Jhon Jairo Ospina-Sarria

Análise filogenética das rãs de desenvolvimento direto (Anura, Terrarana, Craugastoridae)

Phylogenetic analysis of the direct-developing frogs (Anura, Terrarana, Craugastoridae)

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Tese apresentada ao Instituto de Biociências da Universidade de São Paulo, para a obtenção de Título de Doutor em Ciências Biológicas, na Área de Zoologia.

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Nomenclatural Disclaimer

New taxon names and nomenclatural changes referred to this dissertation are disclaimed and unavailable for nomenclatural purposes (ICZN Art. 8.3)

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Introduction

Among the most representatives anurans found in the new world are the frogs of the superfamily Brachycephaloidea, which counts with almost 1118 species and is the larger anuran superfamily in the world (Frost et al. 2018). The majority of the species in the superfamily are characterized by having direct development of terrestrial eggs rather than a free-living larval stage (Lynch 1971; Joglar 1989; Hedges et al. 2008), being an exception actually known the ovoviviparity in *Eleutherodactylus jasperi* (Drewry and Jones 1976) and *Craugastor laticeps* (McCranie et al. 2013). For many years, most species of Brachycephaloidea were placed in a single genus, *Eleutherodactylus*; however, with the implementation of multi-gene molecular phylogenies analyses, several arrangements have been proposed (e.g., Hedges et al. 2008).

Molecular data started to be employed to assess relationships among terraranan frogs with the Darst and Cannatella (2004). In that work, thee author found that *Brachycephalus* was more closely related to members of the leptodactylid tribe Eleutherodactylini rather than to other hyloids. Izecksohn (1988) had already argued that *Brachycephalus* and *Euparkerella*, another member of the tribu Eleutherodactylini, were closely related given their hook-like lateral processes in terminal phalanges. Posteriorly, Frost et al. (2006) also found *Brachycephalus* to be embedded within Eleutherodactyinae (previously tribe Eleutherodactylini), and therefore they transferred all recognized genera of subfamily Eleutherodactylinae to the family Brachycephalidae. Heinicke et al. (2007) performed the first comprehensive molecular phylogenetic analysis of terrarana, including a total of 276 species. That way, Heinicke et al, (2007) found big clades; *Eleutherodactylus* distributed mainly in Caribe, *Craugastor* distributed on Central American, and *Pristimantis* with a South American distribution. Too, some species from southeast Brazil were grouped within of the genus *Ischnocnema* whereas the broad-headed eleutherodactylid species were assigned to the genus *Limnophys*.

Hedges et al. (2008) increased the molecular sampling of Heinicke et al. (2007) to 362 species, resulting on a cladogram containing four major clades that were recognized as the families Brachycephalidae, Craugastoridae, Eleutherodactylidae, and Strabomantidae. These families were grouped within of the clade Terrarana, which is an unranked taxon that corresponds to the more inclusive family Brachycephalidae of Frost et al. (2006). Hedges et al. (2008) also recognized the subfamilies of Eleutherodactylidae named Eleutherodactylinae and Phyzelaphryninae, each of which with two genera. These authors also recognized the subfamily Holoadeninae (six genera) and Strabomantinae (ten genera). Later, Pyron and Wiens (2011) used a slightly smaller amount of data for the same species in Hedges et al. (2008) and found that the strabomantid genera *Hypodactylus* and *Strabomantis* are more closely related to craugastorids (*Haddadus*, *Craugastor*) than to the other sampled strabomantid genera. Thus, Pyron and Wiens (2011) synonymized the family Strabomantidae to Craugastoridae and propose a new subfamily Pristimantinae. Furthermore, their results also indicated that the family Craugastoridae is more closely related to Eleutherodactylidae rather than to Brachycephalidae, contradicting the previous by Hedges et al. (2008) and Heinicke et al. (2009).

More recently, Padial et al. (2014) conducted a phylogenetic analysis of a dataset containing 431species that corroborated most findings in Pyron and Wiens (2011), with some key differences. One of the most striking differences is the position of *Ceuthomantis*. Padial et al. (2014) recovered *Ceuthomantis* embedded within the family Craugastoridae as the sister group to *Pristimantis* and *Yunganastes* rather than as sister taxon to all other Terrarana as in previous works (e.g., Hedges et al. 2008, Heinicke et al. 2009, Pyron and Wiens 2011). Another important discordant result was the recovered clade of Brachycephalidae and Craugastoridae, conflicting with the clade of Craugastoridae and Eleutherodactylidae found by other authors. Accordingly, Padial et al. (2014) recognized three families (Brachycephalidae, Craugastoridae, and Eleutherodactylidae) grouped within the superfamily Brachycephaloidea. Moreover, Padial et al. (2014) also corroborated the monophyly of all genera, transferring *Atopophrynus* and *Geobatrachus* to incertae sedis within their Brachycephaloidea.

On the basis of mitochondrial genomes and including one terminal per each family (*Brachycephalus brunneus*, *Craugastor augusti*, and *Eleutherodactylus atkinsi*), Pie et al.

(2017) corroborated that Brachycephalidae is more closely related to Craugastoridae than to Eleutherodactylidae, as it had been found by Hedges et al. (2008), Heinicke et al. (2009) and Padial et al. (2014).

Finally, Heinicke et al. (2018) provided a phylogenetic analysis of a massive molecular dataset for 30 species of Brachycephaloidea, which corroborated the results previously found by Hedges et al. (2008). Nevertheless, its low number of ingroup taxa compared to those included by Hedges et al. (2008), Pyron and Wiens (2011), and Padial et al. (2014) renders their conclusions problematic inasmuch as taxon sampling density is hugely important (Frost et al. 2018).

Historical background of the Craugastoridae

Craugastoridae was described by Hedges et al. (2008) to join 113 species in two genera. The genus *Craugastor* distributed in southwestern USA, Mexico, Central America and the northwestern South America is composed of three subgenera, *Campbellius*, *Craugastor*, and *Hylactophryne*, of which *Craugastor* has eight informal taxa (species groups and two species series) whereas *Hylacrophryne* has two species series. On the other hand, the genus *Haddadus* distributed in southeastern Brazil includes only two species ("*Eleutherodactylus*" *binotatus* and "*E.*" *plicifer*). Later, Pyron and Wiens (2011) using a slightly smaller amount of data per species than Hedges et al. (2008), found that the strabomantid genera *Hypodactylus* and *Strabomantis* are more closely related to craugastorids (*Haddadus*, *Craugastor*) than they are to the other sampled strabomantid genera. Thus, they incorporated Strabomantidae into Craugastoridae.

Recently, Padial et al. (2014) performed a parsimony analysis under direct optimization of nucleotide sequences including a broad sample of GenBank and found results in broad agreement with Pyron and Wiens (2011) regarding the status of Craugastoridae, except for the inclusion of *Ceuthomantis*. Considering this, Craugastoridae is composed of three subfamilies Craugastorinae, Holoadeninae, and Pristimantinae. From those, the subfamily Craugastorinae is composed of three genera—*Craugastor*, *Haddadus*, and *Strabomantis*. In the case of Holoadeninae, it composes all genera placed in

Holoadeninae by Hedges et al. (2008)—*Barycholos*, *Bryophryne*, *Euparkerella*, *Holoaden*, *Noblella*, and *Psychrophrynella*, plus a clade previously recognized within Strabomantidae by Hedges et a. (2008)—*Lynchius*, *Oreobates*, *Phrynopus*, and *Pristimantis*, and the genus *Hypodactylus* as sister of all other genera. Additionally, Holoadeninae also includes to "*Eleutherodactylus*" *bilineatus*, a species previously considered within of *Ischnocnema* (Cannedo and Haddad 2012). More recently, De la Riva et al. (2017) described the genus *Microkayla* for placed all Bolivian species formerly in *Psychrophrynella* plus five species from southern Peru. This new genus was also was placed in the subfamily Holoadeninae. Lastly, the subfamily Pristimantinae was considered as a junior synonym of Ceuthomantinae (Padial et al. 2014b), encompassing the genera *Ceuthomantis*, *Dischidodactylus*, *Pristimantis*, and *Yunganastes*.

In the present year, Heinicke et al. (2018) employed a dataset containing 389 loci and over 600,000 nucleotides for 30 terraranan. The phylogeny of Heinicke et al. (2018) found similar results to those presented by Hedges et al. (2008) at the same time it provided additional resolution at short internodes. Between the results of Heinicke et al. (2018) was recovered to *Ceuthomantis* as sister-taxon to all other terraranans, rather than deeply embedded within the group. Furthermore, Strabomantidae was recovered as a monophyletic group rather than paraphyletic with respect to Craugastoridae (contra Pyron and Wiens 2011, and Padial et al. 2014). Additionally, Heinicke et al. (2018) described a new subfamily for the genus *Hypodactylus* and recovered the genus *Tachiramantis* (Heinicke et al. 2015) as most closely related to *Craugastor* and *Haddadus*.

Given the above, two opposing hypotheses are available to explain the phylogenetic relationships of 824 species currently placed in seventeen genera. These are; first, recognize both Craugastoridae and Strabomantidae as valid families (Hedges et al. 2008; Heinicke et al. 2009; Heinicke et al. 2015). Second, recognize Strabomantidae as part of Craugastoridae (Pyron and Wiens 2011; Padial et al. 2014). Either of these two hypotheses have implications on the position of the genus *Ceuthomantis* because although Pyron and Wiens (2011) and Padial et al. (2014) agree on the paraphyletic condition of Craugastoridae with respect to Strabomantidae, they have discordant hypotheses on the position of

Ceuthomantis. In Pyron and Wiens (2011), *Ceuthomantis* is shown to be the sister taxon to all other terraranans as in Hedges et al. (2008); Heinicke et al. (2009); Heinicke et al. (2015) whereas in Padial et al. (2014) the genus *Ceuthomantis* is deeply embedded within of Craugastoridae.

To attempt resolve this disagreement on the phylogenetic status of the family Craugastoridae, I performed a phylogenetic analysis of the superfamily Brachycephaloidea with special emphasis in the family Craugastoridae sensu Padial et al. (2014). To date, this is the first phylogenetic study with both molecular and morphological evidence analyzed together in this group.

Re-integration of morphological data into total evidence analysis

Morphology, understood as the description and analysis of organismal form, is one of the oldest biological disciplines and has contributed significantly to our understanding of how animals function and how the overwhelming diversity of phenotypes evolved (Wanninger 2015). However, with the arrival of molecular techniques in the evolutionary sciences, the ever faster and cheaper generation of gene sequences resulted in an explosion of data for phylogenetic and developmental analyses in the past 30 years. As a consequence, morphology has received progressively lesser attention, resulting in a noticeable crisis of morphological approaches toward phylogenetic systematics.

Recently, an older idea so-called “total evidence” analysis, originally proposed by Kluge (1989) is being recovered (Wanninger 2015; Giribet 2015; Pyron 2015, 2016; Sanchez et al. 2017; Gavryushkina et al. 2017; Martin et al. 2017). This approach proposes that phenomic data (e.g., data from morphology, fossils, behavior, ontogeny, etc.) provides a rich, independent source of phylogenetic evidence and an important framework to test hypotheses supported by molecular evidence by combining all evidence in a simultaneous analysis to identify the hypothesis that best explains all the evidence. To date, several studies of amphibians have already incorporated this trend (e.g., Grant et al. 2006; 2017; de Sá et al. 2014; Castroviejo-Fisher et al. 2015). Moreover, such studies have found that inclusion of morphological evidence has a disproportionately large impact on the results of the total evidence analyses, at least under the parsimony optimality criterion (e.g., de Sá et al. 2014). In a similar fashion, large impact on the results has been also found in studies of insects based in model-based approaches (Nylander et al. 2004).

Given the demonstrated importance of morphological characters in testing the phylogenetic relationships, this study provides a case in point for the exploration the effects of incorporating morphological evidence as an independent source of phylogenetic evidence and an important framework to test hypotheses supported by molecular evidence.

