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A new genus and species of arboreal lizard (Gymnophthalmidae: Cercosaurinae) from the eastern Andes of Peru

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Abstract. We describe a new arboreal genus and species of the family Gymnophthalmidae, subfamily Cercosaurinae, from Peru on the basis of genetic and morphological characters. *Dendrosauridion* gen. n. can be distinguished morphologically from all other genera of Cercosaurinae by having the lower palpebral disc transparent and undivided, dorsal scales smooth, lateral scales distinctly smaller than dorsal scales, and lateral scales adjacent to ventrals non-granular, not forming a distinct longitudinal line along body axis. Phenotypic synapomorphies are not known for the new genus. In a previously published phylogeny, *Dendrosauridion* gen. n. was identified as a distinct clade separated from all other cercosaurines. The monotypic genus contains *Dendrosauridion yanesha* sp. n., which is known from two localities in montane forests of the eastern Andes in central (Region Pasco) and southern Peru (Region Cusco) from 2780 to 2825 m a.s.l. with a distributional gap of 413 km in between. The two adult males (SVL 59.1–60.2 mm) and one juvenile were found in trees. The secretive habits of *D. yanesha* sp. n. are likely the reason for its rarity and we propose the threat status of the new species as "Data Deficient."

Key words. Squamata, taxonomy, systematics, phylogeny, morphology, arboreality, *Dendrosauridion* gen. n.

Resumen. Describimos un nuevo género y especie de lagartija arborícola de la familia Gymnophthalmidae, subfamilia Cercosaurinae en Perú, usando caracteres moleculares y morfológicos. *Dendrosauridion* gen. n. se puede distinguir morfológicamente de todos los demás géneros de Cercosaurinae por tener un disco palpebral inferior transparente y no dividido, escamas dorsales lisas, escamas laterales claramente más pequeñas que las escamas dorsales, y escamas laterales adyacentes a escamas ventrales no granulares, sin formar una línea longitudinal distinta a lo largo del cuerpo. No se conocen sinapomorfias fenotípicas para el nuevo género. En una filogenia previamente publicada, *Dendrosauridion* gen. n. fue identificado como un clado distinto separado de todas las demás cercosaurinas. El nuevo género es monotípico y contiene *Dendrosauridion yanesha* sp. n., que se conoce de dos localidades en bosques montanos de los Andes orientales en el centro (Región Pasco) y sur de Perú (Región Cusco) entre 2780 y 2825 m s.n.m., separadas por una brecha de distribución de 413 km. Los dos machos adultos (SVL 59.1–60.2 mm) y un juvenil se encontraron en los árboles. Los hábitos reservados de *D. yanesha* es probablemente la razón de su rareza y consideramos que el estado de amenaza de la nueva especie es de "Datos Deficiente".

Palabras clave. Squamata, taxonomia, sistemática, filogenia, morphología, arborícola, *Dendrosauridion* gen. n.

Introduction

Currently, 249 species of lizards of the family Gymnophthalmidae are allocated in 49 genera, which are distributed widely across Central and South America (Uetz et al. 2018). Thirteen genera and 58 species of gymnophthalmids are known to inhabit Peru (Uetz et al. 2018, Moravec et al. 2018), of which 21 species (36%) were described within the last two decades. The taxonomy of gymnophthalmids is complicated because morphological similarities and con-

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vergences hinder the generic allocation of species (e.g., Kizirian 1996, Köhler & Lehr 2003, Chávez et al. 2011). The need for a systematic revision of gymnophthalmids has long been recognized, and various phylogenetic approaches, either based on morphological characters (Doan 2003a) and/or molecular characters (Pellegrino et al. 2001, Doan & Castoe 2005, Goicoechea et al. 2012, 2013, 2016, Torres-Carvajal & Mafla-Endara 2013, Torres-Carvajal et al. 2015, 2016, Sánchez-Pacheco et al. 2017a, b, Moravec et al. 2018), led to a better understanding of the evolutionary history, many generic reallocations, resurrections of synonyms, recognition of unnamed clades, and descriptions of new genera.

Our extensive herpetological fieldwork in the eastern Andes of central Peru over the past years has led to the discovery of many gymnophthalmid lizards. Among them were three new arboreal species whose generic affiliations based on morphology were difficult to resolve. Based on external morphology, one of them (Unnamed clade 4 in Moravec et al. 2018) resembled the arboreal genus *Anadia* known from Lower Central America to southern Ecuador. A recent phylogenetic revision of gymnophthalmids (Moravec et al. 2018), using tissues of our material and of the type species of *Anadia* (*A. ocellata*), revealed several undescribed species as well as new higher taxonomic clades. One of the above mentioned arboreal taxa, *Selvasaura brava* Moravec, Šmíd, Štundl & Lehr, 2018 was recently described as a new genus and species whereas another taxon clustered in the phylogeny with the recently described *Euspondylus excelsum* Chávez, Catenazzi & Venegas, 2017 (Moravec et al. 2018, Lehr et al. 2008).

Herein, we provide a formal morphological description of a new genus and species of an arboreal gymnophthalmid from the montane forests of the eastern Andes of Peru (Fig. 1) that was recognized as Unnamed clade 4 in a previous large-scale phylogenetic revision by Moravec et al. (2018).

