

A new locality and records of Cherry-throated Tanager *Nemosia rourei* in Espírito Santo, south-east Brazil, with fresh natural history data for the species

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Cotinga 24 (2005): 60–70

São relatadas aqui novas observações sobre a Saíra-apunhalada *Nemosia rourei*, espécie endêmica do Brasil e globalmente ameaçada de extinção, cuja ocorrência atual conhecida era somente de uma localidade no Espírito Santo descoberta em 1998. Foi descoberta uma segunda área com ocorrência regular para a espécie chamada Caetés. Dois registros adicionais para a Reserva Biológica Augusto Ruschi foram feitos. São comentados detalhes destes locais e providas novas perspectivas sobre a conservação da espécie, população e informações da história natural, bem como detalhes sobre procura pela espécie, em outras localidades no Espírito Santo e também nos estados de Minas Gerais e Rio de Janeiro.

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The avifauna of the Atlantic Forest, although relatively well known, continues to produce significant surprises, despite widespread habitat destruction throughout the biome. In the state of Espírito Santo we have studied various important remnant forests, most of them conserved through private initiatives by their owners, and in many cases not previously subject to ornithological investigation. In one of these we recently located a population of Cherry-throated Tanager *Nemosia rourei*, only the second currently known for the species.

Cherry-throated Tanager is endemic to a tiny area of south-east Brazil and is considered Critically Endangered globally^{6,7}. The species was described in 1870, on the basis of a specimen reputedly collected at Muriaé, in Minas Gerais, and held in the Museum für Naturkunde, Zentralinstitut der Humboldt-Universität zu Berlin, although Pacheco¹⁶ suggested that the type locality might actually be Macaé de Cima, in Rio de Janeiro. However, all subsequent records are from Espírito Santo (Fig. 1). In August 1941, Sick²³ observed a group of eight birds in the municipality of Itarana, at Jatiboca (900 m) and, in October 1995, Scott²⁰ observed one, apparently of this species, within a mixed-species flock at Augusto Ruschi Biological Reserve, above Santa Teresa (700–900 m). In February 1998, six Brazilian researchers (among them ACV and PRP) discovered Cherry-throated Tanager at Fazenda Pindobas IV, in the municipality of Conceição do Castelo^{1–3,15}, where subsequently it has been observed frequently down to the present.

Prior to the species' rediscovery in the late 1990s, those authors^{5,9,10,13,18,22,24–26,31} reviewing the status and distribution of Cherry-throated Tanager have possessed very few data on which to base their

remarks. Sick & Teixeira²⁵ noted that the single known locality, in Itarana (previously Itaguaçu) municipality, had been largely deforested and given the lack of subsequent records some authors^{9,10,18,21} voiced the opinion that the species might prove to

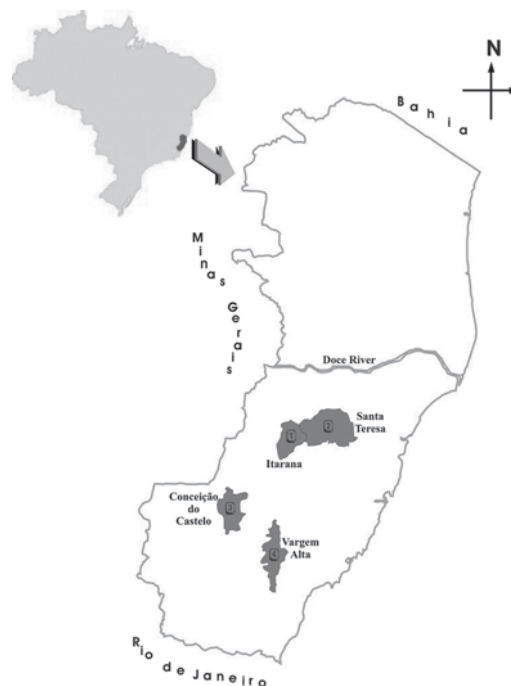


Figure 1. Map showing the municipalities in the state of Espírito Santo with previous records of Cherry-throated Tanager *Nemosia rourei* (1–3) and the new locality (4). 1 = Itarana; 2 = Santa Teresa; 3 = Conceição do Castelo; and 4 = Vargem Alta.

