

*This largely arboreal frugivore of the Atlantic Forest formations of eastern Brazil, eastern Paraguay and north-eastern Argentina used to be abundant, but the combination of enormous hunting pressure and the destruction of its habitat, in particular the forest palms on which it chiefly depends, has rendered it now very rare except for a few protected areas in southern Brazil and in Argentina.*

**DISTRIBUTION** The Black-fronted Piping-guan (see Remarks 1) once occurred in south-eastern Brazil from southern Bahia to Rio Grande do Sul, and in adjacent areas of south-eastern Paraguay and north-eastern Argentina in Misiones and Corrientes (Delacour and Amadon 1973, King 1978-1979), but it has disappeared from most places where it was once common, being currently very local (Sick 1985).

**Brazil** Records from western Paraná and both northern and north-eastern Paraguay (in Amambay) suggest that the species might occur in Mato Grosso do Sul, but there are no records. In the following account, localities are listed from north to south with coordinates from Paynter and Traylor (1991). **Bahia** Records are from Barracão de Cima on the rio Gongogi, October 1915 (specimen in USNM); ribeirão Issara, c.15°05'S 39°45'W, and ribeirão Quiricos, c.14°48'S 39°16'W, both affluents of the rio Ilhéus, December/January 1816/1817 (Wied 1820-1821, Pinto 1964; see Bokermann 1957); the rio Jucuruçu, where it was seen several times around Cachoeira Grande and one specimen was secured, April 1933 (Pinto 1935); and the Monte Pascoal National Park, where it was found in 1977 (King 1978-1979, Sick and Teixeira 1979, Sick 1985).

**Espírito Santo** There is no strong evidence to suggest the species survives in the state. Records are from Fazenda Klabin in 1973 (King 1978-1979, Sick and Teixeira 1979) although only a fraction of this site, now the Córrego Grande Biological Reserve, remains (see Threats) and the species appears to be absent (Gonzaga *et al.* 1987); Fazenda Boa Lembrança, rio Itaúnas, near Conceição da Barra, October 1950 (Aguirre and Aldrichi 1983); Sooretama Biological Reserve and its former forested environs (including córrego Braço do Sul, rio São José, August 1937; Aguirre and Aldrichi 1983), 1977 (King 1978-1979, Sick and Teixeira 1979), although reported to have disappeared around 1953 (Sick 1969, 1972; also Gochfeld and Keith 1977, Scott and Brooke 1985); the mountains of Limoeiro-Jatiboca (900-1,000 m, near Itarana), regular in 1939 and 1942 (Sick 1969, 1972); Forno Grande, near Castelo, late 1960s (Sick 1969, 1972).

**Minas Gerais** The species was formerly common in the valley of the rio Jequitinhonha, and in the Serra do Brigadeiro (20°30'-21°S 42°20-40'W), but is now restricted to one locality in each, respectively: the Rio Doce State Park near Dionísio, where five birds were seen at two sites in 1981 and where today its numbers may even be increasing, and the Serra do Boné, 1,850 m, where a few individuals survive in a *Euterpe*-rich area of forest (G. T. de Mattos *in litt.* 1987, 1992). However, it may also occur in the state's portion of Itatiaia National Park (see Rio de Janeiro below).

**Rio de Janeiro** Records are from the valley of the rio Paraíba do Sul at São Fidélis and Cantagalo (Wied 1820-1821, von Ihering 1900a, Pinto 1964), where it still occurred in the late 1960s (Sick 1969, 1972); Teresópolis (Sick 1972, 1985), where it is believed still present locally (presumably within the Serra dos Órgãos National Park, but in very reduced numbers (Sick 1985 *contra* Scott and Brooke 1985); Itatiaia National Park, in or around November 1903, September 1950, 1978 (Pinto 1951, 1954a, 1964, Sick and Teixeira 1979, Sick 1985); Angra dos Reis, January 1924 (specimen in MNHN); the coastal slopes of the Serra do Mar at Mambucaba (Sick 1969) and Parati (Sick and Teixeira 1979), both these localities being adjacent to the Serra da Bocaina National Park. It is almost certain that the species occurred originally in and around Rio de Janeiro (Sick and Pabst 1968).