Objectives

In this study, I will address the following major objectives: 1) reassess the brachycephaloid phylogeny to resolve the phylogeny status of Craugastoridae; 2) explore and review the impact of incorporating morphological evidence on phylogenetic analyses dominated with molecular evidence; 3) investigate the impact of taxon and character sampling on phylogenetic analyses of the superfamily Brachycephaloidea; 4) propose an updated taxonomy to reflect the results obtained in the total evidence analyses.

Material and methods

Although it is not the goal in this study to solve the taxonomic problems in Craugastoridae, I reviewed type specimens always that was possible in order to correct identify the vouchers sequences available in GenBank. In total, 388 species are included in the dataset, of which 368 are species of the superfamily Brachycephaloidea. From these, 331 are species of the family Craugastoridae where all their genera are sampled, including for first time *Niceforonia* and *Dischidodactylus*. In addition, two monotypic genera considered *incertae sedis* within of Brachycephaloidea—*Atopophrynus syntomopus* and *Geobatrachus walkeri* are also included. Selection of outgroups was made specifically to tests various hypotheses both Craugastoridae as Brachycephaloidea relationships. Previous works have proposed Craugastoridae (including Strabomantidae) as sister clade of Brachycephalidae (Hedges et al. 2008, Heinicke et al. 2009, Padial et al. 2014, Pie et al. 2018) and/or Eleutherodactylidae (Pyron and Wiens 2011). Hence, I included 16 species of Brachycephalidae and 21 species of Eleutherodactylidae representing all the genera known in those families. To test hypotheses of Brachycephaloidea relationships, I included representatives of nobleobatrachian considering the results found in previous works (Darst and Cannatella 2004; Frost et al. 2006; Pyron and Wiens 2011, Heinicke et al. 2009; Padial et al. 2014). Between these, I included 8 species of Hemiphractidae, 1 species of Bufonidae, 1 species of Leptodactylidae, 1 species of Phyllomedusidae, 1 species of Rhinodermatidae, 2 species of Aromobatidae, and 1 species of Dendrobatidaea. Lastly, I included six distantly related clades, 1 species of Heleophrynidae, 1 species of Calyptocephalellidae, 1 species of Microhylidae, 1 species of Sooglossidae, and 1 species of Alytidae as the root.

Molecular data

Molecular dataset were retrieved from GenBank and completed with additional sequences generated in this study. In total 7 mitochondrial and 9 nuclear genes were included in this study, totaling 13,686 DNA bases, for exemplars of 328 craugastorids and 57 outgroup taxa. Mitochondrial genes include 12S ribosomal RNA (12S), tRNA-Valine (tRNAV), 16S ribosomal (16S), tRNA-leucine (tRNALl), NADH dehydrogenase subunit I (ND1), cytochrome c oxidase subunit I (CO1), and cytochrome b (cytb). Nuclear genes are 28S ribosomal RNA (28S), cellular chemokine receptor 4 (CXCR4), histone H3 (HH3), sodium-calcium exchanger 1 (NCX1), proopiomelanocortin A (POMC), two regions of recombination activating protein 1 (RAG-1), rhodopsin (Rho), solute carrier family 8 member 3 (SLC8a3), and tyrosinase precursor (Tyr).

Laboratory protocols

Genomic DNA was extracted from frozen or ethanol-preserved tissue samples using a DNeasy (Qiagen, Valencia, CA, USA) following the instructions of the manufacturer. PCR amplification of samples was performed in a 25μl-volume reaction using Thermo Scientific PCR Master Mix (2X) (Thermo Fisher Scientific Inc., USA). For the amplifications, the PCR program included an initial denaturing step of 30s at 96°C, followed by 37 (mitochondrial genes) and 40 (nuclear genes) cycles of 94°C for 30s, 50°C for 30s, and 72°C for 60s. Primers used in PCR reactions were obtained from the literature (Faivovich et al. 2005; Frost et al. 2006; Grant et al. 2006). Amplified PCR products purified with Agencourt AMpure XP DNA Purification and Cleanup Kit (Beckman Coulter Genomics, Brea, CA, USA). Posteriorly, PCR products were sent to Macrogen Inc. (South Korea). Samples were sequenced in both read frames to check for potential errors. Chromatograms obtained were read and contigs made using the sequence editing software Sequencher 5.2.3 (Gene Codes, Ann Arbor, MI, USA). All the sequences were checked using the aid of Blast (Altschul et al. 1997). Finally, embedded primer sequences were deleted from all sequence fragments before alignment.

Finally, sequences were aligned in MAFFT online version 7 (Katoh and Standley 2013; https://mafft.cbrc.jp/alignment/server/) using G-INS-i strategy. Alignments were inspected in Geneious 6.1.6 to identify obviously misaligned. Datasets corresponding to each individual marker, including all of the GenBank accession numbers are provided in **Appendix 1**.

Morphological characters

A total of 185 morphological characters examined directly from museum specimens are analyzed herein (**Appendix *2***). These 185 morphological characters were scored for 208 species, of which 192 are species of the superfamily Brachycephalidae. In total, the species for which the morphological characters were codified represent the 52.0% of all the species considered in this study. Characters are from external features (140), osteological (10), jaw musculature (10), thigh musculature (8), submandibular musculature (7), urogenital system (6), lymphatic septa (2), and digestive system (2). The list of characters is provided in Appendix 2. I present an assessments and figures below the characters definition whenever necessary. Morphological characters were scored for 208 species, 170 of which belong to the superfamily Brachycephaloidea. The current dataset also includes *Atopophrynus syntomopus* and *Dischidodactylus duidensis*. All characters are understood as historical transformation series (Grant and Kluge 2004) for the purpose of phylogenetic analysis and interpretation of results.

External morphology follows the terminology employed by Savage (1975, 1987, Lynch and Duellman 1980, 1997, Duellman and Pramuk 1999, Duellman and Lehr 2009). The nomenclature of the jaw musculature follows (Lynch 1986, 1993), and myology of other parts of the body follows Gaupp (1896) and Duellman and Trueb (1986) with modifications of Diogo and Ziermann (2014). Muscles were studied with the help of lugol solution. Dissections were made under stereomicroscopes. Cranial and postcranial osteology follow Trueb (1973, 1993). Osteology was studied in cleared and stained specimens. Pictures from morphological features were taken with the aid of software ZEISS using a camera Axiocam 105 color. All the morphological characters were tabulated into a matrix using Mesquite platform (Maddison and Maddison 2015). The matrix of morphological character is available in **Appendix *3***. The complete list of examined material and museum acronyms is provided in **Appendix *4***.

Dataset and phylogenetic analyses

Complete dataset contains 388 terminal taxa and 13871 characters, of which 185 are morphological. In total, the morphological characters are representing the 1.3% of the total characters included in this study. Although I removed characters and taxa to perform other analyses (see below), all systematic results will be discussed on the complete dataset (total evidence), since it uses all available data (all taxa and all characters), and therefore, it provides the most severity-tested hypothesis and the best measure of congruence of the characters used in the phylogenetic analysis (Kluge 1989). I performed other analyses modifying the complete datasets with the aim of evaluating of the effects of the character sampling and taxon sampling in the results. Thus, I conducted the follow experimental design:

Character sampling

To evaluate the effects of the character sampling, I modified the complete dataset and reanalyzed it. In this reanalysis, I removed all the morphological characters from dataset. As consequence, the dataset analyzed was composed of 386 terminals and 13,686 character, which all are molecular. Henceforth I refer to this dataset as molecular dataset.

Taxon sampling

To evaluate the effects of the taxon sampling, I removed two key taxa from dataset. Thus, I performed analyses in each removal as follow; one analysis removing both two taxa, one analysis removing one of those taxa, and another analysis removing the remaining taxon. As a consequence, I analyzed three datasets. The removed taxa (*Atopophrynus syntomopus* and *Dischidodactylus duidensis*) only had morphological characters. Therefore, the first dataset has 386 terminals whereas the other two analyses have 387 terminals respectively. All these three dataset have 13871 characters, of which 185 are morphological. Henceforth I refer to these dataset as combined, the combined plus *Atopophrynus*, and the combined plus *Dischidodactylus*, respectively.

To evaluate the effects of character sampling and taxon sampling, I contrasted the topologies as the branch support values for certain clades using the results obtained for the complete dataset as a reference.

Optimality criteria

I used unweighted parsimony as phylogenetic criteria for all phylogenetic analyses herein, this minimizing ad hoc assumptions and maximizing both the falsifiability and the explanatory power (Farris 1983, 2008; Kluge and Grant 2006; Grant and Kluge 2009). All of the analyses were performed with TNT (Goloboff et al., 2008) on a high-performance computing cluster housed at the Core Facility of the Centro de Facilidades para Pesquisa (CEFAP) at the University of São Paulo. Searches were conducted under the command "xmult" = replications 10 rss css xss ratchet 10 drift 10 fuse 5 consense 5", which randomly implements a variety of tree search algorithms including Random Addition Sequences (RAS), Tree Bisection and Reconnection branch swapping (TBR), Tree Fusing, Sectorial Searches, and Tree Drifting (Goloboff, 1999). Gaps were treated as a fifth state. Goodman-Bremer (GB) support (Goodman et al., 1982; Bremer, 1988) and the Ratio of explanatory power (REP; Grant and Kluge 2007) were calculated as direct measures of support (Grant and Kluge 2010). To estimate the lengths of least parsimonious trees, several random addition sequences plus TBR searches were performed assigning the weight of -1 to all characters and taking the absolute value of the of the resulting tree lengths. Since REP value can be very small, they were multiplied by a constant of 10,000 and reported in the corresponding branches of the topologies.

The resulting trees were visualized through the iTOL phylogenetic tree viewer (Bork 2007) and edited using Dendroscope (Huson et al. 2007) and Inkscape (XQuartz 2.7.7, http://www.inkscape.org/). Finally, putative transformations for selected branches were compiled using the shortest tree with YBYRÁ (Machado 2015), which runs the command "APO" of TNT (Goloboff et al. 2008) to place unambiguous synapomorphies.

Results

Family relationships

The number of equally parsimonious trees and respective tree lengths for all of the analyses performed are given in Table 1. The monophyly of the superfamily Brachycephaloidea sensu Padial et al. (2014) or Terrarana sensu Hedges et al. (2008) was not recovered in all analyses (Figure 1–5). By way of explanation, *Geobatrachus walkeri* was always recovered outside of Brachycephaloidea, being placed within the superfamily Dendrobatoidea. In addition, *Atopophrynus syntomopus*, *Dischidodactylus duisensis*, and the genus *Brachycephalus* were also to be found outside of “Brachycephaloidea” in the total evidence analysis. From the three families currently recognized, Eleutherodactylidae is recovered as monophyletic in all the analyses. In the case of Brachycephalidae, I recovered it as monophyletic for the molecular and combine dataset; however, as already mentioned, it was recovered as non-monophyletic for the complete dataset. In this last case, the genus *Brachycephalus* is placed as sister clade of Nobleobatrachia sensu Frost et al. (2006) or Hyloidea sensu Pyron and Wiens (2011). On the other side, the monophyly of Craugastoridae as in the case of the superfamily Brachycephaloidea, it was not recovered in all analyses as follow. The family Craugastoridae is paraphyletic with respect to Eleutherodactylidae in all analyses. Craugastoridae is also paraphyletic with respect to Brachycephalidae in the combined dataset, and paraphyletic with respect to the genus *Ischnocnema* in the complete dataset.

Dataset	No. of trees	Score
Molecular	460	68,160
Combined	205	71,448
Combined plus *Atopophrynus syntomopus*	325	71,462
Combined plus *Dischidodactylus duidensis*	446	71,470
Complete	682	71,483

Table 1. General results from all analyses performed for this study (molecular, combined, combined plus *Atopophrynus syntomopus*, combined plus *Dischidodactylus duidensis*, and complete dataset). For a detailed description of datasets see Material and Methods.

The trees shown in Figure 1–5 are condensed for clarity (i.e. to highlight generic relationships). Complete trees are available in **Appendix 5** to 9.