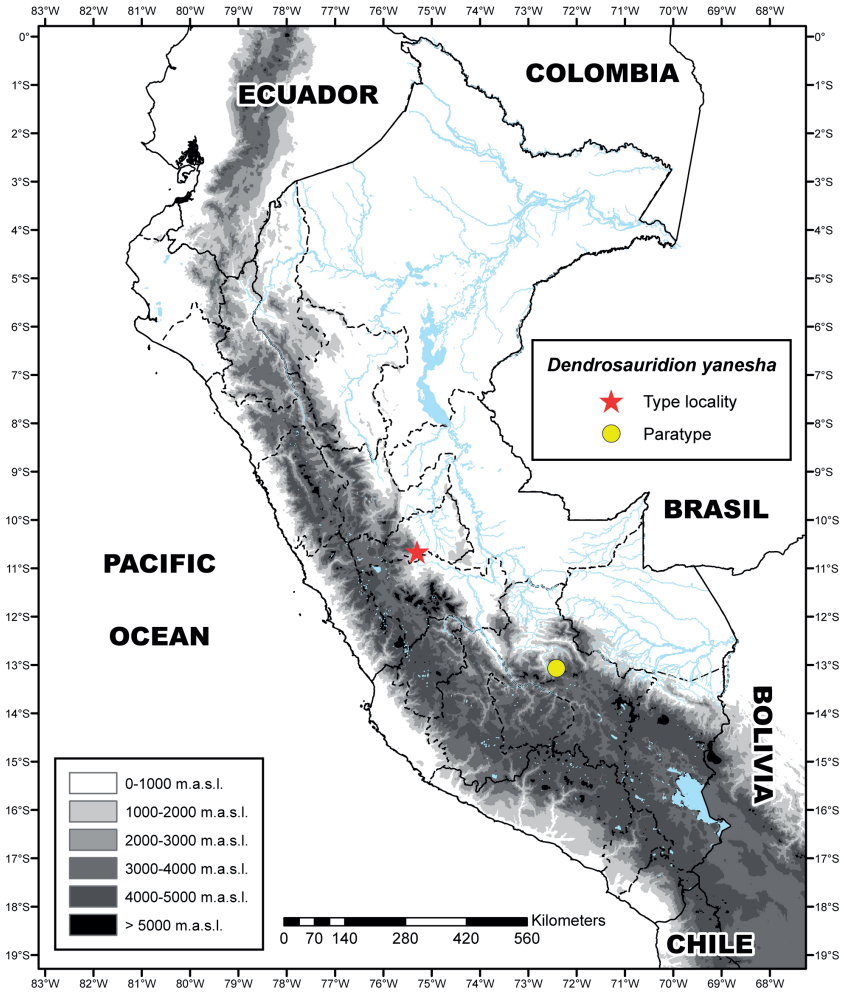

Figure 1. Map of Peru with distribution records of *Dendrosauridion yanesha* gen. et sp. n. The type locality (Region Pasco, Chacos, 2780 m a.s.l.) is indicated by a red star and a yellow circle indicates the southernmost locality (Region Cusco, Alfamayo Hospedaje, 2825 m a.sl.). Map by J. C. Cusi.

Materials and methods

We refer to the results of Moravec et al. (2018) to outline the phylogenetic relationships of the new genus described here to other cercosaurines. Their phylogenetic analyses were based on taxon sampling that covered the entire subfamily Cercosaurinae. They used all genetic data available for the subfamily, which consisted of the 12S rRNA, 16S rRNA, cytochrome b, and ND4 mitochondrial markers and the c-mos nuclear marker. Based on their results, the new genus has phylogenetic affinities to five other genera that were represented in the dataset by the following number of species and samples: *Cercosaura* (25 samples of 10 species,) *Selvasaura* (10 samples of ca. 4 species), *Potamites* (21 samples of 7 species), *Proctoporus* (113 samples of 23 species), and Unnamed clade 2 (13 samples of an unknown number of species). We reproduce Figures S1–S3 from Moravec et al. (2018), showing results of maximum likelihood, MrBayes, and BEAST analyses (Fig. 2). We have pruned the trees to contain only one tip for each genus using the drop.tip function of the 'ape' R package (Paradis et al. 2004, R Development Core Team 2014).

The format of the descriptions and terminology of the morphological characters follow mostly Oftedal (1974), Doan & Castoe (2003), Chávez et al. (2017), Sánchez-Pacheco et al. (2017a, b), and Moravec et al. (2018). Specimens were fixed in 96% ethanol and stored in 70% ethanol. Sex and maturity of specimens were identified by assessing sexual dimorphic characters (size, femoral pores). A specimen with SVL 34.6 mm was considered juvenile. The following metric characters were taken using a digital calliper and a dissecting microscope: snout–vent length (SVL) – distance from the snout tip to cloaca; head length (HL) – distance from the snout tip to the angle of jaw; head width (HW) – greatest width of the head; head depth (HD) – greatest depth of the head; tail length (TL) – distance from cloaca to the tail tip, if original; eye–nose distance (E–N) – straight distance from the snout tip to anterior corner of eye; forelimb length (FLL) – from axilla to tip of distal claw; hind limb length (HLL) from groin to tip of distal claw; axilla-groin distance (AGD) – distance between limbs (left/right). All examined characters were measured to the nearest 0.1 mm.

Meristic and qualitative pholidotic characters were counted and evaluated as follows: number of supralabials – from the rostral to the mouth corner, last labial defined by its considerably larger size compared with the posteriorly adjacent shields; gular scales – number of gulars in a straight median series; collar scales – number of enlarged scales in collar; dorsal scales – number of transverse rows of dorsal scales from the third row behind the interparietal to the level of the rear edge of the hind limb; ventral scales – number of transverse rows of ventral scales; lateral scales – number of considerably smaller lateral scales situated between larger dorsal and ventral scales at midbody (left/right); scales around midbody; preanal plates – number of large plates in the posterior row of preanal scales; number of lamellae under Finger IV – number of single and divided lamellae (left/right, lamellae divided into segments counted as one lamella); number of lamellae under Toe IV – number of single and divided lamellae (left/right, lamellae divided into segments counted as one lamella); number of femoral pores (left/right).

Notes on the coloration in life were taken from field notes and photographs. Collection acronyms are: FMNH = Field Museum, Chicago, USA; KU = University of Kansas, Natural History Museum, Lawrence, USA; MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, USA; MUSM = Museo de Historia Natural Universidad Nacional Mayor de San Marcos, Lima, Peru; NMP-P6V = National Museum Prague, Prague, Czech Republic; SMF = Senckenberg Forschungsinstitut und Naturmuse-