**São Paulo** It used to occur in every forest along big rivers in the interior of the state (see below), but has long since disappeared (Sick 1972, 1985, Sick and Teixeira 1979, D. F. Stotz *in litt.* 1988). Records within a strip roughly 200 km from the coast are from: Fazenda Barreiro Rico, c.22°45'S 48°09'W, near Anhembi, last shot in 1926 (Willis 1979, whence coordinates); Serra da Bocaina, still present in 1977 (Sick and Teixeira 1979); Ipanema, April 1819 or 1820 (von Pelzeln 1868-1871); Boracéia Biological Station, April 1988 (D. F. Stotz *in litt.* 1988); São Sebastião, May 1903 (four specimens in AMNH); Ilhabela State Park (i.e. Ilha de São Sebastião), on the coast, currently (several pairs being seen in 1978 along the road which crosses the island), and seasonally frequent on the eastern side of the island according to local reports (W. C. A. Bokermann *in litt.* 1987); Carlos Botelho State Park, 24°04'S

47°58'W, monthly between January 1985 and September 1986 (A. C. Dias *per* S. G. Paccagnella *in litt.* 1987; see Measures Taken), November 1988 (C. Yamashita *in litt.* 1988), January 1990 (Pacheco and da Fonseca 1990) and in October 1991, when 3-4 were seen, two of them displaying (B. M. Whitney *in litt.* 1991); Itararé, August 1820, March 1821 (von Pelzeln 1868-1871; see Remarks 2); Rocha (untraced but in the rio Juquiá valley: D. F. Stotz *in litt.* 1988, Paynter and Traylor 1991), August and September 1961 (two specimens in MZUSP); Iporanga (untraced but c.25 km north-north-west of Juquiá: Paynter and Traylor 1991), October 1961 (specimen in MZUSP); mountains north of Sete Barras, August 1929 (specimen in MCZ); "Port. V. Travessão" on the rio Ipiranga, March 1957 (two specimens in YPM); Iguape, undated (von Ihering and von Ihering 1907, Pinto 1964); Ilha do Cardoso State Park, currently (P. Martuscelli *in litt.* 1990). An untraced locality is Taquaral, April 1930 (specimen in MCZ: see Paynter and Traylor 1991). In the far west of the state there are records from Itapura, August 1904 (von Ihering and von Ihering 1907, Pinto 1938, 1964); the rio Paranapanema on Ilha da Serra do Diabo, 22°37'S 52°21'W (Pinto 1964); and the rio Paraná (Pinto 1964). The species was reported to exist also at Jacupiranga (now Jacupiranga State Park) and Sete Barras (now incorporated into Carlos Botelho State Park), although this remained to be confirmed (Willis and Oniki 1981a).

*Paraná* Straube (1990) referred to the species being known from a little fewer than 20 localities in the state (many more than are traced here). Records include: Londrina, formerly (Sick 1985); Porto Camargo, undated (Pinto 1964); rio das Cinzas, July 1927 (Pinto 1938, 1964; see Remarks 3); Salto Ubá, 24°30'S 51°28'W, on the rio Ivaí, November 1922 (Sztolcman 1926); Barreiros (untraced), Sertão, c.21°35'S 52°40'W, and Cruzeiro do Oeste, all also in the rio Ivaí valley, along with other unspecified sites there, August and September 1945, July 1951 and November 1956 (Straube and Bornschein 1989); rio Piquiri, undated (Straube and Bornschein 1989); Iguaçu National Park in 1977 and 1979 (Sick 1985), and throughout the 1980s (TAP); the rio Paraná valley, July 1951 (Straube and Bornschein 1989); Antonina and Guaraqueçaba, in the early 1970s (Cominese Filho *et al.* 1986); Cubatão, 25°50'S 48°48'W, February 1989 (Straube 1990); the flooding areas of the Salto Segredo hydroelectric dam at Fazenda Iguaçu, 25°55'S 52°10'W, May 1987 (Straube 1988; also F. C. Straube *in litt.* 1987). It probably still occurs also in the region of Morretes, on the coastal slopes of the Serra do Mar (F. C. Straube *in litt.* 1987). It has disappeared from interior Paraná (Sick 1972, 1985, Sick and Teixeira 1979).