Subfamily relationships

The monophyly of the subfamilies Eleutherodactylinae and Phyzelaphryninae was recovered within of Eleutherodactylidae. Contrasting results are found in the subfamilies that constitute the family Craugastoridae due to the rejection of the monophyly of Ceuthomantinae, Craugastorinae, and Holoadeninae. In the case of Ceuthomantinae, I found it to be paraphyletic with respect to the genus *Haddadus* in the molecular and combined dataset whereas that it is also paraphyletic with respect to the genus *Ischnocnema* in the complete dataset. The subfamily Craugastorinae (including three genera, *Craugastor*, *Haddadus* and *Strabomantis*) was recovered as a polyphyletic in all analyses. In this same way, the subfamily Holoadeninae was recovered as polyphyletic, as follow. In the molecular dataset, *Oreobates*, *Lynchius*, *Phrynopus*, *Hypodactylus*, and *Niceforonia* form a clade nonrelated to another clade comprising *Barycholos*, *Noblella*, *Bryophryne*, *Euparkeralla*, *Holoaden*, *Microkayla*, and *Psychrophrynella*. Similarly, for the analysis of the combined dataset, three nonrelated clades are formed were formed. The first consisted of *Lynchius*, *Phrynopus*, and *Oreoabtes*. The second was formed by *Hypodactylus* and *Niceforonia*. Finally, the third was composed of *Barycholos*, *Noblella*, *Bryophryne*, *Euparkeralla*, *Holoaden*, *Microkayla*, and *Psychrophrynella*. Similarly, my results put the genus *Niceforonia* outside of the subfamily Holoadeninae whereas the genus *Strabomantis* plus *Eleutherodactylus bilineatus* is positioned as part of this subfamily in the complete dataset.

Generic relationships

The genera *Brachycephalus* and *Ischnocnema*, from the family “Brachycephalidae” were recovered as monophyletic assemblages in all the analyses. Likewise, I corroborated the monophyletism of all four genera of the family Eleutherodactylidae. From 20 genera that are include in the family Craugastoridae, the monophyly was refuted in all analyzes in *Craugastor*, *Hypodactylus*, *Niceforonia*, *Pristimantis*, and *Psychrophrynella*. In the case of *Craugastor,* it is paraphyletic due to the inclusion of "*Strabomantis*" *zygodactylus*. Similarly, the position of *Niceforonia nana* and *Noblella pygmaea* makes paraphyletic to *Hypodactylus* and *Psychrophrynella* respectively. In addition, *Hypodactylus latens* and *Niceforonia adenobrachia* formed a clade nonrelated with the genera *Hypodactylus* (type species *Hypodactylus elassodiscus*) neither *Niceforonia* (type species *Niceforonia nana*). Finally, I found the genus *Pristimantis* forming two nonrelated clades.

Discussion

The next sections discuss individually the effects of including 185 morphological characters and two additional taxa (*Atopophrynus syntomopus* and *Dischidodactylus duidensis*) on analyses dominated with evidence molecular in the superfamily Brachycephaloidea that, to date was constituted solely of molecular evidence.

Effects of taxon sampling and character sampling

From all the parsimony analyses, it became apparent that an increase in character sampling and taxon sampling has effects on the phylogenetic relationships of the superfamily Brachycephaloidea (Figure 1–5). The addition of 185 morphological characters and two taxa (*Atopophrynus syntomopus* and *Dischidodactylus duidensis*) to the complete dataset allowed refuting the monophyly of the family Brachycephalidae and therefore the monophyly of the superfamily Brachycephaloidea (Figure 1). This occurred because the genus *Brachycephalus* was placed outside the superfamily Brachycephaloidea at the same time that the genus *Ischnocnema* was inserted within the clade that is shared with *Ceuthomantis* plus *Haddadus*, inside the paraphyletic Craugastoridae. Another topological difference among cladograms from the molecular dataset and cladograms from the complete dataset (molecular, morphologic, and two additional taxa) was the position of the clade that housed the family Eleutherodactlylidae and the clade consisting of "*Niceforonia*" *adenobrachia* and "*Hypodactylus*" *latens*. In the molecular analysis, this clade is recovered within the superfamily Brachycephaloidea as the sister clade to the monophyletic group composed of the genera *Craugastor*, *Pristimantis*, and *Tachiramantis*. However, total evidence analysis recovers this same clade as sister group to all other genera of the superfamily Brachycephaloidea. Another change generated by incorporate character and taxa to the analyses was evident in the clade formed by *Hypodactylus dolops*, *Niceforonia nana*, and *Hypodactylus mantipus* in combination with *Phrynopus*, *Lynchius*, and *Oreobates*, which was not recovered in the context of total evidence (Figure 1).

When comparing the support between the two analyses (Figure 1), it was found that the support (REP) in some clades decreased whereas it increased in other clades when both morphological evidence and additional taxa were added. Cases where REP support values decreased during total evidence analysis included the clade compose of *Phychrophrynella* plus *Noblella pygmaea*, and *Microkayla*, for which the support value dropped from 3.72 to 1.85. Another example, REP support of the family Eleutherodactylidae decreased from 0.61 to 0.44. Conversely, the REP support increases in other clades in the context of total evidence. The clade including *Eleutherodactylus bilineatus*, *Barycholos* plus *Noblella* had a REP value of 1.67 in the analysis based in the molecular dataset. However, in the analysis of the complete dataset, the REP support value for this clade increased to 2.08. Similarly, the clade composes of *Bryophryne*, *Euparkerella* plus *Holoaden* increases its REP support from 0.46 to 2.74 (Figure 1).

It is worth noting that the topological changes generated by the incorporation of characters and taxa include both relatively strong and weak supported clades. That is, the topological changes cannot be predicted according to its REP support. As an example, the clade composes of *Brachycephalus* and *Ischnocnema* (REP support 0.99) was refuted; however, the clade composes of *Adelophryne*, *Phyzelaphryne*, *Diasporus*, and *Eleutherodactylus* (REP support 0.61) was corroborated with the incorporation of additional characters and taxa (Figure 1).

Character sampling

Significant topological changes are also observed by adding the 185 morphological characters to the molecular dataset (combined dataset, Figure 2). For example, the family

Brachycephalidae (*Brachycephalus* and *Ichnocnema*) is positioned as sister clade of all the genera of the superfamily Brachycephaloidea (except *Geobatrachus*) in the analysis performed with the molecular dataset; however, this family is recovered as sister clade of *Pristimanis tayrona*, *P. megalops*, *P. cristinae*, and the genus *Tachiramantis* in the combined dataset. Also, the position of *Pristimantis tayrona*, which was recovered as sister species of the genus *Tachiramantis* in the analysis performed with the molecular dataset but is found to be sister group to the clade that included *P. megalops*, *P. cristinae*, and the genus *Tachiramantis* in the analysis performed with the combined dataset. Other two examples of changes in position are evident in the relationships of the genus *Craugastor* plus *Strabomantis zygodactylus* and the clade composing of *Phrynopus*, *Oreobates*, and *Lynchius* between those two analyses (Figure 2).

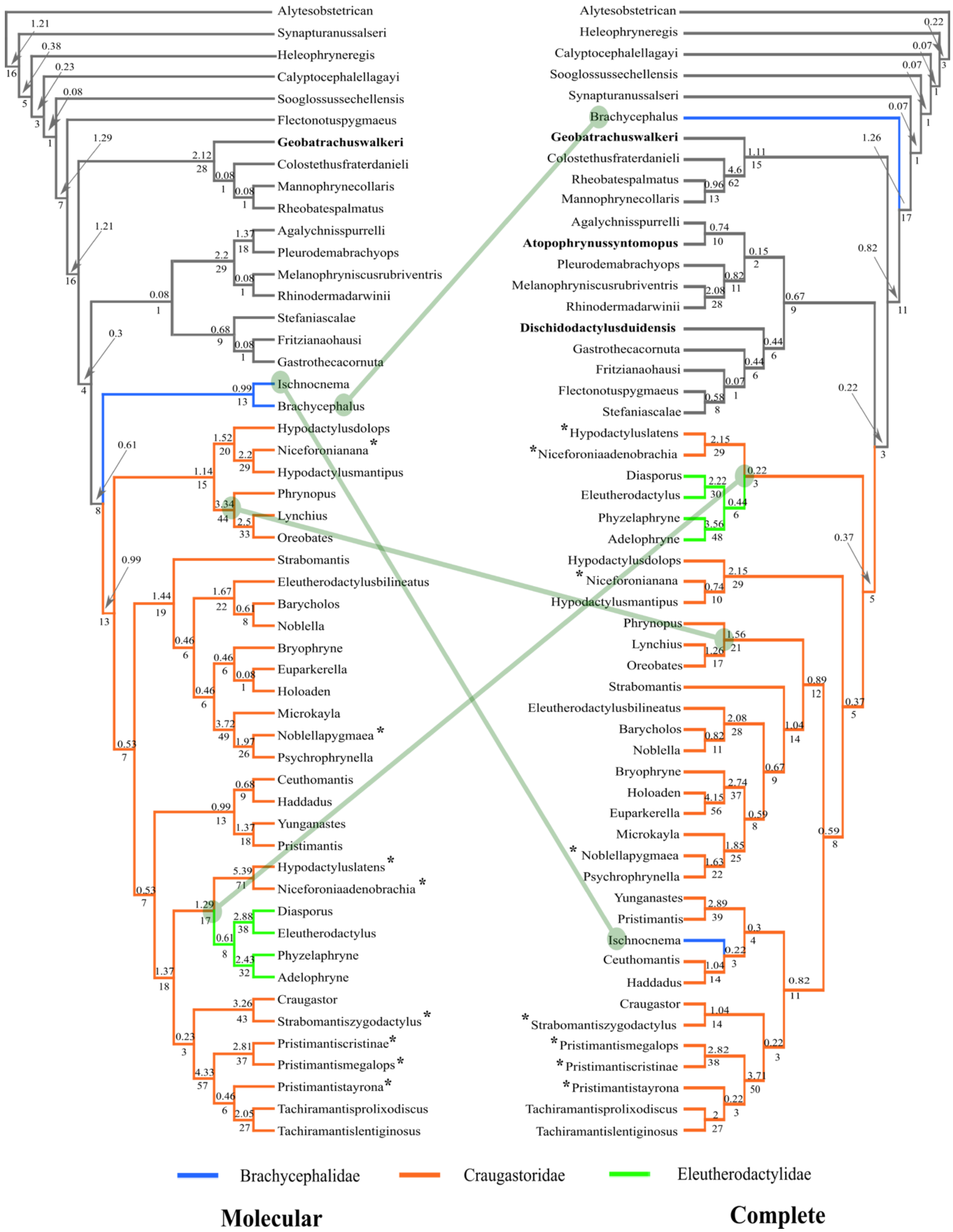


Figure 1. Comparative phylogenetic relationships of Brachycephaloidea. On the left, one of the 460 most parsimonious trees inferred from molecular dataset. On the right, one of the 682 most parsimonious trees inferred from complete dataset. Support values are indicated

on each branch (Goodman-Bremer value below, and REP support values above). Asterisks denote species recovered in different generic position. Species names in boldface to denote taxa previously considered *incertae sedis* within Brachycephaloidea.

Comparing of REP supports among molecular and combined analysis also shown unpredictable variation affecting several (Figure 2). For example, the genus *Tachiramantis* (*Tachiramantis prolixodiscus* and *T. lentiginosus*) show decrease in the REP support from 2.05 (molecular dataset) to 1.86 (combined dataset). Another example REP support values that are reduced by the addition of taxa is observed in the clade of *Niceforonia anobrachia* plus *Hypodactylus latens* and the family Eleutherodactylidae (*Diasporus*, *Eleutherodactylus*, *Adelophryne*, and *Phyzelaphryne*), which decreased from 1.29 (molecular dataset) to 0.3 (combined dataset). In other cases, however, morphological data seem to have caused an increase in REP support values. Examples include the clade composing of *Eleutherodactylus bilineatus* plus *Barycholos*, and *Noblella*, and the clade composing of *Bryophyrne* plus *Holoaden*, and *Euparkerella*, which varied from 1.67 to 3.06 and from 0.61 to 3.13, respectively (Figure 2).