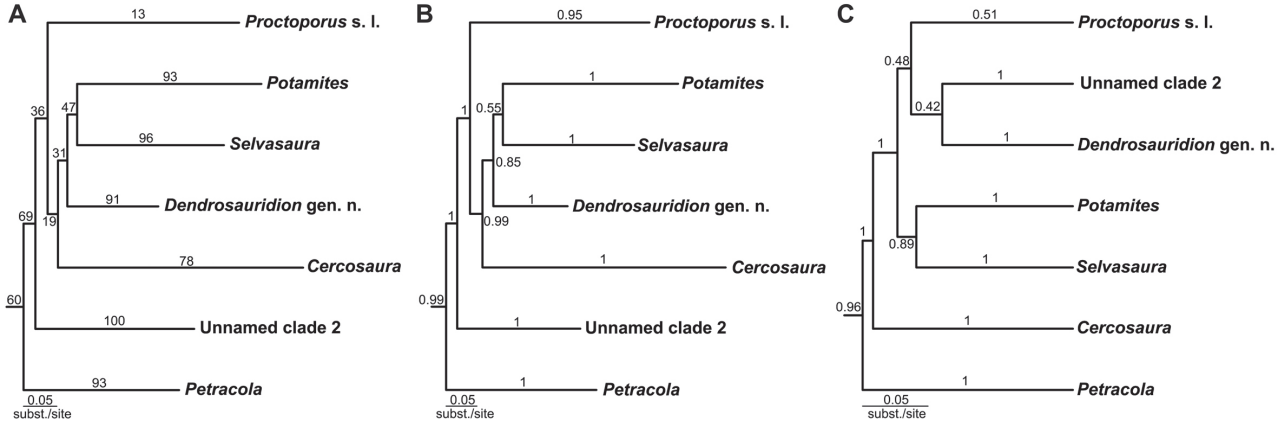

Figure 2. Phylogenetic trees resulting from a) maximum likelihood, b) MrBayes, and c) BEAST analyses conducted by Moravec et al. (2018), showing the phylogenetic position of *Dendrosauridion* gen. n. in a subset of the cercosaurine tree. The values above branches indicate bootstrap support values (A) and Bayesian posterior probabilities (B, C). The 's. l.' (sensu lato) denotes that *Proctoporus* may not be monophyletic, but this is pending further research, as are the relationships between the depicted genera. Diversity of species within each genus is not shown. The trees are reproduced and modified from Moravec et al. (2018, Figures S1–S3).

um, Frankfurt/M., Germany. Field codes are: IWU = Illinois Wesleyan University. For comparative material examined see Appendix 1. Threat status was evaluated using the IUCN criteria (2012). Map in Fig. 1 was drawn with ArcGIS 10.0 (ESRI 2011) by J.C. Cusi.

Nomenclatural acts

The electronic edition of this article conforms to the requirements of the amended International Code of Zoological Nomenclature, and hence the new names contained herein are available under that Code from the electronic edition of this article. This published work and the nomenclatural acts it contains have been registered in ZooBank, the online registration system for the ICZN. The LSID (Life Science Identifier) for this publication is: urn:lsid:zoobank.org:pub:DCEF9DEC-5626-4954-B899-8377B4D3DF67. The electronic edition of this work was published in a journal with an ISSN, has been archived, and is available from the following digital repository: www.salamandra-journal.com.

Systematics

Family Gymnophthalmidae Fitzinger, 1826
Subfamily Cercosaurinae Gray, 1838
Genus ***Dendrosauridion* gen. n.**

ZooBank LSID: urn:lsid:zoobank.org:act:CC2B3B23-96EC-4C6A-965F-C5D2BB4D3BE4

Type species: *Dendrosauridion yanesha* sp. n.

Remark: Referred to as Unnamed clade 4 in Moravec et al. (2018).

Diagnosis: Phenotypic synapomorphies are not known for this genus. Morphologically, *Dendrosauridion* gen. n. can be distinguished from all other genera of Cercosaurinae by the combination of the following characters: lower palpebral disc transparent, not divided (divided in *Anadia, Andinosaura, Euspondylus, Gelanesaurus, Oreosaurus, Petracola, Riama,* and most *Placosoma* species; opaque in *Pholidobolus*); dorsal scales smooth (keeled in *Cercosaura* and most *Proctoporus*; strongly keeled and tuberculate in *Echinosaura, Gelanesaurus, Neusticurus, Potamites;* minute tubercles on posterior dorsal scales in *Placosoma;* slightly rugose in *Selvasaura*); lateral scales distinctly smaller than dorsal scales (lateral scales not distinctly reduced in size in *Macropholidus*); lateral scales adjacent to ventrals nongranular, not forming a distinct longitudinal line along body axis (granular, forming a continuous series of small lateral scales bordering the ventral scales in *Proctoporus*) (comp., e.g., Oftedal 1974, Cadle & Chuna 1995, Altamirano-Benavides et al. 2013, Kok et al. 2013, Torres-Carvajal & Mafla-Endara 2013, Echevarría et al. 2015, Borges-Nojosa et al. 2016, Chávez et al. 2017, Sánchez-Pacheco et al. 2017b, Moravec et al. 2018).

Because of some superficial resemblance of *Dendrosauridion* gen. n. and *Proctoporus* we compare both genera. According to Goicoechea et al. (2012) and Mamani et al. (2015), *Proctoporus* are small to medium-sized, semi-fossorial lizards that occur in Yungas forests and wet montane grasslands, between 1000 and 4000 m a.s.l., along the Amazonian versant of the Andes from central Peru to Bolivia and northern Argentina). The 16–17 currently known species of *Proctoporus* (Uetz et al. 2018) all have keeled dorsal scales (except *P. xestus* which has smooth dorsals, and *P. laudahnae* which has striated dorsals), and a narrow continuous series of small lateral scales bordering the ventral scales. *Dendrosauridion* gen. n. can be distinguished from *Proctoporus* (characters in parentheses) phenotypically based on its arboreal habits (semi-fossorial), its smooth dorsal scales (keeled in all except *P. xestus* and *P. laudahnae*), and its lateral scales forming an irregular pattern up to seven scales wide on the flanks, which is not discernable as a distinct longitudinal line along the body axis (continuous series of small lateral scales bordering the ventral scales), and its pointed and moderately long snout (bluntly rounded, short).

Dendrosauridion gen. n. can be distinguished from Unnamed clade 2 (sensu Torres-Carvajal et al. 2016, Moravec et al. 2018; characters in parentheses) phenotypically based on its arboreal habits (semi-fossorial), its smooth dorsal scales (weakly keeled dorsal scales), lateral scales forming an irregular pattern up to seven scales wide on the flanks, which is not discernible as a distinct longitudinal line along body axis (continuous series of small lateral scales bordering the ventral scales), and its pointed and moderately long snout (bluntly rounded, short).

Genetically, the new genus is identified as a distinct clade separated from other cercosaurines, but its phylogenetic affinities to other cercosaurine genera remain uncertain (Moravec et al. 2018, Fig. 2).

