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Inventory of the herpetofauna of Talampaya National Park, a World Heritage Site in Argentina

Inventário da herpetofauna do Parque Nacional Talampaya, Patrimônio da Humanidade, na Argentina

Camila Kass[1,2*]
camilakass@gmail.com

Nicolas Ariel Kass[2]
nkass@fcnym.unlp.edu.ar

Melina Alicia Velasco[2]
mellazuli@hotmail.com

María Dolores Juri[1]
mdjuri@gmail.com

Jorge Daniel Williams[2]
williams@fcnym.unlp.edu.ar

Federico Pablo Kacoliris[2]
fedekacoliris@hotmail.com

Abstract

Talampaya National Park (TNP) was designated a UNESCO World Heritage Site, together with Ischigualasto Provincial Park in 2000, but there is no list with updated information from reptiles and amphibians eighteen years after its creation. Therefore, we listed a complete inventory of the herpetofauna of TNP with the information obtained from bibliography, data from Argentina National Parks Administration (ranger reports and the species listed in their database) and fieldwork using pitfall traps, active search transects and pictures/material collected in the site. We confirm the occurrence of 35 species of herpetofauna in the TNP, including 29 reptiles and 6 amphibians. Some species found in TNP are of great value because their national conservation status is vulnerable (*Chelonoidis chilensis*, *Liolaemus anomalus*, *Liolaemus riojanus*) or even endangered (*Boa constrictor occidentalis*). Therefore, priority areas for conservation of these species should be proposed inside the park.

Keywords: amphibians, conservation area, list of species, reptiles.

Resumo

O Parque Nacional Talampaya (TNP) foi declarado Patrimônio da Humanidade pela UNESCO, juntamente com o Parque Provincial Ischigualasto, em 2000, mas não há lista com informações atualizadas de répteis e anfíbios 18 anos após sua criação. Portanto, listamos um inventário completo da herpetofauna do TNP com as informações obtidas na bibliografia, dados da Administração de Parques Nacionais da Argentina (relatórios de guardas florestais e as espécies listadas em seu banco de dados) e trabalho de campo usando armadilhas de queda, transecções de pesquisa ativa e fotos/material coletado no *site*. Confirmamos a presença de 35 espécies da herpetofauna no TNP, incluindo 29 répteis e 6 anfíbios. Algumas espécies encontradas no TNP são de grande importância, pois seu estado de conservação nacional é vulnerável (*Chelonoidis chilensis*, *Liolaemus anomalus*, *Liolaemus riojanus*), ou mesmo em perigo (*Boa constrictor occidentalis*). Assim, áreas prioritárias para a conservação dessas espécies devem ser propostas para o parque.

Palavras-chave: anfíbios, lista de espécies, répteis, unidade de conservação.

[1] Universidad Nacional de Chilecito. CONICET. Instituto de Ambiente de Montaña y Regiones Áridas (IAMRA). 9 de Julio 22. Chilecito (5360), F5360CKB Chilecito, La Rioja, Argentina.
[2] Facultad de Ciencias Naturales y Museo. CONICET. Departamento Zoología Vertebrados. Sección Herpetología. Calle 122 y 60 s/n. La Plata (1900), Argentina.

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Introduction

Amphibians and reptiles are among the most threatened vertebrates worldwide (Todd *et al.*, 2010; Whittaker *et al.,* 2013). Habitat loss and fragmentation, human overexploitation, global warming, and emerging diseases, severely increase the risk of extinction and population decline of these taxa (Bosch *et al.,* 2007; Sinervo *et al.*, 2010). In nature, the herpetofauna plays multiple roles in aquatic and terrestrial ecosystems, as well as serving as indicators of environmental quality, thus their study is vital for ecology (Lips and Jaime, 1999; Lewandowski *et al.,* 2010; Nori *et al.,* 2013).

