

## Grey-breasted Conure *Pyrrhura griseipectus*, an overlooked endangered species

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*Pyrrhura griseipectus*, também conhecida como *P. leucotis griseipectus* and *P. anaca*, é considerada ameaçada no Brasil, embora a confusa situação taxonômica do grupo a tenha tornado invisível para a comunidade conservacionista internacional. A espécie é endêmica das florestas úmidas de alguns poucos brejos de altitude no Ceará e Pernambuco, existindo possíveis registros visuais em duas áreas de Alagoas. Sua ecologia é muito pouco conhecida, mas sabe-se que pode utilizar cafezais sombreados e florestas secundárias. Embora sua situação na natureza seja grave, a espécie se reproduz bem em cativeiro e há uma significativa população cativa.

The systematics of the *Pyrrhura leucotis*–*picta* complex is one of the major taxonomic conundrums within Neotropical Psittacines. Recent work<sup>7,8,13</sup> has suggested that many taxa formerly considered subspecies are best treated as species, thus reverting to former arrangements, and dramatically increasing the number of recognised species. Of seven taxa formerly lumped within *Pyrrhura leucotis*, five are now accorded specific status. Two of these (*P. caeruleiceps* and *P. emma*) are restricted to rain and cloud forests in northern Venezuela<sup>1,7,11,15</sup>, whilst three others are endemic to Brazil, isolated from the others by thousands of km that are occupied by the several taxa of the related *Pyrrhura picta* species-group<sup>7,8,13</sup>.

The three endemic Brazilian taxa are: White-eared Conure *Pyrrhura leucotis*, a bird of lowland and foothill forests (below 500 m) east of the Brazilian coastal range from southern Bahia (c.14°S), to Sepetiba, just south of the city of Rio de Janeiro; Pfrimer's Conure *P. pfrimeri*, an endemic of dry, deciduous forests on a narrow band of limestone-derived soils west of the Serra Geral massif in Goiás and southern Tocantins, and Grey-breasted Conure *P. griseipectus*<sup>13</sup>. All three possess distinctive morphology, habitats and ecology, wholly allopatric ranges and complete lack of intermediates or contact zones, and can be considered species under any concept available<sup>7,13</sup>.

The coloration of *Pyrrhura griseipectus*, especially the breast, resembles two widely disjunct taxa, *P. caeruleiceps* of Venezuela and *P. eisenmanni* from Panama, the latter formerly included in *P. picta*<sup>7</sup>. Nevertheless, *P. griseipectus* differs from *caeruleiceps* and *eisenmanni* in its all-brown pileum (fore- and hindcrown blue in *caeruleiceps*, forecrown dull red in *eisenmanni*), maroon cheeks (dull red in *caeruleiceps* and *eisenmanni*) and red shoulders (green in *eisenmanni*)<sup>8</sup>.

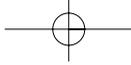
Grey-breasted Conure was described as *Pyrrhura griseipectus* by Salvadori in 1900 based on a cagebird of unknown origin. Seven specimens collected in the Serra do Baturité, Ceará, permitted

Hellmayr<sup>6</sup> to pinpoint the taxon to north-east Brazil. Following then-current trends, Hellmayr<sup>6</sup> considered *griseipectus* a subspecies of *leucotis*. Subsequently, it was suggested that *P. anaca* (Gmelin, 1788) has priority over *griseipectus*<sup>23</sup>. This arrangement has not been widely accepted, although *P. anaca* is included in the Brazilian threatened species list (as Critically Endangered)<sup>12</sup> and national bird species list<sup>4</sup>. The illustration representing the type of *anaca* differs from Grey-breasted Conure in its breast pattern and apparently represents a different species within the *leucotis* group (L. Joseph *in litt.* 2004), an issue that is currently being studied by L. F. Silveira and J. F. Pacheco (*in litt.* 2004). Thus, in this paper, we choose the widely used *griseipectus* in order to avoid further confusing an already complex issue.