Definition: (1) head shields smooth; (2) frontoparietal and parietal shields paired; (3) frontonasal, frontal and interparietal shields single; (4) prefrontal shields present; (5) lower palpebral disc transparent, not divided; (6) loreal shield present; (7) scale organs on labials present; (8) anteriormost supraocular and anteriormost superciliary shields fused; (9) dorsal surface of the tongue covered with scale-like papillae; (10) nuchal scales smooth; (11) dorsal scales subhexagonal to rectangular, irregularly shaped (pentagonal to trapezoid) on posterior midbody along vertebral line, smooth, slightly subimbricate; (12) lateral scales half the size of dorsals or smaller, forming an irregular pattern up to seven scales wide on flanks, which is not discernible as a distinct longitudinal line along body axis; (13) ventral scales square to rectangular, smooth, juxtaposed; (14) limbs pentadactyl, digits clawed; (14) 8–11 (N = 2) femoral pores in males (females unknown).

Content: *Dendrosauridion yanesha* sp. n.

Distribution: The mountain ridge close to the radio tower at Chacos (10.658S, 75.298W; WGS84), 2780 m a.s.l., Distrito Oxapampa, Provincia Oxapampa, Region Pasco, Peru; and forest at Hospedaje Alfamayo (ca. 13.0656S, 72.416W; WGS84), 2825 m a.s.l., Distrito Huayopata, Provincia La Convención, Region Cusco, Peru.

Etymology: The generic name *Dendrosauridion* is derived from the Greek nouns 'dendron' (tree; neutrum) and 'sauridion' (small lizard; diminutive, neutrum) and is in allusion to the arboreal habits of the type species.

Dendrosauridion yanesha **sp. n.**
(Figs 3–5, Table 1)

ZooBank LSID: ZooBank LSID: urn:lsid:zoobank.org:act:CC2B3B23-96EC-4C6A-965F-C5D2BB4D3BE4
Suggested English name: Yanesha tree microtegu
Suggested Spanish name: Lagartija arboricola de Yanesha

Holotype (Figs 3–5): MUSM 25345 (sample code ML 1352, GenBank Accession # MH579624, MH579658, MH579685), an adult male from the mountain ridge close to the radio tower at Chacos (10.658S, 75.298W; WGS84), 2780 m a.s.l., Distrito Oxapampa, Provincia Oxapampa, Region Pasco, Peru, collected on 2 November 2005 by M. Lundberg.

Paratypes (Figs 6–7): Two males (one adult, one juvenile): NMP-P6V 75204 (sample code ML 853), adult male, collected at the type locality on 21 August 2004 by M. Lundberg; MUSM 27618 (sample code EL 409; erroneously labelled as MUSM 27610 in Moravec et al. 2018; GenBank Accession # MH579623); juvenile male, collected in a secondary forest at Hospedaje Alfamayo (ca. 13.0656S, 72.416W; WGS84), 2825 m a.s.l., Distrito Huayopata, Provincia La Convención, Region Cusco, Peru, on 29 March 2009 by E. Lehr.

Diagnosis: A small gymnophthalmid (SVL 59.1–60.2 mm, N = 2 adult males), which can be characterized by the following combination of characters: 1) body slender, slightly depressed, maximum SVL 60.2 mm in males, females unknown; 2) head pointed, about 1.4 times longer than wide, 1.3 times wider than high, distinctly wider than neck; 3) ear opening distinct, moderately recessed; 4) nasals separated by undivided frontonasal; 5) prefrontals, frontal, frontoparietals, parietals, postparietals and interparietal present; 6) parietals as long as wide; 7) supraoculars four, anteriormost one fused with anteriormost superciliary; 8) superciliar series complete, consisting of four scales, anteriormost one fused with anteriormost supraocular; 9) nasal shield completely divided vertically behind the posterior margin of the nostril (Fig. 3A); 10) loreal in contact with second supralabial; 11) supralabials seven; 12) genials in five pairs, first and second pairs in contact; 13) collar present, containing 8–10 enlarged scales; 14) dorsals in 39–41 transverse rows, subhexagonal to rectangular, irregularly shaped (pentagonal to trapezoid) on posterior midbody along vertebral line, smooth, slightly subimbricate; 15) ventrals in 27–28 transverse rows, squared to rectangular, smooth, juxtaposed; 16) scales around midbody 34–38; 17) laterals ovoid, half the size of dorsals or smaller, forming an irregular pattern up to seven scales wide on flanks, which is not discernable as a distinct longitudinal line along body axis; 18) limbs pentadactyl, all digits clawed, adpressed and extended forelimb reaching anteriorly to fourth supralabial; 19) subdigital lamellae under Finger IV 16–18, under Toe IV 21–23; 20) femoral pores in males 8–11; 21) six large preanal plates; 22) tail about 1.9 times longer than SVL (incomplete tail); 23) caudals rectangular, smooth, subimbricate; 24) lower palpebral disc oval, transparent, undivided; 25) in life, dorsal ground coloration of head, body, limbs and tail pale greyish brown; head, back, flanks and tail with