The results indicated that the topological changes generated by the incorporation of morphological characters cannot be predicted according to their REP support. For instance, the relation between the genus *Craugastor* and a clade that includes *Pristimantis cristinae*, *P. megalops* plus *P. tayrona*, and the genus *Tachiramantis* presented a REP support value of 0.23 and refuted. Still, the clade that includes *Euparkerella* and *Holoaden* was corroborated despite its relatively low REP support value of 0.08 (Figure 2).

Figure 2. Comparative phylogenetic relationships of Brachycephaloidea. On the left, one of the 460 most parsimonious trees inferred from molecular dataset. On the right, one of the 205 most parsimonious trees inferred from combined dataset. Support values are indicated

on each branch (Goodman-Bremer value below, and REP support values above). Asterisks denote species recovered in different generic position. Species names in boldface to denote taxa previously considered *incertae sedis* within Brachycephaloidea.

Taxon sampling

If everything else in unchanged, the inclusion of data from the taxa *Atopophrynus syntomopus* and *Dischidodactylus duidensis* into the combined dataset also generates significant changes in the topology (Figure 3). From these, the inclusion of *Atopophrynus syntomopus* and *Dischidodactylus duidensis* refuted the monophyly of the family Brachycephalidae because the genus Brachycephalus was found outside from the superfamily whereas that the genus *Ischnocnema* is recovered within this superfamily (Figure 3). Another example is the change in the position of *Pristimantis tayrona*. With the inclusion of two taxa in the analysis, *Pristimantis tayrona* moved from be sister of a clade including *P. megalops*, *P. cristinae*, and the genus *Tachiramantis* to be sister of the genus *Tachiramantis*. Also, the clade consisting of *Hypodactylus latens* plus *Niceforonia adenobrachia* and the family Eleutherodactylidae are sister of the genus *Craugastor*; however, with the inclusion of the two taxa, it is recovered as sister of all the genera of the superfamily “Brachycephaloidea”.

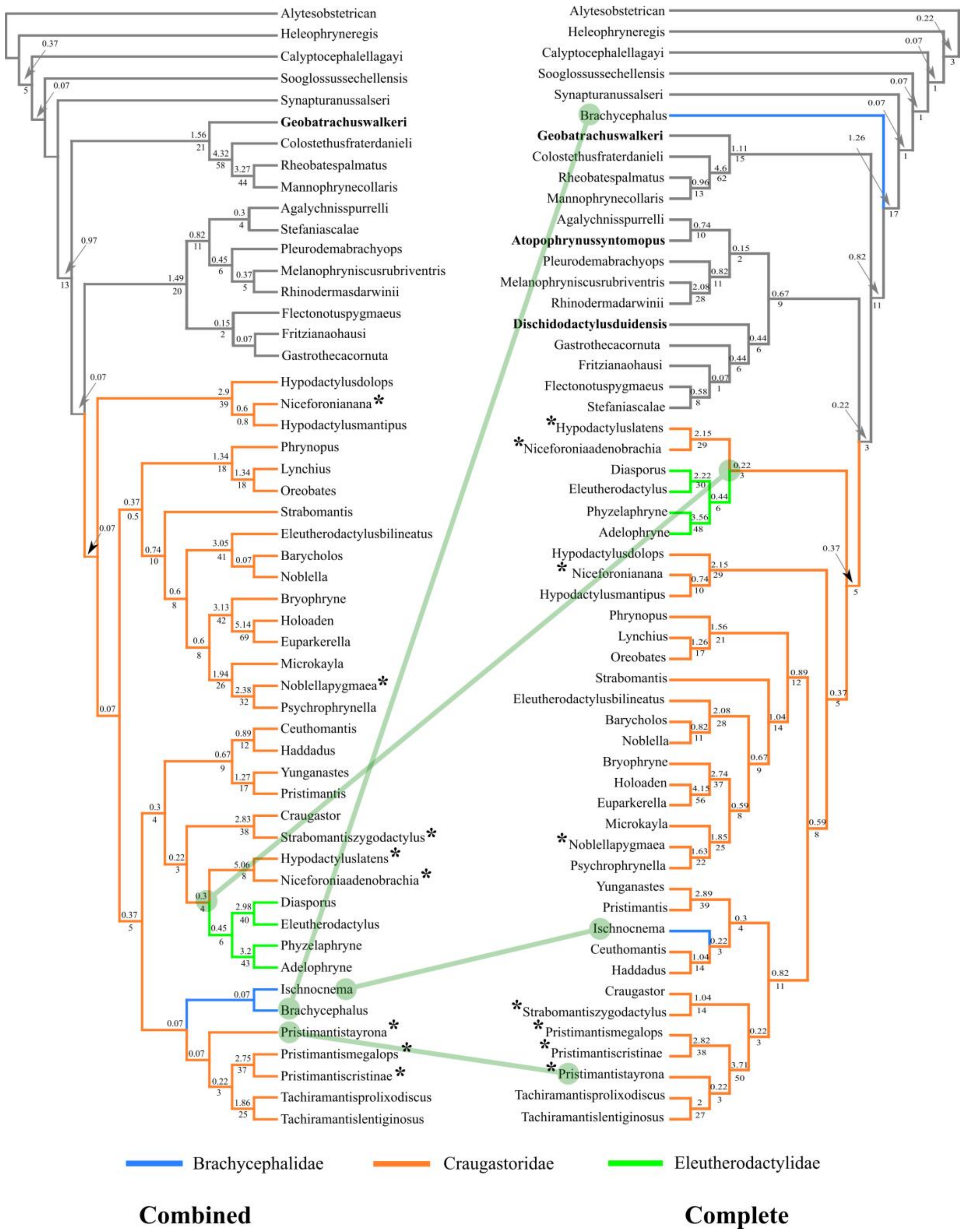


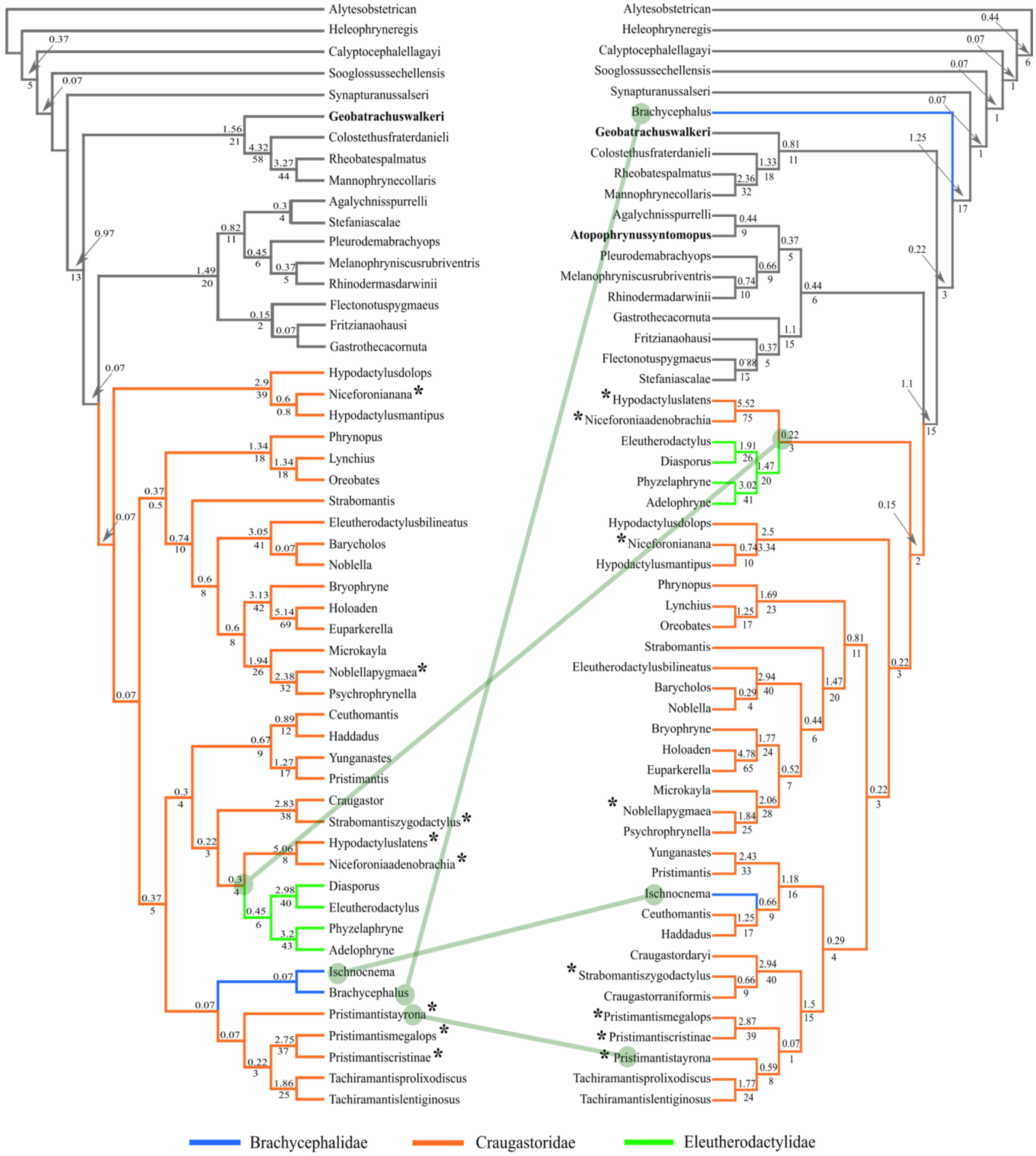
Figure 3. Comparative phylogenetic relationships of Brachycephaloidea. On the left, one of the 205 most parsimonious trees inferred from combined dataset. On the right, one of the 682 most parsimonious trees inferred from complete dataset. Support values are indicated on each branch (Goodman-Bremer value below, and REP support values above). Asterisks

denote species recovered in different generic position. Species names in boldface to denote taxa previously considered *incertae sedis* within Brachycephaloidea.

Comparison of REP support values between analyses (Figure 3) shown that these values are affected by the inclusion of *Atopophrynus syntomopus* and *Dischidodactylus duidensis*, although not in a predictable manner. In the clade including *Eleutherodactylus bilineatus* and *Barycholos* plus *Noblella*, the support decreased from 3.05 to 2.08 with taxa addition. Similarly, the support of clade that includes *Bryophyrne*, *Holoaden*, and *Euparkerella* decreased from 3.13 to 2.74. The clade that composes the family Eleutherodactylidae has a decreased in REP support values from 0.45 to 0.22. Conversely, the clade composed by *Phrynopus*, *Lynchius* plus *Oreobates* presented an increasing in the REP support from 1.34 to 1.56 with taxa addition. The clade encompassing the genus *Tachiramantis* had an increase in support from 1.86 to 2. Also, as a final example, the clade that included *Pristimantis* and *Yunganastes* had an increase in support from 1.27 to 2.89 (Figure 3).

It is worth noting that, as in character sampling, the topological changes generated by the incorporation of both taxa cannot be predicted according to its associated REP support. For instance, the clade that composes the family Brachycephalidae with a REP support of 0.07 was refuted. But the clade of *Barycholos* and *Noblella* also with a support value 0.07 was corroborated (Figure 3).

Finally, when the effects of the taxon sampling are evaluated by incorporating the taxa *Atopophrynus syntomopus* and *Dischidodactylus duidensis*m one at a time, both the topologies and the support values are affected (Figure 4–5). In both cases, the changes in the topology due to taxa incorporation generate are also observed at the generic level. That is, the same phylogenetic relationhips among genera are recovered with tin inclusion of *Atopophrynus syntomopus* or *Dischidodactylus duidensis*. The only differences between the topologies obtained with the addition of one or the other taxon are found inside the genus *Craugastor* and *Pristimantis*, where the incorporation of *Atopophrynus syntomopus* sponsors tree resolution.



Combined **Combined plus *Atopophrynus syntomopus***

Figure 4. Comparative phylogenetic relationships of Brachycephaloidea. On the left, one of the 205 most parsimonious trees inferred from combined dataset. On the right, one of the 325 most parsimonious trees inferred from combined dataset plus *Atopophrynus syntomopus*. Support values are indicated on each branch (Goodman-Bremer value below, and REP support values above). Asterisks denote species recovered in different generic

position. Species names in boldface to denote taxa previously considered *incertae sedis* within Brachycephaloidea.