Argentina has an important herpetofauna diversity, with species distributed throughout the different ecoregions, counting a total of 177 amphibians' species (Vaira *et al.,* 2017), 261 lizards and amphisbaenas (Avila *et al.,* 2013); 136 snakes (Giraudo *et al*., 2012) and 14 turtles (Prado *et al*., 2012). The Talampaya National Park (TNP), located in the west center of La Rioja Province, is an excellent site for ecological studies, due to low human disturbance (Chebez, 2005). Its areas for public use are well managed and tourist access is restricted to small areas of the park. The TNP area was initially declared a provincial park in 1975 due its importance for protecting native wildlife, geological and anthropological features and was upgraded as a National Park in 1997 (Argentinean National Law n. 24.846). In 2000, it was designated as a UNESCO World Heritage Site together with the adjoining protected area Ischigualasto Provincial Park (UNESCO ID 966). These areas together, Ischigualasto Provincial Park in San Juan Province and Talampaya National Park in Rioja Province, cover 275,369 hectares. TNP area is located within Argentina's Monte de Sierras y Bolsones ecoregion, characterized by a warm scrub desert located along the eastern Andean foothills (Secretaría de Turismo, 1999).

From 1997 to 2004, quite a few field studies gathered occasional records of its wildlife diversity (Cei, 1993; Avila *et al.,* 2004) and others were primarily focused in delimiting areas designed for public use (Dellafiore *et al*., 2002). Regarding herpetofauna, there is a checklist of species from Ischigualasto Provincial Park (Sanabria and Quiroga, 2008) but from TNP there are no accurate lists for these taxa after the management plan performed in 2001, which was mostly based on previous records in the literature. In TNP region the herpetofauna is poorly understood, principally due to the lack of extensive field studies.

Since the identification of the lizard *Liolaemus talampaya* described as a new species by Avila *et al.* (2004), no further work has been published addressing the herpetofauna in TNP. Moreover, no additional sampling and field work has been conducted in this area either. In this work, we sought to generate a more updated and comprehensive knowledge of herpetofauna species of the TNP area. We provide an extended list of species and their distribution with the different habitats of the park. We also describe their conservation status, highlighting priority species and habitats, and finally discuss conservation needs for the management of these priority species. We expect this work could help promoting conservation strategies for the herpetofauna diversity in the TNP.

Methods

Study area

Talampaya National Park (Figure 1) is located in west-central La Rioja Province, Argentina (29°48′ S, 67°50′ W), and covers an area of 215,000 hectares (Chebez, 2005). TNP represents the Monte de Sierras y Bolsones ecoregion (Burkart *et al*., 1999), which is exclusive to the west of Argentina and is characterized by shrubby formations in open deserts and xerophilous forests. Further, is practically surrounded by mountain ranges acting as a barrier, which strongly restricts precipitation in this region. Different types of shrubs, often dominated by jume (*Suaeda* and *Allenrolfea*) and jarillas (*Larrea*). Local vegetation reflects the climatic extreme variations in the region through various adaptive features (they often have few or no leaves) or develop special means of storing and conserving water (Chebez, 2005).

According to Kottek *et al.* (2006), the climate in TNP is desertic. Extreme temperatures prevail in summer and winter, with significant diurnal or nocturnal variation. Summers are hot, with temperatures often exceeding 50° C. Winters are cold, with possible snowing, with temperatures as low as -9° C. Frost is common from May to October. Throughout the year, it is strongly windy and solar radiation is intense. Low humidity prevails in summer and winter, except when torrential rains occur, often accompanied by hail in summer. Annual rainfall averages are 150 to 170 mm, mostly 90% falling in summer (Chebez, 2005; Monguillot, 2005). We recognized three habitat-units within TNP (Figure 2) based on flora and geology. The first habitat unit (A: 29°50' S, 67°56′ W) covers about two-thirds of the park and presents soft sand and sand dunes. Vegetation height ranges from small bushes (from 0,05 m to 2 m), genera *Larrea* Cavanilles*, Bulnesia* Gay, *Cercidium* Tulasne and *Acacia* Miller, and no ground cover. The second habitat unit (B: 29°44' S, 67°47' W) covers 20% of the park area and represents canyon and mountains areas, in the prominent rocky areas of the park. The composition of the soil is partly red sand mixed with rock fragments, whereas sand dunes are absent. This area has the oldest vegetation in the park, mostly formed by trees from the genera *Prosopis* Linnaeus. In summer, when it rains, area B tends to flood causing small avalanches that tend to destroy everything in its path. The last habitat unit (C:

30° 7' S, 67°44' O) is in the southern portion of the park and covers 10% of the area. Here, the soil is rocky, there is no fine red sand or sand dunes. This habitat unit has the wettest climate of the study area throughout the year and its vegetation is mostly *Larrea divaricate* Cavanilles and different species of cactuses.

