RED-NECKED AMAZON *Amazona arausiaca* **R**[11]

This amazon is confined to Dominica, where it occurs chiefly in the forests around Morne Diablotin but, having suffered from a combination of habitat loss at lower levels, hunting, trade and hurricanes, in recent years it has benefited from joint government and non-government efforts to protect its habitat and sensitize local citizens to its needs, and its numbers have risen from possibly as few as 150 in 1980 to possibly more than 500 in 1992.

DISTRIBUTION The Red-necked Amazon is endemic to Dominica, West Indies, where its population is centred on the slopes of Morne Diablotin in the north of the island, but with a tiny outlying population in the central east and the possibility of some birds surviving in the far south (see Figure 3 in Evans 1991). Its centre of abundance may always have been Morne Diablotin, where it was "found more commonly than in any other part of the island" by Bond (1941b), although it formerly extended beyond the range of Imperial Amazon *Amazona imperialis* (see relevant account) throughout the mountainous interior of the island (Bond 1928b), including the northern peninsula or Morne aux Diables (where in 1992 it was found once more, apparently resident), and often visited trees along the Indian River near Portsmouth in August–October (Nichols *et al.* 1976), where in fact small numbers continue to be recorded (Evans 1991) and where, in the 1920s, numbers used to be sold cheaply at Portsmouth market (Porter 1930b). From Figure 3 in Evans (1991) it appears that the species has undergone a range contraction since 1950 far more notable than that of the Imperial Amazon; despite sightings throughout the south of the island in 1981, following the devastations of two hurricanes (see Threats), birds have evidently largely disappeared from south of Morne Diablotin, at least for the present (details of its 1978, i.e. pre-hurricane, distribution are in Evans 1991). In the two years to 1990, however, some recovery and expansion of range back into lower-lying areas in the north and north-east of the island were being noted (Evans 1991), and in 1991 and 1992 the species has been seen west of Morne Trois Pitons in the south of the island, near Pont Cassé west towards Cochrane, with sporadic sightings also in the central region around Emerald Pool, above Castle Bruce and the Carib territory: all of which possibly indicates a return to areas occupied before Hurricane David (P. G. H. Evans *in litt.* 1992).

POPULATION In the nineteenth century (or at least in the late 1870s and in March–May 1890) the species was thought rarer ("not abundant") than the Imperial Amazon, although seen in rather larger flocks (Verrill 1892); in 1880 it was reported as "now scarce and... seldom seen away from the deepest woods of the widest part of the island", the offer of a "good reward for a dead specimen" producing no result (Lawrence 1880a). Whether this relative rarity was real or apparent, and whichever explanation of it was true, are matters deserving further consideration. However, at the start of the twentieth century Verrill (1905) reported that, although "in 1890 I found this parrot far rarer and more difficult to procure than the `Ciceroo' [Imperial Amazon] and confined almost entirely to the windward coast... it is now far more abundant than the [Imperial Amazon]"; Bond (1928b) judged it probably the most numerous of the four Lesser Antillean parrots, and a non-specialist observer in 1929 found it common, seeing it many times daily (17 in one day) on Morne Diablotin and several times on Morne Trois Pitons (Howes 1929); curiously, however, a third observer at around this time insisted it was "much rarer than is generally thought" and believed that, on account of its greater vulnerability to hunting in the lowlands, "twenty years or so will see the end of this very interesting species" (Porter 1930b). In 1971 D. Lack (*in litt.* 1971 to P. Barclay-Smith) reported it "in reasonably large numbers on Diablotin and reasonably safe", but elsewhere in the 1970s it was becoming rare: thus around 1950 one observer recollected "clouds" on Morne Negres Marrons although by the mid-1970s few if any remained there or indeed on Morne Trois Pitons (Nichols *et al.* 1976), and the general consensus was that it was "not seen in the same numbers or in the same places that it was ten years ago" (Swank and Julien 1975).

Fieldwork targeted at or at least encompassing the species has been more or less continuous since the mid-1970s, resulting initially in informed guesses by three observers of 400, 250-300 and 350 birds remaining in 1975 (Nichols *et al.* 1976), the last figure gaining the greatest currency through several repetitions (e.g. in Nichols 1976, 1977b; see Remarks 1). However, the reported sighting in 1977 of a single flock of around 350 on Hampstead Ridge north of Morne Diablotin suggested that the 1975 total estimate of 350 may have been too low (Snyder and Snyder 1979; *ICBP Newsletter* 2[1], 1980). The combined impacts of the two hurricanes in 1979 and 1980 (see Threats) was estimated to have halved the population to 150-225 (Anon. 1981a). Nichols (1981c) put the figure at 200; Evans (1986a) estimated

around 300 in 1985 but, owing to fuller data analysis rather than any event, back at around 200 in 1987 (Evans 1988a), although a genuine recovery now seems to be under way with an estimated 300 in May 1990 (Evans 1991; for upper Picard valley, 1978-1990, with the clear effect of the 1979 hurricane, see Figure 6 in Evans 1991). Unanalysed results from fieldwork in April 1992 suggest that the current total population is likely to exceed 500 but to be less than 1,000, probably nearer the former than the latter; it is possible that the 1990 estimate was too low, rather than that there was a very large increase in the period 1990-1992 (P. G. H. Evans *in litt*. 1992).

