

Now rare and local in isolated patches of primary Atlantic Forest in eastern Brazil between Alagoas and Rio de Janeiro, this parrot still suffers from habitat destruction compounded by exploitation for trade; its presence in six protected areas is only partial mitigation of these pressures.

DISTRIBUTION The Red-browed Amazon (see Remarks 1) is endemic to eastern Brazil in Alagoas and from Bahia and eastern Minas Gerais south locally to Rio de Janeiro (Sick 1985).

Alagoas The species was only found in north-east Brazil in Usina Sinimbu in São Miguel dos Campos, March 1957 (Pinto and de Camargo 1961, Camargo 1962). Although lowland forest is now destroyed (see Threats) the species could still be seen in the remaining forests of the area until the mid-1980s (A. G. M. Coelho *in litt.* 1986), as witness a specimen in MNRJ from São Miguel dos Campos (“Grota do Niquim”) shot from a flock of six in April 1984.

Bahia Records (north to south) are from Camamú, 1930s (Pinto 1935); rio Gongogi near the rio Novo confluence, December 1932 (Pinto 1935); Ilhéus in January, February and May 1945, one specimen being from ribeirão de Fortuna (in MNRJ; also Camargo 1962); rio Jequitinhonha at Belmonte (estuary) and on Ilha Cachoeirinha (Wied 1820-1821; see Bokermann 1957); rio Jucuruçu, Cachoeira Grande, April 1933 (Pinto 1935); CVRD Porto Seguro Reserve, October 1986 and January 1988 (Gonzaga *et al.* 1987, B. M. Whitney *in litt.* 1988), where in June 1990 a flock of 37 was seen (Gardner and Gardner 1990b); Monte Pascoal National Park (Ridgely 1981a, Gonzaga *et al.* 1987); rio Mucuri (Wied 1820-1821).

Minas Gerais Records are from the eastern quarter of the state at (north to south) Jequitinhonha valley (locality unspecified), recently; Machacalis, December 1954; lower Suaçuí, north of the rio Doce, September 1940; Mantena, recently; Rio Doce State Park, recently; Viçosa, recently; Ibitipoca State Park, recently (Camargo 1962, Monteiro *et al.* 1983, M. A. de Andrade *in litt.* 1986, 1988).

Espírito Santo Records are (north to south) from Córrego Grande (Fazenda Klabin) Biological Reserve, October 1986 (Gonzaga *et al.* 1987); rio Itaúnas, November 1950 (Aguirre and Aldrichi 1983); Córrego do Veado Biological Reserve, October 1986 (Gonzaga *et al.* 1987); Sooretama Biological Reserve (Ridgely 1981a, Scott and Brooke 1985, B. M. Whitney *in litt.* 1990) and adjacent CVRD Linhares Reserve, recently (Collar and Gonzaga 1985, Pacheco and da Fonseca 1987, B. M. Whitney *in litt.* 1987, D. F. Stotz *in litt.* 1988); Lagoa do Durão, Linhares, December 1945 (specimen in MNRJ); Santa Teresa at 750 m, December 1940 (specimen in MNRJ), this record probably being from the present Augusto Ruschi (Nova Lombardia) Biological Reserve, where the species was found in December 1986 (C. E. Carvalho *in litt.* 1987) and in July 1991 (Anon. 1991b); “rio Espírito Santo”, meaning present-day Vitória, 1810s (Wied 1820-1821); Marataízes, May 1966 (specimen in MNRJ).

Rio de Janeiro Older records (east to west) are: rio Paraíba; Cabo Frio; “Serra dos Órgãos” (see Remarks 2); Serra de Inoã; Sepetiba (Wied 1820-1821, 1831-1833, von Pelzeln 1868-1871). There followed such a long gap in records that Ridgely (1981a) speculated that the species no longer existed in the state, while O. M. O. Pinto (in Wied 1940) had already regarded it as long extinct there. However, modern observations are (east to west) from: Barra Seca, São João da Barra, north of Travessão, 1987 (J. F. Pacheco verbally 1990); lowlands near Desengano State Park, where pairs have been seen since December 1986 (J. F. Pacheco *in litt.* 1987); Macaé, where a flock of 49 was seen in April 1982 and pairs seen subsequently (N. C. Maciel *in litt.* 1987, J. F. Pacheco *in litt.* 1987); Fazenda União, near Casimiro de Abreu, January 1992 (R. Parrini *per* J. F. Pacheco verbally 1992); Ilha da Marambaia, October 1986 (L. A. R. Bege *per* N. C. Maciel *in litt.* 1987); Ilha Grande, outside the Biological State Reserve of Praia do Sul, 1989 (J. F. Pacheco verbally 1991, following a report by N. C. Maciel). Birds have been seen throughout the year at the Desengano site, and repeatedly at Barra Seca (J. F. Pacheco verbally 1991).

POPULATION The species was evidently always relatively abundant within its range, as testified by Wied's (1850) recollection of finding it in every forest visited during his trip, and Pinto's (1935) records (“very common”) from southern Bahia; even today in one extensive tract (the adjacent Sooretama/CVRD Linhares reserves) it remains “fairly common”, with “small numbers seen/heard on all or most days in appropriate habitat” (Ridgely 1981a, Scott and Brooke 1985, D. M. R. Fortaleza *in litt.* 1991). Nevertheless, over 20 years ago the species was noted to be scarce (Sick 1969, 1972), and 10 years ago it was considered rare and very local (Ridgely 1981a). Although in the past few years many more records and localities have been accumulated, sometimes with reports of fairly good numbers, it is clear that the fragmentation of populations is so serious that Ridgely's use of “rare” is fully justified.