*Santa Catarina* Records are from: Joinville, 1904 (Pinto 1938); Jaraguá (do Sul), undated (Hellmayr and Conover 1942); Blumenau, undated (von Berlepsch 1873-1874); rio Itajaí, 1860s, in large numbers (Sick 1985; see Population); Morro do Funil near Pouso Redondo, 1,050 m, where one was seen in November 1979 (Sick *et al.* 1981); Serra do Tabuleiro State Park, near São Bonifácio, where several birds were observed on privately owned land within the park in May 1986 (B. T. Pauli *per* C. Yamashita verbally 1987).

*Rio Grande do Sul* Records are from: Turvo Forest Park, 27°15'S 53°57'W, near Yucumã Falls, rio Uruguay, where five were seen in April 1979 (de Oliveira 1982; also Albuquerque 1981); Nonoai Forest Reserve, 27°21'S 52°57'W, where one was seen in July 1971 (Belton 1984-1985; also source of coordinates); Bom Jesus (i.e. Aparados da Serra, 66 km from Vacaria), where one was collected in July 1961 (de Oliveira 1982); probably in Santiago municipality, April 1849 (de Oliveira 1982); between Canela and São Francisco de Paula, where one was seen in around 1970 (Belton 1984-1985); Barra do Ouro, near Rolante, where five were seen in August 1971, with two or more on subsequent unspecified dates (de Oliveira 1982); Taquara, undated (von Ihering 1899a, Gliesch 1930; see Remarks 4); Arroio Grande, seasonally (von Berlepsch and von Ihering 1885; see Remarks 5); presumably near Porto Alegre, since a specimen was found in the market there during the 1920s (Gliesch 1930); and by report south of Porto Alegre as far as rio Camaquã, 31°17'S 51°47'W (von Ihering 1899a). Records along the rio Uruguay in Corrientes, Argentina (see Distribution), just across from still forested areas in the state, offer hope that the species still occurs in these latter localities (Belton 1984-1985).

**Paraguay** In eastern Paraguay the species occurs north as far as the southern part of Amambay where it overlaps with the Blue-throated Piping-guan *Pipile cumanensis* (Vaurie 1968). Records (roughly north to south, by department, with coordinates from Paynter 1989) are from: (*Amambay*) Capitán Bado in the Cordillera ("Cerro") de Amambay, undated (Hellmayr and Conover 1942); (*Canindeyú*) Mbaracayú Reserve (Sierra de Maracaju), February 1988 (F. E. Hayes *in litt.* 1991); (*Alto Paraná*) río Acaray, río Monday, 25°33'S 54°41'W, and other rivers between 23° and 26°S, at the turn of the century (Bertoni

1901); Reserva Limoy, near the Itaipú Dam, currently (N. Pérez *in litt.* 1988); (*Caaguazú*) Caaguazú, between the end of June and mid-August 1893 (Salvadori 1895b); río Yuquerí, 25°15'S 55°39'W, 240 m, February 1932 (three-quarters grown specimen in MCZ); río Yguazú, 25°20'S 55°00'W, 220 m, March 1932 (four-fifths grown specimen in MCZ); (*Paraguari*) Caballero ("General Caballero, near Villarica": Hellmayr and Conover 1942), 25°41'S 56°50'W, between the end of June and mid-August 1893 (Salvadori 1895b); (*Itapúa*) Capitán Meza, 1912, 1938 and 1939 (specimens in MACN).