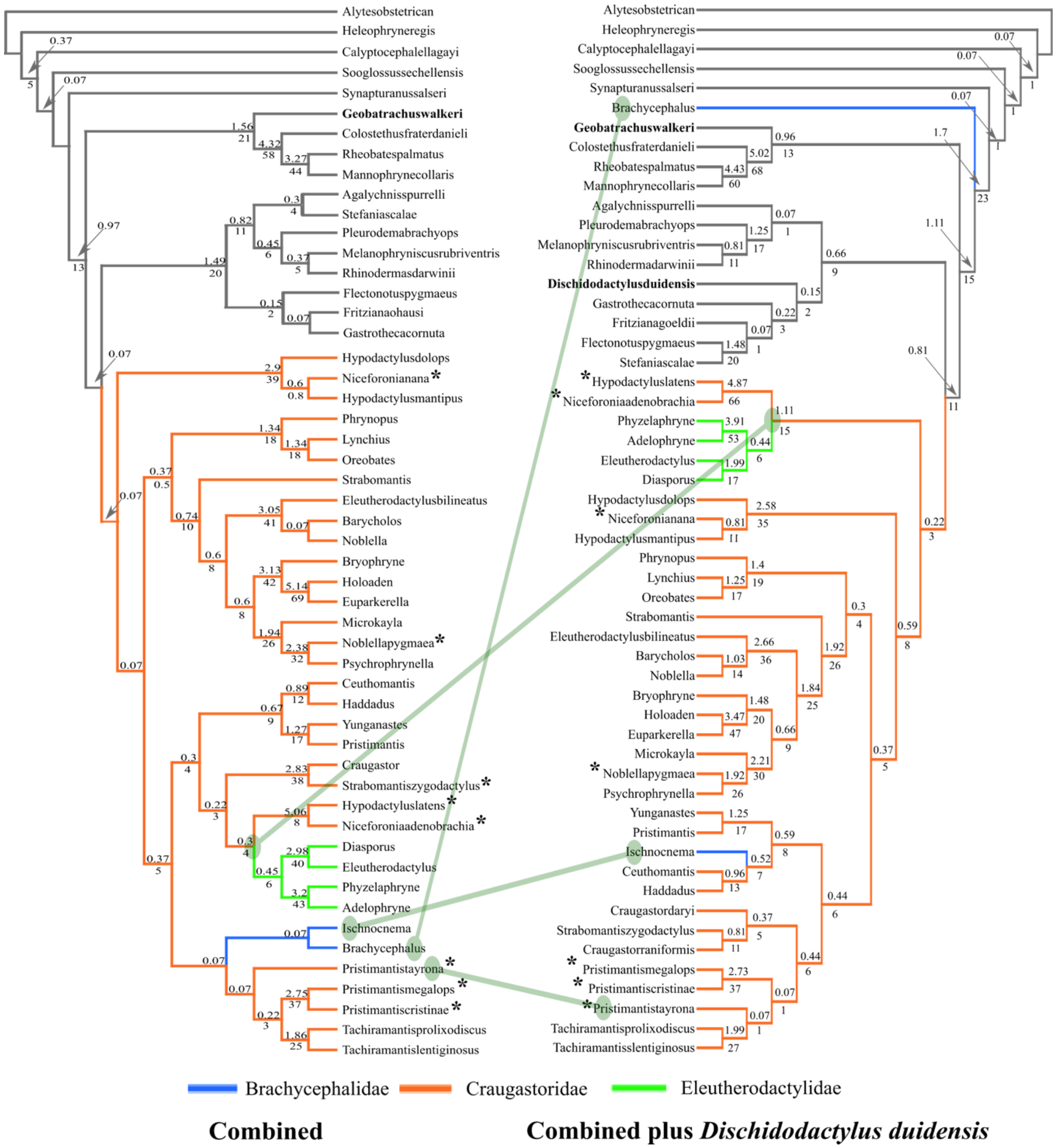


Figure 5. Comparative phylogenetic relationships of Brachycephaloidea. On the left, one of the 205 most parsimonious trees inferred from combined dataset. On the right, one of the 446 most parsimonious trees inferred from combined dataset plus *Dischidodactylus duidensis*. Values below branches are Goodman-Bremer support and above branches are REP support. Asterisks denote species recovered in different generic position. Species

names in boldface to denote taxa previously considered *incertae sedis* within Brachycephaloidea.

In the generic level, both the incorporation of *Atopophrynus syntomopus* or *Dischidodactylus duidensis* refuted the monophyly of the family Brachycephalidae and therefore the monophyly of the superfamily Brachycephaloidea. In this case, the genus *Brachycephalus* is recovered nonrelated to some other genus of the superfamily whereas the genus *Ischnocnema* was found in an internal node shared with *Ceuthomantis* and *Haddadus* (Figure 4–5). Also, the inclusion of any of those two species moved the clade of *Niceforonia adenobrachia*, *Hypodactylus latens* plus the family Eleutherodactylidae from being sister group of the genus *Craugastor* to being the sister clade of all genera of the superfamily Brachycephaloidea (except *Brachycephalus*). Also, *Pristimantis tayrona* is the sister species of *Pristimantis megalops*, *P. cristinae*, and the genus *Tachiramantis*; however, with the inclusion of *Atopophrynus syntomopus* or *Dischidodactylus duidensis* moved to be the sister of the genus *Tachiramantis* only.

When comparing the REP support after the inclusion of *Atopophrynus syntomopus* or *Dischidodactylus duidensis*, it is evident that the tendency observed in the previous analyses is also present, i.e., the REP support increase and decrease between clades. Moreover, it became clear that the effects generated by including *Atopophrynus syntomopus* or *Dischidodactylus duidensis* do not cause predictable alterations in the REP support values. That is, the inclusion *Atopophrynus syntomopus* may generate the increase in the REP support for a clade; however, when the taxon included is *Dischidodactylus duidensis*, this same clade may show a decrease in its REP support. For example, the inclusion of *Atopophrynus syntomopus* causes a reduction in the REP support value of the genus *Tachiramantis* from 1.86 to 1.77, whereas when *Dischidodactylus duidensis* is added, the REP support of the genus *Tachiramantis* increases to 1.99. In a similar manner, the inclusion of *Atopophrynus syntomopus* reduces the REP support of a clade shared with *Adelophryne* and *Phyzelaphryne* from 3.2 to 3.02. Nevertheless, when the terminal included is *Dischidodactylus duidensis*, the REP support of that clade increases to 3.91 (Figure 4–5).

Clades showing decreasing support values after the addition of *Atopophrynus syntomopus* include: the clade integrated by *Hypodactylus dolops*, *Niceoforonia nana* plus *H. manitpus* (support varied from 2.9 to 2.5), and the clade integrated by *Eleutherodactylus bilineatus*, *Barycholos*, and *Noblella* (support varied from 3.05 to 2.94). Conversely, the addition of *Atopophrynus syntomopus* was followed by an increase in support in the clades integrated by *Pristimantis megalops* plus *P. cristinae* (REP support varied from 2.75 to 2.87), and the clade integrated by *Microkayla*, *Noblella pygmae* plus *Pzychrophrynella* (REP varied from 1.94 to 2.06, Figure 4). On the other hand, some clades showing decreasing REP support values with the inclusion of *Dischidodactylus duidensis* include: the clade integrated by the genus *Diasporus* plus *Eleutherodactylidae* (from 2.98 to 1.99), and the clade integrated by *Hypodactylus latens* plus *Niceforonia adenobrachia* (from 5.06 to 4.87). Still, other clades show an increment in support following the inclusion of *Dischidodactylus duidensis*. For example, the support of the clade *Tachiramantis* increased from 1.86 to 1.99, and the support of the clade integrated by *Phrynopus*, *Lynchius* plus *Oreobates* from 1.34 to 1.4 (Figure 5).

Phylogenetic status of Craugastoridae

Results corroborate the monophyly of Craugastoridae and Strabomantidae. Nevertheless, none of them is equivalent to all previous phylogenetic hypotheses. In all analyses presented here, *Craugastor*, *Haddadus*, and *Strabomantis* are not closely related each other. In the case of the analyses performed with molecular and complete dataset, *Craugastor* is closely related to *Tachiramantis* and to some species of *Pristimantis* (Figure 1). On the other hand, in the analysis performed with combined dataset, *Craugastor* is recovered as sister group to a more inclusive family Eleutherodactylidae (Figure 2). Finally, the results obtained with the complete dataset show Craugastoridae is closely related to Ceuthomantidae (Figure 3).

Taxonomic proposal

SUPERFAMILY Eleutherodactyloidea Lutz, 1954. Content: 5 families, 1085 species (Figure 6).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) postrictal tubercles present (10.1, Figure 14); 2) fusion of Wolffian ducts present (61.1, Figure 26).

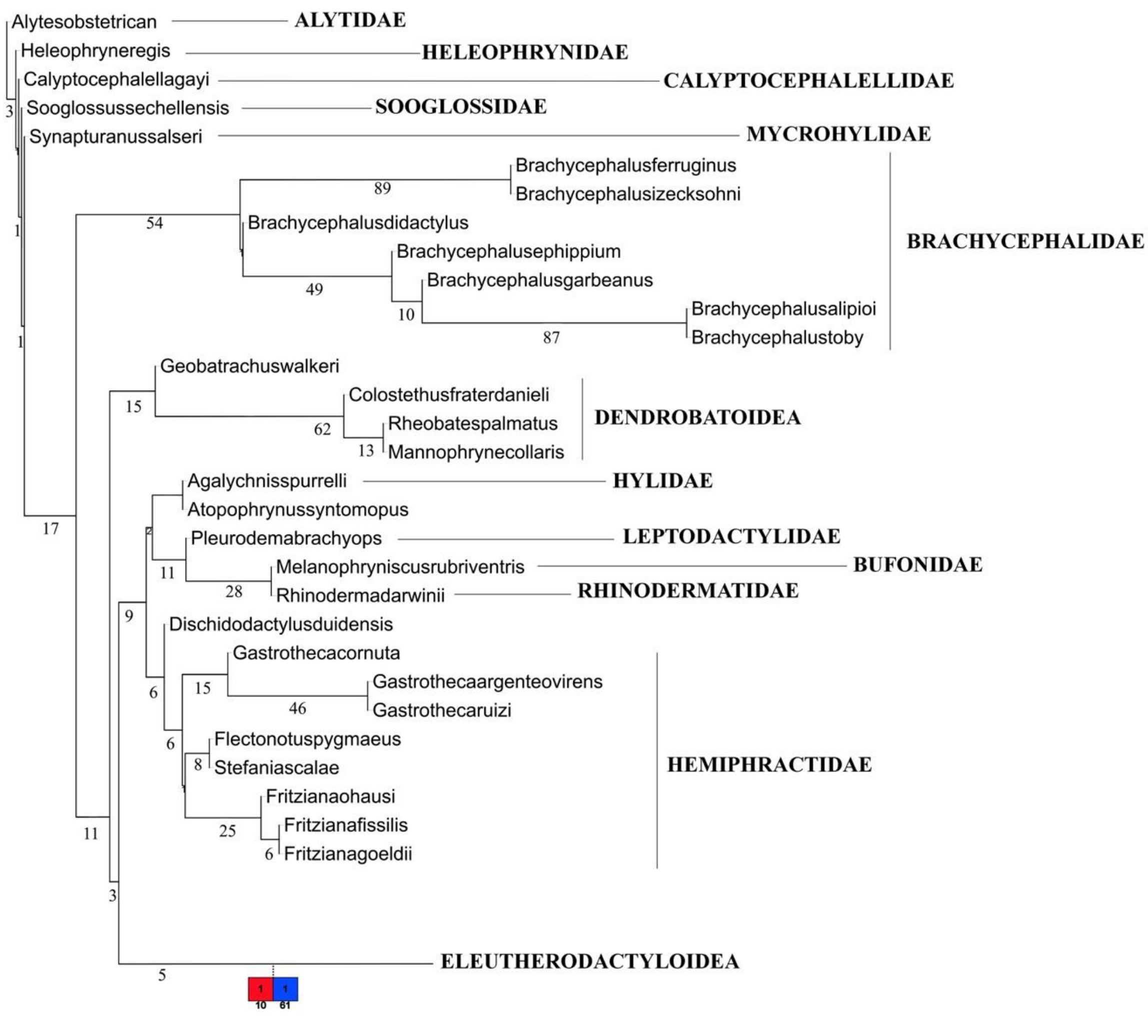


Figure 6. Optimal hypothesis of outgroup relationships. Tree shows proportional branch-lengths (from one of the most parsimonious trees), all supported nodes labeled with Goodman-Bremer values, and selected nodes labeled with unambiguously optimized

morphological synapomorphies (red square = unique, homoplastic; blue square = non-unique, homoplastic; character number below squares; synapomorphic states inside the square).