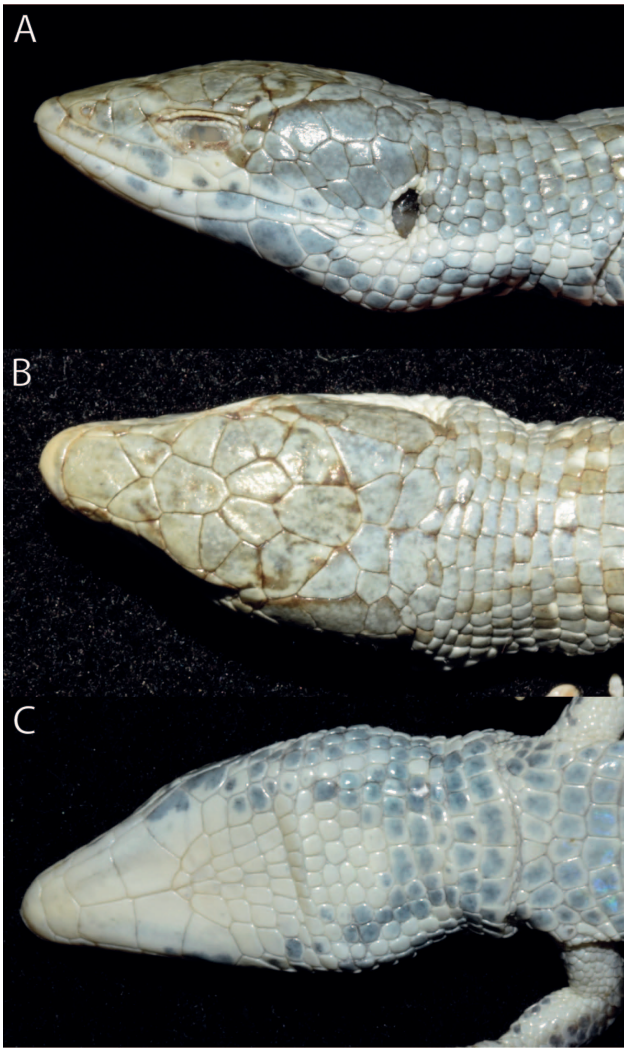

Figure 3. Head scutellation of holotype (MUSM 25345) of *Dendrosauridion yanesha* gen. et sp. n. in preservative. Head in lateral (A), dorsal (B), and ventral (C) views. Photos by J. Moravec.

small to large irregular dark brown flecks or spots; rostral and mental shields pale orange brown; a short cream-white or dirty white (yellow in the juvenile specimen) stripe bordered with dark brown running from posterior margin of eye to outer margin of parietal; a narrow (3–4 scales wide) pale greyish-brown vertebral stripe from neck to tail can be present (tan to copper and more distinct in the single juvenile specimen); a dorsolateral row of cream-white, yellow

Figure 4. Male holotype of *Dendrosauridion yanesha* gen. et sp. n. (MUSM 25345, SVL 60.2 mm) in life in dorsolateral (A, B) and ventral (C) views. Photos by M. Lundberg.

or orange spots on each side of body and tail (spots may be bordered by dark brown dorsal or lateral spots); ocelli-like spots above insertion of each forelimb; supra- and infralabials creamy white; a white subocular blotch continuing as a white ventrolateral stripe to the insertion of arm (bordered with dark brown in juvenile specimen); flanks and tail ventrolaterally creamy white; throat greyish white, or yellowish orange with grey spots laterally; neck and collar grey or yellowish orange; chest pale yellow or yellowish orange, belly, cloacal area, ventral surfaces of hind limbs and tail dull orange (with small dark brown markings on each scale in juvenile specimen); ventrolateral parts of body and ventral face of the forelimbs pale grey; iris tan with a pale orange tint.

Description of holotype: Body slender; legs moderately long, tail regenerated; head length 21.4% of SVL, head width 14.8% of SVL; snout pointed, moderately long, eye–nose distance 39.5% of HL; neck distinct, collar present; head scales smooth; rostral scale wider than long, slightly higher than adjacent supralabials, in contact with frontonasal, nasals, and first supralabials; frontonasal slightly longer than wide, prefrontals present, in narrow contact medially; frontal longer than wide, in contact with second and third supraoculars; frontoparietals in contact with third and fourth supraoculars, parietals and interparietal; supraoculars 4, none in contact with ciliaries; superciliary series complete, consisting of four shields (anteriormost superciliary fused with anteriormost supraocular), in contact with prefrontal and loreal anteriorly; parietals in contact with frontoparietal, fourth supraocular, dorsalmost postocular, one temporal, and one postparietal; interparietal longer than wide, in contact with four postparietals posteriorly; postparietals 4; nasal shield completely divided vertically behind the posterior margin of the nostril, in contact with rostral and first and second supralabials; frenocular triangular, in contact with loreal and second and third supralabials ventrally; palpebral disc oval, translucent, undivided; postoculars 3; temporals polygonal; supralabials 7, fourth below the centre of eye; infralabials 7/6; mental wider than long, in contact with first infralabials; postmental single, in contact with first and second infralabials; genials in five pairs, first and second pairs in contact medially, first pair in contact with second and third infralabials, second pair in contact with third and fourth infralabials on left side and third, fourth and fifth infralabials on the right side, third pair in contact with fourth infralabial on left side and fourth and fifth infralabials on the right side, fourth pair in contact with fifth and sixth infralabials, fifth pair in contact with sixth and seventh infralabials; gulars 14; scales in collar 8; dorsal scales subhexagonal to rectangular, irregularly shaped (pentagonal to trapezoid) on posterior mid-

Figure 5. Holotype of *Dendrosauridion yanesha* gen. et sp. n. (MUSM 25345, SVL 60.2 mm) in preservative in dorsal (A) and ventral (B) views. Photos by J. Moravec.

Figure 6. Male paratype of *Dendrosauridion yanesha* gen. et sp. n. (NMP-P6V 75204, SVL 59.1 mm) in life in dorsolateral (A, B) and ventral (C) views. Photos by M. Lundberg.

body along vertebral line, smooth, slightly subimbricate, in 41 transverse rows; dorsals (enlarged scales) across body at fifth transverse ventral scale row 12, at 10th transverse ventral scale row 16, at 15th transverse ventral scale row 16; laterals ovoid, half the size of dorsals or smaller, forming an irregular pattern up to seven scales wide on flanks, which is not discernible as a distinct longitudinal line along body axis; laterals at fifth transverse ventral scale row 7/6, at 10th transverse ventral scale row 3/3, at 15th transverse ventral scale row 2/3; ventrals smooth, square to rectangular, juxtaposed, in 28 transverse rows; ventrals across belly at midbody 12; scales around midbody 34; preanal plates 6; scales on tail rectangular, smooth, subimbricate; subdigital lamellae under Finger IV 16/18 (5/6 distal lamellae single and smooth remaining lamellae divided into two subconical segments); subdigital lamellae under Toe IV 22/- (5/- distal lamellae single and smooth, remaining lamellae divided into two subconical segments); femoral pores 9/10.

Measurements (in mm): SVL 60.2; TL 54.1 (regenerated); HL 12.9; HW 8.9; HD 6.6; EN 5.1; FLL 11.5/12.2; HLL 18.4/17.5; AGD 32.8/30.4.

