



Notes on the Seven-coloured Tanager *Tangara fastuosa* in north-east Brazil

Luís Fábio Silveira, Fábio Olmos, Sônia Aline Roda and Adrian J. Long

Cotinga 20 (2003): 82–88

São apresentadas novas localidades de ocorrência e extensões de distribuição geográfica para o pintor-verdadeiro *Tangara fastuosa*, uma espécie endêmica e ameaçada de extinção, que ocorre apenas em ambientes florestais dos estados do Rio Grande do Norte até Alagoas, no nordeste brasileiro. São reportados também novos dados sobre preferências de habitat, comportamento, ecologia e conservação desta espécie. A distribuição geográfica deste táxon é revisada e atualizada neste trabalho, bem como o *status* das populações nos diversos estados nordestinos onde ele ocorre. Aparentemente, há uma relação entre a abundância de Melastomataceae e a presença desta espécie em muitas das áreas pesquisadas, o que pode explicar a ausência do pintor-verdadeiro na porção sul de Alagoas. *T. fastuosa* foi freqüentemente observada em bandos mistos, em grupos ou em pares. Registros de nidificação foram realizados em janeiro, e as aves estavam construindo ninhos em bromélias. Atualmente, a principal ameaça à algumas populações do pintor-verdadeiro reside na captura de exemplares para serem mantidos em cativeiro, um hábito ainda muito disseminado nas áreas visitadas. Através do uso de 'chamas', alguns caçadores podem apanhar um número significativo de aves. A manutenção de alguns remanescentes florestais em grotões existentes nas usinas de cana-de-açúcar pode ter um impacto positivo na conservação desta espécie.



Sponsored by NBC

Seven-coloured Tanager *Tangara fastuosa* is a globally threatened Atlantic Forest endemic restricted to north-east Brazil, where it is known from Alagoas, Pernambuco and Paraíba^{3,6,7}. As part of projects investigating the distribution and current status of Atlantic Forest birds in this region of Brazil, we undertook forest bird surveys in protected areas and sugar plantations (*usinas*) where many of the remnant forests of north-east Brazil are located. We report here on our observations concerning the distribution, ecology and conservation of *T. fastuosa*, and relate our findings to published information for the species.

Methods

SAR undertook general ornithological surveys in Atlantic Forest remnants in Alagoas and Pernambuco from June 1999 to January 2001 as part of a study of the distribution and biogeography of Atlantic Forest birds in north-east Brazil¹². LFS, FO and AJL visited such remnant forests in Alagoas, Pernambuco, Paraíba and Rio Grande do Norte between 6 October and 20 November 2001. FO made additional brief surveys along the BR101 highway in May 2000.

During our surveys we recorded bird species, number of individuals and, for species of conservation concern, habitat type, group size, feeding habits and general behaviour. Habitat condition and any threats to the forest were also recorded. Observations were made using binoculars and vocalisations were recorded with a TCM5000 EV tape-recorder and Sennheiser ME66 micro-

phone. Copies of vocalisations are deposited at Arquivo Sonoro Elias Coelho (ASEC), Universidade Federal do Rio de Janeiro. Coordinates and altitudes were obtained using a GPS (Garmin GPS 12) and, where possible, staff of the *usina* plantations were interviewed to provide details on the distribution and size of the remaining forest.

Results

We found Seven-coloured Tanager in 15 forest fragments (Table 1), of which 14 are probably new locations for the species (cf. Collar *et al.*³, BirdLife International Globally Threatened bird database). We also detail here the first records for Rio Grande do Norte, which although published locally¹⁴ have not been widely reported in the ornithological literature. In order to map the tanager's distribution (Fig. 1) we made an exhaustive search of specimen data from all major museums, published literature and recent sightings by ornithologists, thus augmenting the synthesis presented by Collar *et al.*³.

Rio Grande do Norte

Reported from Capim Macio just south of Natal¹⁴, and in adjoining forests of the 1,172-ha Dunas de Natal State Park (F. A. S. Roberto *in litt.*). Also reported to occur in the humid coastal forests of Baía Formosa near the border with Paraíba (F. A. S. Roberto *in litt.*), but not seen during a short visit by FO in May 2000 or by AJL and Luiz Gonzaga during a two-hour visit on 5 November 2001. Despite these reports it would be preferable to obtain more

**Table 1.** Summary of recent Seven-coloured Tanager *Tangara fastuosa* records in north-east Brazil. Letters in parentheses following the locality name refer to the key for Fig. 1.

