A new species of *Cnemidophorus* (Squamata, Teiidae) from the South American Chaco

Mario R. Cabrera

CONICET and Universidad Nacional de Córdoba, Argentina

Comprising one million square kilometres, the Chaco biome is one of the largest open formations of South America, and part of a biogeographic diagonal in loose continuity with the Cerrado to the north, and the Patagonian Monte to the south. Until recently only one species of *Cnemidophorus* was recognized in the ocellifer group (*C. ocellifer*), but in the last decade several new species have been described to Caatingas and Cerrado. In this paper a new species of *Cnemidophorus*, previously regarded as the southernmost population of *C. ocellifer*, is described. Analyses of external morphology revealed that a number of traits known to be taxonomically informative differ from other species of the genus. The new species is bisexual, and distinguished from all other taxa of *Cnemidophorus* by the following character states: 75−98 granular dorsal scales across midbody; 184−212 dorsal scales along vertebral line; 15−19 femoral pores in total; 25−31 lamellae under the fourth toe; two rows of enlarged prebrachial plates; two rows of scales along the inferoposterior half of the calf of males bearing erected thorn-like borders; 23−26 scales around the tail on the fifth complete postcloacal ring; 5 superciliaries; frontonasal scale subrhombical, wider than long; striped pattern on body and tail with unfading of white stripes in adults, and vertebral stripe absent. The range of the new species in Paraguay and Argentina strongly suggests it is endemic to the Chaco biome. Its presence in the Bolivian Chaco is expected.

Key words: *Cnemidophorus*, lizards, ocellifer species group, Squamata, taxonomy.

INTRODUCTION

Covering one million km², the Chaco biome is one of the largest natural regions of South America (Bucher, 1982; Dinerstein et al., 1995). It forms part of the vast xerophytic corridor comprising the Caatingas, Cerrado and Chaco plant formations, extending from northeastern Brazil to central Argentina, continuing as the Patagonian Monte (Cabrera & Willink, 1980; Vanzolini, 1988). These biomes have a close evolutionary affinity to one another (Colli et al., 2002), and are among the biologically richest open formations of continental South America, with high levels of endemism (Freitas & Silva, 2007; Oliveira & Marquis, 2002; Rodrigues, 1988). The Chaco herpetofauna, for example, includes endemic lizards such as *Liolaemus chacoensis*, *Stenocercus doellojuradoi*, *Tropidurus spinulosus* and *Urostrophus gallardoi* (Iguanidae), *Homonota darwinii macrocephala* and *H. whitii* (Phyllodactylidae), *Kentropyx lagartija* and *Teius teyou* sensu stricto (Teiidae) (Cabrera, 1993, 2009; Cei, 1993; Gallardo, 1979).

Until recently, only one species of *Cnemidophorus* of the *ocellifer* group [a collective of species phenotypically alike and probably related phylogenetically (Cabrera, 2004; Cei, 1993; Wright, 1993)] has been recognized: *Cnemidophorus ocellifer* (Spix, 1825), with a large distribution through the open formations from northeastern Brazil to central Argentina. This static taxonomic state seems to be a consequence of the loss of Spix's holotype presumably during World War II (ZSMH 111/0, Hoogmoed & Gruber, 1983), and the lack of in-depth review of the populations. Active research on Brazilian samples has recently revealed several new species belonging to the *ocellifer* group: *C. abaetensis*, *C. confusionibus*, *C. jalapensis*, *C. littoralis*, *C. mumbuca*, *C. nativo* and *C. venetacaudus* (Colli et al., 2003a, 2009; Dias et al., 2002; Rocha et al., 1997, 2000; Arias et al., 2011). The purpose of this paper is to describe a new bisexual species of the *ocellifer* group from the Chaco biome, previously regarded as the southernmost population of *C. ocellifer*.

MATERIALS AND METHODS

Variables examined on preserved specimens (see Appendix) followed definitions in Peters (1964), Smith (1995), Markezich et al. (1997), and Cabrera & Carreira (2009). Meristic and morphometric variables analyzed included the following: Number of dorsal scales around the midbody, excluding ventrals (DS); number of scales between the medialmost light stripes (SPV); number of dorsal scales along body, counted on midline from occiput (i.e., behind the occipitals) to first transverse row of tail scales (DAS); transverse rows of ventral scales, counted along midventral line from behind the granular scales posterior to gular fold to anterior margin of hindlimbs (TVS); longitudinal rows of ventral scales at midbody (LVS); number of supralabial scales (SLB), infralabial scales (ILB), superciliaries (SC) and supraocular scales on each side of the head (SOC); total number of parietal plates (i.e., interparietal + frontoparietals + parietals)

Correspondence: Departamento de Diversidad Biológica y Ecología, Universidad Nacional de Córdoba, Avenida Vélez Sarsfield 299, (5000) Córdoba, Argentina; *E-mail:* mcabrera@efn.uncor.edu

(PAP); total number of femoral pores (FP); lamellar scales under fourth finger of the left hand (FFS); lamellar scales under fourth toe of the left foot (FTS); number of scales around the tail on the fifth complete postcloacal ring (SAT); snout-vent length (SVL); head length (HL); snout length from tip of snout to anterior tip of frontal scale (SL), and axilla-groin distance (AG). Measurements were taken to the nearest 0.1 mm with digital caliper under a dissecting stereomicroscope.

Categorical variables of morphology and pattern analyzed were: Shape of frontonasal scale; contact or not between first and second supraocular; position of nostril in relation to nasal scales; presence or not of vertebral light stripe; presence or not of paravertebral light stripe; pattern along the body flanks between dorsolateral and lateral light stripes (if spotted or not), and distribution of pigment on ventral aspect of body. Sex was determined by gonad inspection through a short incision on the left side of the belly in intact specimens or without everted hemipenis.

Since the holotype of *Cnemidophorus ocellifer* is lost, individuals of the new species were compared to the plate XXV and brief description by Spix (1825) (for colour and pattern) and to data published by Rocha et al. (2000) and Arias et al. (2011), who revised specimens from Salvador (Bahía State), its type locality. A sample of *Cnemidophorus* from the Brazilian State of Paraíba, thought to be *C. ocellifer*, was different from any other known species of the genus, including the new species, and is referred to hereafter as "*Cnemidophorus* sp. (*ocellifer* group)". Comparisons to other taxa of the *ocellifer* group were based on the original descriptions as published in Rocha et al. (1997, 2000), Dias et al. (2002), Colli et al. (2003a, 2009) and Arias et al. (2011). Comparisons with other species groups of *Cnemidophorus* were made with the specimens detailed in the Appendix, except for the *lemniscatus* group, which was based on literature (Markezich et al., 1997; Ugueto et al., 2009). The taxon *C. parecis* (Colli et al., 2003b) was not considered because it bears a lingual sheath (Giugliano et al., 2006; Arias et al., 2011), and therefore should be referred to the genus *Ameiva* (Boulenger, 1885; Peters & Donoso-Barros, 1970; Cei, 1993).