ECOLOGY The species is found primarily in humid lowland forests, but also occurs in forest in the interior highlands (Sick 1985). That there may be seasonal displacements into more montane areas to about 1,000 m, as surmised by Ridgely (1981a), is at odds with Wied's (1831-1833) report that in winter (i.e. around June) birds moved in flocks to the coast and to estuarine mangroves. Burmeister (1856) referred to the species as only found in dense primary forest; and although Ridgely (1981a) found it at the edge of continuous forest he thought it maladaptive to partially deforested areas. Roosting has been recorded in a large flock in the tallest trees of the forest (Pinto 1935).

Food is fruit, seeds, berries and buds procured in the treetops (Forshaw 1989); in one case the fruit of "cajueira" were taken (Aleixo *et al.* 1991). There are no breeding data from the wild, although Silva (1989a) reported evidence that suggests hatching in October, which fits well with one report of captive breeding undertaken within the range of the species (D. M. R. Fortaleza *in litt.* 1991), and another of pairs with fledglings in January 1991 (Aleixo *et al.* 1991). Up to four eggs have been laid in captivity, with an incubation period of 24 days or a little longer; fledging occurs at around 34 days, and independence at around 100 days (Mann and Mann 1982, D. M. R. Fortaleza *in litt.* 1991).

THREATS Extensive forest clearance throughout its range and over many centuries has been the main cause of this amazon's decline (Sick 1969, Sick and Teixeira 1979, Ridgely 1981a). Monte Pascoal National Park is under severe pressure (Redford 1989), and many of the areas from which the species has been recorded in recent years in Rio de Janeiro state are being cleared, notably around Desengano State Park (J. F. Pacheco verbally 1991).

The Red-browed Amazon commands high prices in the pet trade, since it is considered one of the best "speakers" in its genus (M. Levy verbally 1985; a perception reported long ago by Wied 1831-1833), and it appears regularly in small numbers on the domestic Brazilian market, e.g. in the notorious Caxias bird market in Rio de Janeiro (C. E. Carvalho *in litt.* 1987). Even in a reserve like Sooretama, where considered secure (Ridgely 1981a), this species is not safe from bird trappers, as indicated by 36 birds held by a dealer in Espírito Santo who admitted they had all been taken in the reserve (R. Wirth *in litt.* 1984). In October 1986 birds were seen being offered for sale at the roadside outside Monte Pascoal National Park (LPG, NJC). At the international level the species has been imported into the United States despite the legal protection outlined below (Ridgely 1981a), and into Switzerland, legally, as a subspecies of Blue-cheeked Amazon *A. dufresniana* (listed on CITES Appendix II; see Remarks 1) (C. Yamashita *in litt.* 1986).

MEASURES TAKEN The species is protected under Brazilian law (Bernardes *et al.* 1990) and listed on Appendix I of CITES. Its occurrence in Monte Pascoal National Park (Bahia), the Rio Doce State Park and Ibitipoca State Park (Minas Gerais), Córrego Grande Biological Reserve, the adjacent Sooretama/CVRD Linhares reserves and Augusto Ruschi Biological Reserve (Espírito Santo) is important, but the quality of protection provided is variable, with birds being poached from Monte Pascoal (see also Redford 1989) and Sooretama (see Threats), while Córrego Grande (formerly Fazenda Klabin) is now very small (1,242 ha: Gonzaga *et al.* 1987).

MEASURES PROPOSED The Red-browed Amazon's most pressing need is for the speedy location and immediate protection of additional remnant forest areas within its range (Ridgely 1981a, Silva 1989a). More specifically, it is important that CVRD continue to recognize the biological importance of its Porto Seguro Reserve in Bahia and give it total protection, and that the authorities in Rio de Janeiro state take the necessary steps to protect the forests where the species has been recorded that lie outside existing park boundaries, i.e. at Desengano State Park and on Ilha Grande. The taking of nestlings and capture and shooting of adult birds may be reduced by an education campaign in the areas adjacent to the breeding sites (R. Wirth *in litt.* 1984). Silva's (1989a) declaration that no additional specimens should be taken from the wild is no more than a reaffirmation of the existing Brazilian law; his call for additional pairs to be formed from individuals already in confinement is clearly sensible. Captive breeding reports include Mann and Mann (1982) and Robiller and Trogisch (1984).

REMARKS (1) The Red-browed Amazon has often been treated as a subspecies of Blue-cheeked Amazon (e.g. Forshaw 1978), and both have also been included under Red-tailed Amazon *A. brasiliensis*

(see Remarks 1 under that species); however, the modern trend has been to treat all three as good species (Ridgely 1981a, Sick 1985, Forshaw 1989). (2) Wied did not visit the Serra dos Órgãos (see Bokermann 1957 for itinerary, although he does not discuss this fact) and this record probably refers to second-hand information or a misunderstanding of the name for a site (J. F. Pacheco verbally 1991).