FAMILY Eleutherodactylidae Lutz, 1954. Content: 3 subfamilies, 5 genera, 227 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) interruption of contralateral portions of the m. interhyoideus = fibers interrupted by broad median aponeurosis (139.1).

SUBFAMILY Eleutherodactylinae Lutz, 1954. Content: 2 genera, 214 species (Figure 7).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Diasporus* Hedges, Duellman, and Heinicke, 2008. Content 15 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) origin of the anterior slip of the m. depressor mandibulae from otic ramus of squamosal (16.0); 2) supratympanic fold absent (24.0); 3) throat glands present (72.1); 4) morphology of the ungual flap in Toe II lanceolate (110.1); 5) testes coloration entirely pigmented (171.2, Figure 24D).

Genus *Eleutherodactylus* Duméril and Bibron, 1841. Content 199 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphy is: 1) distribution of the supernumeraries tubercles in palm distributed in the entire palm.

SUBFAMILY NEW-Colombia. Content: 1 genus, 2 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) vocal slits in males absent (50.0); 2) black pigmentation on surface area of small intestines present (60.1, Figure 25); 3) black pigmentation on Wolffian ducts (63.1, Figure 26); 4) circumferential grooves in tip of finger II absent (95.0); 5) circumferential grooves in tip of finger IV absent (100.0); 6) circumferential grooves in tip of Toe I absent (103.0); 7) circumferential grooves in tip of Toe II absent (108.0); 8) inner tarsal fold absent (149.1); outer tarsal tubercles present (151.1); development of the m. saltorius moderate developed (M. sartorius not covering the m. adductor magnus in proximal section) (164.1).

Genus new-Colombia1. Content 2 species.

Diagnosis: Unambiguous optimized morphological synapomorphies as the subfamily.

SUBFAMILY Phyzelaphryninae Hedges, Duellman, and Heinicke, 2008. Content 2 genera, 11 species (Figure 7).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Adelophryne* Hoogmoed and Lescure, 1984. Content 10 species (Figure 7).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Phyzelaphryne* Heyer, 1977. Content 1 species.

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon (Figure 7).

FAMILY Hypodactylidae Heinicke, Lemmon, Moriarty Lemmon, McGrathc, and Hedges 2018. Content 1 genus, 12 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) postrictal tubercles forming a short ridge that extends ventrolaterally from the tympanum (11.1); 2) finger fringe I (preaxial) absent (108.0); 3) finger fringe I (postaxial) absent (119.0); 4) finger fringe II (postaxial) absent (121.0); 5) finger fringe III (postaxial) absent (123.0); 6) finger fringe IV (preaxial) absent (125.0); 7) finger fringe IV (postaxial) absent (126.0); 8) Toe I fringe (preaxial) (128.0); 9) Toe V fringe (postaxial) absent (129.0); 10) Toe I fringe (postaxial) absent (176.0); Toe II fringe (preaxial) (177.0).

Toe II preaxial (fringe): absent = 0; fringe = 1; two free = 2; 1.5 free = 3.

Genus *Hypodactylus* Hedges, Duellman, and Heinicke, 2008. Content 12 species (Figure 7).

Diagnosis: Unambiguous optimized morphological synapomorphies as the subfamily.

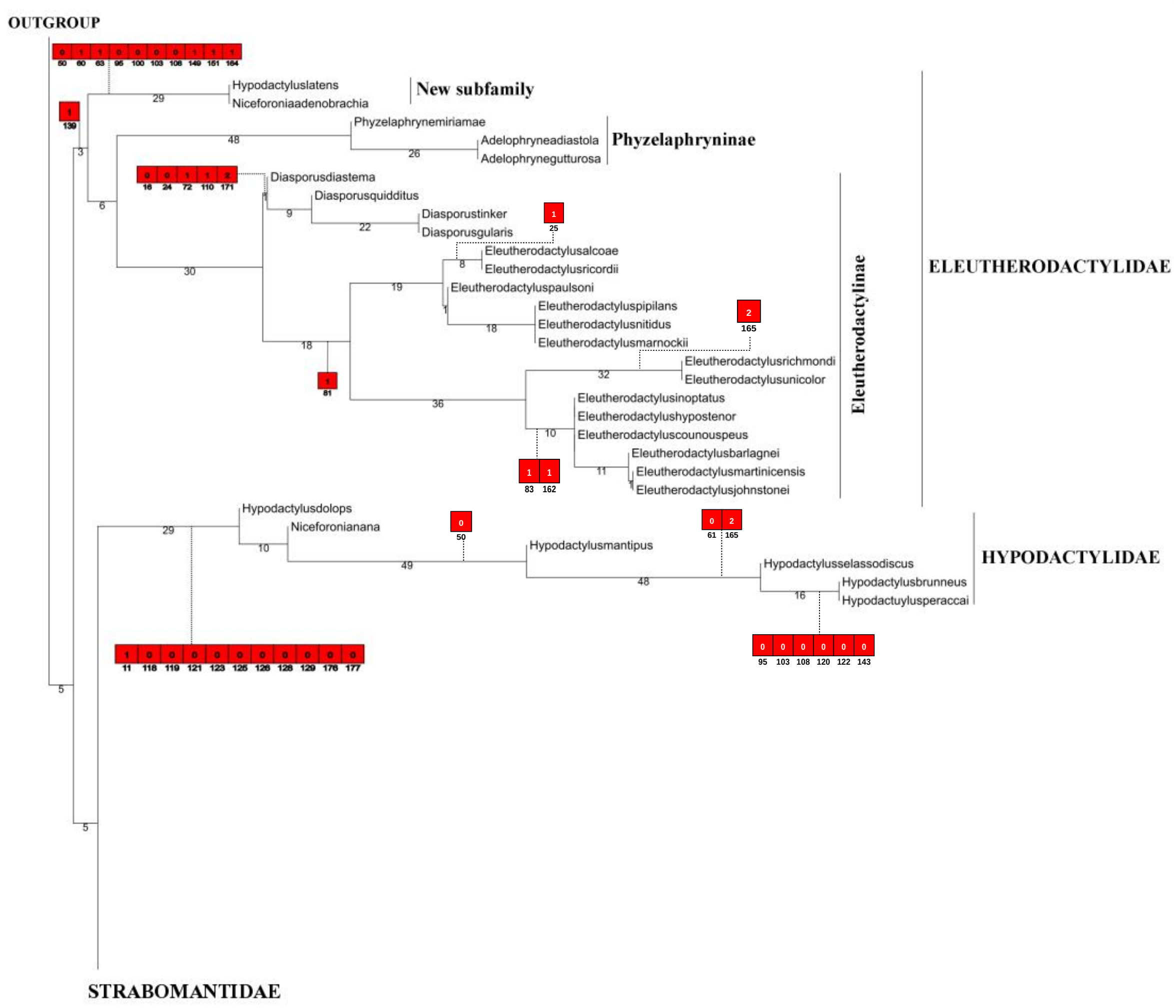


Figure 7. Optimal hypothesis of relationships between Eleuthredoctylidae and Hypodactylidae. Tree shows proportional branch-lengths (from one of the most parsimonious trees), all supported nodes labeled with Goodman-Bremer values, and selected nodes labeled with unambiguously optimized morphological synapomorphies (red square = unique, homoplastic; blue square = non-unique, homoplastic; character number below squares; synapomorphic states inside the square).

FAMILY Strabomantidae Hedges, Duellman, and Heinicke, 2008. Content 12 genera, 146 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphy is: 1) circumferential grooves in tip of finger II absent (95.0).

Genus *Barycholos* Heyer, 1969. Content 2 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1 distribution of the supernumeraries tubercles in palm distributed in the entire surface (81.1); 2) supernumeraries tubercles on base of phalange in Toe II absent (85.1); 3) circumferential grooves in tip of finger IV absent (100.0); 4) finger fringe I (preaxial) absent (118.0); 5) finger fringe I (postaxial) absent (119.0); 6) finger fringe II (postaxial) absent (121.0); 7) finger fringe III (postaxial) absent (123.0); 8) finger fringe IV (preaxial) absent (125.0); 9) finger fringe IV (postaxial) absent (126.0); 10) projecting supernumeraries tubercles on the fleshy part of the palm (169.2).

Genus *Bryophryne* Hedges, Duellman, and Heinicke, 2008. Content 14 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Euparkerella* Griffiths, 1959. Content 5 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Holoaden* Miranda-Ribeiro, 1920. Content 2 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) dorsal skin texture strongly glandular (0.5); 2) vomerine odontophores (dentigerous process of the vomer) present (49.1).

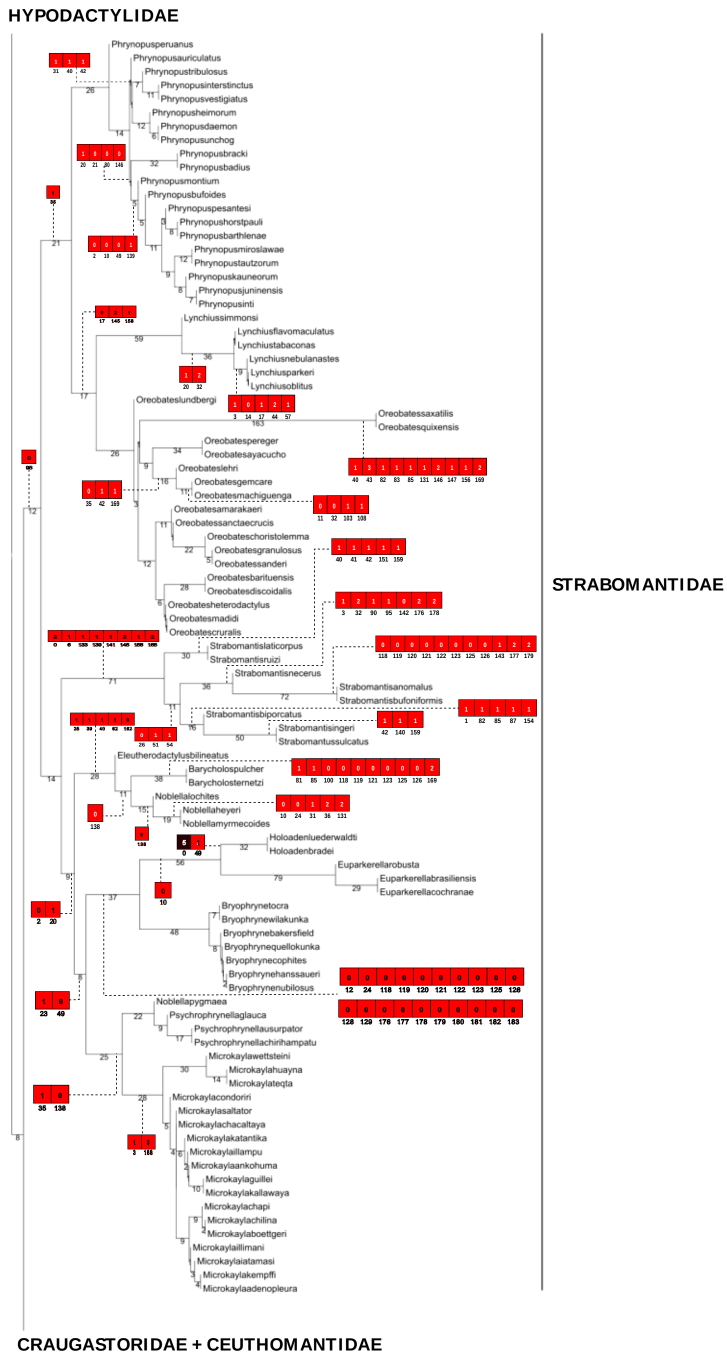


Figure 8. Optimal hypothesis of Strabomantidae relationships. Tree shows proportional branch-lengths (from one of the most parsimonious trees), all supported nodes labeled with Goodman-Bremer values, and selected nodes labeled with unambiguously optimized morphological synapomorphies (red square = unique, homoplastic; blue square = non-unique, homoplastic; black square = unique, non-homoplastic; character number below squares; synapomorphic states inside the square).