The status and natural history of *Pyrrhura griseipectus* are poorly known, despite the species belonging to a charismatic group of birds well known to aviculturists both in Brazil and abroad. Here we bring together available information on its taxonomic status, habitat and conservation.

### Taxonomic considerations

*Pyrrhura griseipectus*, *P. pfrimeri* and *P. leucotis* have completely allopatric distributions, being effectively isolated from each other by thousands of km. *P. pfrimeri* is both the most disjunct and occupies the most distinctive habitat compared to all other taxa in the group, being the only species restricted to dry forests and to occur outside the Atlantic Forest. *P. pfrimeri* and *P. leucotis* are similar in size, with no significant differences in wing length, culmen length and mandible depth, but differ in coloration, the most striking character in *pfrimeri* being the complete absence of the white to pale buff auricular patch of *leucotis* and *griseipectus*, and the contrasting dark red face and pale blue forehead, crown, occiput and nape, this colour spreading to the neck- and throat-sides, and grading to green on the breast. In contrast, *leucotis* has blue only on the forehead (sometimes also just



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Figure 1. Grey-breasted Conure *Pyrrhura griseipectus*, Guarimiranga, Serra do Baturité, Brazil (Ciro Albano)

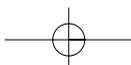




Figure 2. Ventral (top left) and lateral (above right) views of *Pyrrhura leucotis* (left and bottom), *P. griseipectus* (middle) and *P. pfrimeri* (right and top) showing differences in colour pattern. Note the large whitish ear-patch of *anaca* and its mostly grey breast compared to the other birds. Specimens from the Museu de Zoologia da Universidade de São Paulo. *Pyrrhura leucotis*: Itaúnias, Espírito Santo (MZUSP 34495), *P. griseipectus*: Serra do Baturité (MZUSP 41515), *P. pfrimeri*: Nova Roma, Goiás (MZUSP 15769) (Luis Fabio Silveira)

Figure 3. Close-up of a captive *Pyrrhura griseipectus*, showing the diagnostic cap, ear-patch and breast colour pattern. The eye-ring, usually whitish, becomes darker when the bird is excited (Ciro Albano).



Figure 4. Satellite images of northern Ceará showing the forested massifs (green) within the otherwise dry landscape. Shown are four of the known localities for *P. griseipectus* (left), and Quixadá municipality. On the right a closer view of the Serra do Aratanha, with a view of the small Serra Negra (inset) at the same scale for a size comparison.

above the eyes), the crown and nape being buff or grey. *P. pfrimeri* is thus one of the most distinctive taxa in the *picta-leucotis* species group<sup>7</sup> (see Fig. 2).

Although both Atlantic Forest taxa might appear to be closely related, based on their geographical proximity<sup>6,19</sup>, *P. griseipectus* seems to be more divergent from *P. leucotis* than *P. pfrimeri*. Both are distinguished by differences in the periorbital ring (dark blue in *leucotis* and *pfrimeri*, whitish to slaty in *griseipectus*), auricular patch (cream to yellowish in *leucotis*, often with a buff tinge; pure white or cream in *griseipectus*, and notably larger in the latter), head colour (front, nape and neck-sides suffused blue in *leucotis*; no blue in *griseipectus*) and breast feathers (green with a blue suffusion, more intense near the neck, and with a broad pale grey or buff subterminal band and narrow blackish terminal one in *leucotis*; dusky grey with a broad cream to pale buff terminal band in *griseipectus*)<sup>13</sup> (see Figs. 1–2). *P. griseipectus* is the same size as *leucotis* in wing length, but an important difference is the significantly longer bill of *griseipectus* and its deeper mandible<sup>6,13</sup>. *P. griseipectus* is proportionally larger headed than other Brazilian taxa, which should be visible in skull comparisons and make skeletal remains diagnosable<sup>11</sup>, but there is no difference in bill width between *griseipectus* and *leucotis*<sup>13</sup>. As in *P. pfrimeri*, the even more marked morphological differences, the geographical isolation and very different habitat are sufficient to accord species status to *P. griseipectus*, as proposed by several authors<sup>7,13,21</sup>. The degree of morphological differentiation of the three is at least comparable to that between accepted species taxa such as *P. frontalis*, *P. devillei* and *P. molinae*. It should be pointed out that some recent illustrations of the Brazilian taxa bear little resemblance to the birds in life<sup>9</sup>, another factor that has delayed their acceptance as species.

