

This rare cotinga is endemic to the Pacific slope of Costa Rica and western Panama, where it relies on extensive areas of mangrove and to a lesser extent (and seasonally) adjacent foothill forests. Little is known about its ecology, but the preferred habitat has been much reduced and is under increasing pressure.

DISTRIBUTION The Yellow-billed Cotinga is found mainly in coastal mangrove and foothill forest areas along the Pacific coasts of Costa Rica and western Panama. Localities in Costa Rica are traced from the map in Slud (1964), and those in Panama from OG (1969).

Costa Rica Records extend from north-west to south-east, those in the former area coming from: Pigres (Slud 1964), near the mouth of the río Tárcoles (Stiles and Skutch 1989); the mangroves adjacent to río La Pita and río Tárcoles (Taylor 1990); Carara Biological Reserve, through which the río Tárcoles flows (Taylor 1990); Pozo Azul (c.5 km inland of Pirrís; see below), where this species was noted alongside the near-threatened Turquoise Cotinga *Cotinga ridgwayi* in September 1886 (Ridgway 1887a) and subsequently collected there in February and March 1898 (four males and three females in AMNH, MCZ) and May 1902 (five males and two females in AMNH, CM, FMNH, MCZ, ROM) (see Remarks 1); Pirrís (or Parrita, at the mouth of the river), where the type (a male) was taken in May 1883 (Ridgway 1884), and where 22 males, five females and an immature were taken in September 1886 (Ridgway 1887b: see Remarks 2); Santa Rosa de Puriscal (above Parrita), where a post-breeding female (in MZUCR) was collected in May 1979; the estuary of the río Palo Seco (c.5 km east of Pirrís), a locality where Slud (1964) recorded the species in groups (see Population) and which Taylor (1990) mentioned as harbouring the species and having the best mangroves in the area. The most inland record is reported by Skutch (1970), who observed two males and a female over a period of four months in 1940 near Santa Rosa, and nearby across the valley of the río Pacuar (at 760 m, and c.20-25 km from the coast): these were the only places within the El General area (i.e. the mountain-rimmed basin at the head of the río Térraba valley) that he saw the species during 30 years in the area. Further south, all of the other records come from around Golfo Dulce, localities including: río Sierpe, where the species was found to be numerous (mostly males) in June 1987 (Ridgely and Gwynne 1989), and Sierpe estuary, possibly one of the most important areas, where males were seen displaying in May 1977, June 1977 and 1983 (F. G. Stiles *in litt.* 1989, 1991); Golfito, where up to six birds have been seen in mangroves along the road to the airport on the north side of town (Taylor 1990, B. M. Whitney *in litt.* 1991); and Coto, c.10 km up the río Coto estuary/river, a locality mentioned as one of the main nesting areas by F. G. Stiles (*in litt.* 1989). On the Península de Osa side of Golfo Dulce records come from: Rincón [de Osa], where Slud (1964) recorded groups, and where in January 1989 two males were seen in mangroves to the west and a male down a forest track east of town (C. S. Balchin *in litt.* 1989); and Puerto Jiménez, where nine males and three females (in AMNH, FMNH, YPM) were taken on 2-3 October 1926. A single male was seen in January 1986 between La Palmar and Cerro de Oro, on Península de Osa (M. Pearman *in litt.* 1990), and F. G. Stiles (*in litt.* 1991) occasionally recorded the species in Corcovado National Park over a number of years (outside the breeding season, in July, November and February).

Panama Records of this species come almost exclusively from the coastal lowlands of Chiriquí province, where localities include: the head of the río Corotú (behind Puerto Armuelles on Península de Burica), where a male and female were seen in February 1966 (Wetmore 1972), with two further sight records (exact locations unknown), the most recent of which was of a male in June 1982 (Ridgely and Gwynne 1989); Pedregal (8°22'N 82°26'W), where two males (in MCZ, USNM; the only specimens from Panama), were taken in coastal scrub during August 1901 (these were the only ones seen) (Wetmore 1972). Two other published records exist for Panama: to the north, seven *Carpodectes* sp. were seen in the río Cotón valley above Santa Clara (8°50'N 82°45'W: presumably on the border with Costa Rica) in July 1980, Ridgely and Gwynne (1989) presuming them to have been *antoniae* (see Remarks 3); and c.200 km further east one bird was apparently collected (the specimen was subsequently lost) in mangroves near Aguadulce during the 1920s, this record evidently prompting the remark that the species “possibly occurs (or occurred) further east” (Ridgely and Gwynne 1989).