Collection acronyms are: FML, Fundación Miguel Lillo, Tucumán, Argentina; JMC-DC, Diagnostic Collection of J. M. Cei, now housed at Universidad Nacional de San Luis, Argentina; LJAMM-CNP, L. Avila and M. Morando Collection - Centro Nacional Patagónico, Puerto Madryn, Argentina; MACN and MACN (exCENAI), Museo Argentino de Ciencias Naturales, Buenos Aires; MHNSR, Museo de Historia Natural de San Rafael, Argentina; MLP, Museo de Ciencias Naturales, La Plata, Argentina; MNHN, Museo Nacional de Historia Natural, Montevideo, Uruguay; MNHNP, Museo Nacional de Historia Natural del Paraguay, Asunción; UNNEC, Colección Herpetológica Universidad Nacional del Nordeste, Corrientes, Argentina; ZVC-R, Zoología de Vertebrados, Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay.

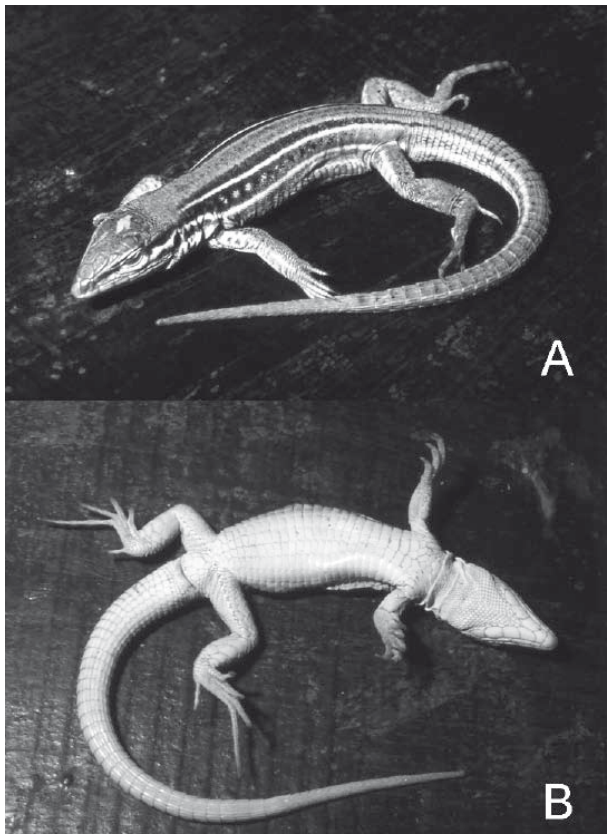

Fig. 1. (A–B) Adult male of *Cnemidophorus abalosi* new sp. from 15 km SE Chamical, province of La Rioja, Argentina, photographed in life by J. M. Cei, March 7, 1989.

Fig. 2. (A–C) Lateral, dorsal and ventral views, respectively, of the head of the holotype of *Cnemidophorus abalosi* (UNNEC 05676).

RESULTS

***Cnemidophorus abalosi* new species** (Figs 1–2)
Synonymy. *Cnemidophorus ocellifer*: Koslowsky, 1898: 185; Tio Vallejo & Miranda, 1984: 81 (in part); Gallardo et al., 1985: 99; Cabrera, 1993: 23; Cei, 1993: 378; Alvarez et al., 2002: 48; Chébez et al., 2005: 40.

Holotype. UNNEC 05676. Adult male. Argentina: Provincia de Formosa: Departamento Bermejo: La Libertad (23º 59' S; 60º 41' W). December 9, 1997. Collected by M. L. Lyons, E. Shaefer and R. Aguirre.

Paratypes. JMC-DC 1057 and 1058, adult female and male, respectively, from Argentina: Provincia del Chaco: Departamento General Güemes: Comandancia Frías. December 16, 1986. Collected by B. Alvarez, M. E. Tedesco and A. Hernando.

MACN (exCENAI) 92, adult male, from Argentina: Provincia de Santiago del Estero: Departamento Choya: Choya. October 13, 1961. Collected by Salguero.

MLP.S 413, adult female, from Argentina: Provincia de Santiago del Estero: Departamento Robles: Beltrán. January 8, 1940; collector unknown.

MLP.S 695, adult male, from Argentina: Provincia de Santiago del Estero: Departamento Robles: Turena. October 1939; collector unknown.

UNNEC 01102, juvenile, from Argentina: Provincia de Santiago del Estero: Departamento Copo: Monte Quemado. April 22, 1988. Collected by B. Alvarez, M. E. Tedesco, A. Hernando and S. Bergna.

Diagnosis

A small (67 mm maximum SVL) bisexual teiid lizard, distinguished from all other species of the genus *Cnemidophorus* by the following combination of character states: 75–98 granular dorsal scales around midbody; 184–212 dorsal scales along body; 8 longitudinal rows of quadrangular ventral scales; 24–31 transverse rows of ventral scales; 15–19 femoral pores in total; 15–17 subdigital lamellae under fourth finger in males, 14–16 in females; 25–31 lamellae under fourth toe; two rows of scales along the inferoposterior half of the calf of males bearing erect, thorn-like borders; preanal spurs absent; 23–26 scales around the tail on the fifth complete postcloacal ring; 4, rarely 5, supraocular scales on each side of the head; 5 superciliaries; frontonasal scale undivided, subrhombical, wider than long; tail twice as long as body and autotomic, and pattern lacking a vertebral stripe.

The new species is easily distinguished from taxa in the *longicauda* species group [*C. longicauda* (Bell) and *C. tergolaevigatus* Cabrera] because these bear an opercule-like projection of skin over the anterodorsal margin of each ear opening and a different colour pattern. *Cnemidophorus abalosi* may be distinguished from species in the *lacertoides* species group (*C. charrua* Cabrera & Carreira; *C. lacertoides* Duméril & Bibron; *C. leachei* Peracca; *C. serranus* Cei & Martori, and *C. vacariensis* Feltrim & Lema) because they lack a semicircle of supraorbital granules separating the frontal scale from second supraocular scale.

The new species is distinguished from taxa of the *lemniscatus* group [*C. arenivagus* Markezich, Cole & Dessauer; *C. arubensis* Van Lidth de Jeude; *C. cryptus* Cole & Dessauer; *C. flavissimus* Ugueto, Harvey & Rivas; *C. gramivagus* McCrystal & Dixon; *C. l. lemniscatus* (Linnaeus); *C. l. splendidus* Markezich, Cole & Dessauer; *C. m. murinus* (Laurenti); *C. m. ruthveni* Burt; *C. nigricolor* Peters; *C. pseudolemniscatus* Cole & Dessauer; *C. senectus* Ugueto, Harvey & Rivas, and *C. vanzoi* (Baskin & Williams)] by having preanal spurs in males and high number of femoral pores (usually more than 40 in total) in the *lemniscatus* group.

