova Friburgo¹⁶ (specimens in BMNH; also Burmeister 1856, Sclater 1891), nearby at Rosário, c.22°16'S 42°32'W (Krabbe undated) and Cantagalo (Cabanis 1874, von Ihering 1900a). Most of the other records, including the modern ones, are from the Paraíba valley at: Bate-pau¹⁷, Porciúncula, December 1988 and February 1990; Miracema¹⁸; Paraoquena; Campelo¹⁹, all in July 1988; Nossa Senhora do Livramento²⁰, Carmo, October 1989 (all the foregoing from J. F. Pacheco *in litt.* 1991); Cantagalo²¹ (Cabanis 1874); Imitação²², Sapucaia, up to six pairs continuously present from March 1988 to 1991 (J. F. Pacheco *in litt.* 1991), although only one was there in May 1992 (M. Pearman *in litt.* 1992); Pirai²³, November 1818 (von Pelzeln 1868-1871). One untraced locality in the state is “Areas”, a stream on the way to Minas Gerais (Burmeister 1856), this being between Cantagalo and Itaocara²⁴ (J. F. Pacheco *in litt.* 1991; see also Paynter and Traylor 1991).

São Paulo Localities (east to west) are: Monjolinha²⁵ (near Areias), November 1818; Piquete²⁶, February 1901; Campinas, 1820s or 1830s (Krabbe undated); Ipanema²⁷, February and July to August 1820; Cemitério²⁸ (now Alambari), July 1820; Jaboticabal²⁹, September 1900; Victoria³⁰ (now Botucatu: see Pinto 1945), 570 m, March to May 1901, March and June 1902; rio Feio³¹ (near Bauru: see Pinto 1945), August and September 1905; Fazenda Cayoá³², Salto Grande, rio Paranapanema (see Pinto 1945), June and July 1903; rio Paranapanema opposite the rio Tibaji confluence³³, May 1945; and Porto Cabral³⁴, rio Paraná (in the extreme west of the state: Pinto 1945), October 1941 (specimens in AMNH, FMNH, MCZ, MZUSP, ROM, USNM; also von Pelzeln 1868-1871, von Ihering and von Ihering 1907, Pinto 1938). The species has not been found in the state since at least 1975 (E. O. Willis *in litt.* 1986).

Paraná Specimens are from Jacarezinho³⁵, 1901 (von Ihering and von Ihering 1907, Pinto 1938); Salto do Cobre, rio Ivaí (near Ubaúna)³⁶, December 1922 (Sztolcman 1926); Porto Camargo³⁷, January and February 1954 (Pinto and de Camargo 1955); and Ivaté (untraced), January 1961 (in MHNCI). The only recent record, one bird seen at the Guaricana Reserve near Morretes³⁸ on the eastern slopes of the Serra do Mar, May 1981 (P. Scherer Neto *in litt.* 1986), fails to conform with current evidence on habitat type (see Ecology) and should perhaps be regarded as provisional.

POPULATION The testimony of Danish explorers in the early and mid-nineteenth century is that the Three-toed Jacamar was “very common” in the province of Rio de Janeiro and in the eastern part of the Serra do Espinhaço in Minas Gerais (Reinhardt 1870), a hitherto almost entirely neglected assessment which gives an ominous perspective to the present-day plight of the species. Although it is apparently easily found in at least small numbers where it occurs, to judge from the number of specimens obtained from several localities (see Remarks 3) and from recent observations in what now seems to be the core of its present distribution, it is clearly extremely local and must have suffered a very substantial decline as a result of habitat loss. While it is likely that some populations remain undetected in São Paulo and Paraná (badly degraded woodlots – see Ecology – being understandably unenticing to ornithologists), it is not safe to assume that the species has been greatly overlooked, given its generally conspicuous habits (see Ecology): lack of recent records in most of the places where it has been recorded in the past may reflect its genuine absence.

ECOLOGY The Three-toed Jacamar has been found in remaining patches of secondary growth in northern Minas Gerais and in Rio de Janeiro (J. F. Pacheco *in litt.* 1986, G. T. de Mattos *in litt.* 1987). Sick (1985) referred to the species as inhabiting riversides with shrubs on the mountains in Espírito Santo.