POPULATION The general impression from the evidence below is that the species has suffered a

decline that is probably much steeper overall than any one record can indicate.

Costa Rica The Yellow-billed Cotinga appears to be poorly known and very local in its distribution, although in areas where it is found (i.e. extensive mangroves) it can be common (Stiles and Skutch 1989). Despite the collection of 27 birds during September 1886 at Pirrís (see Distribution) it was suggested that the species “cannot be called common”, the birds apparently being taken whilst frequenting a particular fruiting tree (Ridgely 1887b). At Pozo Azul seven birds were taken in late February and early March 1898, with a further seven collected in May 1902. Close to both Pirrís and Pozo Azul, Slud (1964) at the estuary of the río Palo Seco saw this species in “groups to the size of small flocks”, suggesting that this area, at least in the past, held a significant population of the species: also at this locality, F. G. Stiles (*in litt.* 1991) recorded 2-3 males and at least one female during January of several years between 1985 and 1989. The population (possibly breeding) around Santa Rosa is impossible to assess: just one pair held a territory there (in 1940) but no evidence of breeding was forthcoming (Skutch 1970); whether or not a breeding population exists in these foothills remains unknown, but as this is the only record of apparent attempted breeding in the foothills it seems unlikely (F. G. Stiles *in litt.* 1991). The mangroves around Golfo Dulce have been identified as a key area, with Coto and Sierpe the main nesting areas, Sierpe possibly being the most important (F. G. Stiles *in litt.* 1986). This suggestion is reinforced by Ridgely and Gwynne (1989), who reported that the bird was found to be numerous during June 1987 in mangroves and adjacent fringing lowland forest along the río Sierpe (both sexes were involved but males were more numerous). As at río Palo Seco, “groups to the size of small flocks” have been recorded at Rincón (Slud 1964), but subsequently the only record seems to be of three males seen in January 1986 (C. S. Balchin *in litt.* 1989). The bird was apparently locally common at Puerto Jiménez where 12 were taken in two days during October 1926 (see Distribution).

Panama The two male Yellow-billed Cotingas collected at Pedregal in 1901 (see Distribution) were the only ones seen there at the time, but all of the recent reliable records of this species (involving just a few individuals) come from closer to the Costa Rica border, on Península de Burica (see Distribution). This peninsula is the one place where Ridgely and Gwynne (1989) have suggested that a remnant population could exist, concluding that the bird was probably never very numerous in Panama (a point supported by the paucity of distributional data), and is now very rare and localized owing to habitat destruction within western Chiriquí (see Threats). The record of seven birds in the río Cotón valley needs to be confirmed (see Measures Proposed).

ECOLOGY The majority of records of the Yellow-billed Cotinga come from or near the coast, with just a few sightings originating in the foothills to as high as 760 m (the significance of these latter records remains essentially unknown; see below). The species is normally found within extensive mangroves where it frequents the canopy and often perches in the taller trees (Ridgely and Gwynne 1989, Stiles and Skutch 1989). When not in mangroves, the bird is most often found within habitat adjacent or close to this vegetation type, and has been recorded (almost invariably) in the taller trees of adjacent fringing lowland humid forest, individuals having been seen at woodland borders and in tall treetops within woodland clearings (Slud 1964, Ridgely and Gwynne 1989, Stiles and Skutch 1989), e.g. the male seen near Cerro de Oro in January 1986 was found atop a huge tree by a river, but amongst scrubby secondary growth (M. Pearman *in litt.* 1990), while the two males collected at Pedregal were found within “coastal scrub” (Wetmore 1972; see Distribution). Especially outside the breeding season, birds are apparently often nomadic, wandering well into the foothills in small groups (F. G. Stiles *in litt.* 1991). The most notable inland record comes from near Santa Rosa, Costa Rica, where birds (possibly attempting to breed; see below) spent much time on prominent trees at the forest edge or within clearings (a similar preference to that shown on the coast), although sometimes flying across large clearings or out of sight over the forest canopy (Skutch 1970; see below). Stiles and Skutch (1989), based presumably on this record, suggested that this species “evidently wanders widely to 760 m in foothills”, Snow (1982) judging it to be “evidently rare so high up”. The record from near Santa Clara, Panama, needs confirmation but, if correct, reinforces the evidence that the bird prefers rivers when away from mangroves (e.g. at Pozo Azul, near Santa Clara, Coto, near Cerro de Oro, and río Corotú: see Distribution), seemingly using them as corridors to penetrate inland.