Cnemidophorus abalosi belongs to the *ocellifer* species group along with *C. abaetensis* Dias, Rocha & Vrcibradic; *C. confusionibus* Arias, Carvalho, Rodrigues & Zaher; *C. jalapensis* Colli, Giugliano, Mesquita & França; *C. littoralis* Rocha, Araújo, Vrcibradic & Costa; *C. mumbuca* Colli, Caldwell, Costa, Gainsbury, Garda, Mesquita, Filho, Soares, Silva, Valdujo, Vieira, Vitt, Werneck, Wiederhecker & Zatz; *C. nativo* Rocha, Bergallo & Peccinini-Seale; *C. ocellifer* (Spix) and *C. venetacaudus* Arias, Carvalho, Rodrigues & Zaher. It is distinguished from other species in the *ocellifer* group as follows: *C. abaetensis* has more transverse rows of ventrals (29–35, mean 32), 6 superciliaries, normally 3 supraoculars and vertebral stripe present; *C. confusionibus* has more lamellae under the fourth toe (29–35), more rows of enlarged prebrachial plates (3), a different colour pattern and lacks thorn-like scales on the calf of males; *C. jalapensis* is smaller (SVL up to 56 mm), has more dorsal scales along body (200–250, mean 225.9) and across midbody (91–122, mean 104), fewer femoral pores (11–16 in total, mean 13.3) and a pattern without spots on flanks; *C. littoralis* has 9–11 (mean 10) longitudinal rows of ventrals, more femoral pores (16–17 on each leg), more superciliaries (7–8) and a vertebral stripe; *C. mumbuca* is smaller (SVL under 60 mm in adults), has more dorsal scales along body (194–271, mean 229.6) and across midbody (91–117, mean 101); *C. nativo* is a unisexual diploid parthenogenetic clone (Rocha et al., 1997; Ugueto et al., 2009), it bears the nostril completely pierced in the anterior nasal scale without contact to postnasal and a pattern lacking light spots on flanks; *C. venetacaudus* has more dorsal scales across midbody (114–129, mean 119.5), more superciliaries (6–7), more longitudinal rows of ventrals (10), more femoral pores (34–35 in total) and an unstriped pattern. The new species is distinguished from *Cnemidophorus* sp. (*ocellifer* group) from the Paraíba State because the latter has more dorsal scales along body (205–234) and across midbody (100–116), more femoral pores (19–21) and more scales around the tail (26–28).

Cnemidophorus abalosi has been long confused with *C. ocellifer*, largely because of a similar colour pattern. The new species differs from *C. ocellifer* in having more dorsal scales along body (184–212, mean 198.8; versus 172–188, mean 181 in *C. ocellifer*), fewer scales across midbody (75–98, mean 85; versus 92–100, mean 94.6), and fewer rows of large prebrachial plates (2, with the anteriormost clearly wider, versus 3 rows in *C. ocellifer*). *Cnemidophorus abalosi* also consistently differs from *C. ocellifer* by having, in males, two rows of scales bearing

erected borders along the inferoposterior half of calves (scales flat in *C. ocellifer*); a persistence of white stripes in adults (frequently faded or lost in *C. ocellifer*) and by having frontonasal scale subrhombic, wider than long in both sexes, preventing contact (or limiting it to a point) between postnasal and prefrontal scales, while in *C. ocellifer* the frontonasal is normally hexagonal to octagonal, as wide as long, with postnasal and prefrontal in full contact.

Description of holotype

UNNEC 05676, adult male; snout-vent length 65.8 mm; head length 17.2 mm; snout length 6.4 mm; axilla-groin distance 29.2 mm; tail complete, length 143 mm. Head elongate, triangle-shaped in dorsal aspect, with straight sides. Canthus rostralis blunt. All dorsal head plates slightly convex. Rostral prominent, visible from above and below. Nasal large, with the nostril pierced entirely on it, its rear limit reaching the anterior border of the postnasal. Extensive middorsal contact between nasals, which also contact rostral, frontonasal, postnasals, and supralabial 1. One postnasal on each side, higher than long, subtriangular with anterior and posterior sinuous borders, contacting the nasal, frontonasal, loreal and supralabials 1−2. Loreal large, single, in broad contact with the posterior border of postnasal, and resting on supralabial 3 and part of supralabial 4 on both sides of the head. Frontonasal single, wider than long, subrhombic with anterior sides slightly curved. Two prefrontals, irregularly pentagonal, in broad contact with one another in the midline, each one also contacting the frontonasal, loreal, frontal and first supraocular. Frontal single, longer than wide, pentagonal, narrow behind; its two anteriormost sides contacting prefrontals, its lateral borders in slight contact with supraocular 1, posteriorly, a row of five small scales separate frontal margins from supraoculars 2 and 3; and the most posterior point contacting the anterior edge of each frontoparietal. Two pentagonal frontoparietal plates, in broad contact with one another along midline, separated from supraoculars 3−4 by a row of five supraorbital granules, continued posteriorly as a field of granules separating the parietal plates of supraocular 4. Four parietals, irregular, each one smaller than the single interparietal on the midline. Interparietal subrectangular, longer than wide, with lateral sides almost parallel; its anterior and posterior edges, straight and short. Postparietals forming a field of irregular polygonal, convex, scales; the one behind the interparietal being a large interoccipital, followed posteriorly by tiny granular scales on neck. Four supraoculars on each side, slightly convex, forming a continuous series. Five superciliaries in row, the first two longest; the first one overlapping to second, and only contacting supraoculars 1 and 2; the other superciliaries separated from the supraocular series by a row of tiny granules. Eyelids finely granular, the lower eyelid with a group of translucent scales at its centre. One tall preocular, keeled, contacting first superciliary. Three suboculars, all contacting supralabials; the first two markedly keeled near their upper borders, the third convex. Supralabials 7, the two anteriormost short, with round free border, all others longer than high. Infralabials 4/5, longer than high, contacting the row of chinshields. Temporals granular, convex, juxtaposed; crossed in middle of the field by a horizontal row of supratemporals, of which the second is the longer, forming a discrete temporal ridge. Ear opening rounded with straight border behind, surrounded by small granular scales.

Mental subtriangular, followed in the midline by one pentagonal postmental. Five pairs of large chinshields, the first pair in broad contact along midline, the rest progressively divergent; the last pair smallest. A field of swollen oval scales between chinshields, followed in the gular region by gulars, round to oval, decreasing in size in the interior of an ill-defined anterior gular fold. A well-defined gular fold posterior to that; mesoptychial scales imbricate, considerably larger than granular scales lining the interior of the fold. Scales on nape and sides of neck granular, small.

On the trunk region, dorsal and flank scales granular to conical, more or less regularly ordered transversally; 90 scales across midbody, 208 scales in a middorsal line from the occiput to the base of tail. A field of large scales, triangular or square, roughly arranged in four rows, on upper chest between insertion of humeri. Posterior to them the series of ventral scales, smooth, mostly rectangular wider than long, becoming square posteriorly. Eight scales in the row between axillae; 8 midventrally; 6 in the last transverse row, near groin. At lateral extremes of most rows, 1−2 additional scales rounded, smaller than regular ventrals, just before the granules of flanks. Transverse rows of ventrals 29 on midventral line. Six squarish preanal plates, the two innermost largest, preceded by a large triangular plate surrounded anteriorly and on sides by smaller imbricate scales. Fields of conical granules anterior and posterior to vent. Preanal spurs absent.