**Argentina** Records are all from Misiones and adjacent north-east Corrientes, and chiefly from the northern half of Misiones (Nores and Yzurieta 1988a), as follows (coordinates being from OG 1968 or Paynter 1985): (*Misiones*) Iguazú National Park, currently (Chebez 1985b, M. Nores and D. Yzurieta *in litt.* 1986); Brazo del Yacuy (presumably part of arroyo Yacuy at 25°34'S 54°11'W), 1947 (specimen in MACN; see Remarks 6); arroyo Urugua-í, at kms 10, 20 and 30, 25°54'S 54°36'W, 1950s (Chebez 1990); arroyo Uruzú, 25°55'S 54°17'W, December 1983 (P. Canevari *in litt.* 1987); Piñalitos, 25°59'S 53°54'W, undated but in 1950s (Chebez 1990; see Remarks 7); Puerto Segundo, 25°59'S 54°38'W, 1917 (specimen in IML); Colonia General J. J. Lanusse, by local report (P. Canevari *per* S. M. Caziani *in litt.* 1988); Piray Miní, untraced but in Eldorado department (Paynter 1985), where a good population currently exists (J. C. Chebez *in litt.* 1992); arroyo Aguaray-Guazú, undated (Giai 1950; see Remarks 7); Tobuna, 26°28'S 53°54'W, 1950s (Chebez 1990); Puerto Leoni, 26°59'S 55°10'W, río Parana, where one seen in January 1987 (F. Moschione *per* S. M. Caziani *in litt.* 1988); Puerto Gisela, 27°01'S 55°27'W, 1926 (Nores and Yzurieta 1988a); Piñal Seco (río Pepirí Guazú, 27°10'S 53°50'W), currently (Nores and Yzurieta 1988a); El Soberbio, 27°18'S 54°13'W, 1871 or 1971 (specimen in a museum in Santa Fe: S. Caziani *in litt.* 1988); Santa Ana, 27°22'S 55°34'W, undated (Dabbene 1913); near Posadas, currently (Chebez 1985b); (*Corrientes*) along the río Uruguay at the Estancia Rincón de las Mercedes, 6 km south-west of Colonia Garabí, September 1967 (Short 1971; see Remarks 8); in forest along the río Paraná 14 km north of Ituzaingó, probably in October 1967 (Short 1971) and certainly post-1980 (Canevari and Caziani 1988).

**POPULATION** The species has suffered a steep decline throughout its range, resulting in its virtual extinction in the northern portion of its range and its restriction to certain areas in the south where it used to be very much commoner and indeed seasonally abundant.

**Brazil** In Espírito Santo in the 1940s it was found as rare as or rarer than the Red-billed Curassow *Crax blumenbachii* (see relevant account) (Delacour and Amadon 1973) and very few have been seen at Sooretama in recent years and indeed the bird has reportedly already vanished there (Gochfeld and Keith 1977); any extant population must be on the verge of extinction (Scott and Brooke 1985). Its current status in Minas Gerais is unknown (M. A. de Andrade *in litt.* 1988). In the state of Rio de Janeiro as early as the late nineteenth century it was reported to be increasingly rare at Cantagalo (Euler 1900), but individuals still appeared on the southern slopes of the Serra dos Órgãos (Goeldi 1894), where the species disappeared before the 1920s (Sick 1972), having been considered common at Teresópolis around 1916 (Sick 1985); small numbers are still, however, believed to survive in the area (see Distribution), although it is now almost certainly absent from the coastal ranges of eastern Rio de Janeiro (Scott and Brooke 1985). In the Carlos Botelho State Park, southern São Paulo, isolated individuals or groups of two to eight (isolated birds and groups of up to three being found more frequently) were observed 117 times between January 1985 and September 1986 (A. C. Dias *per* S. G. Paccagnella *in litt.* 1987); this is probably the best population in protected areas (M. T. J. Pádua *per* H. Sick verbally 1987), the species being frequent at least during the fruiting of palms *Euterpe edulis* (see Ecology), which are abundant there but have been extirpated outside the reserve (W. C. A. Bokermann *in litt.* 1986). This bird was once common to the point of being sold in markets in Rio Grande do Sul and Paraná in the 1940s (Sick and Teixeira 1979) and was shot in considerable numbers (a photograph shows "a pyramid" of dead birds) in the 1930s at Londrina, Paraná, while on the lower rio Itajaí, Santa Catarina, no fewer than around 50,000 birds were killed in just a few weeks during the cold winter of 1866 (Sick 1985). Numbers in Iguaçu National Park in the 1980s were always very low, and birds may even have been crossing from Argentina and were thus being double-counted (TAP).