Data collection

To create an updated list of herpetofauna species inhabiting TNP, we used four data sources. The first of the data sources refers to those taken directly during our field work conducted seasonally from December 2015 to December 2017, made for a total of 150 days (45 days in summer/spring and 30 in winter/autumn), accounting for a total of 7500 hours/man of effort among the three sampling methods. We used different types of samplings, namely occasional walks (1500 hours/man), line transects, live-capture pitfall traps, collection of dead individuals and samplings in water bodies. A total of 130 line transects (1000 meters long and 30 meters wide) was conducted with 5 observers two times per day, from 9h to 12h and from 15h to 18h. The live-capture pitfall traps were Y-shaped: three-armed array of 3 m long with one central bucket (20 liters capacity) placed in the center as a pitfall trap. We used a kind of reinforced tulle nailed to 30 cm tall wooden stakes to secure the drift fence upright (for more details on the traps array see Fisher *et al.*, 2008). To prevent accidental deaths, the traps had a cover on the top and sand on the bottom giving animals the chance to hide, be cool and safe inside. They were checked daily before noon, when the highest temperature in summer (40ºC in average) hits the park. The collection of dead individuals included material collected not only by the authors, but also by rangers or workers from TNP. When dead specimens were found along the line transects, they were collected, registered, fixed and deposited in the herpetological collection of Museo de La Plata. This fieldwork was authorized by the Argentina National Parks Administration (Authorization number: DRC 308). In addition, samplings were performed in water bodies (mostly for amphibians). Temporal waterbodies were searched in TNP after rain, in spring and summer. In areas where water could be found all year long, water bodies where checked in the four seasons periodically.

When necessary to capture some lizard specimens, we used a noosed rope in a hollow stick. It was used mostly for those places where tramps were not settled. For collecting snakes, we employed hooks or tongs. To sampling amphibians, tadpoles and adults, the tool used was a hoop with a fine mesh net fixed to a wooden pole. They were taken away from water bodies, photographed and returned to their habitat.

The second source of information came from published literature and was mainly used to determine species and confirm records, including Koslowsky (1896), Cei (1980, 1993), Dellafiore *et al.* (2002), Avila *et al.* (2004), Chebez *et al.* (2005), Monguillot (2005), Cruz *et al.* (2012) and Abdala and Juarez Heredia (2013).

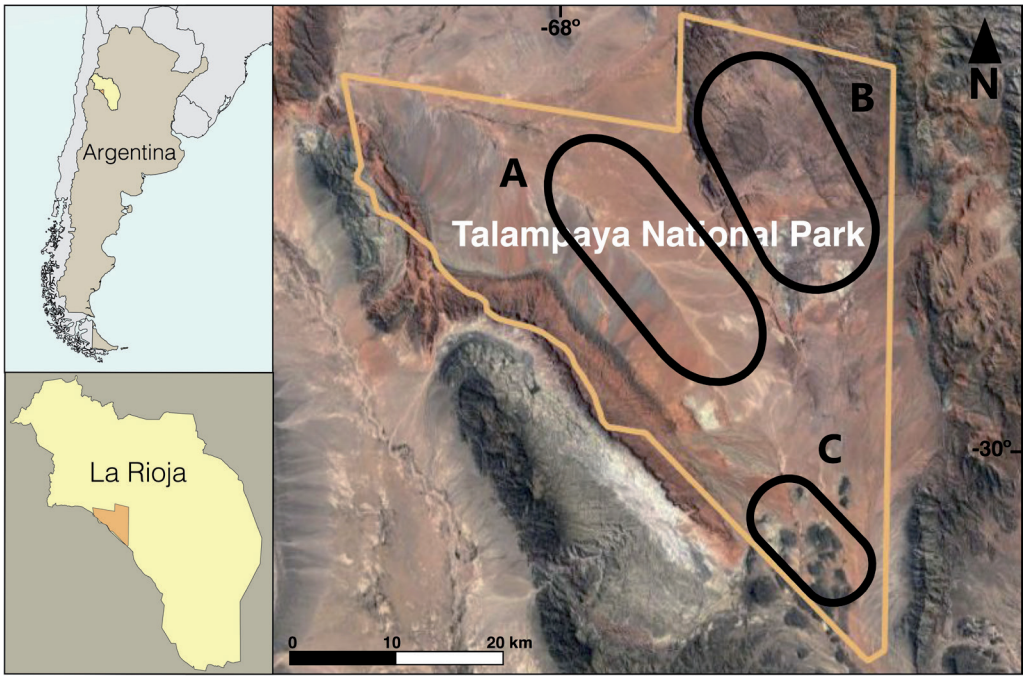

Figure 1. Map of Talampaya National Park, Argentina. The black circles show the three study areas.