Genus *Lynchius* Hedges, Duellman, and Heinicke, 2008. Content 6 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Microkayla* De la Riva, Chaparro, Castroviejo-Fisher, and Padial, 2017. Content 25 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) dorsolateral folds present (3.1); (2) distal insertion of the m. adductor longus, almost to the same level of the m. adductor magnus (168.3).

Genus *Noblella* Barbour, 1930. Content 12 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) vomerine odontophores (dentigerous process of the vomer) absent (49.0); 2) metacarpal I shorter compared to metacarpal II (145.0); 3) distal insertion of the m. adductor longus, almost to the same level of the m. adductor magnus (168.3).

New genus-Brazil. Content 1 species (Figure 8).

Genus *Phrynopus* Peters, 1873. Content 34 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Psychrophrynella* Hedges, Duellman, and Heinicke, 2008. Content 4 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Oreobates* Jiménez de la Espada, 1872. Content 25 species (Figure 8).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Strabomantis* Peters, 1863. Content 16 species (Figure 8).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) dorsal skin texture rugose (0.2); (2) suprascapular folds present (6.1); 3) apical element of the m. intermandibularis present (133.1); 4) exostosis over frontoparietal bones present (139.1); 5) growth lateral of the frontoparietal bones present (141.1); 6) metacarpal I longer comparted to metacarpal II (145.2); 7) ulnar tubercles present (156.1); 8) insertion of the m. deltoideus on ventral margin and posterior surface near the ventral edge of the crista ventralis humeri and extending onto the ventral surface of the humerus distal to the lateral epicondyle of the humerus (165.2).

FAMILY Craugastoridae Hedges, Duellman, and Heinicke, 2008. Content 3 genera, 123 species (Figure 9).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Craugastor* Cope, 1862. Content 117 species (Figure 9).

Diagnosis: Unambiguous optimized morphological synapomorphy is: 1) trigeminal nerve passes medial to the m. adductor mandibulae (160.1)

New genus-Colombia2. Content 2 species (Figure 9).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Tachiramantis* Heinicke, Barrio-Amorós, and Hedges, 2015. Content 3 species (Figure 9).

Diagnosis: Unambiguous optimized morphological synapomorphies are: 1) subterminal fusion of Wolffian ducts (62.1); (2) hyperdistal subarticular tubercles present (77.1); 3) disc of Toe V greater than disco of Toe I (117.1); 4) metatarsal III shorter compared to metatarsal V (146.0); 5) two or three tubercles forming fold on outer border of hand present (147.1); 6) m. saltorius with moderate developed (164.1).

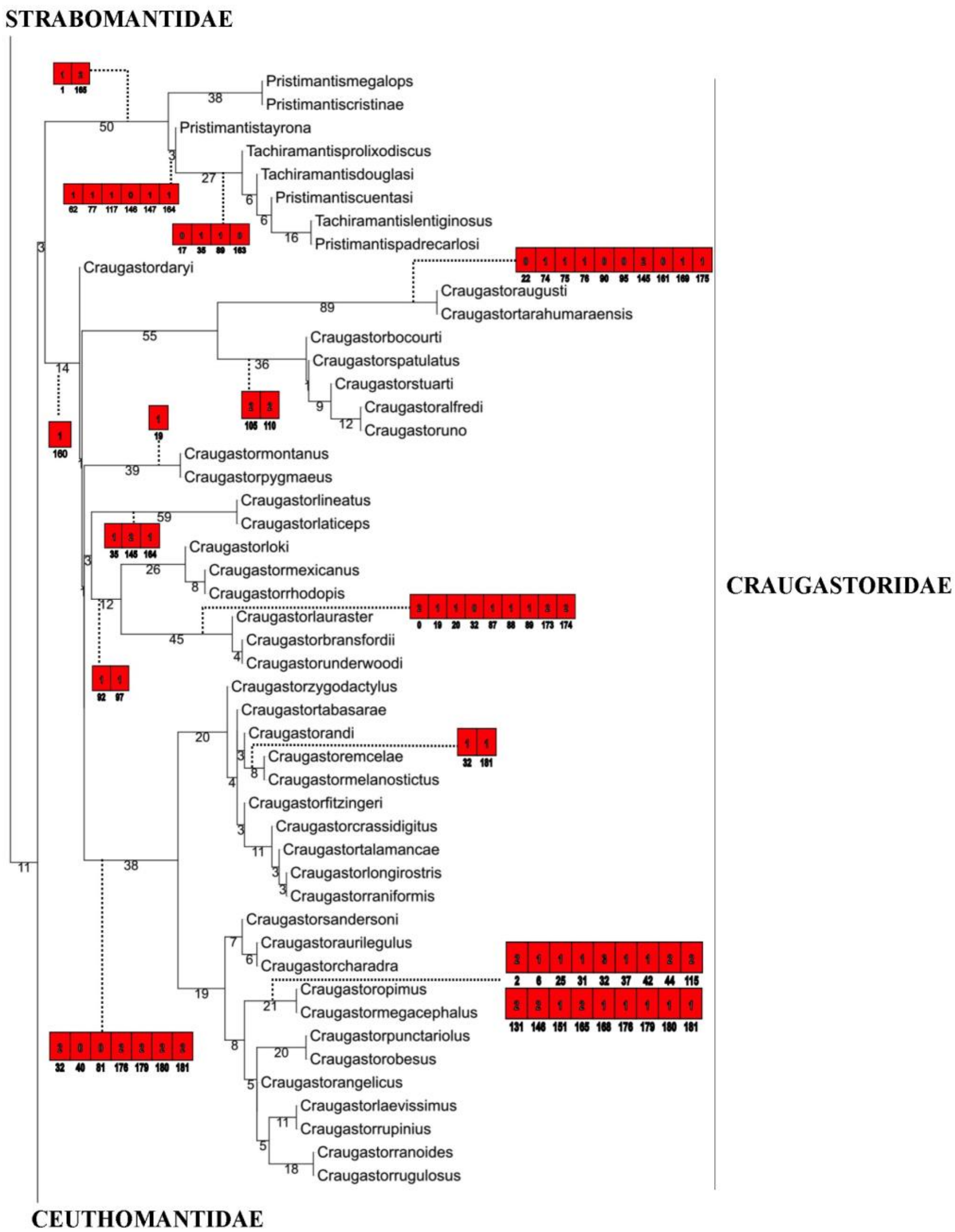


Figure 9. Optimal hypothesis of Craugastoridae relationships. Tree shows proportional branch-lengths (from one of the most parsimonious trees), all supported nodes labeled with Goodman-Bremer values, and selected nodes labeled with unambiguously optimized morphological synapomorphies (red square = unique, homoplastic; blue square = non-unique, homoplastic; character number below squares; synapomorphic states inside the square).

FAMILY Ceuthomantidae Heinicke, Duellman, Trueb, Means, MacCulloch, and Hedges, 2009. Content 5 genera, 576 species (Figure 10).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Ceuthomantis* Heinicke, Duellman, Trueb, Means, MacCulloch, and Hedges, 2009. Content 4 species (Figure 10).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Haddadus* Hedges, Duellman, and Heinicke, 2008. Content 3 species (Figure 10).

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Ischnocnema* Reinhardt and Lütken, 1862. Content 37 species (Figure 10).

Diagnosis: Unambiguous optimized morphological synapomorphy is: 1) morphology of the ungual flap I finger IV emarginated (101.2).

Genus *Pristimantis* Jiménez de la Espada, 1870. Content 527 species.

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

Genus *Yunganastes* Padial, Castroviejo-Fisher, Köhler, Domic, and De la Riva, 2007. Content 5 species.

Diagnosis: No unambiguous optimized morphological synapomorphies for this taxon.

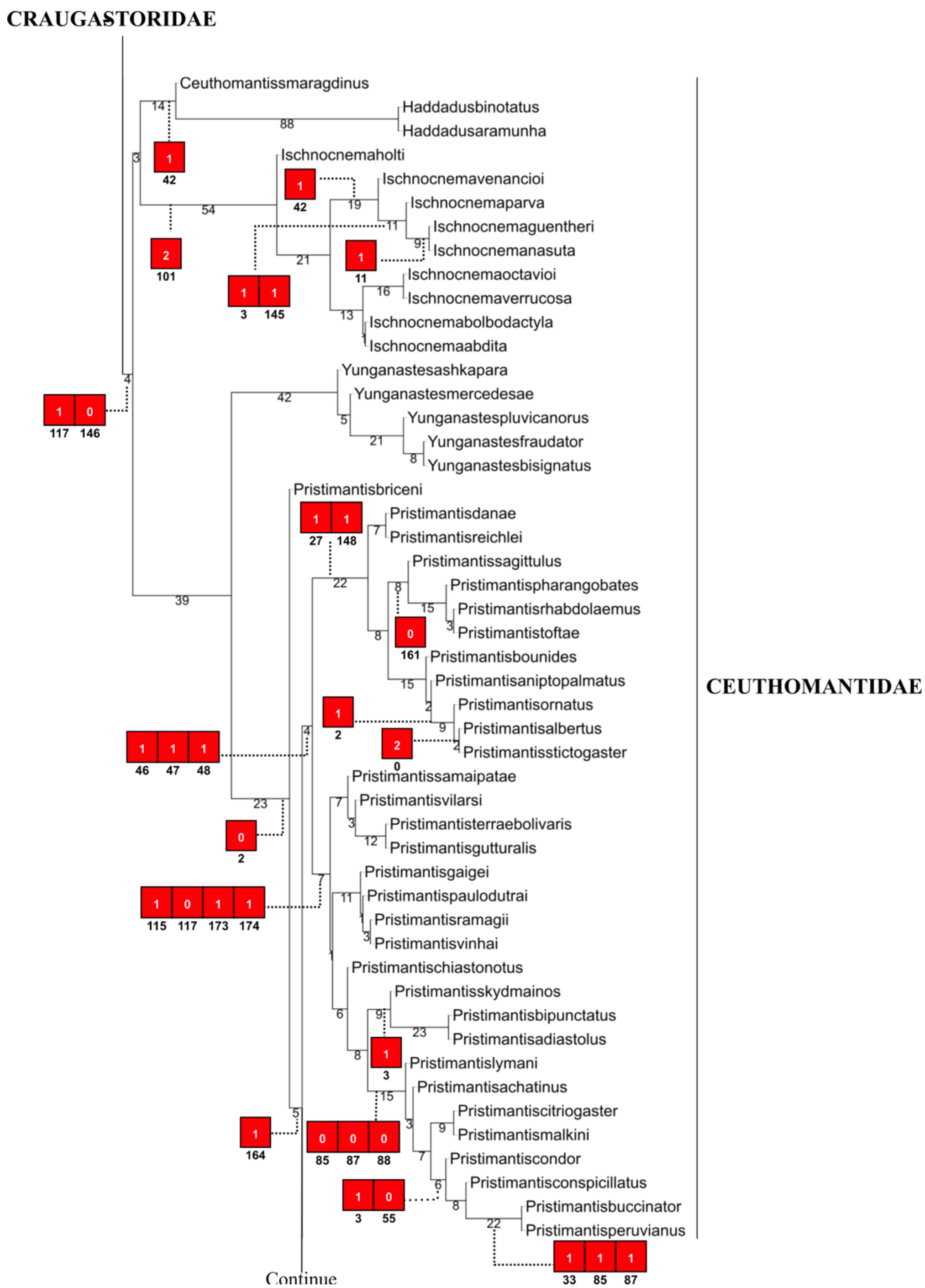


Figure 10. Optimal hypothesis of Ceuthomantidae relationships. Tree shows proportional branch-lengths (from one of the most parsimonious trees), all supported nodes labeled with Goodman-Bremer values, and selected nodes labeled with unambiguously optimized morphological synapomorphies (red square = unique, homoplastic; blue square = non-

unique, homoplastic; character number below squares; synapomorphic states inside the square).