In life (Fig. 4), ground coloration of dorsal head, body, limbs and tail pale greyish brown with small irregular dark brown flecks; head, back, and tail with small irregular dark brown flecks; rostral and mental shields pale orange brown (Fig. 4A); irregular dark brown markings on the head dorsally; a short cream-white stripe bordered with dark brown running from posterior margin of eye to outer margin of parietal; a narrow (3–4 scales wide) pale greyish brown vertebral stripe running from neck to tail (less distinct on regenerated tail, Fig. 4B); regenerated part of tail with irregular dark brown spots and stripes; a dorsolateral row of cream-white (from neck to midbody) to orange (from midbody to tail) spots on each side of body and tail (Figs 4A, B); an ocelli-like spot above insertion of each forelimb; supra- and infralabials creamy white (Figs 4A, B); a white subocular blotch continuing as a white ventrolateral stripe (discontinuous on right side, Fig. 4A) to the insertion of arm; flanks and tail ventrolaterally cream-white; throat greyish white with grey spots laterally; neck and collar grey; chest and anterior midventral part of belly pale yellow, posterior midventral part of belly, cloacal area, ventral faces of hind limbs and tail dull orange (Fig. 4C); ventrolateral parts of body and ventral face of the forelimbs pale grey; iris tan with a pale orange tint.

In preservative (Figs 3, 5), general colour pattern is as described for the holotype in life. Dorsal coloration pale greyish brown. Dorsolateral spots creamy white. Distal parts of hind limbs and regenerated tail pale orange brown. Ventral faces pale grey except of pale tan throat and pale tan tail.

Variation: Measurements and lepidotic data of the type series are given in Table 1. Colour variation is described in the species diagnosis. The colour pattern of the juvenile specimen (Figs 7A, B, C) is distinctly brighter than in adults (Figs 4, 6). The short stripe running from the posterior margin of eye to outer margin of parietal is yellow, bordered with dark brown (Fig. 7C). The subocular blotch is bright white and continues as a wide white longitudinal stripe bordered with dark brown to the insertion of forelimbs. The vertebral stripe (tan on neck and back, copper on tail) is more pronounced, bordered with dark brown laterally, and extends to the tip of tail. Dorsolateral spots are yellow, bordered with dark brown. The throat and chest are whitish yellow, belly and ventral side of tail are yellowish orange to orange with small dark brown markings on each scale.

Etymology: The species epithet *yanesha* is used in reference to the indigenous people Yanesha' or Amuesha that is native to forests in the central Peruvian regions of Huánuco, Junín, and Pasco at altitudes up to 1600 m a.s.l.

Distribution, natural history, and threat status: *Dendrosauridion yanesha* sp. n. is as yet only known from two localities in montane forests of the eastern Andes from 2780 to 2825 m a.s.l. The type locality lies in the Region Pasco, whereas

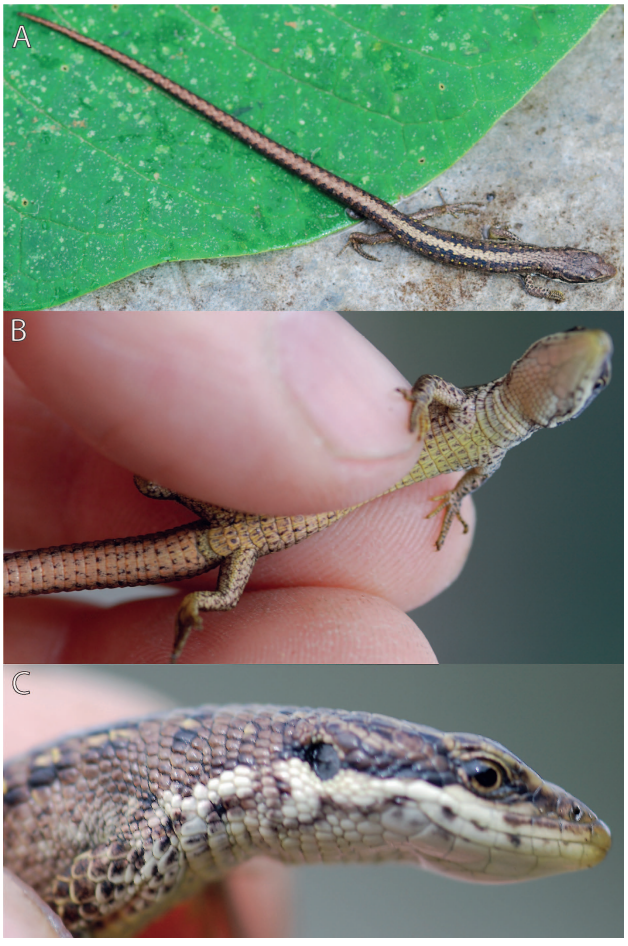

Figure 7. Juvenile paratype of *Dendrosauridion yanesha* gen. et sp. n. (MUSM 27618, SVL 34.6 mm) in life in dorsal (A), ventral (B), and head in lateral (C) views. Photos by E. Lehr.

Table 1. Measurements (in mm) and lepidotic characters of *Dendrosauridion yanesha* gen. et sp. n. A dash indicates that data are not available, and a diagonal bar separates counts from the left and right body sides. For abbreviations, see Materials and methods.

Character	MUSM 25345	NMP-P6V 75204	MUSM 27618
Sex	male	male	juvenile
SVL	60.2	59.1	34.6
TL	54.1 (half regenerated)	78.6 (tip regenerated)	65.1
HL	12.9	12.6	7.8
HW	8.9	8.5	5.2
HD	6.6	6.3	4.1
E-N	5.1	4.8	3.1
FLL	11.5/12.2	13.9/13.4	8.4/9.0
HLL	18.4/17.5	19.1/19.6	11.2/9.7
AGD	32.8/30.4	32.0/31.5	17.4/18.8
Supralabials	7/7	7/7	7/7
Gulars	14	17	15
Scales in collar	8	10	9
Transverse rows of dorsals	41	41	39
Laterals at midbody	3/3	5/5	5/6
Scales around midbody	34	34	38
Transverse rows of ventrals	28	27	27
Ventrals across belly	12	12	14
Preanal plates	6	6	6
Lamellae under Finger IV	16/18	17/18	18/17
Lamellae under Toe IV	22/–	22/23	21/23
Femoral pores	9/10	10/11	8/8

the second known locality is situated in the Region Cusco with a distributional gap of 413 km. All specimens were found in trees. The type locality close to the radio tower at Chacos (Figs 8A, B) is a mountain ridge with small scattered lagunas. The vegetation here consists of bushes, small trees, mosses, lichens, and many epiphytic bromeliads, orchids and ferns, surrounded by primary montane forests at slightly lower altitudes. Sympatric reptiles include one or two gymnophthalmid lizards (*Proctoporus* spp.), and three colubrid snakes (*Atractus nigricaudus*, *Erythrolamprus epinephelus*, *Thamnodynastes* sp.). Sympatric amphibians include two strabomantid frogs (*Pristimantis aniptopalmatus*, *P. bromelicaceus*), and a tree frog (*Scinax oreites*). The collection locality in the Region Cusco is dense secondary forest, which belongs to the Hospedaje Alfamayo and is located next to the road leading to Abra Malaga. The juvenile was found inside an arboreal bromeliad at 2 m above ground in the late morning and a subsequent search at the locality did not yield any additional individuals. No other reptiles were recorded. Sympatric amphibians include *Pristimantis pharangobates*, *Psychrophrynella* sp., and *Gastrotheca* sp.