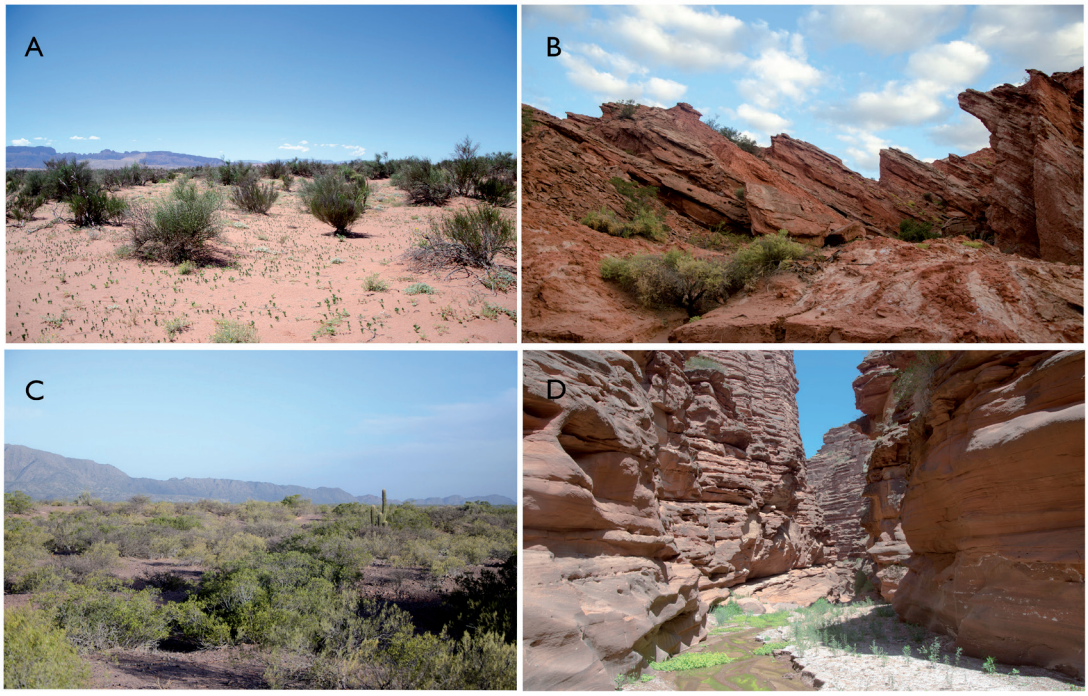

Figure 2. Habitat-units A, B and C in Talampaya National Park, Argentina. Each letter in the photos A-C corresponds with the habitat unit. Photo in Fig. D corresponds to the sampling site where *Liolaemus talampaya* was found in habitat-units B.

The third source came from records that belong to the National Parks Administration, including the management plan for the area (Administración de Parques Nacionales, 2001), which turns out to be the only official document that shows a list of the herpetofauna species of the park. In this database, we also considered information from National Park Administration stored in the Sistema de Información de Biodiversidad (Biodiversity information System: SIB), an online database managed by the Argentina National Parks Administration (Administración de Parques Nacionales, s.f.).

As a fourth source, and the last one, we considered voucher specimens deposited at several museum collections, such as Museo de La Plata (MLP), Museo Argentino de Ciencias Naturales Bernardino Rivadavia (MACN), Fundación Miguel Lillo (FML) and Centro Nacional Patagónico – CONICET (CENPAT).

We followed Uetz *et al.* (2018) for the nomenclature and systematics of reptiles and Frost (2018) for amphibians. The national conservation status for each species was obtained from the Argentinean Red Lists for amphibians (Vaira *et al.,* 2012), turtles (Prado *et al.,* 2012), lizards (Abdala *et al.,* 2012) and snakes (Giraudo *et al.,* 2012). For the international conservation status we followed the International Union for Conservation of Nature and Natural Resources red list (IUCN, 2017).

