



A new species of Andean lizard, *Proctoporus* (Gymnophthalmidae: Cercosaurinae), from the highland of Parque Nacional Otishi in Peru

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Abstract

The gymnophthalmid Andean lizards of the genus *Proctoporus* (Gymnophthalmidae, Cercosaurinae) are semifossorial species that inhabit the montane forests, inter-Andean valley, and humid grasslands across the Cordillera de los Andes from Peru to Argentina. The distribution range of *Proctoporus* is discontinuous, with many places lacking herpetological surveys. Here, based on morphological data, we describe a new species of *Proctoporus* from a remote location on a mountaintop north of the Cordillera de Vilcabamba in southeastern Peru. The new species is readily distinguished from all other species of *Proctoporus* by the presence of three anterior infralabials, three rows of preangular scales and the absence of enlarged preangular scales. With this new species, the species diversity has increased to 19 since 18 species have previously been identified.

Key words: Reptilia, biodiversity, Andes, escalator to extinction, mountaintop, semifossorial lizard

Introduction

The Andean lizards of the genus *Proctoporus* Tschudi, 1845 are semifossorial and occur on the eastern slope of the Andes of Argentina, Bolivia, and Peru, inhabiting montane forests, humid grasslands, Puna, and inter Andean valleys from 1000 to 4100 m a.s.l. (Doan & Castoe 2003; Goicoechea *et al.* 2012, 2013; Mamani *et al.* 2015, 2022; Uzzell 1970). This genus contains 18 formally described species, and the greatest diversity is found in Peru, which is home to 17 species, and only *P. xestus* is not found there (Mamani *et al.* 2022).

Since the use of molecular data for species delimitation by Doan & Castoe (2003), many taxonomic changes and species descriptions have been made. Three species of *Euspondylus* and a monotypic genus (*Opipeteus*) were assigned to *Proctoporus* (*P. chasqui*, *P. oreades*, *P. rahmi*, and *P. xestus*), and seven species (*P. carabaya*, *P. iridescens*, *P. katerynae*, *P. kiziriani*, *P. optimus*, *P. succullucu*, and *P. unsaaca*) were described (Doan & Castoe 2003, Goicoechea *et al.* 2012; Mamani *et al.* 2022; Torres-Carvajal *et al.* 2016). Additionally, two other undescribed species, *Proctoporus* CA1 (Goicoechea *et al.* 2012) and *Proctoporus* sp2 (Torres-Carvajal *et al.* 2016), are grouped within a species complex of *P. guentheri* (Moravec *et al.* 2018; Mamani *et al.* 2022) that includes two synonymized species (*Oreosaurus anomalus* and *O. ocellatus*; Uzzell 1970). The two synonymized species, according to the topology of Mamani *et al.* (2022), may be sister species. However, old museum specimens lack tissues for genetic material extraction, and descriptions were made based on morphological characteristics, such as a species of *Epictia*, *E. rioignis*, from samples collected in 1907 (Koch *et al.* 2019) and our study where we described a species of *Petracola*, *P. pajatensis*, collected in 1989 (Rodríguez & Mamani 2020). Here, based on morphological data from three old museum vouchers, we describe a new semifossorial Andean gymnophthalmid lizard. These three

specimens were collected in June 1997 from a remote location in the highland north of the Cordillera de Vilcabamba in Parque Nacional Otishi (Peru), named *Proctoporus* sp. by Rodríguez (2001) and deposited in the herpetological collection of the Museo de Historia Natural de la Universidad Nacional de San Marcos, Lima (MUSM).

Materials and methods

We examined the biological material deposited in the herpetological collection of the MUSM collected by Lily O. Rodríguez in June 1997 from the headwaters of the Río Pomureni, in the highland of Parque Nacional Otishi, north of Cordillera de Vilcabamba, Department Junín, Peru. Morphological characters of other species of *Proctoporus* were obtained from the literature (Chávez *et al.* 2011; Diaz *et al.* 2019; Doan & Castoe 2003; Goicoechea *et al.* 2013; Mamani *et al.* 2015, 2022) and the examination of vouchers deposited in the herpetological collection of the Centro de Ornitología y Biodiversidad (CORBIDI), Museo de Historia Natural Alcide d'Orbigny (MHNC-R), Museo de Historia Natural de la Universidad Nacional de San Antonio Abad del Cusco (MHNC), Museo de Biodiversidad del Perú (MUBI), and Colección Boliviana de Fauna (CBF) (Appendix I).

The format of the description and terminology of the diagnostic characters follow Goicoechea *et al.* (2013), Kizirian (1996), and Mamani *et al.* (2022) (see Fig. 1 for the phylogenetically close species *Euspondylus caideni*). Abbreviations for measurements are as follows: SVL (snout-vent length), TL (tail length), LAL (length between arm and leg), LSA (length from the tip of snout to the anterior margin of the insertion of the arm), HL (head length, from the tip of snout to posterior margin of tympanum), HW (head wide, maximum width of head), HH (head height, maximum height of head), FR (frontal length), and FN (frontonasal length). The coloration in life was described from photographs of adult female taken by L. O. Rodríguez.