On the forelimbs, suprabrachial and postbrachial scales triangular to rhombic, imbricate, with a short row of enlarged plates reaching the elbow; two longitudinal rows of large prebrachials, those of anteriormost row wider than long and continuous with the large preantebrachial plates. Axillary and infrabrachial scales granular, small. Antebrachial scales granular, small and juxtaposed, except anterodorsally where they form large imbricate plates, in two rows near elbow, followed towards the wrist by a single row of four large plates. Hand pentadactyl, with long sharp claws. Palm granular, larger scales proximal to wrist. Subdigital lamellae smooth, 16 under left fourth finger. Hand dorsum with rows of plates wider than long arranged along the axis of each digit.

On hindlimbs, femoral scales granular, juxtaposed, on the dorsal and posterior surfaces of thigh. Large imbricate plates anterior to the row of femoral pores, reaching the knee. Femoral pores 8 on each thigh. Tibial scales granular and juxtaposed dorsally; large and imbricate ventrally, in two main rows. Two rows of 7−8 scales each, bearing erected borders, along the inferoposterior half of calf. Foot pentadactyl, thin digits with sharp claws. Foot dorsum with imbricate plates in two main rows; sole finely granular. Subdigital lamellae smooth, mostly divided in pairs, 29 under the left fourth toe.

Scales on tail dorsum quadrangular, longer than wide, in regularly ordered rings; oblique keels forming relatively continuous carinae. Proximal ventral and lateral

tail scales squarer than those on dorsum, imbricate; near the tail base smooth, becoming progressively keeled distally, but less markedly than in dorsals. Scales around the fifth complete postcloacal ring 25.

Variation

Table 1 shows meristic and morphometric variation for 23 specimens of *C. abalosi*, including the type series. Males are significantly larger than females in head length (*t*-test: t_{21}=-3.25; p=0.004), snout length (t_{21}=-3.14; p=0.005), and snout-vent length (t_{21}=-2.13; p=0.046). There are no significant differences between sexes in scale counts (DS, SPV, DAS, SAT, TVS, LVS, SLB, ILB, SOC, PAP, FFS, FTS), number of femoral pores and axilla-groin distance. Frontonasal scale invariably entire and rhomb-shaped. Supraocular scales four, except in a few individuals (3/26 lizards) that show five scales on one side, by an evident subdivision of the third supraocular. First supraocular in full contact with second supraocular, except for one specimen where small granules interpose. Semicircle of supraorbital scales always present but highly variable in number, size and shape of scales, separating the supraoculars 2–4 from frontal, frontoparietal and parietal plates. Superciliaries invariably five. The PAP are regularly seven, except few cases of scale bilateral fusion (then totalling five) or unilateral division (then totalling eight). Two chinshields in contact on midline, except for one specimen. Two gular folds, the anteriormost ill-defined and occasionally absent. Eight longitudinal rows of ventral scales; occasionally (8/25 cases) these quadrangular scales are accompanied by a smaller scale, subtriangular or semicircular, at each extreme of the row.

Colouration

In life (Fig. 1) dorsal surface of head olive brown, as well as the central field along dorsum of body, changing gradually to light brown on tail dorsum. No vertebral stripe. Two faint paravertebral stripes, lighter than dorsum and best distinguishable at middle of back, separate at both sides of body the dorsal brown field from a dark brown stripe limited below by a vivid white dorsolateral stripe starting from neck and continuous, more diffuse, on the tail. A lateral white stripe starts on the postnasal, runs along the inferior half of loreal, covers the palpebrals, goes across temporals, surrounds completely the ear and runs along side of neck and body, bifurcates to enter more

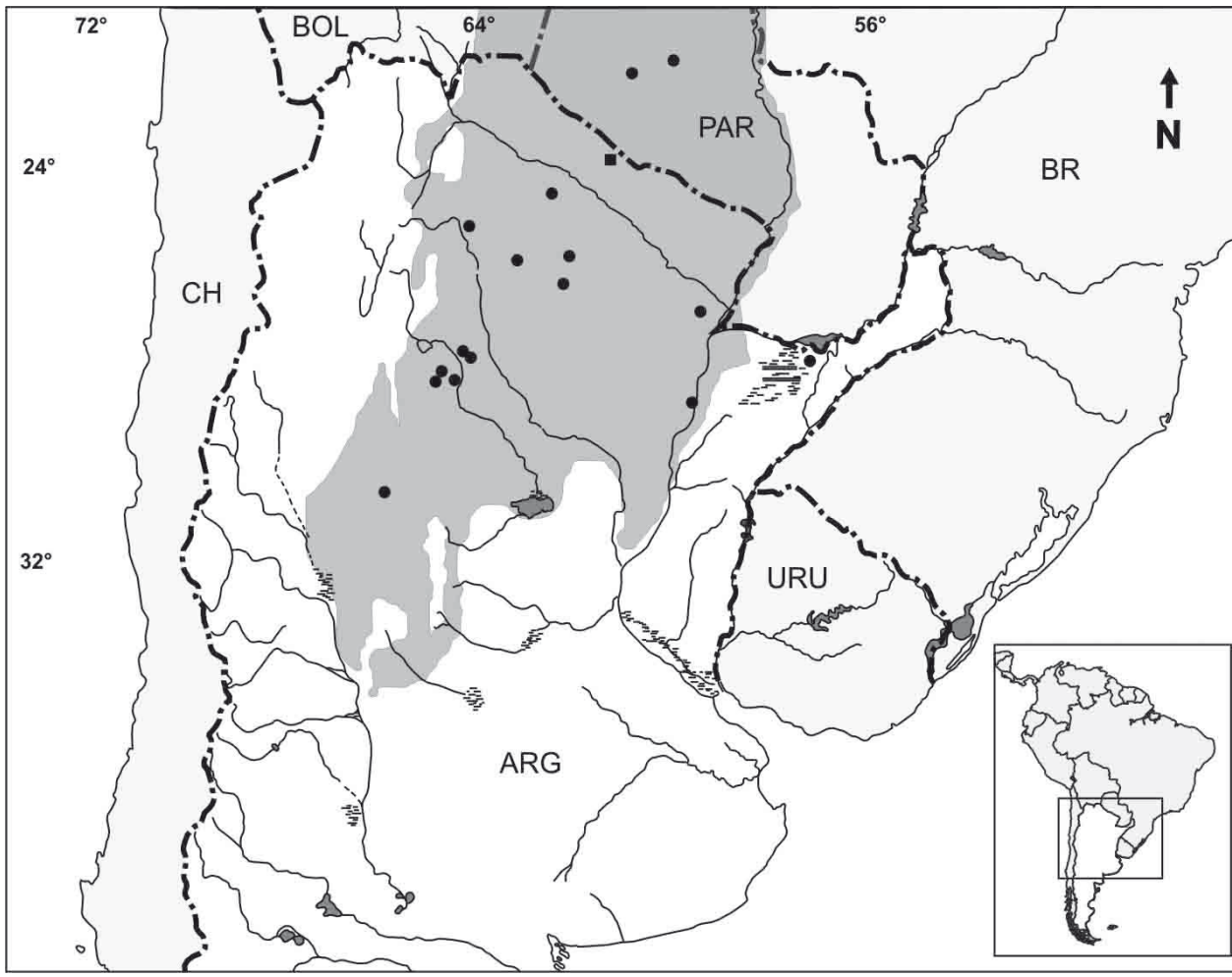

Fig. 3. Map of southern South America showing localities where *Cnemidophorus abalosi* has been recorded (circles). A square indicates the type locality. The dark grey area represents the Chaco biome, adapted from Cabrera & Willink (1980) and Prado (1993). ARG, Argentina; BOL, Bolivia; BR, Brazil; CH, Chile; PAR, Paraguay; URU, Uruguay.