We select two categories based in the results obtained. One category is *possible resident*, for those species that are listed in APN's reports but have never been collected or registered formally for TNP area. The second category is *confirmed* for those species with verifiable records collected inside the park. Also, whenever possible, we considered species to be *frequent* or *rare*, if a species was recorded more/less than one time for turtles, three times for snakes and amphibians and five times for the different lizard's species during sampling seasons.

Results

We recorded a total of 35 herpetofauna species in the TNP, including 29 reptiles (Table 1) and 6 amphibians (Table 2, Figure 3). Some species inhabit in one specific habitat unit, and others were recorded in two or three of them.

Habitat unit A exhibits the highest richness with a total of 16 reptile's species, followed by habitat unit C with a total of 5 species, including the only species of turtle *Chelonoidis chilensis* described for TNP area. Habitat unit B, showed the lowest number of species with a single one, the endemic lizard *Liolaemus talampaya*. The species of lizard *Aurivela longicauda* was found in habitat unit B-C. The remaining 6 species of reptiles and all amphibian species are ubiquitous found in the three habitat units.

Depending on the methods applied to trap the animals in the field, the following results were obtained: 80 % of the lizard's species from habitat unit A were caught with

the pitfall traps and the remaining 20% with the noosed rope. In relation to Dipsadidae snake's species, found in habitat unit A, they were seeing along transects, found by rangers during their work or by occasional walks at night. In terms of amphibians, 50% of the species were caught by traps and the other half by active sampling in places where there was water available.

Discussion

This work is the first updated checklist of TNP herpetofauna. It is also the first paper to provide information on the richness of reptiles and amphibians in diverse habitat categories, proving a useful tool for the management of the different sectors that face the presence of priority species.

By comparing field data with some records included in informal reports or even in the management plan for the TNP, we found that some species might have been misidentified, making its presence in TNP unlikely. These three next species: *Liolaemus chiliensis, Liolaemus elongatus* and *Cercosaura schreibersii* are quoted in an internal TNP's report only by a former park ranger (Valdecantos, 2014). We could not find them in the field and there are no confirmed records of these species in the entire La Rioja province. In the case of *Liolaemus chiliensis*, the species inhabits the southwestern portion of Argentina and until today it has not been recorded for northwestern Argentina (Minoli *et al.,* 2013). Something similar happens with *Liolaemus elongatus*, some investigations have recorded this species in the southern portion of northwest Patagonia. Regarding *Cercosaura schreibersii,* it could be found in the mountains of the adjacent provinces (Cei, 1993) but there is no record of it throughout La Rioja province.

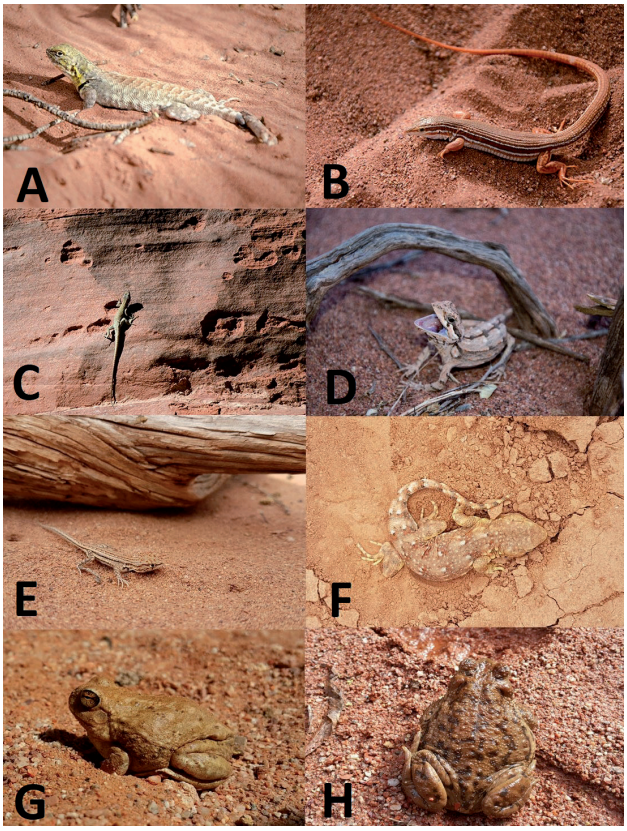

Figure 3. Amphibian species confirmed for Talampaya National Park, Argentina. A: *Liolaemus cuyanus* (male), B: *Aurivela longicauda*, C: *Liolaemus talampaya*, D: *Leisoaurus catamarcensis*, E: *Liolaemus laurenti* (juvenile), F: *Liolaemus anomalus* (male). G: *Pleurodema nebulosum*, H: *Rhinella spinolosa* (female).

