

This highly distinctive parrot is endemic to the Amazonian basin of Brazil, occurring in northern Maranhão and Pará (with a single recent record from Rondônia) where it suffers from both the destruction of its rainforest habitat and the depredations of trappers and hunters: better protection of the Gurupi Biological Reserve, Amazonia National Park and intervening areas is needed, along with stronger enforcement of existing trade laws.

DISTRIBUTION The Golden Parakeet (see Remarks 1) occurs in northern Brazil from north-western Maranhão west through Pará as far as the Tapajós (Amazonia) National Park and along the Trans-Amazonian Highway, with recent evidence of a population in Rondônia in western Brazil (see below). The discovery of this last undermines previous attempts to judge its range (“probably does not extend south of southern Pará”: Ridgely 1981a), and the fact that the Rondônia habitat conforms with that in Pará suggests that further populations await discovery when appropriate areas are investigated. Suggestions that the species occurred perhaps as far east as Ceará (Hellmayr 1929a, Peters 1937), and the assertion that it formerly extended over the whole of north-east Brazil (Pinto 1946, 1978, Ruschi 1979) as far as Pernambuco and Bahia (Burmeister 1856), were at least in part based on its description by Marcgrave (1648), who travelled no further west than western Ceará; however, the specimen he saw was probably a bird traded east by Indians (Oren and Willis 1981, Oren and Novaes 1986a).

Maranhão The map in Oren and Novaes (1986a) indicates five localities for the species in the north-west of the state, surrounded to the north, east and south by a belt (reaching as far as 5°S 45°W) from which the species has (almost) disappeared (a record of birds from the rio Gurupi close to the coast in November 1985 suggests a remnant population: P. Roth verbally 1986). The northernmost of the five mapped localities lies within this belt, and is the state's only specimen record, hence presumably the Serra do Pirocaua (Hellmayr 1912, 1929a). The other four records lie within or close to the Gurupi Biological Reserve, and the easternmost one appears to lie within the drainage of the rio Pindaré, where Ridgely (1981a) also encountered the species.

Pará The map in Oren and Novaes (1986a) indicates twenty-five localities for the species in the northern half of the state (above 5°S), although it has disappeared from the area east of Belém and north of the rio Capim (embracing the rio Guamá drainage) across to the border with Maranhão (the rio Gurupi). Oren and Novaes (1986a) gave their sources as Sneath (1914), Hellmayr (1929a), Pinto (1938), specimens in MNRJ, MPEG and MZUSP, and recent reliable observations, the most notable of which are in Oren and Willis (1981); these appear to be almost all the sources available, and although Oren and Novaes (1986a) did not name all these localities or provide dates the comprehensiveness of their map is sufficient guide to the species's distribution; however, two localities apparently unrepresented on the map are Villarinho do Monte on the rio Xingu and Recreio (c.1°42'S 52°12'W) on the rio Matari (specimens in AMNH; coordinates from Paynter and Traylor 1991).

Rondônia The species was recently found 500 km south-west of its previously known range in the Jamari National Forest (9°07'S 62°54'W) on the right bank of the rio Madeira, where six birds were seen repeatedly in October/November 1989 (Yamashita and França in press).

POPULATION Although long considered rare (Descourtilz 1854-1856) or becoming so (Pinto 1946), it is possible that early explorers, following watercourses and penetrating little into the higher areas between them, failed to find the species's optimal habitat (see Ecology) and gained a distorted view of its abundance. Ridgely (1981a) acknowledged that it avoids várzea and is thus found away from the Amazon or its tributaries; even so, he only found a flock of six in “over a week in seemingly ideal little disturbed forest in Maranhão (drainage of the rio Pindaré)”. While observers with longer experience in the region report that where good forest remains (as in parts even of Maranhão) the species may still be seen regularly (P. Roth *in litt.* 1985, A. D. Johns *in litt.* 1986), overall numbers have declined very considerably (Ridgely 1981a, P. Roth *in litt.* 1986).