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Results

Generic assignment

Based on the presence of imbricate and scale-like papillae on the tongue; smooth head scales without striations or rugosities; eyelids containing an undivided translucent disc; quadrangular elongated dorsal scales that are keeled, juxtaposed, and form a transversal series only; and squarish posterior gulars (collar scales), we tentatively assigned this new species to *Proctoporus* (*sensu* Doan & Castoe 2005).

Taxonomy

Proctoporus otishi sp. nov.

Proctoporus sp. (Rodríguez 2001: 128)

LSID: urn:lsid:zoobank.org:act:1CE8E03D-0E4C-4DB2-BC1E-853402614676.

Holotype. MUSM 20754, adult male (Fig. 2) from north of Cordillera de Vilcabamba (11°39'36"S, 73°40'02"W, 3350 m a.s.l.), Parque Nacional Otishi, province Satipo, department Junín, in Peru. Collected by Lily O. Rodríguez on June 14th, 1997.

Paratypes. Two females (Fig. 3) from the same locality as the holotype collected by Lily O. Rodríguez on June 7th (MUSM 20753) and June 18th, 1997 (MUSM 20755).

Etymology. The specific epithet *otishi* is a term that refers to the place where the new species was found—Parque Nacional Otishi, north of the Cordillera de Vilcabamba in Peru.