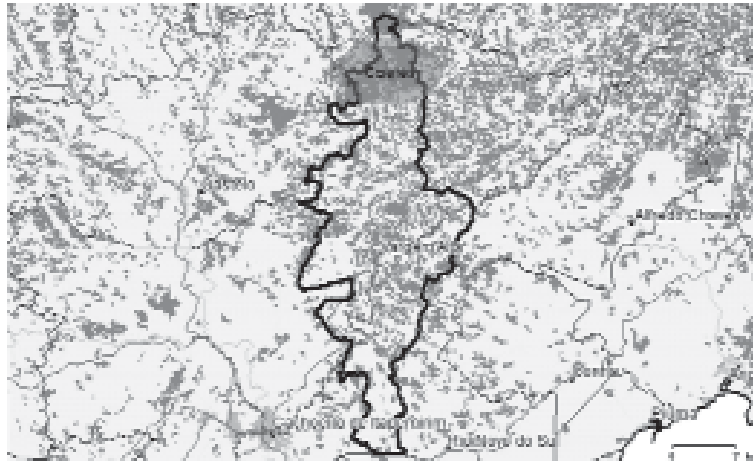


Figure 2. Forest cover in the municipality of Vargem Alta: the forested area in the north corresponds, in large part, to that known as Caetés (Fundação SOS Mata Atlântica/INPE [after the *Atlas dos remanescentes florestais da Mata Atlântica período 1995–2000*]).

be extinct. Nonetheless, surveys undertaken by Originalis Natura (now Faunativa) in 1998–2000 demonstrated that Itarana and Santa Maria de Jetibá municipalities still held many remnant forests, albeit highly fragmented, wherein they found more than 250 bird species (and 19 of mammals)^{17,27–29}, of which 70 are endemic to the Atlantic Forest, leading to the region being listed by BirdLife International as an Important Bird Area⁴.

Since the rediscovery in 1998, our work has centred on obtaining more complete data for *N. rourei*, particularly endeavouring to locate new sites for the species and devise actions for its conservation. We have been assisted by various colleagues, principally at Pindobas IV. Various information concerning morphology, feeding, life history, vocalisations and breeding have been published^{3,30}. Our studies have focused on the montane region of Espírito Santo between Muniz Freire, in the west, and Santa Teresa, in the east, but other field work, executed by Faunativa, has investigated fragmented forests in the montane centre of Rio de Janeiro state and eastern Minas Gerais. The present contribution aims to collate all unpublished information concerning the species gathered since 1998, to announce the discovery of a new locality for the species and to discuss the present state of our knowledge of *N. rourei*.

New records

New site: Caetés

The forest of Caetés lies within Vargem Alta municipality (Figs.1-4), in southern Espírito Santo (20°30'S 41°00'W), at 1,100–1,250 m, and is c.30 km south-east of Pindobas IV. The property where *N. rourei* has been found covers 240.5 ha, of which

most is forested. However, this area forms only a part of a much larger forested block, belonging to several owners (of which the two largest are Aoki Empreendimentos Comércio e Participações Ltda and Brasif S.A.), totalling over 3,000 ha. The region receives heavy rainfall and mild temperatures for practically the entire year. Most of Caetés comprises Atlantic Dense Ombrophylous Forest, with tall trees, heavily covered in epiphytes, abundant palms (including *Euterpe edulis*) and other species characteristic of such forest in montane regions¹⁴. A narrow, unpolluted stream flows through the property, of which small parts are cultivated, principally avocado, corn and beans.

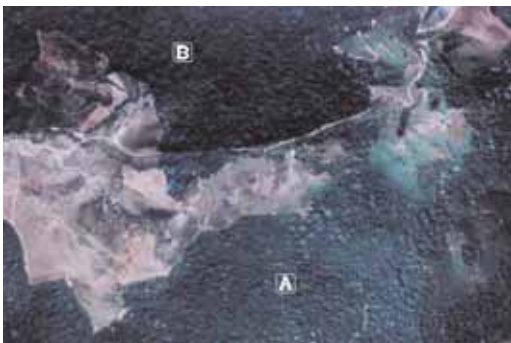
In addition to *N. rourei*, we have recorded more than 200 bird species in Caetés, among them many Atlantic Forest endemics and globally threatened species (threat status in parentheses: Vulnerable = VU, Near Threatened = NT)⁷: White-necked Hawk *Leucopternis lacernulatus* (VU), Reddish-bellied Parakeet *Pyrrhura frontalis*, Golden-tailed Parrotlet *Touit surdus* (VU), Tawny-browed Owl *Pulsatrix koeniswaldiana*, Long-trained Nightjar *Macropsalis forcipata*, Scale-throated Hermit *Phaethornis eurynome*, Dusky-throated Hermit *P. squalidus*, Violet-capped Woodnymph *Thalurania glaucopis*, Surucua Trogon *Trogon surrucura*, Saffron Toucanet *Bailloni bailloni* (NT), Red-breasted Toucan *Ramphastos dicolorus*, Yellow-browed Woodpecker *Piculus aurulentus*, Yellow-eared Woodpecker *Veniliornis maculifrons*, Mouse-coloured Tapaculo *Scytalopus speluncae*, Spotted Bamboowren *Psilorhamphus guttatus* (NT), Tufted Antshrike *Mackenziaena severa*, Spot-breasted Antwren *Dysithamnus stictothorax* (NT), Star-throated Antwren *Myrmotherula gularis*, Ferruginous Antbird *Drymophila ferruginea*,