ECOLOGY The Golden Parakeet frequents tropical rainforest, almost exclusively terra firme forest and mainly in hilly upland areas, ranging primarily in the canopy (Oren and Willis 1981, Ridgely 1981a, Oren and Novaes 1986a). The extent to which the species benefits from partial forest clearance is moot: one report referred to its appearance in an area only after conversion of forest to agriculture (Hellmayr 1912; also Müller 1912); on the Xingu, the species was noted in riverine grasslands, and around Pará in clearings

in primary forest (Sneath 1913). Várzea (seasonally flooded forest) is only known to be used around Tucuruí, the birds regularly wandering from adjacent upland forest along the rio Tocantins (Oren and Novaes 1986a; also, by implication, Sneath 1913; see last paragraph in this section); Johns (1986) referred to the species being common around Tucuruí in igapó (permanently flooded forest), presumably in error for várzea. Use of tall forest takes place during the dry (non-breeding) season, May–November, but when breeding the birds seek out cleared areas (e.g. new fields with isolated living or dead trees for nesting) adjacent to forest (Oren and Novaes 1986a). Tree hollows are used for roosts in the non-breeding season both inside forest and in cleared areas, and are often changed on successive nights (Oren and Novaes 1986a).

The species feeds on fruits, berries, seeds and nuts, procured in the treetops. Although its preferred food was thought to be sapucaia *Lecythis* (Descourtilz 1854-1856) or *Euterpe* palm nuts (Sick 1985), observations reveal the following species as food: cajuí *Anacardium* cf. *spruceanum*, cashew *A. occidentale*, mango *Mangifera indica*, breu *Protium* spp. and *Tetragastris* spp., maize *Zea mays*, ananí *Symphonia* sp., lacre *Visnia gujanensis*, ingá *Inga* spp., murucí *Byrsonima crassifolia*, andiroba *Carapa guianensis*, cecropia *Cecropia* spp., and bacaba *Oenocarpus bacaba*, in all cases the birds consuming the fruits or pseudofruits except for ananí, of which the buds and flowers were eaten (Oren and Novaes 1986a). Feeding on bacaba palm, as well as on an unidentified lauraceous tree, was also noted by Oren and Willis (1981; see Remarks 2). A collected specimen contained a crushed seed (Schubart *et al.* 1965) and others (taken in várzea) berries (specimens in MNRJ, MPEG; see Remarks 3). The species utilizes some cultivated crops, and Descourtilz's (1854-1856) claim that it spends most of the day in corn plantations is at least partially borne out by recent work indicating that maize crops, which unfortunately ripen just before the young fledge, are attacked (Oren and Novaes 1986a).

The breeding season, as noted above, runs from December to April; however, a completely formed egg was found in the oviduct of a specimen collected on 13 October 1912 (Sneath 1935), and a female was caught on the nest on the rio Gurupi, 9 October 1926 (specimen in ANSP), suggesting some variation, perhaps in response to weather conditions. Breeding appears to be communal, with several females contributing to a clutch: in a captive group of three males and three females all six cared for the 14 chicks produced, and in the wild hunters reported up to nine birds (often at very different stages of development) in nests with multiple attendants, but only 2-3 in those of single pairs; nevertheless, it is just possible that only one female lays in a nest, adjusting her clutch-size to the number of assistants available (Oren and Novaes 1986a). The nest-site is a cavity in the highest part of an isolated tree 15-30 m tall, in the main trunk or a thick branch; of four nest-trees in one study, one was a living taxí *Sclerolobium* sp. (Leguminosae), while the others were unidentified because dead, and all were within a few hundred metres of intact forest (Oren and Novaes 1986a). The end of January has been indicated as the time when young are regularly taken from nests (Forshaw 1989). In captive birds, incubation lasts around 30 days and sexual maturity is reached in about three years (Oren and Novaes 1986a). Roosting is gregarious, with up to nine birds sharing a tree-hole “dormitory”, the birds moving in flocks up to 30 between roost-sites and feeding areas (Oren and Novaes 1986a).

Johns (1986) cited Sick (1985) as asserting that the species breeds exclusively in the heavily disturbed region of south-east Pará and Maranhão states, but migrates outwards during the non-breeding season as far as the rio Tapajós (none of which appears to be in Sick 1985); on the basis of this Johns (1986) considered that the forests of the Tucuruí area might form an important staging post “during the February–April migration”. Whether any predictable seasonal movements occur remains to be established, but it certainly appears that birds can wander over huge areas and are not predictably found in one area at any season (TAP).