or less defined on the thigh anterodorsally, while the main branch continues on sides of tail, fading out. Ground colour of body between dorsolateral and lateral stripes brown, clearing gradually and passing to green towards groin, dorsum of thigh and below the lateral stripe. On that field a series of light-blue or whitish green ocelli, poorly defined or absent posteriorly, alternating with irregular black spots. A short second lateral white stripe (ventrolateral) starts behind the chinshields, runs across neck and ends on the insertion of arm. Dorsum of arms and legs brown with small darker dots. Ventral surfaces of head, limbs and tail pearly white. Chest and belly yellowish white, with light blue on the external ventrals, near the granules of flanks. In preservative (70% ethanol) ground colour dark brown, varying according to the time immersed in formalin and alcohol, and exposure to light, but in all specimens the three pairs of lighter stripes as well as the ocelli are still discernible. In some cases, the vivid colours are still evident after decades in the collection.

The variation in colouration is mainly restricted to the bright colours. The dorsolateral and lateral white stripes frequently are light blue, yellow, or bluish green, particularly on the posterior half of body. The ventrolateral stripe is always white. Lateral ocelli may be light blue or greenish white; numbering up to 15, varying among individuals. A stain of light blue is frequently present on infralabials and posterior chinshields. Sexes are not dimorphic in the colour pattern of adults examined (except for brighter colours present in males) nor in the few juveniles examined. The white stripes do not fade in life in larger individuals.

Geographic distribution

The new species is known from the Paraguayan Departments of Boquerón and Presidente Hayes, and from the Argentine provinces of Corrientes, El Chaco, Formosa, La Rioja, Salta and Santiago del Estero, in localities included in the Chaco biome (Fig. 3). *Fide* Koslowsky (1898) is also found in Catamarca Province.

Etymology

The specific epithet is proposed in honour of Jorge W. Abalos; gifted novelist and university professor, who specialized in venomous animals, but mainly (as he proudly liked to remark), was a Chacoan rural teacher who identified with the people, idiosyncrasies and problems of this region.

DISCUSSION

Rodrigues (1987) was the first to recognize that *C. ocellifer* as applied to all South American populations in fact comprised a complex of species, many of which were formally described since then. In this work, I assigned the species rank to the Chaco population because of its particular and constant combination of characters. As evidenced by the documented morphological differentiation, the Chaco populations appear to be isolated from other species over at least tens of thousands of years with no or very limited gene flow, justifying its species status following Torres-Carvajal et al. (2011).

Until recently, the open corridor between northeastern Brazil and central Argentina was regarded to lack a characteristic lizard fauna, an assertion that is currently being reversed (Vanzolini, 1988; Colli et al., 2002). It is now well established that also the Chaco biome harbours an assemblage of endemic herpetofauna [e.g., anurans (Cei, 1980); turtles and tortoises (Cabrera, 1998); Squamates (Cei, 1993)], indicative of its own evolutionary history. The climatic changes during the Pleistocene and Holocene occasioned alternate expansions and contractions of communities and biomes including the

Table 1. Descriptive statistics for meristic and morphometric characters of *Cnemidophorus abalosi* new sp. Abbreviations as in Materials and Methods. Measurements are in mm.

	Males (*n*=17)				Females (*n*=6)			
Variable	Range	Mean	SD	Median	Range	Mean	SD	Median
DS	75−98	84.67	6.24	84	77−98	85.83	8.98	82.5
SPV	9−14	11.13	1.26	11	10−12	11.17	0.98	11.5
DAS	184−212	198.63	8.07	200	190−208	201.17	6.88	202
TVS	27−31	28.71	1.21	29	24−31	28.33	2.34	29
LVS	8	8	0.00	8	8	8	0.00	8
SLB	6−8	6.56	0.57	6.5	6−8	6.83	0.75	7
ILB	5−6	5.16	0.30	5	5−6	5.17	0.41	5
SOC	4−5	4.09	0.26	4	4−5	4.08	0.20	4
PAP	5−8	6.94	0.57	7	5−7	6.60	0.89	7
FP	16−19	17.59	0.94	18	15−19	17.17	1.47	17.5
FFS	15−17	16.06	0.83	16	14−16	15.17	0.75	15
FTS	26−31	28.25	1.29	28	25−31	27.67	2.16	27.5
SAT	23−26	24.41	0.87	24	23−26	24.67	1.21	24.5
SVL	52.5−67.2	60.51	5.35		51.7−59.9	55.57	2.87	
HL	13.7−18.4	16.36	1.48		12.9−15.2	14.27	0.84	
SL	5.0−7.8	6.18	0.74		4.5−5.7	5.17	0.41	
AG	21.1−34.8	27.89	3.26		23.1−28.8	26.33	2.09	

Chaco (Ortiz-Jaureguizar & Cladera, 2006). This cyclic scenario alternately allowed and impeded the faunistic interchange among Chaco, Cerrado and Caatingas, and may have favoured speciation events. With the description of *C. abalosi*, the number of species in the *ocellifer* group rises to nine and the total of species in the genus increases to 27 (Cabrera & Carreira, 2009; Ugueto et al., 2009; Arias et al., 2011). This figure is however still preliminary, because further species will likely be described. A complete phylogeny will only be feasible after accumulating more knowledge about the genus.

Arias et al. (2011) proposed to subdivide the *ocellifer* species group into two phenetically distinct subgroups, one including *C. confusionibus*, *C. jalapensis*, *C. mumbuca* and *C. ocellifer*, and the other including *C. abaetensis*, *C. littoralis* and *C. venetacaudus*. Enlarged scales in temporal region are present in the first subgroup only. Other differences are five superciliaries versus 6−7, respectively; 6−8 longitudinal rows of ventral scales versus 8−10; 24−29 transverse rows of ventrals versus 29−38 and 11−21 femoral pores versus 21−45. The second subgroup also possesses one row of enlarged suprabrachial plates, spurs on heels (calves) of males, and a bluish green tail. Some character states (enlarged temporal scales, enlarged suprabrachial plates) are difficult to assess, due to gradual trait change and some overlap, which is however expected (McCrystal & Dixon, 1987; Colli et al., 2003b). *Cnemidophorus abalosi* shows a combination of traits that prevents its allocation to either of the subgroups as proposed by Arias et al. (2011), and accounts for its distinctiveness as a new species: it has five superciliaries and 15−19 femoral pores, in combination with spurs.