Area/date	Number of birds/group	Notes
Mata do Pau Ferro, Paraíba (A), 30 October–1 November 2001	Seen daily with seven being the largest group	Observed on forest edge and clearings within open and heavily modified <i>brejo</i> forest (semi-deciduous forest with much <i>Cecropia</i>).
Engenho Água Azul, Pernambuco (B), 22–30 May 1999	2, 5, 5, 7	This area has five forest fragments and <i>T. fastuosa</i> was recorded in all. Live trapping of tanagers for sale is common.
Mata da Macambira, Engenho Triunfo, Pernambuco (C), 4–6 August 1999.	10, 12, 15	Recorded always in flocks of 10+ individuals, usually with <i>T. cyanocephala</i> and <i>Euphonia violacea</i> . Forest is continuous with the previous locality. Poaching of mammals and larger birds recorded.
Mata do Estado, Pernambuco (D), 12–20 October 1999	10–15 (forest edge); 4–6 (clearings)	Recorded both in forest interior and edges, most frequently with <i>Tangara cyanocephala</i> . Forest managed by a local association, but poaching of larger mammals by outsiders recorded. The species was not seen during a four-day visit in November 2001 (SAR, AJL and Luiz Gonzaga)
Torre do Microondas, Taquaritinga do Norte, Pernambuco (E), 21–23 January 2000	Five pairs	Observed only in highland forest at 1,067 m, not below in the forest/caatinga ecotone at 800 m. Locals hunt passerines, including <i>T. fastuosa</i> , for food and report them as easy to catch.
Usina Trapiche (F), Pernambuco, 19–20 November 2001	2, 3	Up to three observed in a tall emergent tree (<i>Parkia</i> sp.). The forest block is in good condition but is only a few ha in size.
Usina Sacramento, Pernambuco (G), 27–30 January 2000	2	A pair observed in forest edge. Logging and poaching recorded.
Just north of Palmares, Pernambuco (H), May 2000	2	A pair in a severely degraded forest patch (mostly <i>Cecropia</i> with a few taller <i>Parkia</i> trees).
Usina Frei Caneca, Jaqueira, Pernambuco (I), 7–10 July 1999	12	Flock with 12 <i>T. fastuosa</i> and ten <i>T. cyanocephala</i> . The area is protected by the landowner (private reserve).
Mata do Pinto, Usina Serra Grande (J), 20 October 2001	4, 3, 3, 2, 2	Five groups in mixed-species flocks with <i>Tangara cyanocephala</i> , <i>Dacnis cayana</i> , <i>Hemithraupis guira</i> , <i>H. flavicollis</i> , <i>Cranioleuca semicincta</i> , <i>T. cayana</i> , <i>Picumnus exilis</i> , <i>P. fulvescens</i> , <i>Herpsilochmus atricapillus</i> , <i>Tachyphonus cristatus</i> , <i>T. rufus</i> , <i>Saltator maximus</i> and <i>Contopus cinereus</i> . Feeding on <i>Miconia</i> berries.
Mata do Coimbra, Usina Serra Grande (K), Alagoas, 12 November 2001	2	Observed in <i>Cecropia</i> along an old logging trail through tall second-growth forest.
Pedra (Serra) Branca, Murici, Alagoas—main forest block (L), 18 November 2001	3	A group of three observed in understorey trees with a single <i>Chlorophanes spiza</i> .
Usina Santo Antônio (M) 1, 6–7 October 2001	2, 2, 4, 4	Two pairs alone, the others in different mixed-species flocks with <i>Tangara velia</i> (which is scarcer), <i>T. cayana</i> , <i>Dacnis cayana</i> , <i>Coereba flaveola</i> , <i>Hemithraupis guira</i> , <i>H. flavicollis</i> , <i>Tachyphonus cristatus</i> , <i>T. rufus</i> and <i>Saltator maximus</i> . Feeding on <i>Miconia</i> berries.
Usina Santo Antônio 2 (M), 8 October 2001	4, 2	Both in mixed-species flocks with <i>Hemithraupis</i> spp., <i>Dacnis cayana</i> , <i>Chlorophanes spiza</i> , <i>Euphonia violacea</i> , <i>Thraupis palmarum</i> , <i>Sittasomus griseicapillus</i> , <i>Xenops minutus</i> , <i>Saltator maximus</i> and <i>Polioptila plumbea</i> . Feeding on <i>Miconia</i> berries.
Mata Bamburral II, Usina Cachoeira (N), 19 October 2001	2	A pair seen alone.
Mata da Sálvia, Usina Utinga Leão (O), 14 October 2002	3	Found in forest edge with many <i>Cecropia</i> and <i>Miconia</i> . Three together feeding on <i>Cecropia</i> catkins. One (a male?) inspected a caged conspecific used as a decoy by trappers, while the others remained apparently unconcerned.