In mangroves, at least, this species is relatively sociable, birds often recorded in loose groups (Stiles and Skutch 1989), found to be numerous along the río Sierpe (Ridgely and Gwynne 1989), and occurring in small flocks at río Palo Seco and Rincón (Slud 1964: see Population). They seemingly congregate at particular fruiting trees, Ridgway (1887b) reporting that 27 specimens were collected presumably from the same tree during a period of a few days. The fruits of Lauraceae, mistletoes and Melastomataceae have all been reported as food items taken by this species (Stiles and Skutch 1989).

Breeding data are basically lacking: the male begins to moult from January to April (Snow 1982), with immatures collected on 19 May 1902 at Pozo Azul (specimen in ROM) and in mid-September 1886 at Pirrís (Ridgway 1887b): a post-breeding female (in MZUCR) was collected in May 1979 (see Distribution), and males have been seen displaying during May and June (F. G. Stiles *in litt.* 1991). In 1940, Skutch (1970) observed a male near Santa Rosa (at c.760 m) over a period of four months, and during March and April the bird was observed displaying (this became less frequent as May advanced), and it held a territory against another male that arrived on 3 April; despite the arrival of a female on 27 April, both birds being seen repeatedly, no evidence of breeding was forthcoming. This represents the only evidence that breeding may have occurred inland in the foothills, or indeed of any seasonal migration to such areas (as mentioned by Snow 1982, Ridgely and Gwynne 1989: see above), although the male and female at the head of the río Corotú in February 1966 (Wetmore 1972) and the seven *Carpodectes* above Santa Clara in July 1980 (Ridgely and Gwynne 1989) may also refer to breeding or post-breeding birds. Nevertheless, F. G. Stiles (*in litt.* 1989) suggested that the mangroves around Golfo Dulce, including Sierpe and Coto, are the main nesting areas.

THREATS Accepting that mangroves are essential for the Yellow-billed Cotinga, the bird's habitat is under increasing pressure all along the Pacific coast: in addition to being destroyed to make room for salinas and shrimp ponds, mangroves are cut in order to fuel stoves that evaporate water from the salinas and in order to make mangrove charcoal (Stiles and Skutch 1989). Illegal cutting of mangroves continues in Costa Rica, where road and dyke construction have both affected the hydrology in certain mangrove areas (Scott and Carbonell 1986). In Panama, the mangrove areas in David district are unprotected and threatened by clearance for rice cultivation and ranching, as well as by pollution from pesticide run-off and the oil pipe-line that has been built through the area (Scott and Carbonell 1986). Although the species can tolerate local clearance of woodland (having often been noted in forest clearings: see Ecology), the large-scale destruction of forest in Costa Rica is presumably having a detrimental effect upon the bird (50% of all forest has been destroyed since 1940, and even by 1940 the río Pacuar valley near Santa Rosa had been cleared: Skutch 1970, Stiles and Skutch 1989). In Panama, virtually total deforestation across all of the bird's potential range in Chiriquí suggests that the continued survival of even a remnant population would be unlikely (Ridgely and Gwynne 1989). A small population may still exist on the Panama side of Península de Burica, although the forest there continues to be gradually felled so that most of what remains is on the Costa Rica side of the border (Ridgely and Gwynne 1989).