The geographic distribution of *C. abalosi* strongly suggests that it is a species endemic to the Chaco biome. All records in this study fell into the boundaries of this region except for one outlier locality (Ituzaingó, province of Corrientes); whether or not northern Corrientes belongs in the Chaco biome is still a matter of debate (Dinerstein et al., 1995; Alvarez, 2003; Josse et al.; 2003). In addition to Argentina and Paraguay, *C. abalosi* should be present in the Chaco of Bolivia, where "*C. ocellifer"* has been recorded (Dirksen & De La Riva, 1999; Langstroth, 2005). Further research is needed to verify whether *C. abalosi* and/or other species of the *ocellifer* group are present in the Bolivian Chaco, and in the non-Chaco landscapes of Paraguay (Aquino et al., 1996; Norman Scott, pers. com.).

ACKNOWLEDGEMENTS

I am grateful to J. Williams (MLP), G. Carrizo (MACN), S. Carreira and M. Meneghel (ZVC-R and MNHN), B. Alvarez (UNNEC), L. Avila (LJAMM-CNP), and S. Kretzschmar and E. Lavilla (FML) for sending on loan preserved specimens in their care. Carrizo and Carreira as well as A. Brigada and B. Espeche (JMC-DC), M. Motte and P. Cacciali (MNHNP), and H. and F. Lagiglia (MHNSR) kindly assisted in many ways when I visited the collections. Special thanks go to Alejandro Scolaro (Centro Nacional Patagónico, Arg.) who provided me photos of the new species in life, skilfully shot by the late J. M. Cei, and to Norman Scott Jr. for advice, reviewing and encouraging. Comments by three anonymous referees improved the manuscript. This is the contribution number 9 in the Program "The species of the genus *Cnemidophorus* (Squamata, Teiidae) in southern South America" funded through grants by CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina), and SeCyT-UNC (Secretaría de Ciencia y Tecnología de la Universidad Nacional de Córdoba, Argentina).

REFERENCES

Alvarez, B.B. (ed). (2003). *Fauna del Iberá*. Corrientes: EUDENE.

Alvarez, B.B., Aguirre, R.A., Céspedes, J.A., Hernando, A.B. & Tedesco, M.E. (2002). *Atlas de Anfibios y Reptiles de las provincias de Corrientes, Chaco y Formosa, Argentina. I. Anuros, Cecílidos, Saurios, Anfisbénidos y Serpientes*. Corrientes: EUDENE.

Aquino, A.L., Scott, N. & Motte, M. (1996). Lista de los anfibios y reptiles del Museo Nacional de Historia Natural del Paraguay. In *Colecciones de Fauna y Flora del Museo Nacional de Historia Natural del Paraguay*, 331−400. Romero, O. (ed). Museo Nacional de Historia Natural del Paraguay, Asunción.

Arias, F., Carvalho, C.M., Rodrigues, M.T. & Zaher, H. (2011). Two new species of *Cnemidophorus* (Squamata: Teiidae) from the Caatinga, Northwest Brazil. *Zootaxa* 2787, 37−54.

Boulenger, G.A. (1885). *Catalogue of the Lizards in the British Museum (Natural History). Volume II.* London: Trustees of the British Museum.

Bucher, E.H. (1982). Chaco and Caatinga – South American arid savannas, woodlands and thickets. In *Ecology of Tropical Savannas*, 48−79. Huntley, B.J. & Walker, B.H. (eds). (*Ecological Studies* 42).

Cabrera, A.L. & Willink, A. (1980). *Biogeografía de América Latina*. Washington D.C.: Secretaría General OEA, serie Biología, Monogr. 13.

Cabrera, M.R. (1993). Los saurios del Espinal y su presencia en provincias biogeográficas vecinas. *Revista del Museo Argentino de Ciencias Naturales, Ecología* 4, 17−34.

Cabrera, M.R. (1998). *Las Tortugas Continentales de Sudamérica Austral.* Córdoba: Privately printed.

Cabrera, M.R. (2004). A new species of *Cnemidophorus* (Squamata: Teiidae) from western Argentina. *Amphibia-Reptilia* 25, 265−275.

Cabrera, M.R. (2009). *Lagartos del Centro de la Argentina.* Córdoba: Taller General de Imprenta Universidad Nacional de Córdoba.

Cabrera, M.R. & Carreira, S. (2009). A new, but probably extinct, species of *Cnemidophorus* (Squamata, Teiidae) from Uruguay. *Herpetological Journal* 19, 97−105.

Cei, J.M. (1980). Amphibians of Argentina. *Monitore Zoologico Italiano*, Monogr. 2, 1−609.

Cei, J.M. (1993). Reptiles del Noroeste, Nordeste y Este de la Argentina. *Museo Regionale di Scienze Naturali Torino*, Monogr. 14, 1−949.

Chébez, J.C., Rey, N.R. & Williams, J.D. (2005). *Reptiles de los Parques Nacionales de la Argentina.* Monogr. 19. Buenos Aires: L.O.L.A.

Colli, G.R., Bastos, R.P. & Araujo, A.F.B. (2002). The character and dynamics of the Cerrado herpetofauna. In *The Cerrados of Brazil. Ecology and Natural History of a Neotropical Savanna*, 223−241. Oliveira, P.S. & Marquis, R.J. (eds). New York: Columbia University Press.

Colli, G.R., Caldwell, J.P., Costa, G.C., Gainsbury, A.M.,

Garda, A.A., Mesquita, D.O., Filho, C.M.M.R., Soares, A.H.B., Silva,V.N., Valdujo, P.H., Vieira, G.H.C., Vitt, L.J., Werneck, F., Wiederhecker, H.C., & Zatz, M.G. (2003a). A new species of *Cnemidophorus* (Squamata, Teiidae) from the Cerrado biome in central Brazil. *Occasional Papers Sam Noble Oklahoma Museum of Natural History* 14, 1−14.

Colli, G.R., Costa, G.C., Garda, A.A., Kopp, K.A., Mesquita, D.O., Péres, A.K., Valdujo, P.H., Vieira, G.H.C. & Wiederhecker, H.C. (2003b). A critically endangered new species of *Cnemidophorus* (Squamata, Teiidae) from a Cerrado enclave in southwestern Amazonia, Brazil. *Herpetologica* 59, 76−88.

Colli, G.R., Giugliano, L.G., Mesquita, D.O. & França, F.G.R. (2009). A new species of *Cnemidophorus* from the Jalapão Region, in the central Brazilian Cerrado. *Herpetologica* 65, 311−327.

Dias, E.J.R., Rocha, C.F.D. & Vrcibradic, D. (2002). New *Cnemidophorus* (Squamata: Teiidae) from Bahia State, northeastern Brazil. *Copeia* 2002, 1070−1077.

Dinerstein, E., Olson, D.M., Graham, D.J., Webster, A.L., Primm, S.A., Bookbinder, M.P. & Ledec, G. (1995). *Una Evaluación del Estado de Conservación de las Eco-regiones Terrestres de América Latina y el Caribe.* Washington D.C.: World Bank and WWF.

Dirksen, L. & De La Riva, I. (1999). The lizards and amphisbaenians of Bolivia (Reptilia, Squamata): Checklist, localities, and bibliography. *Graellsia* 55, 199−215.

Freitas, M.A. & Silva, T.F.S. (2007). *A Herpetofauna das Caatingas e áreas de Altitudes do Nordeste Brasileiro*. Pelotas: USEB.