THREATS The species's prime threat is habitat destruction, its eastern distribution having become fragmented as a result of road construction, subsequent development and settlement, with accompanying widespread forest clearance: the Belém-Brasília Highway, with its 30-40 km wide swath of clearing, now bisects the Golden Parakeet's range from north to south, while the newer Trans-Amazonian Highway cuts across it from east to west, these highways and their ancillary networks spurring the clearance of much newly accessible forest (Ridgely 1981a, P. Roth *in litt.* 1985). The Tucuruí site (see Ecology) is now partly inundated by a hydroelectric project (Oren and Willis 1981) whose notoriety was established in Caufield (1985). Tucuruí is on the Tocantins, and the entire area east of the river to the Maranhão border is undergoing major development involving lumber operations, gold-mining, cattle-ranching and the

construction and operation of a massive railroad connecting the Serra dos Carajás to the port of São Luís (Caufield 1985, Oren and Novaes 1986a).

The Golden Parakeet is one of the world's most highly desired aviary birds (Low 1972), commanding extremely high prices (U.S.\$10,000-15,000 around 1980); despite the prohibition of commercial export, therefore, very small numbers were still being smuggled out of Brazil around 1980 (Ridgely 1981a), and indeed throughout the 1980s international smuggling has continued (Silva 1989a). The internal pet trade, though also illegal, is much less controlled (Oren and Novaes 1986a) and, since an average worker from Pará can sell a Golden Parakeet for five times his monthly wage (Keller 1987), young are still taken from nests in some quantity (P. Roth *in litt.* 1985, Oren and Novaes 1986a). A century ago the species was much trapped and domesticated by Indians for its feathers (Goeldi 1894), a practice that might be deleterious now in certain areas. When not being pursued for live capture, it is hunted for food, particularly after the larger game species have been shot out of an area, and the birds are also shot both in retaliation for their attacks on maize crops and, in the Tapajós (Amazonia) National Park (at least around 1980), as sport by weekend and holiday hunters (Oren and Willis 1981, Oren and Novaes 1986a).

Natural predators are reportedly White-breasted and Channel-billed Toucans *Ramphastos tucanus* and *R. vitellinus*, which take eggs and nestlings at nests in clearings, with monkeys, tayra *Eira barbara* and snakes taking a toll in the forest (Oren and Novaes 1986a).

MEASURES TAKEN The species is protected under Brazilian law (Bernardes *et al.* 1991) and thus commercial export from Brazil is prohibited (Ridgely 1981a); the species is on Appendix I of CITES (King 1978-1979). However, highlighting the species through laws may actually have added to pressure by identifying the bird to dealers as of special value (Oren and Novaes 1986a). A population is relatively well protected in the Tapajós (Amazonia) National Park, which covers 994,000 ha (IBAMA 1989) in the region of the rio Tapajós, and is the only nature reserve in the species's range in Pará; hunting in the area, both by local subsistence farmers and weekend and holiday intruders, was expected to diminish as IBDF (now IBAMA) training of new guards improved the protection of the site (Oren and Willis 1981).

MEASURES PROPOSED The obvious first candidate for the fulfilment of Ridgely's (1981a) call for the preservation of a large forest tract for the species is the 341,000 ha Gurupi Biological Reserve, created by decree in January 1988 but which must be urgently demarcated and warded to protect this and several other important species (e.g. the near-threatened Hooded Gnatcatcher *Conopophaga roberti*) in western Maranhão (Oren 1988). The integrity of the Tapajós (Amazonia) National Park at the western end of the species's known range in Pará must equally be maintained, and intervening areas protected and managed so that populations can survive and interbreed. A certain amount of fieldwork, seeking to establish the species's western and southern limits in Pará, to clarify its habitat requirements, and to discover the size and distribution of the population in Rondônia, with the overall aim of understanding where else birds may yet be found, needs to be undertaken. Measures must also be implemented to control the exploitation of the Golden Parakeet in internal trade (Oren and Novaes 1986a). Because it is yellow and green like the national flag, the Golden Parakeet has been proposed as the national bird of Brazil (Sick 1985, 1987); it is time this measure was taken, which would perhaps result in higher vigilance for the species than at present.

REMARKS (1) The species is so distinct from *Aratinga* parakeets that it merits its own genus, *Guaruba* (Sick 1985, 1990). (2) Oren and Willis (1981) referred to a flock perched in a brazil-nut tree *Bertholletia excelsa*, which Forshaw (1989) mistook as a record of birds feeding. (3) Forshaw (1978), who apparently examined the relevant MPEG skin, reported that the berries were cultivated, but this is in error.