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## First record of the globally-threatened Cerrado endemic snake *Philodryas livida* (Amaral, 1923) (Serpentes, Dipsadidae) from Paraguay, and the importance of the Reserva Natural Laguna Blanca to its conservation

Paul Smith<sup>1,2</sup>, Pier Cacciali<sup>2</sup>, Norman Scott<sup>3</sup>, Hugo del Castillo<sup>4</sup>, Helen Pheasey<sup>2</sup>, Karina Atkinson<sup>2</sup><sup>1</sup> Fauna Paraguay, Encarnación, Paraguay.<sup>2</sup> Para La Tierra, Reserva Natural Laguna Blanca, Santa Rosa del Aguaray, San Pedro, Paraguay.<sup>3</sup> Smithsonian Institution, P. O. Box 307, Creston, California, 93432, USA.<sup>4</sup> Guyra Paraguay, Gaetano Martino Nro. 215 esq. Tte. Ross., Asunción, Paraguay.

*Locality.*— Paraguay. Reserva Natural Laguna Blanca (RNLB), Departamento San Pedro. (23°46'52.6"S, 56°17'28.9"W). RNLB is a 804 hectare reserve consisting of over 400 hectares of near pristine Cerrado, a patch of degraded Atlantic Forest, and areas of transitional semi-deciduous, semi-humid gallery forest. The four main Cerrado ecotopes are present at RNLB and grow on a predominately sandy substrate (Eiten, 1972; 1978). The reserve is based around an eponymously-named freshwater lake of 157 hectares which, geologically-speaking, is possibly the only true lake in Paraguay (Guyra Paraguay, 2008).

A specimen of *Philodryas livida* was found sunning itself half-coiled on a patch of open sandy soil in campo limpio Cerrado within RNLB at around 10 am on 24 March 2011. The snake flattened itself against the ground when approached, but did not try to flee until capture was attempted, when it headed directly for a nearby hole in a low termite mound. The specimen was collected under permit 03/11 issued by the Secretaría del Ambiente, and is deposited in the Para La Tierra collection, Laguna Blanca, Departamento San Pedro (CZPLT 131). Additional images and a video of the live specimen are stored in the FAUNA Paraguay (2012) photo database (FPREP 775-781). The specimen is a male and shows the typical coloration of the species, quite distinct from all other members of the genus. Identification was confirmed by means of the pholidosis. Scale counts are as follows: dorsal scale rows 17-17-15, ventrals 172 (range 148-168, n=19; Thomas and Fernandes, 1996), and subcaudals 71 divided (range 66-86, n=19; Thomas and Fernandes, 1996). SVL 530 mm, tail 163. The number of ventral scales for this specimen is slightly higher than previously recorded for this species.

*Comments.*— *Philodryas livida* (Amaral, 1923), is a rarely-recorded xenodontine snake that was described in the monotypic genus *Platyinon* (Amaral, 1923). Thomas and Fernandes (1996) merged *Platyinon* with *Philodryas* on the basis of meristic data and hemipenial morphology. Although the type locality was originally cited as the Brazilian city of Dorizon, state of Paraná, this was later corrected to the locality of Guaicurús, in the Brazilian state of Mato Grosso do Sul (Amaral, 1925), and to date there are still no records from Paraná.

*Philodryas livida* is rare in collections and is known only from a handful of specimens in the Cerrado belt of Brazil, with published records from São Paulo, Goiás, Mato Grosso, and Mato Grosso do Sul (Amaral, 1925; Amaral, 1977; Thomas and Fernandes, 1996; Valdujo *et al.*, 2009). IUCN classifies the species as Vulnerable because of its restricted and fragmented range, severe threats to its preferred habitat, and a paucity of recent records even in well-sampled areas. It is considered endemic to the southern portion of the Cerrado (the upper Paraná basin), the most modified region of the greatly fragmented Neotropical Savanna habitat that covers much of central Brazil, a small area of eastern Bolivia, and extreme northeastern Paraguay (Eiten, 1978). It has been estimated that just 16% of the original Cerrado habitat remained in 2008, and forecasts estimate that this will dwindle to just 8% by 2018. Urgent conservation measures have been recommended in order to ensure the survival of *P. livida*, though no species specific conservation measures are currently in place and less than 1% of its known range lies within protected areas (Nogueira, 2010).