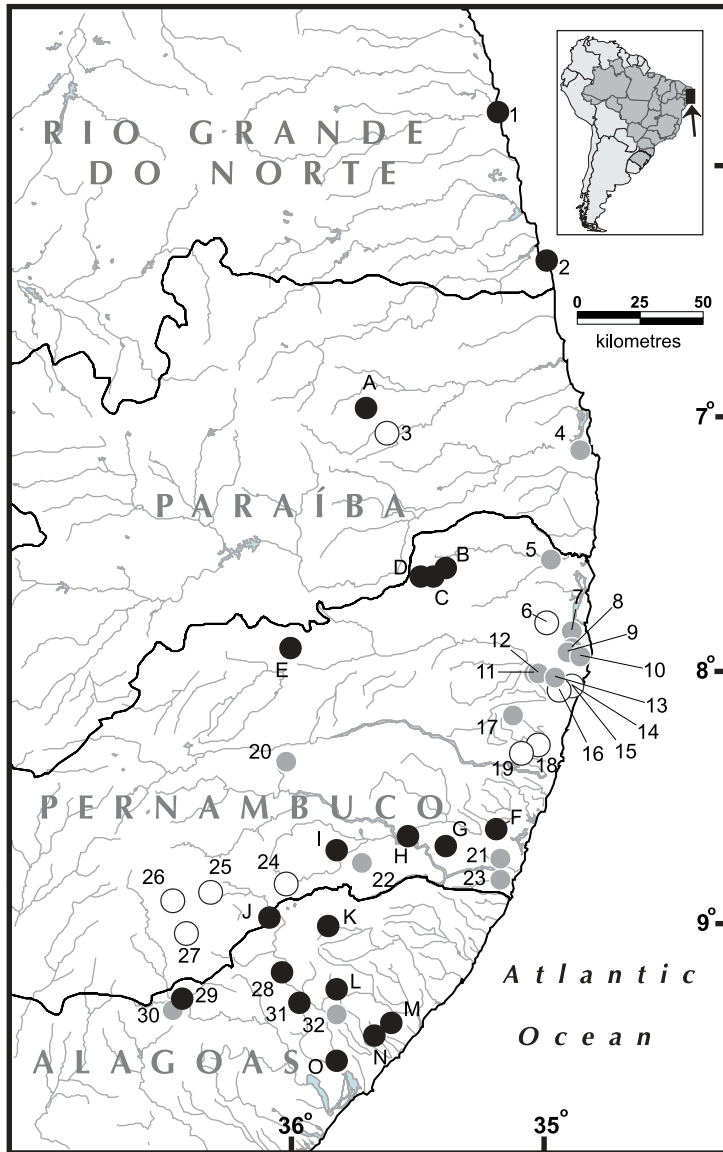
observations as they possibly could have been released cagebirds. It is common practice for wildlife officers to release birds confiscated from dealers in the nearest convenient vegetation.

Paraíba

Known previously from sightings at two localities, one of which we have traced only to municipality³ (Fig. 1). We observed the species at Mata do Pau Ferro State Ecological Park on four occasions dur-

ing 30 October to 1 November 2001. Sightings were mainly in forest edge and the largest group involved seven individuals. The site is close to the untraced Serrotinho, listed by Zenaide¹⁶, in the municipality of Alagoas Grande.

We failed to find the species during our two-day visit to Guaribas Biological Reserve, north of Mamanguape. Previous surveys of this reserve also failed to record it⁵ and Pinto & Camargo¹⁰ made