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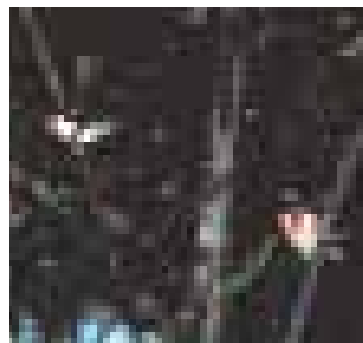
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Ochre-rumped Antbird *D. ochropyga* (NT), Streak-capped Antwren *Terenura maculata*, White-bibbed Antbird *Myrmeciza loricata*, Such's Antthrush *Chamaeza meruloides*, Rufous Gnateater *Conopophaga lineata*, Pallid Spinetail *Cranioleuca pallida*, White-collared Foliage-gleaner *Anabazenops fuscus*, White-browed Foliage-gleaner *Anabacerthia amaurotis* (NT), Pale-browed Treehunter *Cichlocaptus leucophrus*, Oustalet's Tyrannulet *Phylloscartes oustaleti* (NT), Pin-tailed Manakin *Ilicura militaris*, Hooded Berryeater *Carpornis cucullata* (NT), Chestnut-vented Piha *Lipaugus lanioides*, Bare-throated Bellbird *Procnias nudicollis* (VU), Elegant Mourner *Laniisoma elegans* (NT) and Brown Tanager *Orchesticus abeillei* (NT). Most of these have been documented with sound-recordings or photographs. We have also recorded the following primates: Buffy-headed Marmoset *Callithrix flaviceps*, Masked Titi *Callicebus personatus*, Black Tufted Capuchin *Cebus nigritus* and Northern Muriqui *Brachyteles hypoxanthus* (Critically Endangered).

On 12 September 2003, at 11h20, while leading a group of birdwatchers, one of us (PRP) heard the distinctive vocalisations of several *N. rourei*, and immediately used playback in order to bring the birds into view. Initially, two birds were visible, but subsequently PRP, ACV and the entire group observed eight birds, perched together on two branches in the crown of the same tree (the largest single group of birds recorded since Sick's observation in 1941^{23,24}).

Thereafter, until July 2004, groups of *N. rourei* have been observed a further five times at the same site, usually along the same 200 m of trail. On 5 October 2003, all three of us, together with a group of birdwatchers, observed five individuals at

10h50, apparently unassociated with a mixed-species flock or at least somewhat separated from one. At 06h30 on 10 October 2003, PRP, ACV and another group of birdwatchers again observed five birds, this time closely following behind a mixed flock led by *Syristes sibilator*. On the morning of 2 November 2003, PRP alone observed a group of at least three birds. On 20 March 2004, in the same place the first two authors briefly heard and saw (without playback) a single Cherry-throated Tanager. Finally, on 26 July 2004 PRP and ACV heard various individuals slightly distant from the usual area during the course of the morning.

These records confirm our previously held suspicion that the species occurred at Caetés, although we had been unable to document previous sightings (at the boundary of Fazenda Forno Grande da Brasif S.A. and in the same area as the new occurrences). Such confirmation, only gained since 1998, further demonstrates the apparently genuine rarity of the species, which appears to require comparatively large feeding territories and is difficult to locate unless its vocalisations are known and playback is used.

Other possible sites

Another four possible encounters with *N. rourei* in private land north of Caetés and Pindobas IV are being further investigated. These comprise a brief vocalisation (an even smaller part of which was recorded), two very brief sightings, both involving single birds (for which we prefer to await more complete observations) and a possibly heard vocalisation. However, the habitat in one of the areas (at Santa Maria de Jetibá) for which a sight record was available, has subsequently been substantially modified by the landowner (see below).

Recent records in Augusto Ruschi

The Augusto Ruschi Biological Reserve (previously Nova Lombardia Biological Reserve) is a well-known area amongst ornithologists and birdwatchers, and was the site of Scott's²⁰ 1995 observation which, it is worth re-emphasising, we consider could only plausibly refer to *N. rourei*. Despite Scott's prompt publication of this record, but perhaps due to his understandable caution over reporting such a momentous observation, few field workers that have visited the area since appear to have either actively searched for the species (its vocalisation is presented on at least two commercially available recordings) or to have held any expectation of finding it there again. Clearly, the single observation, despite many years of ornithological work in the reserve, offers a degree of further evidence of *Nemosia's* natural rarity (see Bauer *et al.*³ and below), although it might equally be noted that, whilst Augusto Ruschi is comparatively well worked for a Brazilian location,

Captions to plates on opposite page

Figure 3. The interior of Caetés forest (Faunativa)

Figure 4. General view of Caetés forest (Faunativa)

Figure 5. Aerial view of the Pingadeira complex (fragments A and B), Pindobas IV (Faunativa)

Figure 6. View of Atlantic Dense Ombrophylous Montane Forest in the Pingadeira complex (Faunativa).

