

***Nothura minor* (Tinamidae) a globally threatened Cerrado species new to Paraguay**

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RESUMO. *Nothura minor* (Tinamidae) uma espécie globalmente ameaçada do Cerrado nova para Paraguai.

A Codorna-mineira e um inhambu endêmico do Cerrado e globalmente ameaçado, considerado previamente restringido ao Brasil. Aqui nos documentamos os primeiros registros para Paraguai, incluindo um espécimen e gravações das vocalizações, provenientes de habitats de campo sujo em Laguna Blanca, departamento de San Pedro. Também são apresentadas notas sobre a ecologia e o comportamento da espécie, incluindo as primeiras observações do uso de ocos de tatu quando o indivíduo é ameaçado, e potencialmente como sítio de descanso. Laguna Blanca é uma área muito importante de Cerrado, onde mais cinco espécies globalmente ameaçadas foram registradas. As áreas circundantes foram convertidas à agricultura mecanizada, e o restante do habitat natural merece tratamento como uma prioridade conservacionista a nível global.

PALAVRAS-CHAVE: *Nothura minor*, Cerrado, Paraguay, Especie Amenazada, Laguna Blanca.

KEY WORDS: Lesser Nothura, *Nothura minor*, Cerrado, Paraguay, Threatened Species, Laguna Blanca.

The grasslands of central South America, and in particular the Cerrado, have recently been recognised as one of the highest conservation priorities in the Neotropics (Dinerstein *et al.* 1995, Wege and Long 1995, Collar 1996, Stotz *et al.* 1996). This recognition has brought closer attention to Cerrado areas in Paraguay, which along with the southern Brazilian Cerrado (Silva 1995), have long been overlooked by ornithologists and conservationists alike. A number of recent bird surveys have focused on Cerrado sites in Paraguay, including Aguara Ñu, in the Mbaracayú Forest Nature Reserve, Canindeyú Department (Lowen *et al.* 1996, Clay *et al.* 1998), and Serranía San Luis National Park, Concepción Department (Robbins *et al.* 1999). Since 1999, ourselves and co-workers have been documenting the Cerrado avifauna at Laguna Blanca, San Pedro Department. Among the most significant discoveries have been populations of two globally threatened Cerrado endemic species, the White-winged Nightjar *Eleothreptus candicans* (*e.g.* Lowen 2002) and Lesser Nothura *Nothura minor*. Here we present details of the first records of *N. minor* for Paraguay, and the first documentation of the species' occurrence outside of Brazil, based on visual records, tape-recordings and a specimen.

"Laguna Blanca" is a natural island of Cerrado habitats, covering approximately 26,000 ha, immediately to the north of a lake of the same name. Originally surrounded by humid Atlantic-type forest, most of this has now been cleared for agriculture. The habitat island is divided between several properties, but the majority of our fieldwork has been conducted at the "Establecimiento Laguna Blanca", particularly in the vicinity of "Retiro Malvina". This 2,250 ha property, centered on 23°49'S, 56°18'W, at a mean elevation of 215 m, was formerly used for low-intensity cattle-ranching, but is now primarily dedicated to tourism (at the adjacent Laguna Blanca lake). The region holds almost 18,000 ha of well-preserved Cerrado habitats (Guyra Paraguay unpubl. data). The gently undulating terrain of Establecimiento Laguna Blanca, which

lies on a primarily west-facing slope that drops down to the valley of the Clementina stream, is covered by a complex mosaic of vegetation types. Open formations predominate in the lower and more humid tracts, while higher areas are generally covered by dense low woody shrubs of less than 50 cm height (mainly Myrtaceae). Fires affect the Laguna Blanca Cerrado on an almost annual basis.

Fieldwork covered the periods between 10–12 November 2001, 12–19 January 2002 and 27 May–2 June 2003. Surveys during the first two periods were primarily focused on locating and censusing the White-winged Nightjar population in the vicinity of Retiro Malvina, and our field effort was therefore largely nocturnal, allowing, nonetheless, for diurnal observations to be made. Fieldwork during May–June 2003 focused on exploring the properties to the north of Establecimiento Laguna Blanca, Estancia Norte Yboty (23°41'S, 56°18'W) and Estancia Señorita (23°45'S, 56°16'W). Binoculars and sound-recording equipment, a Sony TCM-5000 and a Sennheiser ME-66 microphone, were used to document our records. Voucher tape recordings are currently deposited at the archive of Guyra Paraguay and at Colección Nacional de Sonidos Naturales, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina, and will later be deposited at the Arquivo Sonoro Elías Coelho, Universidade Federal do Rio de Janeiro, Brazil. A specimen of *N. minor* was collected, and has been deposited at the Museo Nacional de Historia Natural del Paraguay (MNHNP 2082).