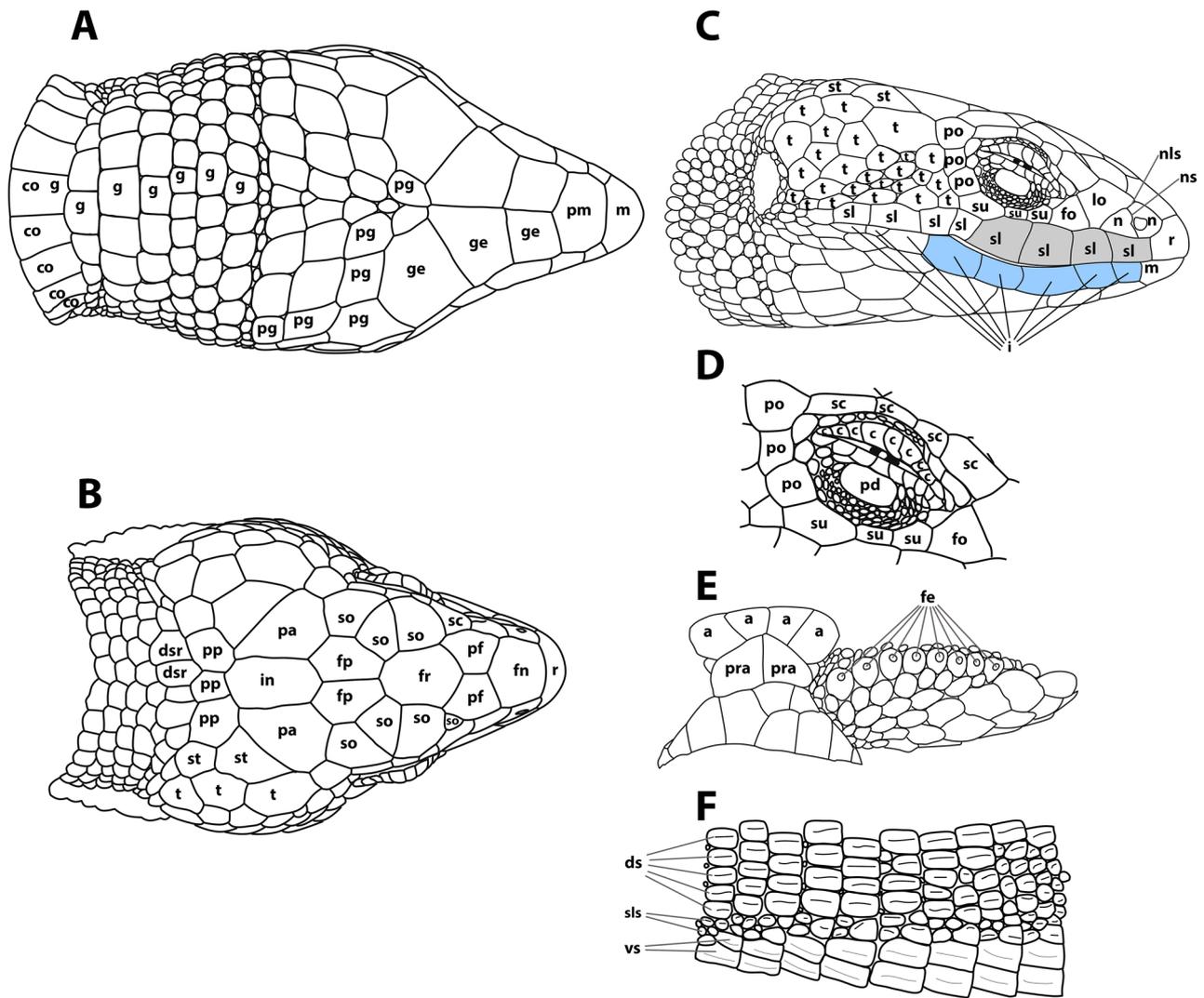


FIGURE 1. View of scales characterization of *Euspondylus caideni* (MUBI 14330): ventral (A), dorsal (B), and lateral (C) side of the head; eye (D), groin (E), and lateral side of the body (F). Anal scales (a), ciliars (c), collar scales (co), dorsal scales (ds), femoral pores (fe), first transversal dorsal row (dsr), freno ocular (fo), frontal (fr), frontonasal (fn), frontoparietals (fp), gulars (g), genials (ge), infralabials (i), interparietal (in), loreal (lo), mental (m), nasal (n), nasal suture (ns), nasoloreal suture (nls), palpebral disc (pd), parietals (pa), postmental (pm), postoculars (po), postparietals (pp), preanals (pra), prefrontals (pf), pregulars (pg), rostral (r), small lateral scales (sls), suboculars (su), supraoculars (so), superciliars (sc), supralabials (sl), supratemporals (st), temporals (t), ventral scales (vs), anterior infralabials (light blue), supralabials anterior to the posteroventral angle of the subocular (gray).

Diagnosis: (1) Frontonasal subequal, longer or shorter than frontal; (2) nasoloreal suture absent; (3) two supraoculars; (4) four superciliaries; (5) two postoculars; (6) palpebral disc undivided and transparent; (7) four supralabials anterior to the posteroventral angle of the subocular; (8) three anterior infralabials; (9) six genials and four in contact; (10) three rows of pregulars; (11) dorsal body scales quadrangular, keeled, sub imbricate; (12) 32–35 scales around midbody; (13) 33–38 transverse dorsal rows; (14) 20–21 transverse ventral rows; (15) 22–25 longitudinal dorsal rows; (16) 10 longitudinal ventral rows; (17) two rows of continuous series of small lateral scales separating dorsals from ventrals per side; (18) 5–6 posterior cloacal plate scales; (19) two anterior preanal plate scales; (20) four femoral pores per hind limb in a male, absent in females; (21) preanal pores absent; (22) 11–13 subdigital lamellae on finger IV; 16–17 subdigital lamellae on toe IV; (23) limbs not overlapping when addressed against body; (24) pentadactyl, digits clawed; (25) in life, the dorsum is purple brown with tiny cream-colored spots, the flanks have enlarged cream-colored spots distributed irregularly from head to tail and the surface of the forelimbs and hindlimbs are similar to the flanks (Fig. 3); in preservative, the dorsum, head, and dorsal surface of

the tail are dark brown, the flanks of the body, tail and dorsal surface of the limbs are dark brown with small and irregular cream-colored spots, and the venter, throat, and ventral surface of the limbs and tail are dark brown (Fig. 2). The measurements are shown in Table 1.