Gallardo, J.M. (1979). Composición, distribución y origen de la herpetofauna chaqueña. In *The South American Herpetofauna: Its Origin, Evolution and Dispersal*, 299−307. Duellman, W.E. (ed). Lawrence: University of Kansas Museum of Natural History, Monogr. 7.

Gallardo, J.M.; Tio Vallejo, M. & Miranda, M.E. (1985). Estudio sobre la distribución de los saurios de Santiago del Estero, República Argentina (Reptilia: Sauria). *Historia Natural* 5, 97−103.

Giugliano, L.G., Contel, E.P.B. & Colli, G.R. (2006). Genetic variability and phylogenetic relationships of *Cnemidophorus parecis* (Squamata, Teiidae) from Cerrado isolates in southwestern Amazonia. *Biochemical Systematics and Ecology* 34, 383−391.

Hoogmoed, M.S. & Gruber, U. (1983). Spix and Wagler type specimens of reptiles and amphibians in the Natural History Musea in Munich (Germany) and Leiden (The Netherlands). *Spixiana* Suppl. 9, 319−415.

Josse, C., Navarro, G., Comer, P., Evans, R., Faber-Langendoen, D., Fellows, M., Kittel, G., Menard, S., Pyne, M., Reid, M., Schulz, K., Snow, K. & Teague, J. (2003). *Ecological Systems of Latin America and the Caribbean: A Working Classification of Terrestrial Systems.* Arlington: NatureServe.

Koslowsky, J. (1898). Enumeración sistemática y distribución geográfica de los reptiles argentinos. *Revista del Museo de La Plata* 8, 161−200 + 7 plates.

Langstroth, R.P. (2005). Adiciones probables y confirmadas para la saurofauna boliviana. *Kempffiana* 1, 101-128.

Markezich, A.L., Cole, C.J. & Dessauer, H.C. (1997). The blue and green whiptail lizards (Squamata: Teiidae: *Cnemidophorus*) of the Peninsula de Paraguana, Venezuela: Systematics, ecology, descriptions of two new taxa, and relationships to whiptails of the Guianas. *American Museum Novitates* 3207, 1−60.

McCrystal, H.K. & Dixon, J.R. (1987). A new species of *Cnemidophorus* (Sauria: Teiidae) from the llanos of Colombia and Venezuela. *Journal of Herpetology* 21, 245−254.

Oliveira, P.S. & Marquis, R.J. (eds). (2002). *The Cerrados of Brazil. Ecology and Natural History of a Neotropical Savanna.* New York: Columbia University Press.

Ortiz-Jaureguizar, E. & Cladera, G.A. (2006). Paleoenvironmental evolution of southern South America during the Cenozoic. *Journal of Arid Environments* 66, 498−532.

Peters, J.A. (1964). *Dictionary of Herpetology*. New York: Hafner.

Peters, J.A. & Donoso-Barros, R. (1970). Catalogue of the Neotropical Squamata: Part II. Lizards and Amphisbaenians. *United States National Museum Bulletin* (297), 1-293.

Prado, D.E. (1993). What is the Gran Chaco vegetation in South America? II. A redefinition. Contribution to the study of the flora and vegetation of the Chaco. VII. *Candollea* 48, 615−629.

Rocha, C.F.D., Araújo, A.F.B, Vrcibradic, D. & da Costa, E.E.M. (2000). New *Cnemidophorus* (Squamata; Teiidae) from coastal Rio de Janeiro State, southeastern Brazil. *Copeia* 2000, 501−509.

Rocha, C.F.D., Bergallo, H.G. & Peccinini-Seale, D. (1997). Evidence of an unisexual population of the Brazilian whiptail lizard genus *Cnemidophorus* (Teiidae), with description of a new species. *Herpetologica* 53, 374−382.

Rodrigues, M.T. (1987). Sistemática, ecologia e zoogeografia dos *Tropidurus* do grupo *torquatus* ao sul do Rio Amazonas (Sauria, Iguanidae). *Arquivos de Zoologia* 31, 105−230.

Rodrigues, M.T. (1988). Distribution of lizards of the genus *Tropidurus* in Brazil (Sauria, Iguanidae). In *Proceedings of a Workshop on Neotropical Distribution Patterns*, 305−315. Heyer, W.R. & Vanzolini, P.E. (eds). Rio de Janeiro: Academia Brasileira de Ciências.

Smith, H.M. [1995 (1946)]. *Handbook of Lizards. Lizards of the United States and of Canada*. Ithaca: Comstock Publishing, Cornell University.

Spix, J.B. (1825). *Animalia Nova sive Species Novae Lacertarum quas in Itinere per Brasiliam annis MDCCCXVII-MDCCCXX jussu et auspiciis Maximiliani Josephi I Bavariae Regis Suscepto Collegit et Descripsit Dr. J. B. de Spix.* Munich: F.S. Hübschmanni.

Tio Vallejo, M. & Miranda, M.E. (1984). Presencia en la Argentina de *Cnemidophorus ocellifer* (Sauria, Teiidae). *Physis, Secc. C* 42(103), 81−82.

Torres-Carvajal, O., Etheridge, R. & De Queiroz, K. (2011). A systematic revision of Neotropical lizards in the clade *Hoplocercinae* (Squamata: Iguania). *Zootaxa* 2752, 1−44.

Ugueto, G.N., Harvey, M.B. & Rivas, G.A. (2009). Two new species of *Cnemidophorus* (Squamata: Teiidae) from islands of the northeastern coast of Venezuela. *Herpetological Monographs* 23, 123−153.

Vanzolini, P.E. (1988). Distributional patterns of South American lizards. In *Proceedings of a Workshop on Neotropical Distribution Patterns*, 317−342. Heyer, W.R. & Vanzolini, P.E. (eds). Rio de Janeiro: Academia Brasileira de Ciências.

Wright, J.W. (1993). Evolution of the lizards of the genus *Cnemidophorus*. In *Biology of Whiptail Lizards (Genus Cnemidophorus)*, 27−81. Wright, J.W. & Vitt, L.J. (eds). Norman: Oklahoma Museum of Natural History.

APPENDIX

Specimens Examined

Acronyms as in Materials and Methods. Additional comments are in italics and parentheses.

Cnemidophorus abalosi

ARGENTINA. **Corrientes**: Departamento Bella Vista:

Bella Vista, MLP.S 951.Departamento Ituzaingó: Ituzaingó, MACN 36807. **El Chaco**: Departamento General Güemes: Comandancia Frías, JMC-DC 1057/58. Departamento Libertador General San Martín: Selvas del Río de Oro, UNNEC 06528. **Formosa**: Departamento Bermejo: La Libertad, UNNEC 05676, 05681, 05692, 06826. **Jujuy**: Departamento Yaví: La Quiaca, MACN (ex-CENAI) 838 *(locality probably erroneous since it is situated at 3442 metres above sea level; not mapped in Fig. 3)*. **Salta**: Departamento Anta: El Quebrachal, MACN (exCENAI) 990. **Santiago del Estero**: Departamento Alberdi: Coronel Rico, UNNEC 06478. Departamento Choya: Choya, MACN (exCENAI) 92, 93-A, 93-C; Villa La Punta, MLP.S 1026. Departamento Copo: Monte Quemado, UNNEC 01102/03; Parque Nacional Copo, Paraje Florencia, UNNEC 04568, 06475, 06480/81, 06523. Departamento Loreto: 5 km S Villa San Martín, MACN 27834/35 *(only field number tags 57 and 58 attached to specimens)*. Departamento Robles: Beltrán, MLP.S 413, 555, 964; Turena, MLP.S 695. PARAGUAY. **Boquerón**: Filadelfia, MNHNP 2747, 2883; Parque Cué, MNHNP 09195. **Presidente Hayes**: 60 km ENE de Filadelfia, MNHNP 4069.