Otherwise, the fact that two possible resident lizard species, *Tropidurus spinolosus* and *Tupinambis rufescens*, were not recorded during the present survey might be related to their low abundance in the area, but more surveys are needed to verify their absence in TNP. Regarding *T. spinulosus*, this arboreal lizard is present in La Rioja province (Cruz *et al.,* 2012) and the existence of trees of *Prosopis* in some areas of the park makes its presence likely. In the case of *T. rufescens*, there are reports of a large lizard in the southern portion of the park, which could be this one, considering that this area is near to sites where the species has been seen sunbathing near a national route (C. Kass, direct observation, February 10, 2016).

The only turtle species presented in the area *Chelonoidis chilensis* is the only representant of the order Testudines (Family Testudinidae). This species was found in the southern portion of the park (habitat unit C) only in the spring of 2017, reason why we consider it to be *rare*. *Chenoloides chilensis* is among the most captured animals for the illegal pet trade in Argentina (Prado *et al.*, 2012). At present, we have no knowledge of the status of the populations of this species inside the park. Hence, more research is needed to take actions on the conservation of this turtle.

Lizards constituted the group with the highest abundance of individuals, being Liolaemidae the most numerous family. In addition, we found variations in the use of space by different lizard species. For example: some lizards were only found in sand dunes (*L. anomalus*, *L. cuyanus*, *L. laurenti*, *L. olongasta*, *L. riojanus* and *Aurivela longicauda* and others were found in areas were sand was not the main component of the soil (*L. darwini* and *L. kosloswskyi*). Some species were found frequently (*L. cuyanus* and *A. longicauda*) and others were rare such as *L. anomalus*, *L. pseudoanomalus and Leiosaurus catamarcensis.* In addition, three populations of *L. talampaya* (Avila *et al.*, 2004) were found since they were described in 2004.

Liolaemus anomalus and *L. riojanus* deserve a separate comment because they are classified as vulnerable throughout the Argentine territory (Abdala *et al.*, 2012), and, therefore, their conservation should be considered a priority.

Table 1. List of reptile species from Talampaya National Park, Argentina. Conservational status: DD (data deficient); EN (endangered); LC (least concern); NE (not evaluated) or VU (vulnerable). Presence: C (confirmed species) or P (possible residents). Source of information: B (bibliography/ museum database), Db (museum database), O (occasional record), P (pitfall trap), RR (ranger report) or/and T (transect line). Observation frequency: F (frequent) or R (rare).

Species/ Common name	Presence	Habitat unit	Source of records	Observation frequency	Conservation status	
					National	International
Order Testudines						
Family Testudinidae						
Chelonoidis chilensis (Gray 1870) Argentine tortoise	C	C	B-RR-O	R	VU	VU
Order Squamata						
Infraorder Iguania						
Family Leiosauridae						
Leiosaurus catamarcensis Koslowsky1898 Catamarca's matuasto	C	A	B-O	R	LC	LC
Pristidactylus fasciatus (D'Orbigny & Bibron 1837) D'Orbigny's banded anole	C	?	B	-	DD	DD
Family Liolaemidae						
Liolaemus anomalus Koslowsky 1896 Anomalus chelco	C	A	B-P	R	VU	LC
Liolaemus chiliensis (Lesson 1830) Chilean tree iguana	P	A	B	-	LC	LC
Liolaemus cuyanus Cei & Scolaro 1980 Cuyanus chelco	C	A	B-P	F	LC	LC
Liolaemus darwini (Bell 1843) Darwin's tree iguana	C	C	B-T	F	LC	LC
Liolaemus elongatus Koslowsky 1896 Elongate tree iguana	P	?	B	-	LC	NE
Liolaemus koslowskyi Koslowsky 1993 Koslowskyi's lizard	C	B-C	T	F	LC	LC
Liolaemus laurenti Etheridge 1992 Laurent's lizard	C	A	B-P	F	LC	LC
Liolaemus olongasta Etheridge 1993 Chelco	C	A	B-P	F	LC	LC
Liolaemus pseudoanomalus (Cei 1981)	C	A	B-O	R	LC	LC
Liolaemus riojanus Cei 1979 La Rioja's sand dune lizard	C	A	B-P	F	VU	LC
Liolaemus talampaya Avila, Morando, Perez & Sites 2004 Talampaya lizard	C	B	B-RR-T	R	LC	LC
Family Tropiduridae						
Tropidurus spinolosus (Cope 1892) Spiny lava lizard	P	?	B	-	VU	NE
Infraorder Gekkota						
Family Phyllodactylidae						
Homonota borellii (Peracca 1897) Borelli's Marked Gecko	C	A-B-C	B-O	F	LC	LC