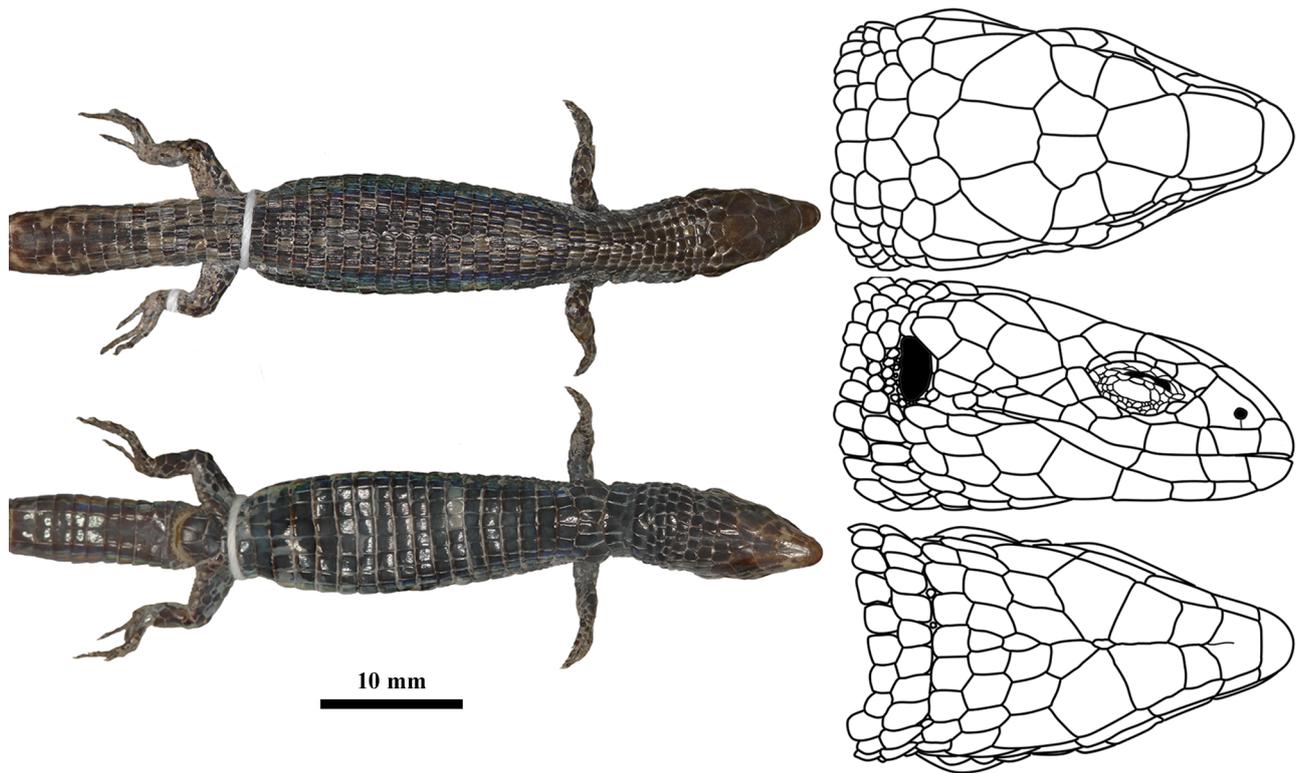


FIGURE 2. Ventral and dorsal view and drawing of the head of the holotype of *Proctoporus otishi* sp. nov. (MUSM 20754, SVL = 45.3 mm, TL = 31.8 mm, male). Drawing by R. Cruz.

TABLE 1. Measurements (mm) of the type series of *Proctoporus otishi* sp. nov.

	MUSM 20754	MUSM 20753	MUSM 20755
	Holotype	Paratype	Paratype
Sex	Male	Female	Female
SVL	45.3	49.6	48.6
LAL	23.6	25.6	25.8
LCP	16.7	15.9	15.8
TL	31.8, reg.	68.7	29.8, reg.
HL	10.6	10.4	10.1
HW	6.2	5.9	5.7
HH	5.5	5.2	5.3
FR	2.3	2.1	1.8
FN	1.8	2.0	2.4

Comparisons: *Proctoporus otishi* sp. nov. can be distinguished from *P. bolivianus*, *P. carabaya*, *P. chasqui*, *P. iridescens*, *P. kiziriani*, *P. lacertus*, *P. laudahnae*, *P. machupicchu*, *P. oreades*, *P. pachyurus*, *P. rahmi*, *P. spinalis*, *P. sucullucu*, *P. unsaaca*, and *P. xestus* by the presence of three anterior infralabial scales (five in all species except for *P. machupicchu*, *P. laudahnae*, and *P. unsaaca*, which have four scales, and *P. xestus*, which has six scales); from *P. katerynae* and *P. optimus* by the presence of three rows of preocular scales (two in *P. katerynae* and *P. optimus*); and from *P. guentheri* by the lack of two enlarged preocular scales (present in *P. guentheri*).



FIGURE 3. Image of the paratype of *Proctoporus otishi* **sp. nov.** (MUSM 20753, SVL = 49.6 mm, TL = 68.7 mm, female) in life. Photos taken by Lily O. Rodríguez.

Description of the holotype: An adult male, snout-vent length (SVL) of 45.3 mm and a regenerated tail length of 31.8 mm; the head scales smooth, without striations or rugosities; the rostral scale wider than height, meets the supralabials on both side, in contact with the frontonasal, nasals, and first supralabials; the frontonasal slightly longer than wide, the posterior the widest, and in contact with the rostral, nasals, frontal, and first superciliar; the frontal longer than wide, pentagonal, and in contact with the frontonasal, first supraoculars, and frontoparietals; the frontoparietals polygonal and in contact with the frontal, two supraoculars, parietals, and interparietal; two supraoculars, both in contact with superciliaries; interparietal longer than wide, irregularly heptagonal, and in contact with the frontoparietals, parietals, and occipitals; the parietals in the shape of an irregular pentagon and in contact with the frontoparietals, posterior to the postoculars, located posteriorly to the occipital and laterally to the supratemporals; three occipitals, occipitals smaller than the parietals; the nasal having a small suture under the nostril, longer than high and in contact with first supralabials; loreal scale absent; four superciliaries, the first one