The arboreal and secretive mode of life may explain the lack of records for this species and consequently we suggest classifying *D. yanesha* as "Data Deficient" according to the IUCN red list criteria (IUCN 2012).

Discussion

The recent discovery of new species (e.g., *Euspondylus excelsum* Chávez, Catenazzi & Venegas, 2017) and new genera (*Selvasaura* Moravec, Šmíd, Štundl & Lehr, 2018; this article) of arboreal gymnophthalmids from montane forests in Peru demonstrates that the arboreal niche is not yet scientifically well explored and harbours an underestimated species richness. All the above-mentioned taxa have relatively large disjunctive distribution ranges, reflecting a lack of fieldwork and difficulties of surveying this niche. For example, two additional specimens of *Euspondylus excelsum* have recently been discovered in the regions Junín and Cusco with a gap of 458 km between them (Lehr et al. 2018). *Selvasaura brava* is only known from the Region Junín in central Peru, whereas other candidate species of the same genus are known from Ecuador (Moravec et al. 2018), and *Dendrosauridion yanesha* sp. n. is known from two localities with a distributional gap of 413 km. Similar distributional patterns are known from arboreal amphibians, e.g., *Ctenophryne carpish* (Microhylidae), which is known from few specimens in the Regions Huánuco and San Martin with a gap of 364 km between them (Lehr & Trueb 2007), whereas other species (e.g. *Gastrotheca zeugocystis,* Hemiphractidae) are only known from their type localities (Duellman et al. 2004).

In their thorough contribution to the systematics of teioid lizards (Teioidea), Goicoechea et al. (2016) recognized four subfamilies of Gymnophthalmidae (Cercosaurinae, Gymnophthalminae, Rhachisaurinae, and Riolaminae) and suggested divisions of the most diverse subfamilies (Cercosaurinae and Gymnophthalminae) into several tribes. In the case of Cercosaurinae, three tribes were delimitated: Bachini (1 genus), Cercosaurini (14 genera), and Ecpleopodini (11 genera). At the same time, Torres-Carvajal et al. (2016) kept a more traditional approach, leaving Bachinae and Ecpleopodinae at subfamily level (sensu, e.g., Castoe et al. 2004, Pyron et al. 2013). This was consequently followed by Sánchez-Pacheco et al. (2017) and Moravec et al. (2018), whose delimitation of Cercosaurinae corresponds to Cercosaurini sensu Goicoechea et al. (2016). Regarding the generic composition of Cercosaurinae, Goicoechea et al. (2016) listed 14 genera and included the genera *Pantodactylus* and *Teuchocercus* in Cercosaurini. However, Torres-Carvajal et al. (2016) synonymized *Teuchocercus* with *Echinosaura* and Sánchez-Pacheco et al. (2017b) synonymized *Pantodactylus* with *Cercosaura* as did Doan (2003b). In total, Torres-Carvajal et al. (2016) recognized 12 genera and 3 unnamed clades within Cercosaurinae. One of these unnamed clades was subsequently assigned to the generic name *Euspondylus* by Chávez et al. (2017), and another one was described as the genus *Selvasaura* by Moravec et al. (2018). Besides of this, Sánchez-Pacheco et al. (2017) recognized two more genera within Cercosaurinae – the newly described *Andinosaura* and the resurrected genus *Oreosaurus*. In summary, including *Dendrosauridion* gen. n. described in the present paper, the subfamily Cercosaurinae currently contains 17 genera and one as yet unnamed clade (Unnamed clade 2 sensu Torres-Carvajal et al. 2016, Moravec et al. 2018, this article).

Despite recent efforts to reconstruct the phylogenetic relationships of cercosaurines with the aid of genetic data, intergeneric relationships remain mostly obscure. Torres-Carvajal et al. (2016) detected three unnamed clades (two of which have been assigned to generic names in the interim), and the existence of *Dendrosauridion* gen. n. was confirmed recently by Moravec et al. (2018). Based on the collective results of these two studies, the following genera likely form a clade within Cercosaurinae: *Cercosaura*,