**Paraguay** The species was evidently once abundant in much of eastern Paraguay, since Bertoni (1901)

referred to its remaining so along certain rivers (specifically Monday and Acaray) despite having been exterminated wherever high levels of human settlement had occurred. It is probably now an uncommon resident of such large tracts of forest as remain in eastern Paraguay (F. E. Hayes *in litt.* 1981).

**Argentina** In the early 1950s it was repeatedly found to be abundant along arroyo Uruguay (Chebez 1990), but it soon afterwards showed signs of alarming decline (Canevari and Caziani 1988, Canevari *et al.* 1991) and is now very rare throughout the country (Chebez 1990); it is commonest at Piñal Seco, Misiones, on the río Pepirí Guazú, where four individuals were seen in June 1985 and the local people know it well (M. Nores and D. Yzurieta *in litt.* 1986), and in 1986 it was found to be very common along the arroyo Uruzú in what is now the Uruguay Provincial Park (J. C. Chebez *in litt.* 1992). In Iguazú National Park a small increase in the species's population has been noted (J. C. Chebez *in litt.* 1986).

**ECOLOGY** Wied (1831-1833) considered the Black-fronted Piping-guan a bird of the interior of tall, closed primary forests, but never found it close to sea coasts. It has been found in the Serra do Mar region "at any elevation" in rough, rocky places covered by thick high forest rich in palms *Euterpe edulis* (Sick 1985). In Espírito Santo it was found in luxuriant lowland forest to the north of the rio Doce alongside the Red-billed Curassow (Sick 1972, 1985). In Corrientes birds were seen in gallery forests (Short 1971), which are outliers of the formerly continuous forests of Misiones and adjacent Paraguay and Brazil (Delacour and Amadon 1973). In Misiones the species is very much tied to riverine strips of forest (M. Rumboll *in litt.* 1986), a point confirmed by studies in the 1950s along the arroyo Uruguay, where all birds seen and collected were close to the stream, (almost) never in the interior forest (Chebez 1990), by observations in the 1980s (P. Canevari *in litt.* 1987), and by work at Piñal Seco along the río Pepirí Guazú (M. Nores *in litt.* 1992); observations in Iguazu National Park in Brazil indicate the same, with birds mainly confined to forest within 100 m of the river, as is the case with many populations of Blue-throated Piping-guan in Amazonia (TAP). It inhabits higher strata of the vegetation, but sometimes descends to the ground to feed on fallen fruits of, e.g., bicuíba *Virola* (Aguirre and Aldrighi 1983). In Bahia, 1933, two or more birds were almost always seen perched on the branches of high trees in virgin forest: in the mornings they used to visit big araçazeiros *Psidium* full of ripe fruit, or rested in the highest branches of some nearby tree (Pinto 1935).

Fruits, seeds, grains and buds are listed as food by Canevari *et al.* (1991). Fruits of *Euterpe* are its favourite food (Aguirre and Aldrighi 1983, Sick 1985). Nuts of these trees are regurgitated in numbers and litter the forest floor, thereby attracting the attention of hunters (Sick 1985). Food in Carlos Botelho State Park consists mainly of *Cecropia* and *Euterpe* fruits but also includes figs, wild guava and other fruit (A. C. Dias *per* S. G. Paccagnella *in litt.* 1987). Other fruits recorded as food are *Psidium* (Pinto 1935, Aguirre 1947), *Hymaenea* and *Myrcia* (Aguirre 1947). In the one case where a bird was found away from water, it was eating alecrín *Holocalyx balansae* and cocú *Allophylus edulis* (J. C. Chebez *in litt.* 1992). Wied (1831-1833) recorded the remains of both fruit and insects in the stomachs, and W. H. Partridge once found birds eating molluscs among stones at the side of arroyo Uruguay, and on another occasion found them on mud where they were possibly taking salt (Chebez 1990). Birds formerly migrated vertically in the Serra do Mar in São Paulo in response to the availability of *Euterpe* fruit, which ripen earlier at lower elevations (Sick 1985). Vertical movements are still noted on Ilha do Cardoso, where the species ranges between 100 and 900 m (P. Martuscelli *in litt.* 1991). Regular displacements of the species in Santa Catarina occurred during the fruiting of pindaúba *Xylopia* in March and April, when flocks of 10 to 15 were seen; it used to appear in numbers in Santa Catarina during cold winters (see Population) and was periodically present also in south-central Rio Grande do Sul (Sick 1985), e.g. at Arroio Grande, where it arrived in May and June in flocks of 4-16 and left in December after nesting (von Berlepsch and von Ihering 1885; von Ihering 1900b gave the same information but for the north of the state).