expanded onto the dorsal surface; the frenocular in the shape of irregular trapezoid and in contact with the second and third supralabials, both preoculars, and the first subocular; palpebral disc undivided, transparent; three suboculars; two postoculars; the temporals smooth, glossy, and polygonal; four supralabials anterior to the posteroventral angle of the subocular. The mental wider than long and in contact with the first infralabial and posteriorly with the postmental; postmental pentagonal, in contact with the first infralabials and the first pair of genials; six genials and four in contact; the first pair in contact with the first and second infralabials; the second pair of genials in contact with the second and third infralabials; three preangular scale rows; seven gular scale rows; the collar fold distinct; the lateral neck scales round, smooth, and juxtaposed. The dorsal scales rectangular, longer than wide, juxtaposed, and with a single keel; 38 transverse dorsal rows and 25 longitudinal dorsal rows at midbody; a continuous longitudinal series of smaller laterals; scales at limb-insertion regions reduced in size; 20 transverse ventral scale rows; 10 longitudinal ventral scale rows at midbody; two anterior preanal plate scales; five posterior preanal plate scales. Caudal scales rectangular and juxtaposed dorsally, keeled dorsally and dorsolaterally, quadrangular and smooth ventrally. The forelimbs pentadactyl, digits clawed; the scales on dorsal surface of brachium polygonal, subimbricate, and smooth; the scales on ventral surface of brachium roundish, subimbricate, and smooth; the dorsal antebrachium scales polygonal, smooth, and subimbricate; the ventral antebrachium scales subimbricate, smaller than the dorsal antebrachial scales; the dorsal manus scales polygonal, smooth, and subimbricate; the palmar scales small, rounded, juxtaposed, and domelike; the dorsal scales on the fingers smooth, quadrangular and distributed as follows: three on finger I, four on finger II, six on finger III, six on finger IV, and five on finger V; subdigital lamellae seven on finger I, nine on finger II, twelve on finger III, twelve on finger IV, and eight on finger V. The hindlimbs pentadactyl, the digits clawed; the scales of the anterodorsal surface of the thigh large, polygonal, smooth, and subimbricate; scales on posterior surface of thigh small, rounded, juxtaposed; scales on ventral surface of thigh large, rounded, flat, smooth; the scales on the anterior surface of the crus polygonal, smooth, juxtaposed, and decreased in size distally; the scales on the anterodorsal surface of the crus rounded and subimbricate; the scales on the ventral surface of the crus large, smooth, flat, and subimbricate; the scales on the dorsal surface of the toes quadrangular, smooth, and distributed as follows: three on toe I, five on toe II, seven on toe III, nine on toe IV, and six on toe V; subdigital lamellae single distally and double proximally, six on toe I, eight on toe II, thirteen on toe III, fifteen on toe IV, and eleven on toe V. The limbs were not overlapping when adpressed against the body.

Variation: Based on the three voucher specimens of the type series of one male (holotype, MUSM 20754) and two females (paratypes, MUSM 20753, 20755), respectively: the SVL of the male (45.3 mm) was lower than that of the females (49.6, 48.6 mm), and the head was wider in the male (6.2 mm) than in the females (5.8, 5.7 mm); one female (MUSM 20755) had six supralabials and the other had seven (MUSM 20753), and the male had seven on the left side and six on the right; the two females had six temporals on the left side and seven on the right, and the male had ten on both sides; the females had 34 and 32 scales around the body, and the male had 35; and the females had nine rows of gular scales and the male had seven. We did not observe significant variation in the color pattern. This variation was observed only in the type series, and the true intraspecific variation may be greater.

Distribution and ecology: The new species has only been found on the mountaintop of Parque Nacional Otishi, north of the Cordillera de Vilcabamba; it is an area that can be considered a “sky island” because the highlands are surrounded by montane forest, at elevations of 3350 m a.s.l. (Fig. 4). The specimens of *Proctoporus otishi* **sp. nov.** were found to be associated with mosses of the genus *Sphagnum* and Bromeliads during diurnal assessments in a mixed ecosystem dominated by grassland and *Polylepis* forest. Six eggs were found under mosses (Fig. 5); one nest had only two eggs, and the other had four eggs. We hypothesize that *P. otishi* **sp. nov.** may use communal nests that are characteristic of this genus (Doan & Castoe 2003). *Proctoporus otishi* **sp. nov.** was found in sympatry with the amphibians *Phrynopus* sp. and *Gastrotheca* sp. No potential risks that could endanger *Proctoporus otishi* **sp. nov.** were observed, but they could be affected by global warming through the mechanism known as the escalator to extinction (Freeman *et al.* 2018; Urban 2018).