Rio Grande do Norte: (1) Capim Macio and Parque das Dunas Costeiras; (2) Baía Formosa. **Paraíba:** (A) Mata do Pau Ferro; (3) Serrotinho, in the municipality of Alagoa Grande; (4) João Pessoa, Universidade Federal da Paraíba Campus. **Pernambuco:** (5) Estação Ecológica Charles Darwin, near Goiana; (B) Engenho Água Azul, Timbaúba; (C) Engenho Triunfo, Mata da Macambira, São Vicente Ferrer; (D) Mata do Estado, São Vicente Ferrer; (6) Usina São José, Goiana; (7) Igarassú; (E) Torre do Microondas, Taquaritinga do Norte; (8) Abreu e Lima; (9) Reserva Ecológica de Caetés, Paulista; (10) Paulista; (11) Estação Ecológica de Tapacurá, São Lourenço da Mata; (12) São Lourenço da Mata; (13) Camaragibe; (14) Horto Florestal de Dois Irmãos, Recife; (15) Recife; (16) Várzea; (17) Jaboatão dos Guarapes; (18) Cabo; (19) Engenho Pirajá, Mercês; (20) Brejo (=Serra) dos Cavalos, Caruaru; (F) Usina Trapiche; (G) Engenho Sacramento, Água Preta; (H) Palmares, north of; (I) Usina Frei Caneca, Jaqueira; (21) Estação Experimental Saltinho, Rio Formoso; (22) Maraial; (23) Barreiros; (24) Quipapá; (25) Macuca; (26) Garanhuns; (27) Brejão. **Alagoas:** (J) Mata do Pinto, Usina Serra Grande (USGA); (K) Mata Coimbra (USGA); (28) Hotel Parque dos Quilombos, União dos Palmares; (L) Pedra (Serra) Branca, Murici; (29) Reserva Biológica de Pedra Talhada; (30) Quebrangulo; (31) Parque Ecológico de Murici, Murici town; (32) Junction of BR104/101; (M) Usina Santo Antônio; (N) Mata Bambural II, Usina Cachoeira; (O) Mata da Sálvia, Usina Utinga-Leão

Figure 1. Distribution of Seven-coloured Tanager *Tangara fastuosa* in north-east Brazil. Localities prefixed by a letter represent area with records during our surveys. Filled circles refer to records in the last five years; grey circles to records between five and 25 years old; and open circles to records older than 25 years.

several collecting trips to the general area in the 1950s without finding the species, suggesting it is absent from northern Paraíba. The status of Seven-coloured Tanager in the state requires further study.

Pernambuco

Most specimen localities are from Pernambuco. A. G. M. Coelho (pers. comm.) found the species at several of the small ecological stations and biological reserves near Recife during the 1980s, and it has

been seen recently (late 1990s) at several localities in the state^{4,9}, as well as within the Universidade Federal de Pernambuco (UFPE) Brejo dos Cavalos Reserve.

We observed the species at several widely scattered localities: the largest groups (flocks with 10+ individuals) were seen by SAR at Mata do Estado and Mata da Macambira in northern Pernambuco, both 'new' areas for *T. fastuosa*. FO observed a pair just north of Palmares in May 2000. AJL and Luiz

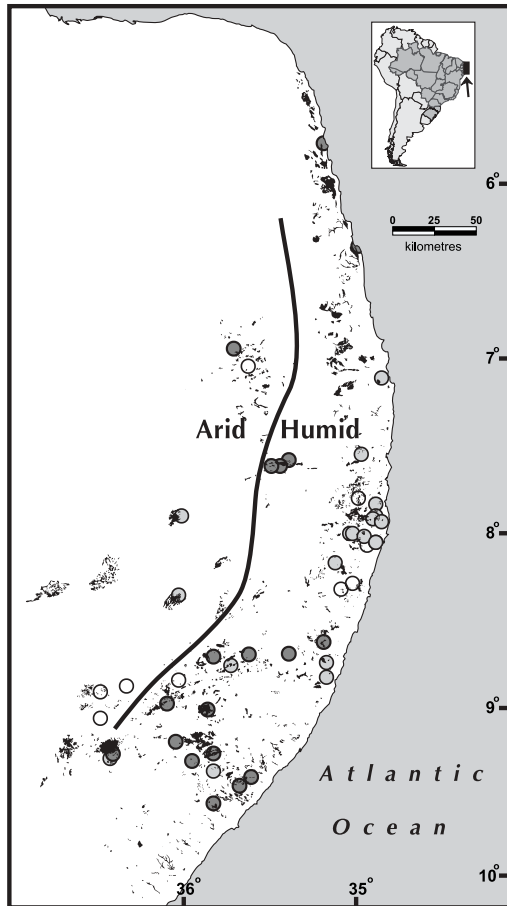


Figure 2. Localities for Seven-coloured Tanager *Tangara fastuosa* (see Fig. 1 for details) in relation to remaining forest cover in 1990. This map depicts the highly fragmented nature of the Atlantic coastal forests of north-east Brazil, where there are no fragments greater than 4,000 ha. The line represents the approximate division between the humid coastal plain and the dry *caatinga* interior of north-east Brazil. Forests marked on the arid side of the divide represent isolated *brejo* forest rather than remnant humid forests. The species occurs in isolated *brejo* forests within the *caatinga* region (e.g. Mata do Pau Ferro, Taquaritinga do Norte, Serra dos Cavalos, Macuca, Garanhuns and Brejão).