Figure 7. A *Nemosia rourei* with the red of the lower throat in the form of a comma (Faunativa)

Figures 8 and 10. Different patterns of red on the throat shown by *Nemosia rourei* (Faunativa)

Figure 9. A *Nemosia rourei* with the 'typical' pattern in which the red forms a small point on the lower throat (Faunativa)

compared to birdwatching activity in many areas of Western Europe, such field work is, practically, miniscule.

GMK has been visiting the reserve at least annually since 1998 and, equipped with recordings of the species' vocalisations, using playback to search for *N. rourei*. On 10 October 2002, while working a huge mixed-species flock along one of the principal dirt roads through the reserve GMK heard the immediately recognisable sharp calls of probably two *Nemosia* and, alerting the other four observers present, immediately commenced playback. Unfortunately, it proved impossible to locate either of the birds within the enormous flock of perhaps 100+ individuals of tanagers, woodcreepers, tyrant-flycatchers and furnariids, and the *N. rourei* rather swiftly ceased to call. During further field work in the same area, on 20 January 2003, GMK again heard the diagnostic and easily identified vocalisations of *Nemosia*, and this time observed briefly but conclusively at least one, and probably two, individuals in tall canopy trees within a mixed-species flock. These new observations demonstrate the, at least intermittent, presence of a, perhaps tiny, population within the Augusto Ruschi area and demonstrate the importance of observers visiting the site being alert for the species and learning its vocalisations.

Knowledge of the species

Other recent sightings

Since the species' rediscovery, on 22 February 1998, and late-July 2004, we have collectively made observations of *N. rourei* on 52 days (the vast majority at Pindobas IV) and totalling 64 contacts, with records in all months and at various times of day from 06h30 to c.17h20. At Caetés the six records (on different days) are insufficient for pertinent analysis, but all were made during morning hours.

On 21 February 1997 (one day prior to the species' rediscovery at Pindobas IV) PRP observed, at the border of a forest fragment, a bird with a similar appearance to *Cissopis leverianus* but with red, rather than black, on the throat. This was probably the first modern encounter with *N. rourei* and occurred some distance from the so-called 'Pingadeira complex', from where all subsequent sightings at Pindobas IV have come. The locality has not been subject to detailed investigation since. Additionally, during the same period, the species was probably heard in another forest fragment just east of the 'Pingadeira complex' (J. F. Pacheco pers. comm.).

Table 1. List of species recorded in mixed flocks with Cherry-throated Tanager *Nemosia rourei*.

Scientific name	English name
PICIFORMES	
Picidae	
<i>Piculus aurulentus</i>	Yellow-browed Woodpecker
<i>Veniliornis maculifrons</i>	Yellow-eared Woodpecker
PASSERIFORMES	
Thamnophilidae	
<i>Dysithamnus stictothorax</i>	Spot-breasted Antvireo
Furnariidae	
<i>Philydor lichtensteini</i>	Ochre-breasted Foliage-gleaner
<i>Philydor rufum</i>	Buff-fronted Foliage-gleaner
<i>Xenops rutilans</i>	Streaked Xenops
Dendrocolaptidae	
<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper
<i>Xiphocolaptes albicollis</i>	White-throated Woodcreeper
<i>Dendrocolaptes platyrostris</i>	Planalto Woodcreeper
<i>Lepidocolaptes squamatus</i>	Scaled Woodcreeper
<i>Campylorhamphus falcularius</i>	Black-billed Scythebill
Tyrannidae	
<i>Phyllomyias burmeisteri</i>	Rough-legged Tyrannulet
<i>Phyllomyias virescens</i>	Greenish Tyrannulet
<i>Phylloscartes ventralis</i>	Mottle-cheeked Tyrannulet
<i>Sirystes sibilator</i>	Sirystes
<i>Myiarchus swainsonii</i>	Swainson's Flycatcher
<i>Pachyrhamphus castaneus</i>	Chestnut-crowned Becard
<i>Tityra cayana</i>	Black-tailed Tityra
Cotingidae	
<i>Carpornis cucullata</i>	Hooded Berryeater
<i>Piprites chloris</i>	Wing-barred Piprites
<i>Oxyruncus cristatus</i>	Sharpbill
Vireonidae	
<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike
Emberizidae	
<i>Dendroica cf. striata</i>	Blackpoll Warbler
<i>Orchesticus abeillei</i>	Brown Tanager
<i>Hemithraupis ruficapilla</i>	Rufous-headed Tanager
<i>Thraupis ornata</i>	Golden-chevroned Tanager
<i>Euphonia pectoralis</i>	Chestnut-bellied Euphonia
<i>Chlorophonia cyanea</i>	Blue-naped Chlorophonia
<i>Tangara cyanocephala</i>	Red-necked Tanager
<i>Tangara desmaresti</i>	Brassy-breasted Tanager
<i>Tangara cyanoventris</i>	Gilt-edged Tanager
<i>Dacnis cayana</i>	Blue Dacnis