Nothura minor was first recorded on 12 November 2001 when two to three separate individuals were heard from two distinct areas of open campo sujo (RPC, JK, HdC, Alberto Esquivel). During January 2002, the species was recorded on five out of eight field days, on 13, 15, 16, 18 and 19 January (JMB, EC). Daily counts for these days were of 9, 1, 6, 3 and 3 individuals respectively. During May–June 2003 *N. minor* was located in two further properties within the Laguna Blanca

cerrado. On 28–29 May there were two sightings of single individuals in the same general area of Estancia Señorita, 6 km to the east of Retiro Malvina (HdC, JK); and during 1–2 June a total of four birds were heard in two distinct areas of the Estancia Norte Yboty (HdC, JK), about 3 km to the north of Retiro Malvina.

Nothura minor was primarily located by its voice, and was initially identified with the aid of the examples of its song presented in Hardy *et al.* (1993), which sound nearly identical to those at Laguna Blanca. Only a few times were birds heard to vocalise during the morning, most notably when the species was first found, once in January when up to four birds sang sporadically but regularly during 07:30–08:30 h, and briefly at dawn during June (06:45 h). Vocalising birds often gave the impression of being far apart, keeping a minimum distance of at least 200 m between individuals. In January, during the afternoon, individuals would start to vocalise sporadically from approximately 18:15 h onwards, two hours before twilight. At about 19:30 h (roughly the time of sunset) birds suddenly erupted in song, delivering repeated song bouts, with up to four individuals singing at the same time, and as many as five on one afternoon. At these times, the birds gave the impression of being closer to each other, and to sing from a more restricted area. This peak of vocal activity ceased at about 20:15 h. Vocalising birds appeared to prefer higher areas of the terrain, covered by shrubby campo sujo, mixed with areas of more open grassland, and sometimes, open campo sujo. These areas presented a high percentage of bare sandy soil, and patches of denser woody cover, often with a predominance of *Piptadenia macrocarpa*. Campo sujo is a structural term used to describe similar physiognomies of different vegetation types (Eiten 1972), referring to shrubby or woody grassland.

Individuals of *N. minor* were observed on four occasions. Once, JMB flushed a bird from an area of open campo sujo (patches of scrubby Myrtaceae), and although no plumage features could be distinguished, its small size was noticeable. Spotted Nothura *N. maculosa* was also flushed during our surveys, and was clearly larger (see Cabot 1992). On another occasion, a bird was flushed from the same area at 03:30 h during searches for White-winged Nightjars (JMB, EC). It landed nearby and was relocated hunched tightly within sparse shrubby cover, from where it didn't move. Similar accounts have been described before for this species (see Collar *et al.* 1992: 35). Although the bird escaped when an attempt was made to capture it, a number of key identification features were observed while the bird was grounded. Its small size was immediately apparent (both observers are experienced with *N. maculosa*). Also, the upperparts were rather dark and uniform, each mantle feather blackish brown with outer fringes and apical vermiculations pale buff, a pattern similar to that depicted in a photograph of the species in Silveira (1998: 56). During May 2003, at Estancia Señorita, individuals were twice observed crossing dirt roads (on the 28 and 29 May, JK, HdC). Both individuals initially took flight, but then “disappeared” despite intensive searching of the area. On the suggestion of a local inhabitant of the area, on both occasions tracks of a small tinamou were found entering an armadillo burrow (either *Cabassus* sp. or *Euphractus sexcinctus*). On the 29 May the burrow was opened (by digging), and the nothura found at the end of it, at a depth of about 50 cm. This individual was photographed and collected. It was a female, and measurements

were: wing chord 116 mm, tarsus 38 mm, bill (to base of skull) 20 mm, bill (to anterior edge of nostrils) 11.2 mm. The legs were dark yellow-orange, the iris pale orange, and the bill had a dark flesh maxilla, with paler (pinker) tip and cutting edge (yellow), and yellowish flesh mandible with darker tip. The stomach contents were preserved for future analysis. This specimen was deposited at MNHNP under the accession number 2082.