Nests at Arroio Grande were commonly placed in a thick tree in the hollow of a fork formed by three or four branches, without any lining, both parents apparently incubating the 2-3 eggs and tending the young, which hatched at the end of November (von Berlepsch and von Ihering 1885, von Ihering 1900b). In Misiones, Argentina, females were forming eggs in August, a female and her two agile young were collected high in trees over arroyo Uruguay on 28 October 1949, and an adult with two already fully feathered young were taken on 8 November 1952 (Chebez 1990). A pair from rio Paraná, São Paulo, were in breeding condition in late October (specimens in MZUSP) and a three-quarters grown male and a four-

fifths grown female from Paraguay were collected on 26 February and 3 March respectively (see Distribution). Young have been observed in Carlos Botelho State Park in January (A. C. Dias per S. G. Paccagnella *in litt.* 1987). A male collected in November 1940 in Espírito Santo reportedly had considerably enlarged gonads (Delacour and Amadon 1973), but these were much smaller than those of another specimen collected in August 1941, while a female from the state in January 1941 had undeveloped ovaries (specimens in MNRJ). However, both Wied (1831-1833) and Euler (1900) referred to a nest with 2-3 eggs in February, and Bertoni (1901) reported a clutch-size of up to four.

**THREATS** The Black-fronted Piping-guan is threatened by both habitat loss and incessant poaching (Sick and Teixeira 1979, Cominese Filho *et al.* 1986, Chebez 1990, Straube 1990). Although the former has been seen as the more important cause of its decline (King 1978-1979) and has certainly eliminated it from most of its range (Delacour and Amadon 1973), the impact of hunting over the centuries cannot easily be understated (see below).

*Habitat destruction* Monte Pascoal National Park is under severe pressure (Redford 1989). The species's (chiefly riverine) habitat is especially susceptible to deforestation and hydroelectric developments (J. C. Chebez *in litt.* 1986), both known sites for it in Corrientes (see Remarks 8) facing loss through the construction of the Yacireta–Apipe dam on the río Paraná and the Garabí dam on the río Uruguay (Chebez 1985b, 1990). The species is sensitive to disturbance, disappearing as soon as clearings are made in the forest (Aguirre and Aldrighi 1983). Destruction of palms within forested areas may have been a particular factor in the steep decline of the species (Nores and Yzurieta 1988a); in Paraguay such exploitation has been massive (J. Escobar *in litt.* 1991). In this regard it is worth noting the similar impact such activity appears to have had on the largely sympatric Blue-bellied Parrot *Triclaria malachitacea* (see Threats in relevant account).