MEASURES TAKEN This species is not adequately protected within the existing (and reasonably extensive) Costa Rica protected areas system (F. G. Stiles *in litt.* 1986). No extensive mangrove swamps are receiving protection, leaving the Mangrove Hummingbird *Amazilia boucardi* (see relevant account) and sympatric Yellow-billed Cotinga unprotected (Stiles and Skutch 1989). There is a general law in Costa Rica which prohibits the cutting of mangroves (Scott and Carbonell 1986), although this is seemingly widely flaunted and generally ignored (see above: F. G. Stiles *in litt.* 1991). The only reserves where the cotinga occurs are the Carara Biological Reserve (Taylor 1990), although its status and the extent of suitable habitat there are unknown (the reserve seemingly comprises 7,600 ha, primarily tall humid forest: Taylor 1990), and Corcovado National Park, which the species probably uses only seasonally owing to the lack of extensive mangrove habitat (F. G. Stiles *in litt.* 1992). The bird has also been recorded at the Golfito Wildlife Refuge (see Distribution) although the mangroves there are in a poor state (Stiles and Skutch 1989).

In Panama, the Bahía de Muertos Refugio de Vida Silvestre (Morales and Cifuentes 1989) may well have suitable habitat within it but the species has not been recorded from Pedregal or nearby since 1901 (see Population) and its status there as well as the park's are unknown. The Reserva Florestal Chorogo (on Península de Burica: Morales and Cifuentes 1989) may also harbour a population (see Population). No other protected areas appear to cover the few sites where this species has been recorded.

MEASURES PROPOSED Even on the assumption (and more data are clearly needed: see below) that the extensive mangroves around the Golfo Dulce are a key area for this species (F. G. Stiles *in litt.* 1989), it is essential that a protected area is set up in which a viable population can survive. The areas around the río Sierpe, Rincón, and río Coto appear to have retained large enough expanses of mangrove to warrant their protection, which should be carried out as soon as possible. In the north, extension of the Carara Biological Reserve to incorporate some coastal mangrove may facilitate the protection of this species without the creation of another new park, although in order to save the mangroves around río Palo Seco such a park is clearly desirable.

The situation in Panama is somewhat different owing to the lack of recent information about this species, but the Península de Burica (on both sides of the border, but especially in Costa Rica) would appear to be the least deforested area which may yet hold a population, and the protection of what remains should receive the highest priority (Ridgely and Gwynne 1989). Wetmore (1972) recommended that this species should be looked for in mangroves from Pedregal eastward.

An ecological study is urgently needed to show exactly which habitats are used, where the species breeds and whether local migrations are an important part of the life-cycle for a majority of the population. Such a study may show that the bird relies on foothill forest for part of the year, and that protection of such habitat within the bird's range is no less important than measures for the mangrove areas. Obviously, any conservation measures focusing on the mangrove areas of the Pacific coast should be taken in conjunction with those for the Mangrove Hummingbird (see relevant account), and consideration should also then be given to the simultaneous conservation of the near-threatened Turquoise Cotinga and Black-cheeked Ant-tanager *Habia atrimaxillaris*.

REMARKS (1) A male specimen (in ROM) taken at Pozo Azul was apparently collected in "1847" (35 years prior to the collection of the type). This almost certainly represents either a labelling or an interpretation error. (2) Both Pirrís and Pozo Azul were names used by the same collector in the same month and year, suggesting that the differentiation between the two localities (c.5 km apart) was intended. (3) The record of seven *Carpodectes* sp. at Santa Clara (presumed *antoniae*) is a mystery: the justification for their identification as Yellow-billed Cotingas is unknown, although the similar Snowy Cotinga *C. nitidus* occurs primarily on the Caribbean slope in western Bocas del Toro (Ridgely and Gwynne 1989). However, the Snowy Cotinga is poorly known in Panama, occurs throughout adjacent Costa Rica where it wanders widely (Stiles and Skutch 1989), and the río Cotón valley is only just on the Pacific side of the continental divide.