Longevity

With the aim of studying the species' behaviour and territory use, as well as gathering biometric and other data, it was decided to band at least one of the *N. rourei* at Pindobas IV, given the birds responsiveness to playback (sometimes descending very low in the trees). In July 1998, together with L. A. P. Gonzaga and G. Castiglioni, PRP and ACV made an

unsuccessful attempt to mist-net the species. Thereafter, on 4 September 1998, GC, M. P. Rehen and ACV returned to the site and were successful in capturing one bird in the 'Pingadeira complex' (hereafter referred to as fragment B). Although two birds approached closely in response to playback, only was captured in the mist-net, c.2 m above the ground, the other bird narrowly evading being caught but vocalising intensely for several minutes in the close vicinity before departing. A metal band, no. 511 (H. Sick collection), was placed on the left tarsus, with two plastic bands, one black and one pale blue, being fitted on the right tarsus. Biometric data for this individual were already presented by Bauer *et al.*³. In the hand it was also possible to verify certain details of the species' plumage, but we did not find any ectoparasites or note any evidence of moult. The absence of a brood-patch suggests that the bird was not breeding (the only nesting datum is the observation of nest building in November³⁰). A final effort, again unsuccessful, was made to capture and band *N. rourei* in October 2000, by Faunativa, C. Bauer, J. F. Pacheco and B. M. Whitney.

Since capture, the banded bird has been observed on several occasions, always within mixed-species flocks and with other *N. rourei* (in groups of 2–6 birds), in October 1998, February 1999, April 2000, May 2000, June 2000, October 2002, November 2002 and October 2004. Thus, this individual, which was perhaps already adult in September 1998, survived at least six years one month.

Intra-specific interactions

Within a group, on many occasions we have observed that, prior to the entire party commencing vocalising, one bird maintains a more elevated perch and vocalises more than the other individuals. Such behaviour was frequently observed in the banded bird (suggesting that it was a flock leader), but other individuals have also been noted assuming this role. In addition, presumed adults have been observed directly feeding birds of similar plumage, assumed to be juvenile, as such behaviour did not take the manner of courtship feeding. Interactions during nest building were described by Venturini *et al.*³⁰. In October 2000, GMK *et al.* observed an apparent pair of *N. rourei* engaged in a type of display, during which one bird (assumed to be male) faced the other, on a high branch, while holding the wings half-open, perpendicular to the body, and slightly fluttering them, simultaneously slightly raising the head and calling rather quietly (calls as described in Bauer *et al.*³). GMK has witnessed similar, apparent courtship behaviour in Hooded Tanager *N. pileata*, the species' only conspecific.

Inter-specific interactions

During our observations, *N. rourei* has been observed within mixed-species flocks on 23 occasions (35% of all contacts). It is possible that on other occasions birds were associated with a nearby mixed flock, but this was not obviously apparent. Venturini *et al.*³⁰ noted that the nest-building birds, in November 1998, were not directly associated with a mixed flock. Sick²³ noted that the eight birds he observed, in August 1941, were unassociated with other birds (this observation was made prior to the species' voice being known) and, given that they were flocking together, not breeding.

Mixed flocks in which we recorded *Nemosia rourei* were usually led by *Sirystes sibilator*. Other species that were always present (or, at least, most easily detected) within these groups were Chestnut-crowned Becard *Pachyramphus castaneus* and Rufous-headed Tanager *Hemithraupis ruficapilla*. Larger flocks always contained other tanagers, as well as woodpeckers, woodcreepers, furnariids, tyrant-flycatchers and cotingids. A list of all those species recorded in mixed flocks with *N. rourei* is presented in Table 1.

Two agonistic interactions were noted, one with a Golden-chevrons Tanager *Thraupis ornata*, which pursued a *N. rourei* that had a large Lepidoptera in its bill (see Feeding). On another occasion, a Black-necked Aracari *Pteroglossus aracari* that was constantly vocalising close to three *N. rourei* appeared to attack one of the *N. rourei*, which only just avoided the toucan, before both birds disappeared from view and ACV and PRP were unable to observe any further interactions between them.

Ectoparasites

In October 2002, one individual that remained perched on the same high branch for several minutes was observed through binoculars to remove an ectoparasite, apparently a female Ixodidae, from the left side of the throat. The bird appeared calm and was not heard to vocalise.

Feeding

Besides those prey items, namely caterpillars, an ant and small arthropods, already noted³, we have seen a bird with a large butterfly (Lepidoptera) in its mandible. It is impossible to know if the *N. rourei* consumed this prey, as the individual was immediately pursued from view by a *Thraupis ornata*; when we relocated the bird the butterfly was gone. On another occasion, several birds were observed foraging within the flowers of a *Eucalyptus* sp., but it was impossible to be sure whether they were searching for nectar or associated insects.