*Hunting* This bird has evidently long been persecuted both for its meat and, by Indians, for its feathers, evidence of the former being (e.g.) in the form of many feathers of this and the Red-billed Curassow strewn around a site near ribeirão Issara in 1817 (see Wied 1831-1833). It is avidly pursued by both predators and hunters in its remaining forests (Coimbra-Filho and Magnanini 1968). Its disappearance from Sooretama in Espírito Santo was caused by hunting (Gochfeld and Keith 1977). In the Carlos Botelho State Park, apparently one of the few places where a good population survives, one poacher shot eight birds by the roadside (C. Yamashita *in litt.* 1986). In Ilha do Cardoso State Park hunting is the major cause of decline (P. Martuscelli *in litt.* 1991). In Paraná the species declined during the expansion of coffee plantations in the north of the state, being shot in numbers in the 1930s at Londrina (Sick 1985; see Population), and hunting persisted until the 1970s, as attested by bird remains in the camps of settlers around Antonina and Guaraqueçaba (Cominese Filho *et al.* 1986). Appearing only periodically in the regions colonized by Europeans in Santa Catarina the birds developed no fear of firearms: in Itajaí, half a dozen were killed consecutively in the same tree and nearly 100 were shot in another tree, and the record of 50,000 killed in a few weeks in 1866 (see Population) evokes the history of the loss of the Eskimo Curlew *Numenius borealis* (see Appendix A) and Passenger Pigeon *Ectopistes migratorius* (see, e.g., Greenway 1958); but in the states of Rio de Janeiro and Minas Gerais they were very wild, possibly as a result of centuries-long persecution by man (see Sick 1985). Already at the turn of the century Bertoni (1901) reported that hunting had “totally exterminated” the species from populated areas of Paraguay, and this factor has certainly continued down to the present (J. Escobar *in litt.* 1991). Relatively frequent in Misiones until a few years ago, it has been pursued relentlessly this century for its much-prized meat (Chebez 1985b). Its decline along the arroyo Urugua-í may have been linked to its persistent use for food during a major expedition there in the late 1940s and early 1950s (Canevari and Caziani 1988), though given the size of the area at the time this seems unlikely (J. C. Chebez *in litt.* 1992). The record of the species from arroyo Uruzú in 1983 consisted of remains of a bird that had been hunted there (P. Canevari *in litt.* 1987). It was reported as occasionally taken by hunters at Estancia Rincón de las Mercedes in Corrientes (Short 1971), but may be extinct there now (J. C. Chebez *in litt.* 1992).

**MEASURES TAKEN** The species is listed on Appendix I of CITES, and protected under Brazilian law (Bernardes *et al.* 1990). Its hunting has been prohibited by law in Brazil since 1951 (Sick 1969, 1972). In Brazil the importance needs stressing of Monte Pascoal National Park in Bahia, Rio Doce State Park in Minas Gerais, Itatiaia and (possibly) Serra da Bocaina National Parks in Rio de Janeiro, Boracéia Biological Station, Ihabela State Park (where neither poaching nor deforestation has been known to occur:

W. C. A. Bokermann *in litt.* 1987), Carlos Botelho State Park and Ilha do Cardoso State Park in São Paulo, Iguazu National Park in Paraná, Serra do Tabuleiro State Park in Santa Catarina (which covers 900 km<sup>2</sup>, 80% being montane: L. A. R. Bege *in litt.* 1991), Turvo Forest Park (possibly important for Helmeted Woodpecker *Dryocopus galeatus*: see relevant account) and Nonoai Forest Reserve (apparently important for Vinaceous Amazon *Amazona vinacea*: see relevant account) in Rio Grande do Sul. A study of the species's population and ecological requirements began at Carlos Botelho State Park in 1989 (S. G. Paccagnella verbally 1989) but details remain unknown. An attempt to reintroduce the species to Sooretama Biological Reserve is reported to have been made, but failed (Gochfeld and Keith 1977); there seems to be no documentation of this initiative. Creation of a forest reserve on the Atlantic slopes of the Serra do Mar between Mangaratiba and Parati, Rio de Janeiro, was suggested (Sick 1969), apparently in ignorance of the existence, since 1961, of the Serra da Bocaina National Park in part of this very region. The 1988 record of the species from the Mbaracayú Reserve, a proposed national park, is important further evidence of the value of this site in Paraguay (see Measures Taken and Proposed under Vinaceous Amazon). In Misiones, Argentina, strict control in Iguazú National Park is believed to have led to some recovery of the species in the first five years of the 1980s (M. Rumboll *in litt.* 1986), and this park remains critically important to the survival of the species, although other parks, such as the Islas Malvinas Provincial Reserve and the newly created Alto Urugua-í Reserve, may also prove of great value (Canevari and Caziani 1988, Nores and Yzurieta 1988a), the former having now been integrated into the Urugua-í Provincial Park (J. C. Chebez *in litt.* 1992; see Chebez and Rolón 1989).

Captive breeding has been achieved several times in Brazil (Junqueira 1938, Sick 1969, Cominese Filho *et al.* 1986) as well as in Italy (Taibel 1968). However, there appears to have been extensive deliberate hybridization of birds with other members of the genus *Pipile* (R. Wirth *per* D. F. Jeggio *in litt.* 1986), and this cannot be regarded as a conservation measure of any merit.