Gonzaga observed the species twice at Usina Trapiche on 19–20 November 2001, the largest group being three individuals. Other recent records (all SAR observations) are from Engenho Água Azul, Usina Frei Caneca, Engenho Triunfo, Engenho Sacramento and Taquaritinga do Norte (Table 1).

Alagoas

Collar *et al.*³ listed five localities, with regular sightings in the 1990s from Murici and Pedra Talhada. Recent unpublished records are from the



Figure 3. Seven-coloured Tanager *Tangara fastuosa* being trapped at Usina Utinga Leão (Fábio Olmos)



Figure 4. Two boys selling five Seven-coloured Tanagers *Tangara fastuosa* trapped at Usina Utinga Leão (Fábio Olmos)



Figure 5. Seven-coloured Tanager *Tangara fastuosa* (Edson Endrigo)

grounds of the Hotel Parque dos Quilombos near União Palmares (G. Green *in litt.* 2002) and Usina Serra Grande, where two males were collected (deposited in the Universidade Federal de Pernambuco collection, UFPE 3312 and 3313).

We found the species in seven of the 17 fragments we visited (Table 1). It was not seen south of the state capital, Maceió, being absent from the drier forests of Usina Coruripe (c.10°20'S), near the mouth of the rio São Francisco. This suggests the





distribution of the species is subject to ecological constraints.

Ecology

Collar *et al.*³ and Isler & Isler⁶ detailed our scant knowledge of the ecology of *T. fastuosa*. It occurs (often within mixed-species flocks) in the canopy and edges of lowland and montane forest, but also in second growth and at some sites regularly into scrub and orchards close to forest fragments. Nests have been found in March.

We found *T. fastuosa* in a variety of habitats, from forest edge and interior, and in areas ranging from relatively undisturbed mature forest to severely degraded second growth dominated by *Cecropia* and a few taller, vine-laden trees. At Usina Serra Grande and Pedra Talhada it has been observed in gardens and orchards with bromeliad-laden trees.

The northernmost locality for the species (Capim Macio, Rio Grande do Norte) is an area of cerrado (locally known as *tabuleiro*) bordering dunes and coastal scrubby *restinga*. *Tabuleiros* are typical of the transition between more humid coastal formations and the xeric hinterland¹⁴. As well as extending the range of the species, records from this area broaden its known habitat preferences. The other record from Rio Grande do Norte (Baía Formosa) is from the largest Atlantic Forest remnant in the state (Mata Estrela) comprising a tall, semi-deciduous area rich in Brazilwood *Caesalpinia echinata* between sugarcane fields and coastal dunes covered by scrubby *restinga*.

Our findings demonstrate that *T. fastuosa* occurs in humid forests within interior Paraíba, Pernambuco and Alagoas. Some of these interior humid forests (in Paraíba and Pernambuco) are isolated from the Atlantic Coast humid forests by arid *caatinga* vegetation and are known as *brejos*. They tend to be located on hills exposed at right angles to humid coastal winds¹, and possess a more humid and cooler climate than the surrounding *caatinga* as their higher elevation causes air to cool, with consequent precipitation. Mata do Pau Ferro (Paraíba), Taquaritinga do Norte, Serra dos Cavalos, Macuca, Garanhuns and Brejão (all Pernambuco) are known *brejo*-forest localities for *T. fastuosa* (Fig. 2).

Most of our observations of feeding tanagers were on berries of arboreal *Miconia* spp. (Melastomataceae), c.4–7 m high in forest edge and second-growth forest. At Usina Santo Antônio and Usina Utinga Leão, tanagers were also seen searching dead leaves hanging from branches, apparently looking for insects. At Usina Utinga Leão three were feeding on *Cecropia* catkins and apparently on Müllerian corpuscles at the bases of the leaves.