On the 2 June, two additional armadillo burrows were found with fresh tracks, apparently of *N. minor*, entering and leaving them. *N. minor* had been heard in this area at dusk the night before, and then at dawn. It is suspected that the birds roosted in the burrows. On opening the burrows, the tracks were found to extend for a distance of 1.5–2 m, at a depth of 30–40 cm. This appears to be the first documentation of *N. minor* using armadillo burrows, though the behaviour has been noted for other open country tinamou species when threatened (see Cabot 1992). This behaviour is well known to local people in the Laguna Blanca zone, and presumably also in Brazil, where the species is known as “codorna buraqueira” (Sick 1993). “Buraco” means “hole” in Portuguese, and the name therefore translates as “hole tinamou”, and is also used for White-bellied Tinamou *N. boraquira* (Ihering 2002). We speculate that *N. minor* may also enter armadillo burrows to escape fires.

Nothura minor is locally known as “inambú loma”, meaning “tinamou of the hills”, a name that distinguishes it from its relative *N. maculosa*, which is said to prefer lower-lying tracts of more grass-dominated habitat. We noted *N. minor* to have a clear preference for campo sujo habitat on higher ground, although *N. maculosa* was occasionally also recorded from such areas. A preference for campo sujo habitat (as opposed to pure grasslands) has been noted by other authors (e.g. Collar *et al.* 1992, Sick 1997). Collar *et al.* (1992) consider that the species does not occur in recently burnt areas. However, on the 1 June at least one individual was heard calling from a burnt area, though one where new shoots were appearing on the burnt vegetation. Although no census or density estimates were undertaken, it was felt Lesser Nothuras were as numerous at Laguna Blanca as Spotted Nothuras can be in areas where they are common. Parker *et al.* (1996) give a minimum altitude for the species of 700 m, but our records are nearly 500 m below this limit.

Lesser Nothura is a poorly known species (Cabot 1992, Collar *et al.* 1992), endemic to the Cerrado Region (Silva 1997), which is probably overlooked. Although it has been considered as locally common (Collar *et al.* 1992), it is widely recognised as globally threatened with extinction, being listed as Vulnerable by BirdLife International (2000), as well as the Brazilian red list (Ministério do Meio Ambiente 2003). The main threats appear to be the rapid conversion of its habitat to agriculture, cattle ranching and afforestation.

Laguna Blanca holds an important tract of Cerrado habitats which to date have only been mildly to moderately altered by cattle grazing, tree clearance and overburning. Besides Lesser Nothura, a number of other campo threatened species have been recorded, including four Vulnerable species (Crowned Eagle *Harpyhaliaetus coronatus*, Cock-tailed Tyrant *Alectrurus tricolor*, Black-masked Finch *Coryphaspiza melanotis* and Chestnut Seedeater *Sporophila cinnamomea*), a population of the Endangered White-winged Nightjar *Eleothreptus candicans* and the Near Threatened Sharp-tailed Grass-tyrant *Culicivora*

caudacuta and White-banded Tanager *Neothraupis fasciata* (BirdLife International 2000). Consequently, it is considered one of the top Cerrado IBAs (Important Bird Areas) in Paraguay (Guyra Paraguay unpubl. data). However, the surrounding area has largely been heavily converted to extensive soy plantations, or is subject to intense cattle grazing. The rapid loss of Cerrado habitats and the urgent need for conservation measures, starting with the creation of new protected areas, have been highlighted by numerous authors (e. g. Willis and Oniki 1992, Silva 1995, Parker and Willis 1997, Mittermeier *et al.* 1999), and Laguna Blanca is no exception. Its avifauna is the most representative of any Cerrado site known in Paraguay and clearly merits formal protection.