Population

For now, only two groups of *N. rourei* are definitely known, a population of at least six individuals at Pindobas IV and the other of at least eight at Caetés, although there are also now further observations from Augusto Ruschi, suggesting the presence of a low-density population in that reserve.

At Pindobas IV we initially observed up to five individuals in one fragment (hereafter A) and five in another (B), but, in May 2000 up to six were present in the latter area, including the banded individual, with five still present in A, where we have never observed the banded *N. rourei*. Both fragments are within the 'Pingadeira complex', which occupies two hills whose slopes practically meet in a narrow valley with less dense vegetation (Figs. 5–6). Given that Faunativa has, on more than one occasion, observed groups apparently moving between the two fragments, it is possible that the estimate of ten birds³ in Pingadeira is incorrect, and that just six are present. As mentioned above, at Caetés we have observed up to eight individuals simultaneously. Thus, the presently known population consists of a minimum of 14 individuals.

All observations have involved 1–8 individuals, with most contacts being of 2–3 birds (17 observations) or four birds (11 observations), but on at least some occasions perhaps not all of those present were counted. At Caetés, since the initial observation of eight birds, we have observed groups of three and five individuals, and it appears possible that these birds were of the same group, which had (temporarily) disbanded.

Despite the larger area of possible occurrence, elsewhere in Espírito Santo, as well as in Rio de Janeiro and Minas Gerais, it may be premature to suggest that the species numbers as many as 50–249 individuals (albeit 'in decline')⁶. Nonetheless, we continue to search for new populations and localities for the species in the region.

Territoriality

There are still no precise data concerning territory size of *N. rourei* due to several factors: our relative inability to find the species in certain seasons using playback, despite it being easily encountered in the same areas at other times; and its apparent propensity for relatively long flights and ability to utilise plantations of coffee, *Pinus* and *Eucalyptus* spp. between forest patches, although the species' demonstrably high responsiveness to playback makes us believe that the same group is using an extensive area, perhaps the entire 'Pingadeira complex', an area of probably more than 400 ha. Nonetheless, it is now apparent that, in Pindobas IV, the species has become somewhat less

responsive to playback, a factor that to some extent mitigates further study.

At Pindobas IV we have noted at different seasons and in the two fragments comprising the 'Pingadeira complex' that groups follow a regular 'circuit' during the course of the day, thus we observed in fragment A along certain sections of trail birds always arriving from the same direction at the same time of day, and, on several occasions, in fragment B we have observed the group moving through the same valley within the forest or, in other periods, regularly traversing the same forest border with a coffee plantation. It has been impossible to determine what factors are influencing such behaviour, but we do know that external factors can, apparently, modify it (see Threats).

Plumage variation

The existence of individuals, possibly young birds, with throat colour different to the usual bright red, has already been reported³; these had a brownish or yellowish-brown cast to the throat patch. One lone bird (apparently a *N. rourei*), which was very briefly observed on 10 November 2001 (during the supposed breeding period), had an entirely dark crown and vent with the red patch much smaller, and on the breast (not reaching the throat), forming a concave line immediately below the black. Further, unlike previously described plumages, but also undocumented photographically, we have observed variation in the crown colour (between white and grey) and the red of the throat patch (in its size and shape), which appears to vary individually and, in many cases, according to light conditions, rather than genuine morphological variation (Figs. 7–10). One individual appeared to have the red patch a sharp-pointed comma shape, whilst another was observed with a trace of red extending beyond the throat.

Habitat

Until now, *N. rourei* has only been recorded at 850–1,250 m in Atlantic Dense Ombrophylous Montane Forest (following MME¹⁴), and there is no evidence, as yet, to indicate that the species occurs in Open Ombrophylous Forest (as at Pindobas IV), which exists in the region. Occurrence in coffee plantations and those of *Eucalyptus* sp. and *Pinus* spp. are sporadic and relate to movements between forest fragments through these corridors of otherwise unsuitable habitat.

Surveys outside Espírito Santo

Through a grant awarded by NBC/Field Guides, during the year 2000 Originalis Natura (now Faunativa) undertook three short surveys of areas in Minas Gerais and Rio de Janeiro for *N. rourei*.

On 22–24 February we visited the area around Muriaé in Minas Gerais. We were unable to locate suitable habitat for the species, based on our current knowledge of its requirements, on the north bank of the rio Paraíba do Sul, which area appears generally too low for *N. rourei*, despite the, until recently, widely held opinion that this area represents the type locality^{3,16} (see introduction). We were assisted by various local residents, who indicated the highest points within the district of Pirapanema (610 m), and visited a number of properties, but found only second growth, unworthy of further attention. Subsequently we moved to the district of Belisário where the Pico do Itajuru, at c.1,600 m, marks the highest point in the municipality of Muriaé^{8,11}. Here, the area that held most interest was Fazenda Iracambi (Rosário de Limeira municipality). Access is reasonable, but in order to reach the best forest at higher altitudes (1,130 m) it is necessary to traverse a stream, which proved impossible during our visit due to high water levels caused by heavy rainfall. During our short visit we employed playback unsuccessfully for *N. rourei*.