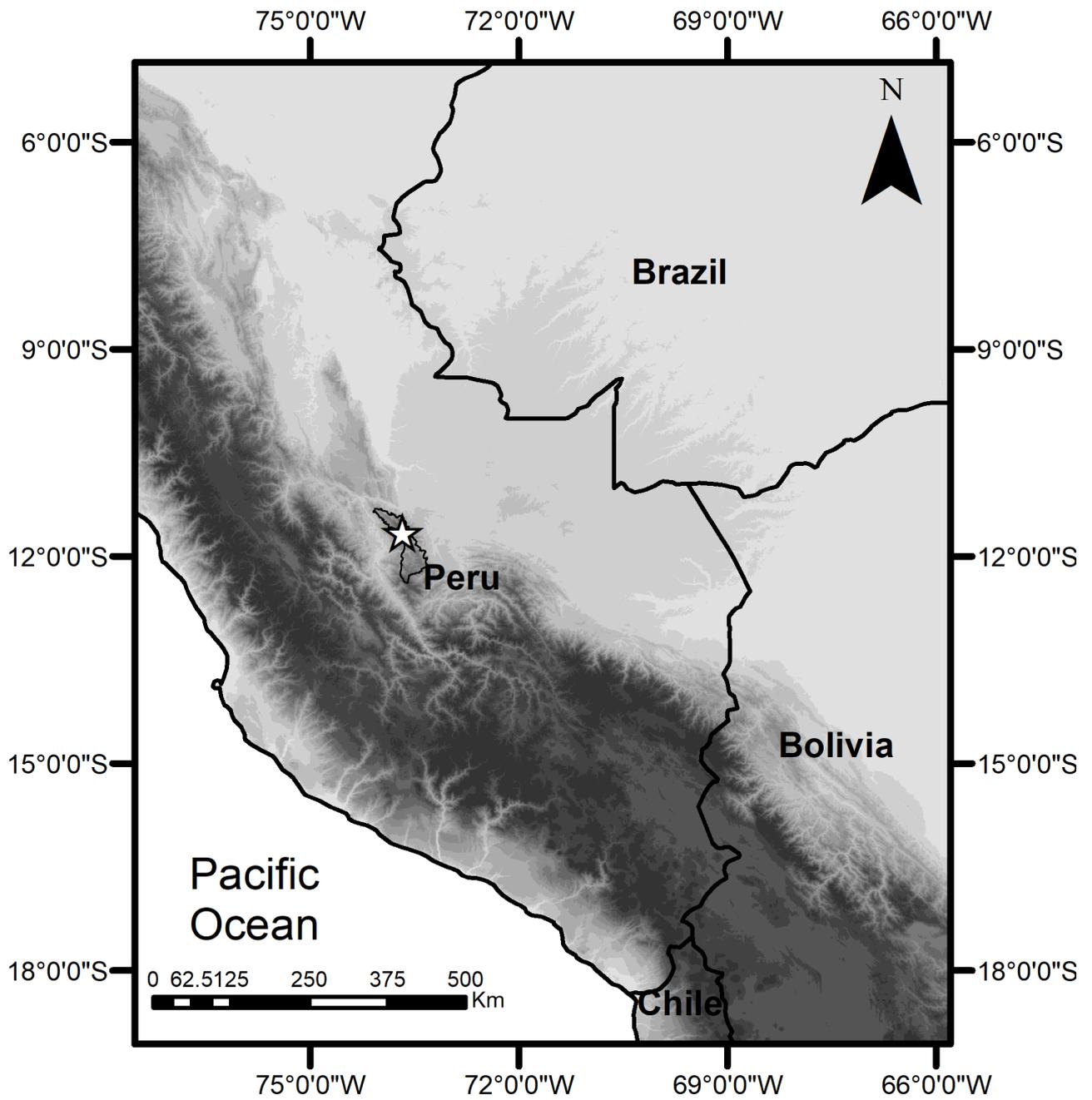


FIGURE 4. Map showing the type locality of *Proctoporus otishi* sp. nov. in the highland of Parque Nacional Otishi.



FIGURE 5. Images of eggs of *Proctoporus otishi* **sp. nov.** found under mosses. Photos taken by Lily O. Rodríguez.

Discussion

Peru is the country that hosts the greatest diversity of species of the genus *Proctoporus* with 17 species (Mamani *et al.* 2022), where the greatest diversity is concentrated in the department of Cusco with nine formally described species (*P. guentheri*, *P. katerynae*, *P. kiziriani*, *P. lacertus*, *P. machupicchu*, *P. optimus*, *P. rahmi*, *P. sucullucu*, and *P. unsaacae*), followed by Junín with three species (*P. guentheri*, *P. pachyurus*, and *P. otishi* **sp. nov.**), Pasco with three species (*P. spinalis*, *P. oreades*, and *P. guentheri*), Ayacucho with three species (*P. chasqui*, *P. guentheri*, and *P. sucullucu*), Puno with three species (*P. carabaya*, *P. guentheri*, and *P. iridescens*), Huánuco with two species (*P. laudahnae* and *P. guentheri*), and Apurímac with only one species (*P. sucullucu*). Of these, *Proctoporus guentheri* is present in several of the aforementioned departments, and it is presumed to be a species complex (Mamani *et al.* 2022). Furthermore, from the study conducted by Doan *et al.* (2003), species diversity of *Proctoporus* has increased significantly from five to 19 species, with the vast majority supported by genetic evidence (Doan & Castoe 2003, Goicoechea *et al.* 2013, Mamani *et al.* 2022). However, two species, *P. machupicchu* and *P. otishi* **sp. nov.**, still lack genetic sequences, so their phylogenetic position remains uncertain. This high richness is due to the intense work carried out by taxonomists in various departments of Peru (Doan & Castoe 2003; Goicoechea *et al.* 2012, 2013; Mamani *et al.* 2015, 2022; Uzzell 1970), and it is likely that the diversity in other departments of the eastern slopes is underestimated.