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REFERENCES

BirdLife International (2000) *Threatened birds of the world*. Barcelona and Cambridge, UK: Lynx Edicions and BirdLife International.
 Cabot, J. (1992) Family Tinamidae (Tinamous) p. 112–138. In: J. del Hoyo, A. Elliott and J. Sargatal (eds.) *Handbook of the Birds of the World*. Vol. 1 Barcelona: Lynx Edicions.
 Clay, R. P.; D. R. Capper, J. Mazar Barnett, I. J. Burfield, E. Z. Esquivel, R. Fariña, C. P. Kennedy, M. Perrens and R. G. Pople (1998). White-winged Nightjars *Caprimulgus candicans* and cerrado conservation: the key findings of Project Aguará Ñu 1997. *Cotinga* 9:52–56.
 Collar, N.J. (1996) The conservation of grassland birds: towards a global perspective. p. 9–18. In J. Fernández Gutiérrez and J. Sanz-Zuasti (eds.) *Conservación de las aves esteparias y sus hábitat*. Valladolid: Junta de Castilla y León.

Collar, N. J.; L. P. Gonzaga, N. Krabbe, A. Madroño Nieto, L. G. Naranjo, T. A. Parker and D. C. Wege (1992) *Threatened birds of the Americas: the ICBP/IUCN Red Data Book*. Cambridge, UK: International Council for Bird Preservation.
 Dinerstein, E.; D. M. Olson, D. J. Graham, A. L. Webster, S. A. Pimm, M. P. Bookbinder and M. Ledec (1995) *A conservation assessment of the terrestrial ecoregions of America and the Caribbean*. The International Bank for Reconstruction and Development/The World Bank: Washington D.C.
 Eiten, G. (1972) The Cerrado vegetation of Brazil. *The Botanical Review* 38:201–341.
 Hardy, J. W.; J. Vielliard and R. Straneck (1993) *Voices of the Tinamous*. Gainesville, Florida: ARA Records (audio cassette).
 Ihering, R. (2002) *Diccionario dos animais do Brasil*. Rio de Janeiro: DIFEL.
 Lowen, J. C. (2002) Conservación del Atajacaminos de Ala Blanca *Caprimulgus candicans* y el cerrado paraguayo. *Cotinga* 18:9–10.
 Lowen, J. C.; L. Bartrina, T. M. Brooks, R. P. Clay and J. A. Tobias (1996) Project Yacutinga ‘95: bird surveys and conservation priorities in eastern Paraguay. *Cotinga* 5:14–19.
 Ministério do Meio Ambiente (2003) Lista nacional das espécies da fauna brasileira ameaçadas de extinção. Available at: <http://www.mma.gov.br/port/sbf/fauna/index.cfm>
 Mittermeier, R. A.; N. Myers, P. Robles Gil, and C. G. Mittermeier (1999) *Hotspots: Earth’s biologically richest and most endangered terrestrial ecoregions*. Mexico: CEMEX.
 Parker, T. A. and E. O. Willis (1997) Notes on three tiny grassland flycatchers, with comments on the disappearance of South American fire-diversified savannas. *Orn. Monogr.* 48:549–555.
 Parker, T. A., D. F. Stotz and J. W. Fitzpatrick (1996) Ecological and distributional databases. p. 113–436 In D. F. Stotz, J. W. Fitzpatrick, T. A. Parker and D. K. Moskovits (eds) *Neotropical birds: Ecology and conservation*. Chicago and London: Univ. of Chicago Press.
 Robbins, M. B.; R. C. Faucett and N. H. Rice. (1999) Avifauna of a Paraguayan cerrado locality: Parque Nacional Serranía San Luis, Depto. Concepción. *Wilson Bull.* 111:216–228.
 Sick, H. (1997) *Ornitologia brasileira*. Ed Nova Fronteira, Rio de Janeiro.
 Silva, J. M. C. (1995) Avian inventory of the Cerrado Region, South America: Implications for biological conservation. *Bird Conserv. Int.* 5:291–304.
 — (1997) Endemic bird species and conservation in the Cerrado region, South America. *Biodiv. Conserv.* 6:435–450.
 Silveira, L. F. S. (1998) The birds of Serra da Canastra National Park and adjacent areas, Minas Gerais, Brazil. *Cotinga* 10:55–63.
 Stotz, D. F.; J. W. Fitzpatrick, T. A. Parker and D. K. Moskovits (1996) *Neotropical birds: Ecology and conservation*. Chicago and London: Univ. of Chicago Press.
 Wege, D.C. and A. J. Long (1995) *Key areas for threatened birds in the Neotropics*. Cambridge, U.K: BirdLife International (Conservation Series No. 5).
 Willis, E. O. and Y. Oniki (1992) Losses of São Paulo birds are worse in the interior than in Atlantic forests. *Ciência e Cultura* 44:326–328.