Cnemidophorus charrua
URUGUAY. **Rocha**: Cabo Polonio, MNHN 03423 (*holotype*), 03422 and 03424 (*paratypes*); ZVC-R 1856 and 1865 (*paratypes*), 2505/06, 2519/20.

Cnemidophorus lacertoides
URUGUAY. **Lavalleja**: Asperezas de Polanco, ZVC-R 5042/43; Ruta 8, Km 131 Establecimiento "El Penitente", ZVC-R 5350. **Maldonado**: Cerro de Animas, MLP.S 965; Ruta 60, ZVC-R 5304; Sierra de Animas, ZVC-R 3891, 4358/59. **Montevideo**: Cerro de Montevideo, ZVC-R 1265/66. **Rocha**: Castillos, MACN 1127/28; Parque Nacional de San Miguel, ZVC-R 1810. **San José**: Sierra de Mahoma, ZVC-R 5566. **Treinta y Tres**: Quebrada de los Cuervos, ZVC-R 1348, 1351, 1353, 1355, 1382, 4569/70, 4578, 4751; Santa Clara de Olimar, ZVC-R 1263.

Cnemidophorus leachei
ARGENTINA. **Salta**: Departamento Orán: Río Pescado y Serranía Las Pavas, extremo SW del Parque Nacional Baritú, MACN 32299. Departamento Rosario de la Frontera: Rosario de la Frontera, MLP.S 1064.

Cnemidophorus longicauda
ARGENTINA. **Córdoba**: Departamento Cruz del Eje: La Batea, MLP.S 201, 203, 205/11. Departamento Tulumba: Lucio V. Mansilla, FML 02761-2, 02761-4/7. **La Pampa**: Departamento Chical-Có: La Ahumada, MACN 29144/48. Departamento Puelén: 7 km NE Casa de Piedra, LJAMM-CNP 2118/20, 2179. **La Rioja**: Departamento Chilecito: Chilecito, MLP.S 1091. Departamento Coronel Felipe Varela: Km 158 de Ruta Nacional 76, 18 km S de Pagancillo, LJAMM-CNP 4061, 4064, 4066. Departamento Rosario Vera Peñaloza: Ruta Nacional 141, 7.6 km W Mascasin, Salinas de Mascasin, LJAMM-CNP 5748. **Mendoza**: Departamento Luján: Chacras de Coria, MLP.S 107, 110. Departamento Malargüe: La Matancilla, MHNSR.H 835; Malargüe, Cihueco, MLP.S 968; 100 km S Gobernador Ayala, Ruta Provincial 180, LJAMM-CNP 5100. Departamento San Carlos: Viluco, MLP.S 233, 597, 712. Departamento San Rafael: Rincón del Atuel, MHNSR.H 1127/28; Valle Rincón del Atuel, MHNSR.H 106/09, 376/77, 676/77, 742, 801/03. Departamento Santa Rosa: Ñacuñán, MACN 36100. **Río Negro**: Departamento Avellaneda: Chelforo, LJAMM-CNP 21; Chimpay, LJAMM-CNP 40/51, 53, 57/62, 1690/91. Departamento San Antonio: Las Grutas, LJAMM-CNP 4541; San Antonio Oeste, MACN 29143. Departamento Valcheta: 4 km N de Apeadero Nahuel Niyeu, MACN 28422/23. **San Juan**: Departamento Valle Fértil: 2 km E Baldecitos, Km 88 sobre Ruta Provincial 510, LJAMM-CNP 4075. Departamento 25 de Mayo: 2.8 km W Encón, Ruta Nacional 20, LJAMM-CNP 4071, 4073/74.

Cnemidophorus sp. (*ocellifer* group)
BRAZIL. **Paraíba**: João Pessoa, Cidade Universitária *(UFPR Campus)*, ZVC-R 3610/11, 3615/19; Manaíra and João Pessoa, ZVC-R 3571, 3607/09.

Cnemidophorus serranus
ARGENTINA. **Córdoba**: Departamento Calamuchita: El Sauce, MACN 2584, 8003; Departamento Colón: Cabana, MACN 12509; MLP.S 1055. Departamento Punilla: Carlos Paz, Estancia Vieja, MLP.S 1164; Cosquín, MACN 36176; Cruz Chica, MACN 29625; Cruz Grande, MACN 21446; Icho Cruz, FML 02053-1 (*holotype*), FML 02053-2/3 (*paratypes*); Los Chorrillos, MLP.S 1163; Río de Cruz Grande, MACN 20614/15; Tanti, JMC-DC 1088, MACN 10247, UNNEC 01083. Departamento Río Cuarto: Alpa Corral, JMC-DC 1089. Departamento Santa María: Alta Gracia, MLP.S 1066, 1305.

Cnemidophorus tergolaevigatus
ARGENTINA. **Catamarca**: Departamento Belén: 11 km E Belén, Ruta Provincial 46, LJAMM-CNP 4259, 4262. Departamento Santa María: Ruta Nacional 40, 6 km W Punta de Balasto, LJAMM-CNP 4274/75; Santa María, MLP.S 1716. Departamento Tinogasta: Km 1298 sobre Ruta Nacional 40 y Río La Puerta, LJAMM-CNP 2321; Los Medanitos, FML 03554; 16 km S Palo Blanco, Ruta Provincial 34, LJAMM-CNP 2341/43, 2346. **La Rioja**: Departamento Aimogasta: Llanos entre Aimogasta y Sierra de Velasco, MACN 7469. Departamento Castro Barros: Anillaco, LJAMM-CNP 1028, 1032, 1034; 6 km E Anillaco, LJAMM-CNP 596, 836, 1027, 1029/31, 1035, 1833. Departamento Chilecito: Chilecito, MACN 6827 (*holotype*), MACN 6828/29 (*paratypes*), MLP.S 105, 109. Departamento Famatina: 9.9 km W Antinaco, FML 02980-1, 02980-2. Departamento Sanagasta: Quebrada Duraznillo, Sierra de Velasco, 14 km ciudad de La Rioja, MACN 24974. Departamento San Blas de los Sauces: 2.1 km W Alpasinche sobre Ruta Nacional 60, LJAMM-CNP 4263, 4265. **Salta**: Departamento Cafayate: Los Médanos, 0.5 km E Ruta Nacional 68 y 6.7 km de la confluencia entre Rutas 68 y 40, FML 03552.

Accepted: 13 November 2011