Proctoporus otishi **sp. nov.** was collected on the top of a mountain located north of the Cordillera de Vilcabamba, characterized by being geographically isolated and surrounded by montane forest vegetation; due to these characteristics, it can be considered a “sky island” (He & Jiang 2014). Thus, the origin of this species may be difficult to ascertain, but the colonization process could have occurred in three ways: (1) if the new species is phylogenetically related to lineages that inhabit montane forests (*Proctoporus guentheri*, *P. katerynae*, *P. optimus*),

it could be due to a colonization event from the lowlands to the highlands; (2) if the new species is related to lineages that inhabit the southern mountain top of the Cordillera de Vilcabamba (*P. lacertus*), the colonization event may have been carried out by dispersal through the mountain chain from a connection in the southern part of the Cordillera de Vilcabamba, which reaches up to 2000 m a.s.l.; or (3) the lineage is very old and could have been present at the top of the mountain, and the isolation was driven by geological events such as the subsidence and weathering of the Andes Mountains (Eakin & Lithgow-Bertelloni 2018). To evaluate these hypotheses, it is necessary to carry out genetic studies that allow us to determine the origin of this species in this “sky island” system. Finally, future studies that include a broader genetic sampling of *Proctoporus* lizards in the eastern slopes of Peru will allow us to discover the hidden diversity of this lineage such as *P. guentheri* species complex and the colonization process of *P. otishi* sp. nov.

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APPENDIX I. Specimens examined

- Proctoporus bolivianus*: BOLIVIA: LA PAZ: CBF 1507–8, 1513–4, 1519–21 (7 males), 1505–6, 1509–12, 1522–5 (10 females), 1517–8 (2 juveniles). Total = 19.
- Proctoporus carabaya*: PERU: PUNO: Carabaya: MUBI 5428, 5430, 11582 (3 males), MUBI 5422, 11579–81, 11584 (5 females), MUBI 5431 (juvenile); Ollachea: MUBI 11849 (1 male), MUBI 11850–1 (2 females). Total = 12.
- Proctoporus chasqui*: PERU: AYACUCHO: La Mar: Chuiquintirca: CORBIDI 6961–5, 6967, 8413, 8415–6, 8418–9, 8423 (12 males), CORBIDI 6955–6, 6968–9, 8414, 8417, 8420–2, 8424–5, 8431–2 (13 females) Total = 25.
- Proctoporus guentheri*: BOLIVIA: SANTA CRUZ: CBF 36.2, 1677–8 (3 males); COCHABAMBA: MHNC-R 499, 3136–7, 3139 (4 males), MHNC-R 3138 (1 females); PERU: AYACUCHO: Cajadela: CORBIDI 17876 (1 female); CUSCO: La Convención: Urusayhua: MUBI 13341–2 (2 females), 13518–20, 13325, 13327, 13622, 13642 (7 males); Marcapata: MUBI 5880 (1 females), 5878–9, 6045 (3 males), CORBIDI 14355, 14692 (2 females), 14693 (1 male); Paucartambo: Kosñipata: San Pedro: MUSM 27981 (1 female); Quellouno: MUBI 2987 (1 female), 2985–6 (2 males); Echarate: Alto Lorohuachana: MUSM 29455–6 (2 females), 29454 (1 male); Alto Sangobatea: MUSM 29449 (2 females); Reserva Comunal Machiguenga: MUBI 10278–9, 11188 (3 males); HUÁNUCO: Tingo María: La Garganta: CORBIDI 15558 (1 male), 14932, 14978–9 (3 females); Santa Rosa de Yanajanca: MUSM 39217 (1 female); PASCO: Huancabamba: MUBI 14516, 14526, 14528, 14530 (4 females), 14518, 14525, 14529 (3 males); JUNÍN: Chanchamayo: San Ramón: MUSM 36484 (1 female), 36476 (1 male); PUNO: Carabaya: Ollachea: MUBI 2867. Total = 53.
- Proctoporus katerynae*: PERU: CUSCO: La Convención: Monte Carmelo: MUBI 10482 (female, holotype), MUBI 10492 (female, paratype), 10493 (male, paratype). Total = 3.
- Proctoporus iridescens*: PERU: PUNO: Sandia: MUBI 5359, 5699 (2 males), MUBI 5360–1, 5421, 5700–2 (6 females). Total = 8.
- Proctoporus kiziriani*: PERU: CUSCO: Quispicanchi: Marcapata: MUBI 5369, 5859 (2 females); MUBI 5366–7, 5683–5, 5861 (6 males). Total = 8.
- Proctoporus lacertus*: PERU: CUSCO: Santa Teresa: MUBI 11165–67, 11169 16085–6 (6 males), MUBI 11168 (1 female); Soraypampa: MUBI 2808, 13299–302, 13311 (7 males), MUBI 13303–7, 13309–10 (7 females); Vilcabamba: MUBI 2880,