All known specimens are from open areas in campos cerrados habitat or in transition zones from

Cerrado to sub-humid deciduous forest (Thomas and Fernandes, 1996). A single specimen is from Porto Esperança, Mato Grosso do Sul, a locality which lies well within the Pantanal wetlands, but Thomas and Fernandes (1996) commented that this may have been a shipment point rather than a true locality. All recent records are from the municipality of Mineiros (Parque Nacional Emas), in the state of Goiás (Valdujo *et al.*, 2009). The specimen reported here is the first record of this species in Paraguay, the first documented record outside of Brazil and the most southerly record to date (Fig. 1). It extends the species' known range within the Cerrado ecoregion by almost 404 km to the southwest of the closest known record at Campo Grande, Mato Grosso do Sul (20°28'S; 54°37'W) (Thomas and Fernandes, 1996).

The species might reasonably be assumed to be present in suitable habitat in other areas in Paraguay, forming a more or less continuous distribution between its known Brazilian range. However, given the rarity of specimens in collections, the apparently patchy distribution throughout the Brazilian Cerrado, and the limited amount of Cerrado in Paraguay, this species is likely to be critically endangered at national level. Considering the current state of habitat destruction within the Cerrado region, the less than adequate coverage of it within protected areas, and the apparent rarity of this species throughout its range, the conservation of the population at RNLB assumes special significance. The RNLB was declared a Natural Reserve on 3 February 2010 for a limited period of just five years (Decreto 3893,

Artículo 26 of Protected Areas Law 352/94), but consolidating its long term conservation should now be a national conservation priority.

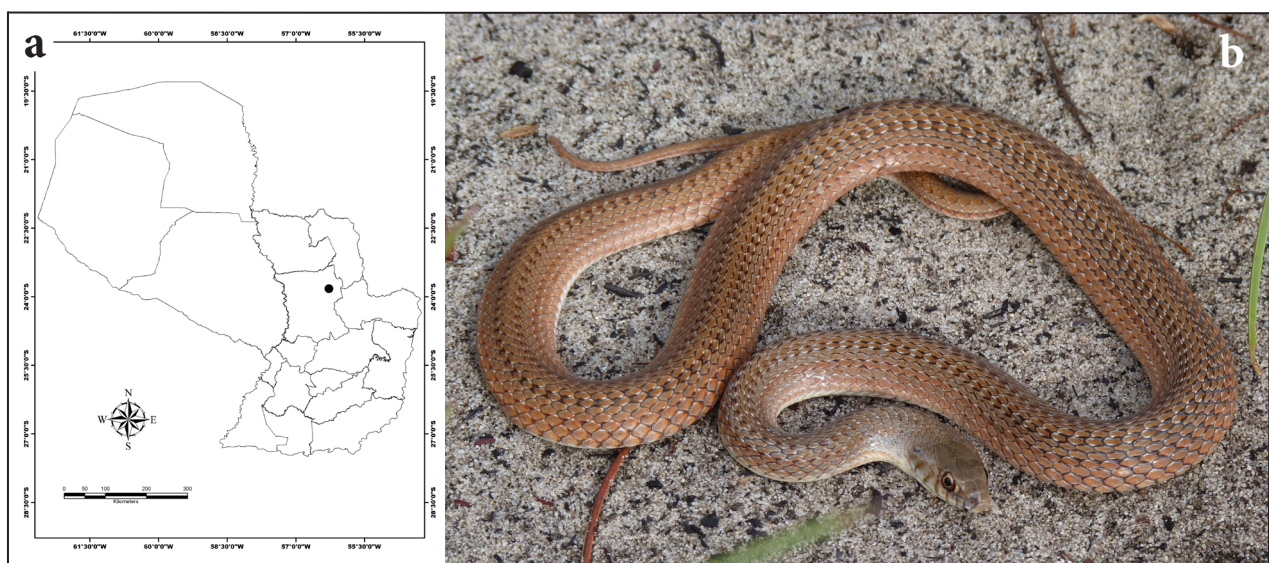
Though relatively small, the importance of the RNLB for conservation in Paraguay should not be underestimated. It was declared an Important Bird Area by Birdlife International (IBA PY021- Guyra Paraguay 2008) due to the extraordinarily high number of globally (11) and nationally (47) threatened bird species occurring within the reserve. Early indications from ongoing herpetological inventories suggest that it is also an area of national and international importance for the conservation of reptiles and amphibians, and a series of species, several previously considered to be endemic to Brazil, have recently been recorded there by fieldworkers from Para La Tierra Ecological Station based permanently within the reserve (Smith *et al.*, 2012, Cacciali *et al.*, 2013, Smith *et al.*, 2013a, b).

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**Figure 1.** a. Collection locality for *Philodryas livida*. PARAGUAY: San Pedro: Reserva Natural de Laguna Blanca, Municipality of Santa Barbara (CZPLT 131). b. *Philodryas livida* (CZPLT 131) from Reserva Natural Laguna Blanca, San Pedro, Paraguay (Photo by Paul Smith).

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