Melastome berries are a known food item of *T.*

*fastuosa*³, as well as other *Tangara* spp.⁷. We believe it is possible that there is a relationship between the abundance of melastomes and the presence of *T. fastuosa*. Most *Miconia* are edge or second-growth species and in Alagoas they are dominant in humid forests in hilly country (such as Mata do Pinto and Usina Serra Grande) and in gullies north of Maceió (Usinas Santo Antônio, Utinga Leão, Cachoeira and Serra Grande; Fig. 1, Table 1). In fact, very few or no *Miconia* trees were found in the drier forests of southern Alagoas or in fragments on better-drained soils outside gullies, which were also devoid of *Tangara* spp. (Silveira & Olmos in prep.). Previous surveys by FO found that melastomes are uncommon in coastal lowland forests of Paraíba and Rio Grande do Norte. This could, at least partially, explain why *T. fastuosa* is rare or absent from coastal forests in these states. Further surveys are, however, required to substantiate the hypothesis.

Most *T. fastuosa* records were of pairs or groups of up to four (Table 1). Most were in mixed-species flocks of varying composition. Fragments with the best-conserved forest possessed more, and the most species-rich, flocks. The most frequent flock species in Alagoas were *Herpsilochmus rufimarginatus*, *Thraupis palmarum*, *Tangara cayana*, *Tachyphonus rufus*, *T. cristatus*, *Hemithraupis flavicollis*, *H. guira*, *Dacnis cayana*, *Coereba flaveola* and *Saltator maximus*. Other flock species, found only in Usina Serra Grande, which has the best forest in the state, were *Picumnus exilis*, *P. fulvescens*, *Cranioleuca semicinerea* and *Tangara cyanocephala*. *Tangara velia cyanomelaena*, an Atlantic Forest endemic probably worthy of specific status, was observed in a flock with *T. fastuosa* at Usina Santo Antônio, and was the rarest *Tangara* in the surveyed areas.

In Pernambuco, SAR has observed *T. fastuosa* in mixed flocks in the forest at Mata do Estado with *T. cyanocephala*, *Tersina viridis*, *Dacnis cayana* and *Cyanerpes cyaneus*. Flocks observed in clearings at the same locality included, in addition to both of the above *Tangara*, *Tachyphonus rufus*, *T. cristatus*, *Tangara cayana* and *Euphonia violacea*. At Usina Frei Caneca, *T. fastuosa* was seen in numbers with *T. cyanocephala*, *T. cayana*, *T. velia*, *Tachyphonus cristatus* and *Thraupis palmarum*, whilst *Hemithraupis flavicollis* was added at Engenho Água Azul. At the latter locality most flocks consisted solely of *Tangara fastuosa* and *T. cyanocephala*.

Breeding behaviour was observed at Torre do Microondas (which locality appears to be the highest-altitude area known for the species), in Taquaritinga do Norte, Pernambuco, where SAR saw five different pairs nest-building in different arboreal bromeliads, up to 15 m high, on 21 January 2000. The total area occupied was slightly larger than 500 m², suggesting that breeding territories are relatively small. The only other breeding data we are



aware of are those of G. M. Kirwan (*in litt.* 2003), who observed fledged, non-dependent young in family parties at Pedra Talhada, in February 1995.

Threats and conservation

Seven-coloured Tanager has experienced severe habitat loss, only 2% of the original Atlantic Forest remains in north-east Brazil, much of it second growth¹³, and capture to supply the cagebird trade. None of the remaining forest fragments is larger than 4,000 ha, with most of this still subject to selective logging and poaching (pers. obs.).

During a visit to the recently decreed (but ineffectively implemented) Murici Ecological Station we saw the last forest remnants on ridges-tops being encroached by pastures: the sound of axes and chainsaws was common. Large areas were cleared for charcoal production just prior to our visit in October 2001 (C. J. Bakker pers. comm.). There is a lack of law enforcement by local environmental authorities, despite the state representative of IBAMA (the Federal Environment Institute responsible for managing Murici) having its office only 65 km away.

Most *usinas* in Alagoas have banned further clearance or logging of forests fragments within their properties, but pole extraction was witnessed in Mata da Sálvia, and this type of extraction was also evident in other areas (Table 1). The only *usina* where we witnessed no attempt to curb tree cutting was Usina Santo Antônio, where the already severely degraded area, 1, was being felled. Several endemic and threatened birds, including *T. fastuosa*, were present in the area. In contrast, Usina Serra Grande harbours well-protected forest fragments that may be the most important in north-east Brazil, especially given the continued clearance at Murici.