### Distribution and habitat

*Pyrrhura griseipectus* has been documented from just three areas: the Serra do Baturité, the eastern slope of the Serra de Ibiapaba, both in Ceará, and the tiny Serra Negra (38°00'S 08°40'S), in Pernambuco<sup>26</sup>. Specimens of *griseipectus* are from the Serra Negra<sup>26</sup>, Ipú in the Ibiapaba range (04°20'S 40°42'W), Quixadá (04°58'S 39°01'W), just south of the Baturité range, and Guaramiranga (04°15'S, 38°56'W), atop Baturité<sup>7,16</sup>. The Quixadá specimens at the American Museum of Natural History (New York)<sup>7</sup> may appear anomalous, as the area lies wholly within the xeric caatinga. Nevertheless, the Baturité range is just to the north, and three small ranges reaching 500–1,000 m (the serras do Machado [04°30'S 39°35'W], Céu [04°30'S 39°45'W] and Estevão [04°54'S 39°08'W],

the last about 45 km from Baturité) dot the area. Now largely denuded, these ranges formerly supported lushier vegetation, as documented by earlier visitors<sup>22</sup>, and are the probable source of the specimens (the old monastery at Serra do Estevão was an obligatory stop for travellers heading to Quixadá<sup>22</sup>), as the birds would have been capable of overflying the 15-km dry stretch between the serras do Machado and do Céu, where Quixadá lies.

Additionally, the often overlooked work of Antonio Bezerra Meneses<sup>10</sup> describes a *P. griseipectus* he was given at Tianguá (03°40'S 40°57'W), c.70 km north of Ipú and also in the eastern Serra de Ibiapaba, although the specimen has subsequently been lost. Also, based on sight records, the species has been reported from Murici<sup>25</sup>, a montane forest tract in Alagoas (c.09°15'S 35°50'W), but not from nearby lowland forest<sup>17</sup>. It is interesting that the coordinates provided by Teixeira *et al.*<sup>25</sup> for Murici (09°47'S 36°50'W) actually lie near Palmeira dos Índios, close to the well-known Pedra Talhada Biological Reserve.

Several small massifs in northern Ceará may hold (or held until recently) populations of *P. griseipectus*. Local people in the Serra de Aratanha (03°58'S 38°39'W) have reported to WS the presence of a 'wholly dirty' or 'painted' parakeet, whilst similar descriptions were made by inhabitants of the Serra do Machado. Interviews made by CA in the Serra de Maranguape (formerly Serra do Castelo; 03°52'S 38°43'W) resulted in detailed descriptions agreeing with *P. griseipectus*. The birds were described by elders, who informed CA that the most recent sightings were 15–20 years ago. Of course such reports are unproven.

The confirmed localities are montane (above 500 m) humid forest enclaves in the otherwise semi-arid north-east Brazil. These wet areas are known in the Brazilian literature as 'brejos' or 'brejos de altitude'. Brejos receive orographic rains because of their altitude and situation relative to the prevailing moisture-laden winds, and are clad in humid forests within areas facing the winds. These grade into semi-deciduous forest and eventually into dry, xeric caatingas in lower areas. The Serra de Ibiapaba is a sandstone plateau averaging 750 m, where rainfall is 1,400–2,000 mm/p.a., depending on the locality. Serra do Baturité, peaking at 1,114 m, is a granite massif where annual rainfall is c.1,500–1,700 mm, approximately three times that at lower altitudes. The humid forests atop the Baturité massif form a continuous canopy c.20 m tall, with some emergents. Common tree species in less disturbed areas are *Myrcia multiflora*, *Byrsonima sericea*, *Clusia nemorosa*, *Casearia guianensis* and *Stryphnodendron purpureum*<sup>3</sup>.