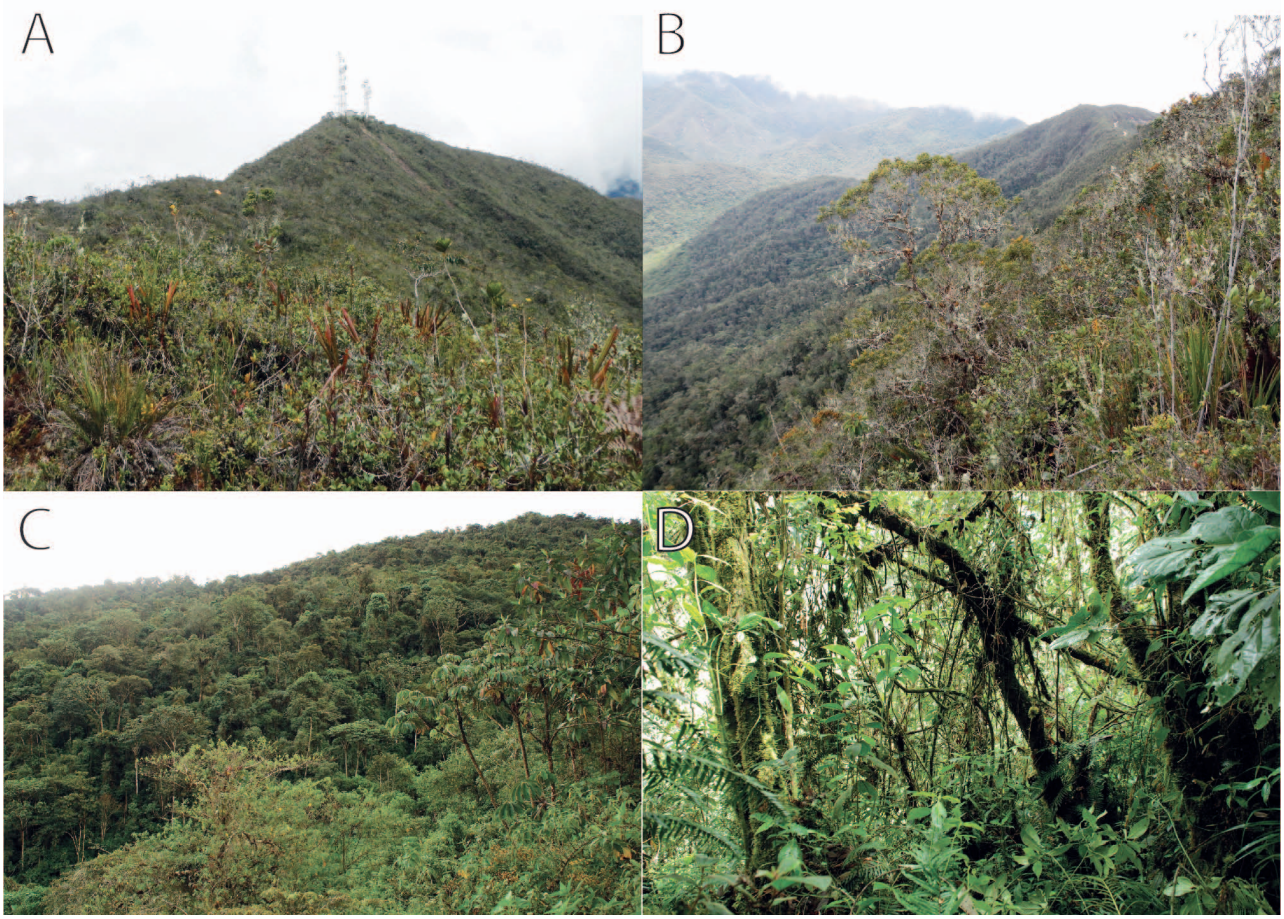

Figure 8. Collecting sites and habitats of *Dendrosauridion yanesha* gen. et sp. n. Type locality (Chacos, 2780 m a.s.l.) on a mountain ridge (A) and in the adjacent valley (B). Southernmost locality in a secondary forest (C, D, 2825 m a.s.l.) close to the road leading to Abra Malaga. Photos (A, B: taken on 16 February 2012; C, D: taken on 30 March 2009) by E. Lehr.

Selvasaura, *Potamites*, *Dendrosauridion* gen. n., *Proctoporus* sensu lato (the monophyly of this genus is questionable), and Unnamed clade 2 (Fig. 2). This clade of six genera was supported in the BEAST analysis conducted by Torres-Carvajal et al. (2016) and in the MrBayes and BEAST analyses done by Moravec et al. (2018), but other analyses did not find conclusive support for this node (MrBayes of Torres-Carvajal et al. 2016 and maximum likelihood [ML] reconstructions of either study). Relationships within this clade remained largely unresolved, and hence the phylogenetic position of *Dendrosauridion* gen. n. could not be identified with certainty. However, some inferences can be made. In all analyses, all genera of this clade but one were significantly supported as monophyletic, with the exception being *Proctoporus* that was only supported by MrBayes (see Figs S1–S3 in Moravec et al. 2018). It is therefore apparent that *Dendrosauridion* gen. n. is not an inner group of any of these genera, but rather an independent lineage at the same taxonomic level, justifying its description (also see Vences et al. 2013). While *Dendrosauridion* gen. n. was supported as forming a group with *Cercosaura*, *Potamites* and *Selvasaura* in MrBayes results and a similar topology was also recovered in the ML analysis, bootstrap support in the latter was low. Moreover, the topology of the BEAST analysis showed *Dendrosauridion* gen. n. as sister to Unnamed clade 2, but again without any convincing support. Therefore, for the time being, it is impossible to draw detailed conclusions about phylogenetic affinities in this clade of six genera other than that they are all supported as unique and independent evolutionary entities. It is apparent that we lack data to resolve their mutual relationships and it is likely a matter of broader sampling of loci than what is currently available (four mitochondrial and one nuclear gene) to provide a better resolution to this part of the cercosaurine phylogeny.

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Appendix 1
Comparative material examined

Anadia bogotensis: Colombia: FMNH 177263–64, 177663. *Anadia ocellata:* Costa Rica: Cartago: Rio Pacuare, Pacuare: KU 34223; Costa Rica: Guanacaste: Las Flores, Tenorio de las Canas: KU 34225. *Anadia rhombifera:* Colombia: FMNH 167601; Ecuador: Tungurahua: 1.3 km W Rio Verde: KU 142754, 142757, 142759–60; Ecuador: Pinchincha, 2 km N, 1 km E Sto Domingo de los Colorados, 570 m: MCZ 156888–90. *Euspondylus excelsum:* Peru: Region Junín: coffee plantation on the trail leading to the Pui Pui Protected Forest, 1550 m: MUSM 31949. *Euspondylus jusyi:* Peru: Region Junín: Sucsha Asha: MUSM 26020–21. *Euspondylus maculatus:* Peru: Region Puno: Ollachea: MUSM 25601. *Euspondylus simonsii:* Peru: Region Huánuco: R. C. el Sira: MUSM 29383. *Petracola ventrimaculata:* Peru: Region Cajamarca: Celendin: MUSM 27295, 27297–27303. *Proctoporus chasqui:* Peru: Region Junín: near road leading to Comas, 3038 m: MUSM 31159; Region Junín: Pui Pui Protected Forest, Hito 3, 1615 m: MUSM 31172, IWU 140. *Proctoporus spinalis:* Peru: Region Junín: near road leading to Comas, 3038 m: IWU 120, MUSM 31162; Region Pasco: Oxapampa: MUSM 17725–28. *Proctoporus sucullucu:* Peru: Region Apurimac: Chinchay: MUSM 27987–89, 2796–98. *Selvasaura brava:* Peru: Region Junín: from the border of the Pui Pui Protected Forest, 1700 m: MUSM 32738 (holotype), 32739 (paratype), NMP-P6V 75653–55 (paratypes).