In the Caratinga Reserve birds were seen perched in subcanopy of forest in one of the main valleys (M. A. Brazil and D. R. Waugh *in litt.* 1986). Woodlots in the Paraíba do Sul valley are usually dry forest fragments surrounded by pastureland or ricefields, but at least one has a stream running through it; however, for reasons unclear, very few woodlots surveyed have been found to contain the species (J. F. Pacheco verbally 1991). Birds often sit in exposed situations, such as on tall grass stems, wires and leafless twigs, from where they sally for flying prey, and call loudly (Sclater 1882, Sztolcman 1926, Sick 1985, J. F. Pacheco *in litt.* 1986).

Food items include butterflies and other flying insects (J. F. Pacheco verbally 1991). Two specimens from the 1820s had eaten beetles, cicadas and wasps (Krabbe undated); one from December had eaten Hymenopterans (Sztolcman 1926); one in USNM from September contained “vesperas” (probably *vespas*, wasps); one in MNRJ from November simply “insects”; and one in CGTM from November had eaten one wasp and other insects.

The Three-toed Jacamar nests in holes excavated by the birds themselves in riverside or roadside banks (Euler 1900, von Ihering 1900b, Sick 1985); a statement that several entrances to the nest are made to mislead enemies (Goeldi 1894) refers to the members of the family in general, although it has been repeated by Euler (1900) and Sick (1985) as if referring particularly to this species. One pair observed spent more than two months excavating the nest (Euler 1900). Holes are apparently used also for overnight roosting (J. F. Pacheco verbally 1991), and may serve also as roosting sites for swallows (von Ihering 1900b; also Sick 1985). Breeding occurs around October and November, from the available evidence, yet of seven specimens (in AMNH and MNRJ) collected in late August whose gonads were examined, only one male had them slightly enlarged, the other being dormant; however, an early October specimen in MZUSP was labelled as an active male, two specimens in CGTM from early November had enlarged testes, and specimens from June and July had small gonads while ones from August and November had large (Krabbe undated). A nest found in November was in a deep horizontal gallery and contained two white eggs; disturbance of the nest prevented further incubation and the eggs were predated (G. T. de Mattos *in litt.* 1987). Nesting tends to occur gregariously, in small colonies (von Ihering 1900b: 150, B. M. Whitney *in litt.* 1991; see Remarks 1).

THREATS Although the Three-toed Jacamar has been found in very degraded woodlots, it is absent from many such sites and is in general now so rare that some form of habitat loss or disturbance must be assumed: perhaps the most likely explanation is that while like all jacamars it selects forest edge habitat or even habitat that mimics this, such as degraded woodland, it can only survive in the long term at sites which also possess banks in which to breed, and this combination is presumably now extremely uncommon, and becoming ever more so. At this stage collectors could add to the possibility of local extinctions (see Remarks 3).

MEASURES TAKEN The Three-toed Jacamar is protected under Brazilian law (Bernardes *et al.* 1990), but the Caratinga Reserve seems to be the only protected area where the species is known to occur.

MEASURES PROPOSED Surveys in the field are needed as a matter of great urgency to delimit current range and assess conservation status more accurately, and fieldwork on the ecology and breeding success of the populations in the Paraíba valley and the Caratinga Reserve would yield valuable data on the options for managing the species, particularly given the speculation over the causes of its decline (see Threats). Collection of further specimens should not be countenanced.

REMARKS (1) The species is the only one in its genus, and indeed the only jacamar with three toes; however, *Jacamaralcyon* and *Brachygalba* are quite similar in occurring in groups, in their pattern of vocalizations (members of pairs sing together, triggering adjacent pairs to do likewise), in their small size and plumage tones, and in their choice of relatively open arid habitats (B. M. Whitney *in litt.* 1991). (2) This conceivably refers to the road to São Domingos (19°09'S 40°37'W in Paynter and Traylor 1991) leading from Conceição da Barra municipality in northern Espírito Santo. (3) Occurrence of small groups of individuals (or pairs) has been recorded (Sztolcman 1926; J. F. Pacheco *in litt.* 1991) and seems also evident from the museum series. Sztolcman (1926) reported that he obtained three specimens from a "small" group perched on branches of a small tree; according to him, part of the group left the tree after a gunshot, but returned soon after, and in that manner one could kill many birds from a single flock. Nevertheless, a skin (that from Conceição in 1933; see Distribution) indicates that the species's abundance ("frequência") at the site was low ("pouca").