Nichols (1981c) lamented the fact that the private Dominican bird-keeper D. Green had 15 birds captive in mid-1980 but only five in mid-1981, a significant loss of the then total global population.

ECOLOGY The Red-necked Amazon occupies the canopy of rainforest in the mountainous interior, but concentrating at lower altitudes than the Imperial (300-800 m as opposed to 600-1,300 m) (Evans 1988a, 1991). It ranges as high as Imperial (see Figure 9 in Evans 1991) but tolerates some agricultural activity close by and will return (at least at first) to old feeding areas after their conversion to (fruit-)farms (Nichols *et al.* 1976, Anon. 1981b). Birds formerly moved to at least one lowland (coastal) area in the period August–October (see Distribution), and would then (at least sometimes) be in "open country" (Porter 1930b).

Ecological separation of Red-necked from Imperial Amazon, and a list of plants whose fruits are eaten by both, are given in Ecology under the latter; the Red-neck is known also to take (unless otherwise stated the fruits of) coco poule *Cordia elliptica* and *C. laevigata*, pistolet or pipirie *Pithecellobium jupunba*, mauricif *Byrsonima martinicensis*, the palm *Euterpe dominicana*, wild almond *Anacardium occidentale* (buds), penipice *Pouteria multiflora*, pommier *Dussia martinicensis*, caconier *Ormosia monosperma*, caconier blanc *O. krugii*, zolivier *Buchenavia capitata*, savonette *Lonchocarpus* sp. (fruits and buds), ti citron *Ilex macfadenii*, feuille cigene *Anthurium* sp. and cord sec (a vine) (Evans 1988a; also Anon. 1981b), and while bois cote *Tapura antillana* and kaklin *Clusia venosa* were two of three species listed as (usually) only taken by Imperials (Evans 1988a) both were listed for both parrots in the wake of Hurricane David (Zamore 1980) when the Red-neck was also noted to feed near ground level on young shoots (Gregoire 1981). In the nineteenth century birds were reported to descend valleys to feed on wild guavas (Lawrence 1878), and in the 1920s "their chief food during certain seasons of the year" was reported to be "the seeds of one of the huge forest palms" (Porter 1930b). Butler (1989) reported observations of Red-necked Amazons occasionally feeding in trees beneath the canopy layer and even sometimes settling on the ground. Unfortunately the species also shows a propensity for cultivated citrus, which is likely to establish it as an enemy of farmers within its range (P. G. H. Evans *in litt*. 1992).

The main breeding season for both species of Dominican amazon is February–June (particularly March–May), coinciding with the dry season and perhaps therefore related to greater food abundance during the nestling and fledgling period (Evans 1988a). The first three nests discovered during research in the mid-1970s were all in gommiers *Dacryodes excelsa*, all found in May, and all with one young (two well-feathered, the third not described), but the fourth was in an unidentified tree with two young (Nichols *et al.* 1976, Nichols 1977b); subsequently both gommier and chataignier *Sloanea berteriana*, two dominant rainforest trees, were found to be primarily used for nesting (Evans 1988a), although a bois diable *Licania ternatensis* has also been used (Zamore 1982). The reproductive rate is low, with two eggs being laid perhaps only every second year and pairs seldom raising more than one young per clutch (Gregoire 1981; also Evans 1988a); nevertheless, at one nest-site (presumably) the same pair (reputedly) reared two young in each of three successive years (Amberger 1989a). Age of first breeding and whether nest-sites are limiting remain unknown (Evans 1988a). A fledged young was still clearly smaller than its parents, October 1980 (Anon. 1981b). During November–January birds tend to be more nomadic, owing apparently to a relative scarcity of food, and will fly long distances in pairs or small flocks; about an hour after their arrival in a feeding area, birds tend to form large, loose feeding flocks, e.g. 50-70 in the Syndicate–Picard area, 50 in Woodford Hill heights, and 70-100 in the Bense–Dos d'Ane heights (Anon. 1981b; also Evans 1988a, Butler 1989, P. G. H. Evans *in litt*. 1992). The greater gregariousness of Red-necked than Imperial Amazon has long been noted (e.g. Lawrence 1878, Verrill 1892, Nichols *et al.* 1976, Evans 1988a). Comments on diurnal activity and roosting, given in Ecology under Imperial Amazon, apply almost identically for this species.

THREATS The introductory paragraph in Threats under Imperial Amazon is relevant also for this

species.