Table 1. Continuation.

Species/ Common name	Presence	Habitat unit	Source of records	Observation frequency	Conservation status	
Homonota fasciata (Duméril & Bibron 1836) South American Marked Gecko	C	A-B-C	B-T	F	LC	LC
Homonota underwoodi Kluge 1964 Underwood's marked gecko	C	A-B-C	B-P	F	LC	LC
Infraorder Scincomorpha						
Family Gymnophthalmidae						
Cercosaura schreibersii (Wiegmann 1834) Long-tailed little lizard	P	?	?	-	LC	LC
Family Teiidae						
Aurivela longicauda (Bell 1843) Longtail whiptail	C	A-C	B-P	F	LC	LC
Teius teyou (Daudin 1802) Four-toed tegu	C	C	B	-	LC	NE
Salvator rufescens (Günther 1871) Red tegu	P	C	B-RR	-	LC	NE
Suborder Serpentes						
Family Boidae						
Boa constrictor occidentalis Philippi 1873 Boa Constrictor	C	C	B-RR	-	EN	NE
Family Dipsadidae						
Erythrolamprus sagittifer (Jan 1863) Arrow ground snake	C	A	B-O	F	LC	LC
Oxyrhopus rhombifer Duméril, Bibron & Duméril 1854 Amazon false coral snake	C	A	O	F	LC	LC
Philodryas psammophidea Günther 1872 Günther's green racer	C	A	B-T	F	LC	LC
Philodryas trilineata (Burmeister 1861) Mousehole snake	C	A	B-RR	F	LC	LC
Pseudotomodon trigonatus (Leybold 1873) False Tomodon snake	C	A	B-T	F	LC	LC
Xenodon merremii (Wagler 1824) Wagler's snake	C	A	B	-	LC	NE
Family Elapidae						
Micrurus pyrrhocryptus (Cope 1862) Coral snake	C	A	B-RR	F	LC	LC
Family Viperidae						
Bothrops ammodytoides Leybold 1873 Patagonia lancehead	C	A-B-C	B-RR	F	LC	NE
Bothrops neuwiedi Wagler 1824 Jararaca pintada	C	A	B-RR	F	LC	NE

Table 1. Continuation.

Species/ Common name	Presence	Habitat unit	Source of records	Observation frequency	Conservation status	
Crotalus durissus Linnaeus 1758 Cascabel Rattlesnake	C	A	B-RR	-	LC	LC
Family Leptotyphlopidae						
Epictia australis (Freiberg & Orejas-Miranda 1968) Freiberg's Blind Snake	C	C	B	-	LC	LC

Table 2. List of amphibian species from Talampaya National Park, Argentina. Conservational status: DD (data deficient) and LC (least concern). Presence: C (confirmed species). Source of information: B (bibliography) and/or O (observation). Observation frequency: F (frequent) or R (rare).