Wild *T. fastuosa* are captured with the aid of a caged tanager, which serves as a decoy. The strongly territorial tanagers investigate the intruder and are caught in traps or nets (Figs. 3–4). Professional trappers are able to catch up to 30 Seven-coloured Tanagers in a day where the species is common. The captives are usually placed together in a cage with some fruit and despatched to market, where some may arrive injured from fights and overcrowding, and with their plumage soaked by fruit pulp (Fig. 3). Unsurprisingly, mortality may be high but most trappers seem more concerned with quantity than the quality of their product. Seven-coloured Tanagers could be purchased for just R\$5 (less than US\$2) in October 2000 (LFS and FO pers. obs.).

Catching wild birds, including Seven-coloured Tanagers, is common in Alagoas and indeed throughout north-east Brazil. We observed a large number of homes with caged native birds and saw, on many occasions, people (usually young males) with decoys and traps, especially at weekends. Today, because of the rarity of most passerines in Alagoas, 'new' bird

species are being caught to supply the demand and, perhaps surprisingly, Bananaquit *Coereba flaveola* is now among the commonest cagebirds, a phenomenon unknown elsewhere in Brazil. Most die within a few months because most owners do not know how to care for them. Everyone we met was unconcerned about displaying their birds and traps, despite the activity being illegal since 1965, and buying birds, including *T. fastuosa*, was quite easy. This, and what we have witnessed in Murici, is sure sign that law enforcement in Alagoas is in dire need of effective implementation.

Seven-coloured Tanager was considered threatened (Endangered) in the most recent global assessment². It was judged, against the IUCN Red List criteria, to have a range smaller than 5,000 km² at five or fewer localities, as well as having a continued decline inferred and projected in its extent of occurrence, area of occupancy, quality of habitat, number of locations (or subpopulations) and number of mature individuals. BirdLife International² further stated that the species occurs 'at a minimum of four localities', with the strongholds thought to be Murici and Pedra Talhada, in Alagoas, and UFPE Serra dos Cavalos Reserve and near Goiana, in Pernambuco. Our recent surveys have greatly increased the number of extant localities and hence it should now be downgraded to Vulnerable under the B criterion. Its range is larger than previously estimated, but is still probably far less than 5,000 km², given the small area of severely fragmented Atlantic forest remaining (Fig. 2).

We hope that the discovery of previously unreported populations of *T. fastuosa* and other endangered endemics¹¹ will prompt conservation initiatives for the most important areas, especially Mata do Estado, Usina Serra Grande, Mata da Macambira, Usina Utinga-Leão and Usina Santo Antônio. The ability of the species (and other regional endemics) to utilise second-growth habitat is encouraging, as the natural regeneration and forestation schemes being undertaken by some *usinas* to create new forested areas along rivers and on steep slopes may produce a positive impact in the short and medium-terms.

Acknowledgements

Luiz Pedreira Gonzaga and Luis Claudio Marigo accompanied us during some of the field work. BirdLife International, Neotropical Bird Club, Wetlands Fund and Gesellschaft für Arten-und Populationsschutz (ZGAP) supported the work. Our thanks to Nigel Collar, David Wege and Jaqueline M. Goerck for raising the necessary funds, and to Manomet Bird Observatory (Birder's Exchange) for donating field equipment. A Winston Churchill Travelling Fellowship awarded by the Winston Churchill Memorial Trust funded A.J.L.'s participation.

Field surveys in Alagoas were possible due to Fernando Pinto (IPMA); Marcelo Sousa, S/A Usina Coruripe Açúcar e Álcool (Cícero Almeida e Magno Túlio Madeiro); Usina Leão S/A, Vila Utinga (John William Buyers Júnior); Usina Cachoeira (Leonardo Pinto Costa); Usina Serra Grande and Trapiche (Clodoaldo José Bakker); Usina Camaragibe (Cláudia Maranhão); Engenho Água Azul (José Guilherme Queiroz); Usina Frei Caneca (Gustavo Duarte Barros); and Engenho Sacramento (Sr Cadoca). Dr Severino Mendes Júnior and Tchayleny Valéria kindly received us at the ornithological collection of the Universidade Federal de Pernambuco (UFPE), and João Maram, Roberto Azevedo and Moacyr Dias kindly supplied information on captive birds. Dr Marcelo Tabarelli provided information on remaining forests in the region. Jeremy Minns, José Fernando Pacheco and Luiz Pedreira Gonzaga sent us recordings used during the surveys. Jaqueline Goerck kindly reviewed the manuscript. Associação dos Moradores da Mata do Estado and the Secretaria de Turismo de Taquaritinga do Norte supported our visits to these areas. SAR received support from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil, for her doctoral scholarship studies, and from WWF-Brazil for field work in the north-eastern Atlantic Forest.