Thereafter, on 13–17 September, Faunativa visited Rio de Janeiro/Minas Gerais, working the so-called 'Centro-Serrana' of Rio de Janeiro, starting at Macaé de Cima (22°25'S 42°31'W, 1,065 m), in Nova Friburgo municipality. This area apparently holds high potential for the species, given the habitat, altitude and extensive area of largely continuous forest, now partially incorporated within the Parque Estadual dos Três Picos (46,350 ha), created in 2002 and situated within the municipalities of Teresópolis, Nova Friburgo, Guapimirim, Silva Jardim and Cachoeiras de Macacu¹⁹. Again, we used playback at various localities, but without success. This same region was identified by Pacheco¹⁶ as possibly being the true type locality of *N. rourei*. We continued towards Petrópolis and Teresópolis, within the same part of Rio de Janeiro state. We conducted field work in higher parts of the Parque Nacional da Serra dos Órgãos, another region which appears highly suitable for *N. rourei*, although it has been relatively well worked previously by ornithologists and birdwatchers, and the large area of suitable habitat, much of it relatively inaccessible, makes location of a low-density species, such as *N. rourei*, extremely difficult, as has proved the case with *Calyptura cristata*. Thereafter we proceeded towards Pirapetinga, in Minas Gerais, from where there is a possible sighting of the species, by E. P. Brettas in 1994³, having previously confirmed the coordinates of the locality concerned with the observer. We found altitude at the site to be 230 m, rather than the c.150 m previously cited³, in either case somewhat lower than elevations from which the species is currently known. Since Brettas' report, no further sightings have been made,

despite visits to the area in August 1994, June 1995 and July 1996³, and our search, on 17 September 2000, was also unsuccessful, when the site was apparently being explored for its granitic deposits.

The other trip was made to easternmost Minas Gerais, close to the border with Espírito Santo, in the region of Lajinha (at c.470 m), but we were unable to locate any suitable habitat, as forest destruction in this region has been almost complete.

Other surveyed areas in Espírito Santo

The entire region around Pindobas IV and Caetés, including the municipalities of Conceição do Castelo, Muniz Freire, Brejetuba, Venda Nova do Imigrante and Vargem Alta, has been investigated for new populations of *N. rourei*. Further north, our field work has centred (principally in 1998–2000) on the environs of Itarana, based on Sick²³. Through the assistance of various members of the local population, we have accessed many interesting forest fragments in this region, including that worked by Sick in 1941–42. We have also made widespread searches through Santa Maria de Jetibá, again finding diverse potential forest fragments. In both these municipalities we have gained interesting data on birds and mammals, among them the discovery that Northern Muriqui was quite well known to some local people¹⁷. Elsewhere, we have worked in the municipality Santa Teresa, in the Reserva Biológica Augusto Ruschi (see above), but also in other important forest fragments. More recently (since early 2004) we have searched for potential localities between the two largest blocks of forest (Pindobas IV/Caetés and Santa Teresa/Santa Maria de Jetibá), in the municipalities of Domingos Martins and Marechal Floriano, at altitudes above 700 m. In all of these areas there are forests that demand further and more intensive field work: at Itarana, Barra Encoberta/Alto Jatibocas, Alto Santa Maria and Alto Santa Joana; around Santa Maria de Jetibá, the localities of Plantojo, Simão, Sabino, Cristal, Garrafão and remnant forests near the rio Bonito dam; around Domingos Martins, Chapéu and Paraju; at Marechal Floriano the region around the rio Fundo; whilst around Brejetuba/Muniz Freire there is a considerable area meritorious of future investigation. With the exception of Itarana and Santa Maria de Jetibá, where our work has been most intensive and has produced three records requiring verification, the areas above have only been identified as potential localities to search for *N. rourei*, but it has not been possible to properly survey them.

Threats and future perspectives

Given available information, we believe that *N. rourei* is a naturally rare species, which occurs at

low densities and, in the present day, is restricted to montane Espírito Santo.

The major threat to *N. rourei* is destruction and exploitation of the little that remains of its habitat: removal of granite, limestone and marble, illegal palm extraction, small-scale logging for firewood, and expansion of existing coffee plantations. Timber extraction is still a significant problem, including that for the production of charcoal. In 2000 a landowner neighbouring Pindobas IV (abutting the 'Pingadeira complex') felled an area in order to expand his coffee plantations (prior to our holding discussions with him), and in late 2002 a company commenced exploration of a private area of pasture and coffee just below fragment A in Pindobas IV (where nest building was noted in November 1998) for marble and granite, with explosives being used to partially extract these rocks. IBAMA (the federal environment agency) and the environmental police took action, and the research was apparently suspended for an unknown period. In April 2004, the same landowner mentioned above 'threatened' to suspend access to his property in 'reprisal' for the order concerning granite extraction. The impacts of such work would be significant, both directly (in terms of habitat destruction) and indirectly, as we noted an apparent reduction in activity by many bird species in the area, including *N. rourei*, during the period when detonations were made.