**MEASURES PROPOSED** Survey of the Serra da Bocaina National Park in Rio de Janeiro and the Jacupiranga State Park in São Paulo would be valuable to confirm the species's presence. The Brazilian parks and reserves where birds are known still to occur (listed under Measures Taken) merit full maintenance. The establishment of Mbaracayú Reserve as a national park in Paraguay is clearly very important; the record of the species there consisted of a bird that had been shot (F. E. Hayes *in litt.* 1991), which indicates a problem of wardening and education that will have to be confronted at this site (and clearly many others). It has been suggested that other nature reserves like the existing Moconá Provincial Park in San Pedro and the Alto Urugua-í reserve in General Belgrano departments should be created in Misiones (Chebez 1985b), and Piñal Seco, with its important population, particularly deserves this treatment (Nores and Yzurieta 1988a). Moconá should be extended to include the Yabotí basin and to the north, and the area around Piray Miní and that of the Sierra Morena (in Iguazú department) should be established as reserves (J. C. Chebez *in litt.* 1992). Basic research into the ecology and movements of this bird is clearly important, and this might be allied with a study of *Euterpe* palms and their significance for two other threatened bird species, the Blue-bellied Parrot and the Cinnamon-vented Piha *Lipaugus lanioides* (see relevant accounts).

Captive breeding could aid further reintroduction of the species in parks and reserves, especially the Serra dos Órgãos, Itatiaia and Tijuca National Parks (Coimbra-Filho and Magnanini 1968); however, it seems that the enhancement of protection of the remaining populations and forests is more a priority (see Threats); Serra dos Órgãos and Itatiaia possibly continue to hold a population (see Distribution), and one attempted reintroduction has already failed (see Measures Taken).

**REMARKS** (1) The proposed inclusion of *Pipile* in *Aburria* (Delacour and Amadon 1973) has been rejected, but all the species of *Pipile* might be merged into one (Sick 1985). The Red-throated Piping-guan *P. cujubi* has been treated as a race of *P. jacutinga* (Pinto 1964, 1978), but this has not generally been accepted (e.g. Vaurie 1968, Delacour and Amadon 1973, Sick 1985). (2) The itinerary in von Pelzeln (1868-1871) indicates that J. Natterer was never in Itararé in March, the closest date being April. (3) There are other specimens from Rio das Cinzas, all with the name barely legible: one in MCZ dated 16 May 1903, one in AMNH dated 15 May 1903 collected by A. Hempel, and one in YPM dated 16 March 1909. However, the MCZ specimen label has "S. Sebastião, E. de S. Paulo" crossed out, yet AMNH has four other specimens collected by Hempel from São Sebastião, three of them on 18 May 1903. From this it appears that an error perhaps in dating has crept in. FMNH appears to have two skins, listed

in Hellmayr and Conover (1942) as “Rio das Linga” (dated in the database 15 March 1903) but which Paynter and Traylor (1991) indicate as a misreading of Rio das Cinzas; this also applies to “Rio das Linyas”, May 1903, on two specimen labels in MHNG. (4) The listing of Taquara (Mundo Novo) possibly simply referred to the nearby locality of Arroio Grande, as von Berlepsch and von Ihering (1885) indicated that the species had not been found at Taquara. (5) The siting of Arroio Grande in the southern littoral of Rio Grande do Sul on the map in de Oliveira (1982) is mistaken. (6) MACN data on this species were sent by S. M. Caziani (*in litt.* 1988), who gave the locality as reproduced; however, Nores and Yzurieta (1988a) referred to this site as Barra del Yacuy, while J. C. Chebez (*in litt.* 1992) has corrected this to “bajo del Yacuy”. (7) Nores and Yzurieta (1988a) pointed out that Refugio Piñalitos is on arroyo Aguaray-Guazú, but this is not the same as the Piñalitos in General Belgrano department (J. C. Chebez *in litt.* 1992). (8) Chebez (1985b) referred to three localities in Corrientes, apparently counting estancia Rincón de las Mercedes and Colonia Garabí as two.