References

1. Andrade-Lima, D. (1982) Present-day refuges in northeastern Brazil. In: Prance, G. T. (ed.) *Biological diversification in the tropics*. New York: Columbia University Press.
2. BirdLife International (2000) *Threatened birds of the world*. Cambridge, UK: BirdLife International & Barcelona: Lynx Edicions.
3. Collar, N. J., Gonzaga, L. A. P., Krabbe, N., Madroño Nieto, A., Naranjo, L. G., Parker, T. A. & Wege, D. C. (1992) *Threatened birds of the Americas: the ICBP/IUCN Red Data Book*. Cambridge, UK: International Council for Bird Preservation.
4. Farias, G. B. (1996) Distribuição do pintor-verdadeiro, *Tangara fastuosa*, no estado de Pernambuco. In: *Resumos do Congresso Brasileiro de Ornitologia, 5, Campinas*. Campinas: UNICAMP.
5. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) (1998) *Reserva Biológica Guaribas: plano de ação emergencial*. Brasília: IBAMA.
6. Isler, M. L. & Isler, P. R. (1987) *The tanagers*. Washington DC: Smithsonian Institution Press.
7. Isler, M. L. & Isler, P. R. (1999) *The tanagers*. Second edition. Washington DC: Smithsonian Institution Press.
8. Lamm, D. W. (1948) Notes on the birds of the states of Pernambuco and Paraíba, Brazil. *Auk*, 65: 261–283.
9. Neves, R. M. de L., Telino-Júnior, W. R., Rodrigues, R. C. & Botelho, M. N. (2000) *Caracterização e avaliação da população avifaunística da Área de Proteção Ambiental de Guadalupe*. Recife: Prodetur/PE-CPRH.
10. Pinto, O. M. O & Camargo, E. A. de (1961) Resultados ornitológicos de quatro recentes expedições do Departamento de Zoologia ao nordeste do Brasil, com a descrição de seis novas subespécies. *Pap. Avulsos Zool., São Paulo* 13: 51–69.
11. Roda, S. A. (2002) Aves endêmicas e ameaçadas de extinção no estado de Pernambuco. In: Tabarelli, M. & Silva, J. M. C. da (compilers) *Diagnóstico da biodiversidade de Pernambuco*. Recife: Secretaria da Ciência, Tecnologia e Meio Ambiente, Ed. Massangana.
12. Roda, S. A. (in prep.) Aves de florestas do centro de endemismo Pernambuco: composição, vulnerabilidade e conservação. PhD. Recife: Universidade Federal de Pernambuco.
13. Silva, J. M. C. da & Tabarelli, M. (2000) Tree species impoverishment and the future flora of the Atlantic Forest of northeast Brazil. *Nature* 404: 72–74.
14. Varela-Freire, A. A. (1997) *Fauna Potiguar*, 1. Natal: Ed. Universidade Federal Rio Grande do Norte.
15. Wege, D. C. & Long, A. J. (1995) *Key Areas for threatened birds in the Neotropics*. Cambridge, UK: BirdLife International (Conservation Series 5).
16. Zenaide, H. (1953) *Aves da Paraíba*. João Pessoa: Ed. Teone.

Luís Fábio Silveira

Departamento de Zoologia, Universidade de São Paulo, Rua do Matão, Travessa 14, nº 321, Cidade Universitária, São Paulo, SP, Brazil 05508-900. E-mail: lfsilveira@uol.com.br. Bolsista FAPESP (processo no. 99/12326-9).

Fábio Olmos

Largo do Paissandu 100/4C, 01034-010, São Paulo, SP, Brazil. E-mail: guara@nethall.com.br.

Sônia Aline Roda

Programa de Pós-Graduação em Ciências Biológicas, Centro de Ciências Biológicas, Universidade Federal do Pará, Rua Augusto Corrêa 1, 66075-900, Belém, Pará, Brazil. E-mail: sonia.roda@bol.com.br.

Adrian J. Long

BirdLife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, U.K. E-mail: Adrian.Long@birdlife.org.uk.