In general, we should note that most of the properties visited in Itarana and Santa Maria de Jetibá are held by a rather closed community of small, rather poor landowners, cultivating vegetables and without plans to substantially increase or otherwise develop their holdings, e.g. by deforesting large areas to plant coffee. Nonetheless, it is probable that sporadic and low-intensity timber extraction for firewood continues in some parts of these regions. Recently, however, ACV and PRP returned to the area within Santa Maria de Jetibá municipality wherein they had made a possible sighting of *N. rourei* to discover that one landowner had felled most of the forest (17 ha) on his property in early 2004; his action had been clandestine (although known to certain other residents) as it would have been subject to various fines. Caetés and Pindobas IV are both large fazendas (of more than 800 ha) of which the major parts are still forested and possess corridors of silviculture connecting forest blocks, but most neighbouring landowners are smallholders (of 10–50 ha), exploiting their properties diversely, and are generally rather poor.

We have observed human use of the species' habitat to have an obvious effect on its behaviour, and the birds once appeared to disappear from fragment A at Pindobas IV during the 'Enduro da

Polenta', an annual event, in October, marking the 'Festa da Polenta' in the municipality adjoining Venda Nova do Imigrante. Without the knowledge or consent of the landowners, the organisers decreed that the event should traverse Pindobas IV, via the same trail from which *N. rourei* is most frequently observed. Related to this, on the same day more than 90 vehicles passed through the area between 09h00 and 15h00. Evidence of the event (remains of maps, deep tyre tracks in certain sections, and the borders of the property damaged by the heavy traffic) was very obvious. We have observed the pressures and results (namely the invasion of private land, without official consent and with no respect for the ability of an area to withstand such usage) of similar events elsewhere in Espírito Santo, e.g. at Reserva Biológica de Duas Bocas, Cariacica.

More positively, it is apparent that plantations of *Eucalyptus* sp. and *Pinus* spp. separating different forest blocks (as at Pindobas IV) function well as corridors permitting forest species (including *N. rourei*) to move between areas.

Action is urgently required to secure the species' future, which for now is principally and rather perilously bound with the conservation of just two privately owned areas in southern Espírito Santo. Creating a Reserva Particular do Patrimônio Natural (RPPN) in Pindobas IV, a conservation category of some security but which does not affect its ownership, will be a major step forward. It is also necessary to continue the searches for the species in new areas initiated in 1998. As noted above, several potential areas have been identified, principally in Espírito Santo, but also in Minas Gerais and Rio de Janeiro, and these require more thorough investigation than has yet been possible. For such work financial resources are needed. The recently agreed partnership between the BirdLife International–Brasil Program and Faunativa is studying the viability of developing conservation action for *N. rourei* in both currently known major sites, and in this are being presently supported from the Critical Ecosystem Partnership Fund (CEPF), but additional resources will be required in the future.

Acknowledgements

Principal thanks must go to the owners of Caetés for their foresight in protecting the area, particularly Bruno V. Leal and Lucio S. de Andrade who permitted access to their property, and Dinho, as well as Camilo Cola and D. Ignez Massad Cola and their staff for conserving Pindobas IV and assisting our field work. Pastor Ido Port helped ACV and PRP at Itarana, and many other local residents both there and in Santa Maria de Jetibá showed much interest in our work. ACV and PRP are further grateful to those at Muriaé who offered assistance: Paulo R. B. da Silva, Abílio G.

de Almeida, D. Nina and Fazenda Iracambi. The IBAMA director and staff of the Augusto Ruschi Biological Reserve, Santa Teresa, are thanked for affording relevant permissions for field work therein. Claudia Bauer was instrumental by inviting ACV and PRP to join her and Fernando Pacheco's study of forest remnants in southern Espírito Santo, during which *N. rourei* was rediscovered. Luiz Gonzaga provided the inspiration, and directed attempts, to capture *N. rourei*, in which Gloria Castiglioni also participated. Dr Alexandre P. Aguiar helped identify the ectoparasite. NBC and Field Guides financially supported ACV and PRP's field work, in which M. P. Rehen, L. P. do Carmo, Manoel A. A. Netto also participated. Bret Whitney also joined the field work and provided a videotape of the species. Toucan Tours, Birding Brazil, VENT, Field Guides, Ornifolks, BirdQuest, Boute Expeditions, Focus on Nature Tours and all of the birdwatchers who joined their various tours greatly aided our work, providing encouragement and participating in the exciting discovery of the new locality. BirdLife International-Brasil Program has been involved in plans to conserve the species (made possible by a donation from CEPF). Fábio Olmos, Jaqueline Goerck and Fernando Pacheco made valuable suggestions concerning the manuscript.

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