The brejos of Ceará harbour several invertebrate, reptile and bird taxa with both Atlantic and Amazonian affinities<sup>2</sup>, including many endemics, and can be considered part of the Amazonian–Atlantic forest crossroads in north-east Brazil and a remnant of a larger forested area in former periods. *P. griseipectus*, being close to *P. picta* of northern Brazil and Guianas, is one testament to such exchange.

The Serra Negra is a relict sedimentary plateau 800 m wide and 3 km long and 800–1,036 m high. The top of the plateau is covered in dense forest with emergents reaching 35 m. Conspicuous tree species are the large *Manilkara salzmanii* (Sapotaceae), *Trichilia emarginata* (Meliaceae), *Albizia polycephala* (Mimosaceae), *Gallsia integrifolia* (Phytolaccaceae), *Myrcia falax*, *M. multiflora* (Myrtaceae) and *Terminalia brasiliensis* (Combretaceae). Myrtaceae bearing fruit eaten by birds are common. There is low similarity between forest atop the plateau and semi-deciduous forests of lower areas<sup>20</sup>.

### Threats

There is no estimate of the original forest coverage in the mountains that *P. griseipectus* inhabits. Data on current forest cover are also scarce, with estimates of just 13% of original forest cover remaining in the Baturité massif in the early 1990s<sup>5</sup>.

All forested massifs in Ceará have seen their forests cut for shade-coffee plantations and this is the most traditional activity in areas like Baturité, where the coffee is shaded mainly by fast-growing *Inga* trees. Sugarcane was formerly an important culture, but has declined, as has cultivation of fruit trees. In 1972–74, the Brazilian Coffee Institute attempted to eradicate shade coffee plantations and turn them into sun coffee. The coffee varieties imported to the region failed to adapt and the programme was abandoned causing an economic crisis, but not before increased deforestation had swept the area<sup>5</sup>.

*P. griseipectus* has long been kept by aviculturists, as evidenced by the type being a cagebird. Crates of wild-caught birds from Baturité were commonly seen for sale at Parangaba fair in Fortaleza until ten years ago (L. W. Lima-Verde pers. comm.) and, although the species is now very rare, there is still trade in wild birds. The ubiquity of caged conures among amateur bird fanciers throughout north-east Brazil (and more serious breeders worldwide) is one of the main causes of the species' decline.

A number of protected areas have been decreed within the range of *P. griseipectus*, mostly in the Baturité massif. The state-run Serra de Baturité Environmental Protection Area (APA) was created

in 1990 covering 32,690 ha in seven municipalities. This area category is similar to IUCN category V and, in practice, has been of little use for conservation as it imposes few restrictions on land use and even urban areas are included in APAs.

Guaramiranga Ecological Park was decreed by the Ceará state government in 1979, covering 3,320 ha in Guaramiranga and Pacoti. In the small satellite mountains north of Baturité, another APA was decreed in 1998 by the state government, at Serra da Aratanha (6,448 ha), whilst Aratanha municipality decreed all areas above 100 m be included within an APA.

In the Ibiapaba massif, there is a 1,592-ha APA decreed by the federal government, and the state-run 3,485 ha APA Bica do Ipu. Additionally, Ubajara National Park (now covering some 5,000 ha) was decreed in 1959 and has been implemented. It protects some humid forest, but there is no available information on the presence of *P. griseipectus* in the park. Indeed, current evidence suggests that *P. griseipectus* may be extinct in the Ibiapaba massif. If so, Ubajara is a natural candidate area for a reintroduction project.