Species/ Common name	Presence	Area inside TNP	Source of records	Observation frequency	Conservation status	
					National	International
Order Anura						
Family Bufonidae						
Rhinella spinulosa (Wiegmann 1834) Warty toad	C		B-T	F	LC	LC
Rhinella arenarum (Hensel 1867) Common toad	C		B-P	F	LC	LC
Family Hylidae						
Boana riojana (Koslowsky 1895)	C		B-O	R	LC	DD
Family Leptodactylidae		A – B – C				
Pleurodema guayapae Barrio 1964 Guayapa's Four-eyed Frog	C		B-P	R	LC	LC
Pleurodema nebulosum (Burmeister 1861) Mendoza Four-eyed Frog	C		B-T	F	LC	LC
Family Odontophrynidae						
Odontophrynus barrioi Cei, Ruíz & Beçak 1982 Barrio's escuerzo	C		B	-	LC	DD

Taxonomic studies (Abdala, 2012) indicate that *L. anomalus* is distributed in a restricted area in the south-central La Rioja province and north-central San Juan province. There is a paucity of available information about its biology, but it is a species that inhabits specialized places with high aridity and salinity and with few vegetation (Abdala *et al.*, 2012). Further studies should be carried out on their population state, their biology, and the degree of anthropogenic threat, specifically in tourist trails inside the park. While this species is protected in the TNP and Provincial Park Ischigualasto (San Juan province), it is necessary to detect the causes of low population density (Abdala *et al.*, 2012).

Being a strictly psamophic species, *Liolaemus riojanus* has been under threat because of the expansion of the agriculture frontier due to new technologies that have led to the installation of crops in areas with marginal growing conditions (Abdala *et al.*, 2012). The agricultural expansion itself results in the loss of habitat in most of the distribution sites recognized in the province of San Juan (south to La Rioja) (Abdala *et al.*, 2012). Besides, this anthropic factor can change the dynamics of the dune formation processes in the surrounding areas, causing changes in the population dynamics. For this reason, we found TNP as a key site for the protection of this species, since no agricultural activities are allowed. For both *Liolaemus* species, we think it is necessary to determinate areas inside TNP with sand dunes, with a minimal intervention of cattle, tourism or other action that could

damage the dynamics of the sand dunes in order to preserve the habitat of this species.

Information on the snakes found inside the park is scarce and no materials were found in museum collections that could throw more light on this point. Even so, we found one new record for TNP during sampling in the field in spring 2017, the Amazon false coral snake *Oxyrhopus rhombifer*. The most frequent species found are *Philodryas psammophidea* and *Pseudotomodon trigonatus*. Most records of *Bothrops ammodytoides* and *Micrurus pyrrhocryptus* were documented by rangers in hot summer days. Snakes from TNP were really difficult to sample because they spend a lot of daily time hidden (Kass *et al*., obs pers). We assume this is related with the extreme temperatures that take place in TNP that make the soil to warm up quickly (up to 50ºC), thus leaving it inaccessible for several ground species. We could only see a few snakes active during the day but up in the bushes.

Boa constrictor occidentalis (locally called "Lampalagua") was seen by rangers inside the park years ago and it is usually seen close to the south limit of TNP. This species is listed as endangered for Argentina (Giraudo *et al.*, 2012); therefore, management strategies are required for its conservation. The "Lampalagua" has been severely exploited because of their valued leather many years ago but nowadays their hunting is prohibited. On hot summer/spring days is common to see vehicles ran over this species, next to 76 National Route.

Among amphibians, *Rhinella spinulosa* and *Rhinella arenarum* were the most frequent species found in several areas of TNP. *Boana riojana* was only found in rainy season where water was deposited and plants grew around. While *Pleurodema* species were found days after several rainstorms in summer and during the year, tadpoles from *Pleurodema* and from *Rhinella spinulosa* were found all year round (even in autumn in places were the water runs all year long). *Odontophrynus barrioi* is endemic for La Rioja province and there are reliable records from the rangers for the area.

In contrast with all Argentinian herpetofauna, TNP protects 7% of the turtle species of Argentina, 6% of the lizard species, 9% of snake species of the entire country and 3% of the amphibian species. If we compare the herpetofauna confirmed for TNP with the one listed for La Rioja province (Cruz *et al*., 2012) we can evaluate that the park holds 51% of the reptile species described for the entire province. The snakes found in the Park represent 58% of the diversity and lizards (including amphisbaena species) 40% of the diversity in La Rioja province. Amphibian's species diversity, in the other hand, represent the half of the diversity described for La Rioja.

We recommend establishing, within the TNP, sites that function as priority areas for conservation in each habitat unit based on the diversity of species found, specially taking account that there are species with vulnerable and endangered conservation status. In these priority areas, monitoring of the species is needed in order to get better knowledge of the status of the populations found.

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