Habitat destruction Because a lower altitude species than the Imperial, the Red-necked Amazon was considered to be at much greater risk from clearance of forest (Gochfeld 1974, King 1978-1979, Gregoire 1981). This assumption has not been borne out by developments, although the incidents reported below of pairs competing unsuccessfully with Imperial pairs for nest-sites suggest that some displacements caused by deforestation have taken place. Further information about habitat loss is in Threats under Imperial Amazon.

Hunting Hunting was the most serious factor limiting the population through into the 1970s. The species was shot for food, September–February, in the 1870s (Lawrence 1878), and this was doubtless what made it so wild and difficult for Verrill (1892) to procure in 1890; it was still being hunted in the 1920s (Bond 1928b, Porter 1929), with Porter (1930b) being told of such things as (a) "twelve a day being killed by white residents who were fond of eating Parrot-pie", (b) a man shooting 30 dead in the process of winging two that could be sold as pets, and (c) a man in the interior being able to "trace the passage of a small flock... from hill to hill by the reports from the rifles of the native gunners as they followed the birds from one part to another". By the mid-1970s hunting was still the single most serious threat to the species (Nichols *et al.* 1976); indeed, because more accessible altitudinally, it was considered to be in greater danger from hunting than the Imperial Amazon (Gochfeld 1974). Even after the 1979 hurricane and in spite of Forestry Division efforts, there were believed to be "strong hunting pressures" on the species (Snyder and Snyder 1979; *ICBP Newsletter* 2[1], 1980; Zamore 1980, Gregoire 1981), and in November 1981 four Frenchmen from Guadeloupe were apprehended while hunting in the Forest Reserve (Anon. 1981b); nevertheless, throughout the rest of the 1980s there was little evidence of other than occasional shooting (P. G. H. Evans *in litt*. 1992).

Trade Owing at least in part to the inaccessibility of nests from which to take young, hunting for cage-birds involved the highly destructive practice of "wing-shooting", which resulted in the accidental deaths of many birds (as reported, e.g., by Lawrence 1878, Porter 1929). Gregoire (1981) estimated that 40 birds (of each species) were being shot every year (i.e. even in the 1970s) as a consequence of this practice; much of this was apparently from local rather than international interest (Nichols *et al.* 1976). However, the fact that illegally exported birds had been able to remain in foreign hands (Christian 1991) had been noted by other European aviculturists, and this was thought to be likely to contribute to further attempts to capture and smuggle birds abroad (Nichols 1981c); but the situation is now considered under control (see Measures Taken under Imperial Amazon).

Natural causes: hurricanes General background to the two hurricanes of 1979 and 1980 is given in Threats under Imperial Amazon. The first of these is believed to have halved the number of Red-necked Amazons (see Population); but despite the loss of fruit in the second, the observation of a fledged young in October (Anon. 1981b) indicates that its effects may have been more limited.

Natural causes: predators and competitors Possible predators include opossum *Didelphis marsupialis*, rats *Rattus*, boas *Constrictor constrictor* and Broad-winged Hawks *Buteo platypterus*, although only the first, believed introduced in the later nineteenth century, has been thought in any way serious (Nichols *et al.* 1976). Owing to their greater sympatry in lower rainforest, competition for nest-sites from Pearly-eyed Thrashers *Margarops fuscatus* was thought to be more serious for Red-necked than for Imperial Amazons, and interactions were witnessed at the first nest found; nevertheless, they were judged not to have been a major force in the decline of the Red-neck in the 25 years to 1975, being insufficiently common while potential nest-sites remained abundant (Nichols 1976, Nichols *et al.* 1976). The idea that Red-necked Amazons might be in direct competition with Imperials (see, e.g., King 1978-1979) cannot be confirmed, with no interactions when seen feeding together ("feeding and living in harmony": Porter 1929) and with evidence that both were in steep decline together (Nichols *et al.* 1976); however, nest-site competition between the species (won by Imperials) was witnessed twice in 1981 and attributed to Red-necks being forced into higher altitudes by habitat destruction below (Anon. 1981b). Escape of exotic parrot pets might pose a threat in the future, with two African Greys *Psittacus erithacus* reported flying in a flock of Red-necks in the early 1970s (Nichols *et al.* 1976).

MEASURES TAKEN These are discussed in the equivalent section under Imperial Amazon.

MEASURES PROPOSED These are discussed in the equivalent section under Imperial Amazon. It is, however, worth noting that perhaps the earliest proposal to save this species was Porter's (1930b) idea,

inspired by the colony of Greater Birds-of-paradise *Paradisaea apoda* that had been established on Little Tobago in 1909 (see ffrench 1992), of translocating a number to "some small uninhabited island" to be maintained "under strict supervision".

REMARKS Anon. (1981a) cited "Nichols and Nichols" as the source of information that there were 300-450 birds present in 1972, something which hence crops up even in Evans (1988a); but there is no evidence in any writing by any Nichols that 1972 was a year used for estimating numbers or that "300-450" were then indicated as population figures. These figures may therefore be forestry personnel assessments (P. G. H. Evans *in litt*. 1992).