The very disjunct population of *P. griseipectus* in Pernambuco occurs in the Serra Negra Biological Reserve (1,100 ha), a federal protected area for over 50 years. Nevertheless there is an ever-possible threat of Serra Negra losing its protected status as the Kambiwá and Pipipã people, currently inhabiting a 27,500-ha Indian land adjacent to the reserve, consider it part of their territory with religious significance, and have demanded its inclusion within their indigenous land on several occasions. Currently, the Kambiwá have access to the reserve for specific purposes, but it is uncertain if this arrangement will persist. Also, the region is renowned for chronic violence, the result of a combination of local culture and marijuana plantations, so there is limited control over the reserve and field work there is deemed very unsafe. There are no recent records of the species in this area, although it was reportedly common in the early 1980s (A. G. Coelho pers. comm.).

As witnessed, most known sites for *P. griseipectus* are within APAs, thus conservation of habitats relies more on the will of landowners than on legal enforcement. Fortunately, the Baturité massif is strategic in the water supply of the state capital, Fortaleza, and the need to conserve water sources and that shade coffee outperforms sun coffee means there is real incentive for retaining some forest cover<sup>5</sup>.

### Status and ecology

Based on current records, there are two confirmed areas where *P. griseipectus* still occurs (the Baturité massif and Serra Negra Biological Reserve) and at

least another three where it probably does so but for which proof is lacking (serras de Aratanha, Maranguape and Machado). There are no data on the species' current status in the Ibiapaba massif, including Ubajara National Park.

The species has not been found at Murici (Alagoas) despite monthly field work by WS throughout 2002 and 2003. J. F. Pacheco (*in litt.* 2004) reported watching a group of six *Pyrrhura* in flight there on 4 January 1991 that could have been *griseipectus*, although plumage details were not observed. This is the last such record from Murici and it is possible such birds were the result of releases of confiscated birds by environmental agencies, a common practice that has resulted both in puzzling records and range extensions throughout the country. The possibility that the species occurs at Pedra Talhada Biological Reserve also requires investigation, and a fairly large range near the Serra Negra, which appears in satellite images to be forest-covered (the Serra do Arapuá), should also be explored for *P. griseipectus* and other brejo species.

Present evidence suggests *P. griseipectus* has a relict distribution, being a genuine endemic of the brejos, the forested 'sky islands' amid the xeric caatinga of north-east Brazil and (should the Murici records ever prove to relate to indigenous birds) high-altitude forest enclaves. The disjunct population at the small Serra Negra suggests the former range was more extensive, but is now much reduced by loss of forest cover both through human agency and climate change.

The sole available information on the ecology of *P. griseipectus* comes from Baturité<sup>24</sup>. The nesting season is February–May. One nest was found in April, 8 m high in a 30-cm diameter hollowed *Inga bahiensis*. The nest cavity was 31 cm deep and 12 cm wide, with a 6-cm round entrance. Clutch size is 2–4 and one egg measured 25.1 × 19.9 mm and weighed 5.4 g. Young are drabber coloured, and attain plumage similar to adults after their second year.

The conures use the higher strata of humid and semi-deciduous forests, and shade coffee plantations, but there is no information on relative use of different habitats. Reported foods are the fruit of the legume *Inga bahiensis* (a tender-seeded species with sweet pulp), seeds of the euphorb *Croton* sp., and fruits of cultivated *Byrsonima* sp., *Syzigium jambolanum* and *Eryobotria japonica*.

That *P. griseipectus* has been long considered a mere subspecies and new taxonomic treatments have been slow to gain acceptance have made its plight invisible to conservationists, and certainly prevented its study becoming a matter of import. From the limited information available, wild populations are in a dire situation and it may prove

to be among the most threatened Neotropical parrots. We still know very little concerning its precise range, populations and specific threats, and such baseline data are urgently required to plan for the species' conservation.

More positively, *P. griseipectus* breeds well in captivity and is held in some numbers both in Brazil and abroad. Thus, it is one of the few species of parrots where captive-breeding may play a significant role in restoring wild populations. Nevertheless, captive populations need to be managed in a coordinated way in order to maintain their genetic diversity and assure their long-term viability. It is hoped this paper, by revealing the conservation plight of the species, will prompt action by private aviculturists and zoological park associations.

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