- 2884 (2 males), MUBI 2881–3, 2885–6 (5 females). Total = 28
- Proctoporus laudahnae*: PERU: HUÁNUCO: Carpish: Achupampa: CORBIDI 16071, 16073, 16077 (3 females), CORBIDI 16074, 16076 (2 males), CORBIDI 16072 (Juvenile). Total = 6.
- Proctoporus machupicchu*: PERU: CUSCO: Aobamba: MUBI 13362, 13373 (2 females, paratypes); Santuario Histórico de Machupicchu: MUBI 11815 (1 female, holotype); San Luis: MUBI 16307 (1 male). Total = 4.
- Proctoporus optimus*: PERU: CUSCO: Urubamba: Santuario Histórico de Machu Picchu: MUBI 11119 (male, holotype), MUBI 962, 975 (2 male, paratypes), MUBI 855, 964 (2 female, paratypes); Wiñaywayna: MHNC 1716, 1721, 1724, 1731 (4 male, paratypes), MHNC 1717–19, 1722, 1729 (4 female, paratypes); La Convención: Santa Teresa: Sahuayaco: MUBI 12742, 13133, 13136 (3 male, paratypes), MUBI 12740–1, 12744, 12962–3, 13133–5 (8 female, paratypes); Maranura: Mesa Pelada: MUBI 2915, 2984 (2 male, paratypes); Chuyumayo: MUBI 2809 (male, paratype). Total = 27.
- Proctoporus oreades*: PERU: PASCO: Santa Barbara: CORBIDI 7219 (male, holotype), CORBIDI 7214, 7216–8, 7220, 7222, 7224–25 (8 females, paratypes), CORBIDI 7215, 7221, 7229 (3 males, paratypes), CORBIDI 7223 (juvenile). Total = 12.
- Proctoporus pachyurus*: PERU: JUNIN: Tarma: Cerro San Cristóbal: MUBI 4690, 4693, 4696, 4701, 4703–6 (8 males), 4692, 4697–8, 4700 (4 females); Palca: MHNSM13882, 13890, 13893 (3 females) 13887–8, 13891 (3 males), 13889, 13893 (2 juveniles); Tarma: MHNSM 13905, 13908, 13910–11 (4 males), 13906–7, 13908, 13912–16 (8 females); Huasi Huasi: 16646–7 (2 males), MHNSM 16644 (1 female). Total = 35.
- Proctoporus rahmi*: PERU: CUSCO: Paucartambo: Estación Biológica Wayquecha: MUBI 4555, 4577–8, 4592, 4688 (5 males), MUBI 4556, 4559, 4569, 4599 (4 females); Marcapata: MUBI 5849, 5863–6, 6065, MUSA 1516, 1515 (8 males); MUBI 5847–8, 5853–8, 5862, 6066–7, 6069, 12885, MUSA 1532, MUSM 30275, 30284 (16 females), MUSM 30293, 30296, MUBI 12877 (3 juveniles) Total = 36.
- Proctoporus spinalis*: PERU: PASCO: Huancabamba: MUBI 14505 (1 female), 14506 (1 male); Osaplaya: CORBIDI 7234, 7237, 7240–1 (4 males), CORBIDI 7246 (1 female); Shollet Forest: CORBIDI 11573–5 (1 female); Lugar 1: CORBIDI 10177, 10232–3, 10276 (4 male), CORBIDI 10208, 10231 (2 female); Cuevablanca: MUSM 19965 (1 male), 19964 (1 female); Oxapampa: MUSM 23527 (1 male), 28856 (1 female), MUSM 17725–6 (2 males), 23528 (1 female). Total= 23.
- Proctoporus succullucu*: PERU: CUSCO: Urubamba: Piscacucho: MUBI 2925–9, 2931–3, 2937–40, 2942, 2944 (14 females), 2923–4, 2934–6, 2941 (6 males); Área de Conservación Privada La Verónica: MUBI 14341 (1 male), 14342 (1 female). Total = 22.
- Proctoporus unsaacaе*: PERU: CUSCO: Andahuaylillas: Piquillacta: MUBI 12040 (1 female), 12038–9, 12045 (3 males); Calca: MUBI 12058–9, 16027–8, 16031–3, 16035 (8 females), 12060, 16030, 16036 (3 males); Calca: Colcabamba: MUBI 15392–3 (2 males); Coya: MUBI 12057 (1 juvenile); Taray: MUBI 12055 (1 female); Lamay: MUBI 12056 (1 male); Quispicanchi: Lucre: MUBI 12030 (1 female), 12029, 12031 (2 males); Urcos: MUBI 12917 (1 female); Canchis: Checacupe: MUBI 2817 (1 female), 2818–9, 11978 (3 male); Combapata: MUBI 11964, 11967 (2 female), 11972 (1 male). Total = 31.
- Proctoporus xestus*: BOLIVIA: LA PAZ: CBF 617–8, 622–4, 2089, 3697, 4530–2 (10 ♂ males), CBF 619, 1861, 2090, 2331–2 (5 females), CBF 625 (1 juvenile); COCHABAMBA: CBF 1694, G2-141, MHNCR 16, 204, 315, 334 (6 males); TARIJA: CBF 2072, 2074, 2294, 2296–7, 2303, 2753 (7 males), CBF 2071, 2073, 2291, 2295, 2748, 3279 (6 females), CBF 2298, 2749–52 (5 juvenile). Total = 40.