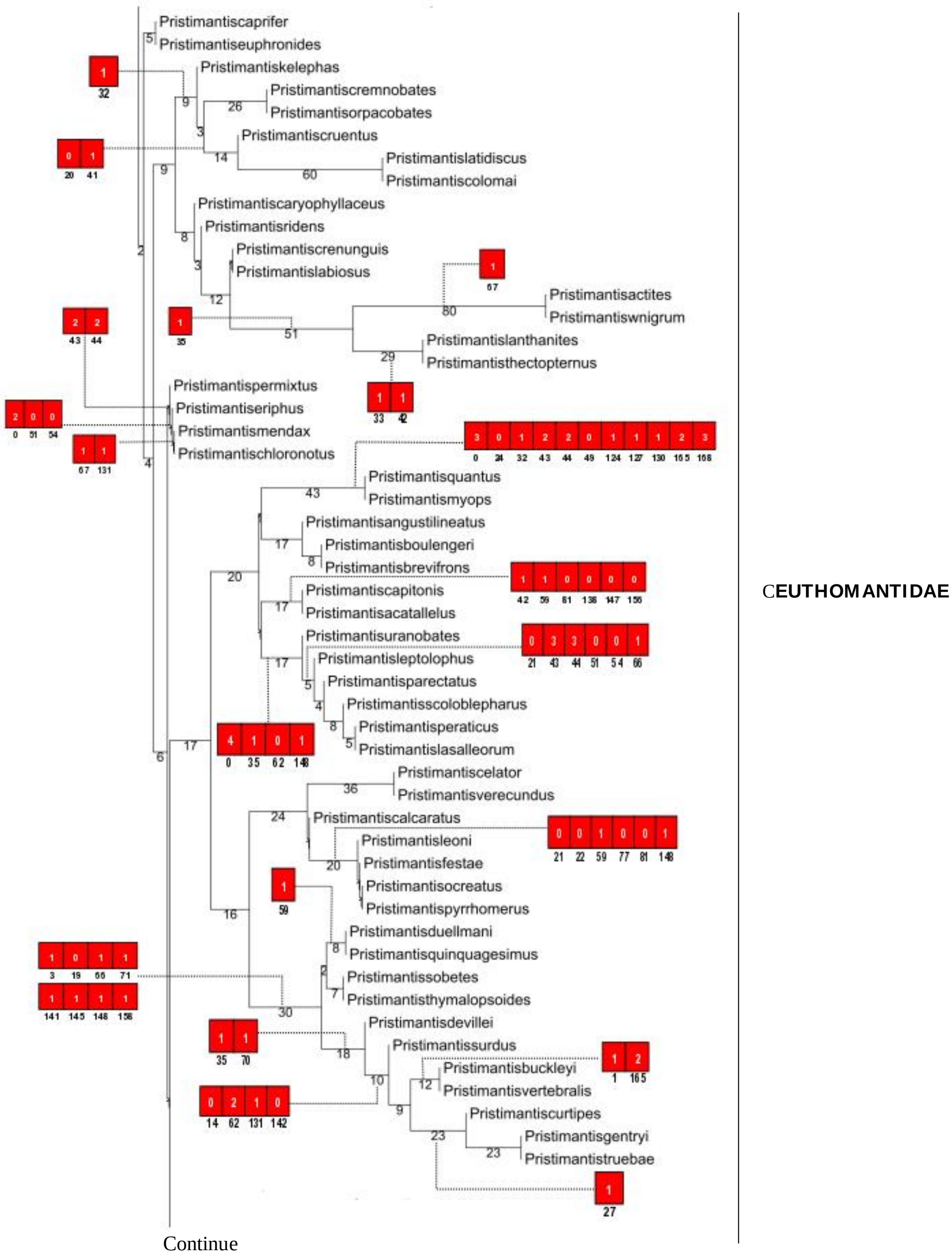


Figure 10. Continued.

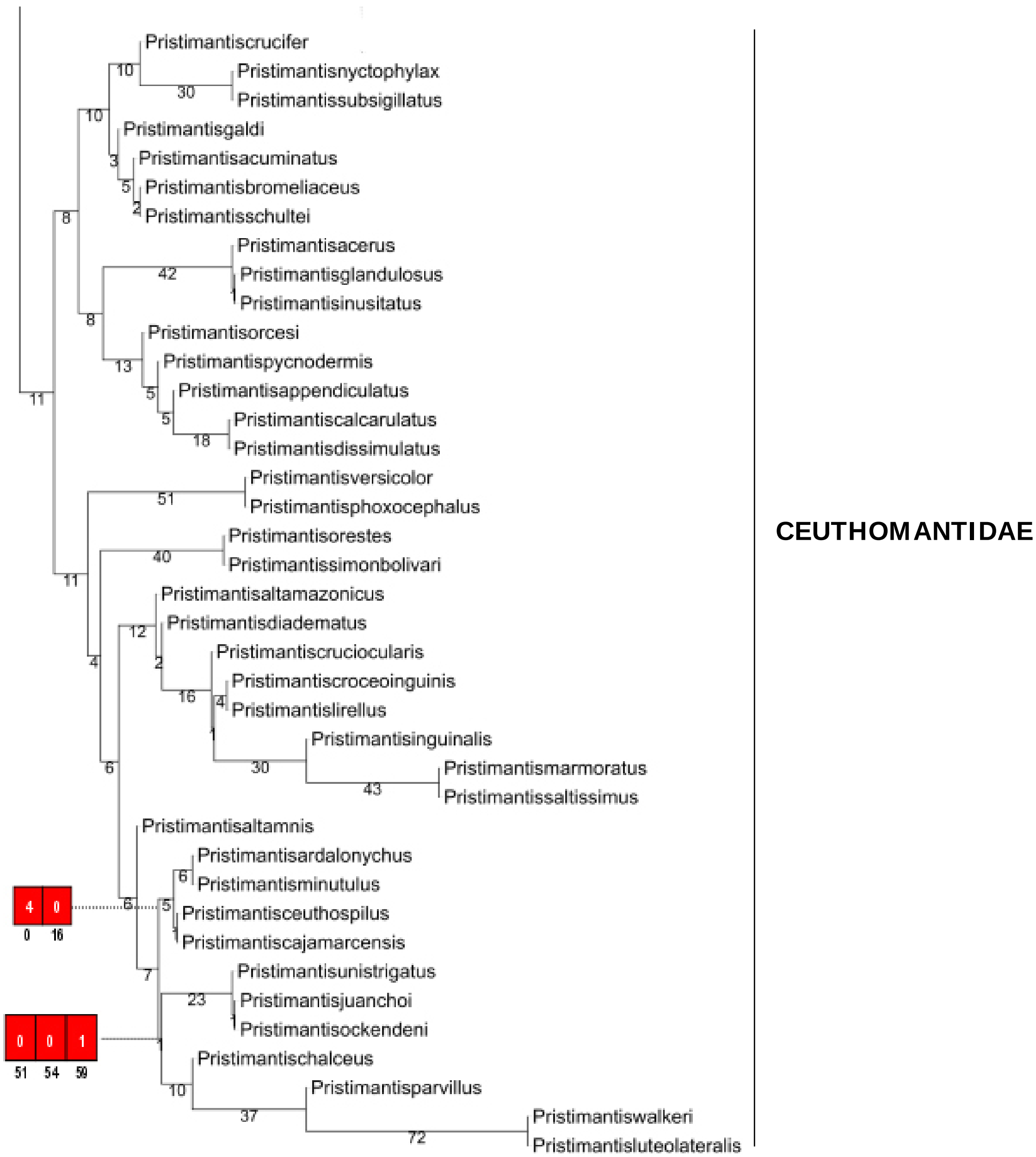


Figure 10. Continued.

Conclusions

Detailed examination of the impact of both character and taxon sampling on the phylogenetic relationships of the superfamily Brachycephaloidea reveals that the inclusion of a relatively small phenomic dataset (with 185 characters) in comparison to the molecular data (13,686 characters), as well as the inclusion of key taxa (*Atopophrynus syntomopus* and *Dischidodactylus duidensis*) have disproportionately large impacts on the tree topology and nodal support. Among this, it is striking to note that the superfamily Brachycephaloidea sensu Padial et al. (2014) or Terrarana sensu Hedges et al. (2008) does not represent a monophyletic group as previously thought.

The experiments shown here, explicitly designed to evaluate the impact of character and taxon sampling, allowed identifying that the genus *Brachycephalus* is sensitive to the inclusion of *Atopophrynus syntomopus* and/or *Dischidodactylus duidensis*. As consequence of this sensitivity to taxon sampling, the genus *Brachycephalus* is placed outside of the superfamily, being positioned as sister clade of Nobleobatrachia sensu Frost et al. (2006) or Hyloidea sensu Pyron and Wiens (2011). Moreover, the results indicate that there is no evidence of a relationship between nodal support values and its refutation. Therefore, it is not possible to predict the refutation of clades in subsequent phylogenetic analyses by considering their nodal support values.

The phylogeny resulting from this analysis refuted the monophyly of several taxa: 1) the superfamily "Brachycephaloidea" as presently constituted is non-monophyletic and the species *Atopophrynus syntomopus*, *Dischidodactylus duidensis*, *Geobatrachus walker* should no longer be retained within this superfamily; 2) the family Brachycephalidae is demonstrated to be polyphyletic since *Brachycephalus* is not closely related to *Ischnocnema*; 3) the family Craugastoridae is paraphyletic due to the nesting of *Ischnocnema*; 4) the genus *Craugastor* is paraphyletic due to the nesting of *Strabomantis zygodactylus* within the clade; 5) the genus *Psychrophynella* is paraphyletic due to the nesting of *Noblella pygmaea* within it; and 6) the genus *Pristimanits* is polyphyletic because it comprises two well-differentiated clades. Several interesting sister-group relationships include: *Ischnocnema* is closely related to a clade including *Haddadus*; *Ceuthomantis* clearly embedded within of the superfamily; *Hypodactylus latens* and *Niceforonia adenobrachia* forming a sister clade of family Eleutherodactylidae; and the genus *Brachycephalus* was placed as sister clade of Nobleobatrachia sensu Frost et al. (2006).

The phylogenetic hypothesis resulting from this study is used to propose a new taxonomy arrangement for this group, recognized formally as superfamily Eleutherodactyloidea. Five families including 26 genera within of the superfamily Eleutherodactyloidea are recognized (Ceuthomantidae, Craugastoridae, Eleutherodactylidae, Hypodactylidae, and Strabomantidae). From these five families, three are diagnosable morphologically (Eleutherodactylidae, Hypodactylidae, and Strabomantidae) whereas the other two are diagnosable solely by molecular evidence (Ceuthomantidae, Craugastoridae). At the generic level, twelve genera are diagnosable morphologically (*Ischnocnema*, *Tachiramantis*, *Craugastor*, *Strabomantis*, *Noblella*, *Microkayla*, *Holoaden*, *Barycholos*, *Hypodactylus*, Genus new-Colombia1, *Eleutherodactylus*, *Diasporus*) whereas the other fourteen are defined uniquely by molecular evidence (*Yunganastes*, *Pristimantis*, *Haddadus*, *Ceuthomantis*, New genus-Colombia2, *Oreobates*, *Psychrophrynella*, *Phrynopus*, New genus-Brazil, *Lynchius*, *Euparkerella*, *Bryophryne*, *Phyzelaphryne*, *Adelophryne*).

Regarding perspectives toward posterior total evidence analyses and given the demonstrated importance of character and taxon sampling for the phylogenetic inference of Eleutherodactyloidea, the concerted efforts should focus in incrementing both the morphological evidence as well as taxon sampling. As suggestion, these efforts should start by increasing the representativeness of hyloid families sensu Frost et al. (2006) since outgroup sampling used herein is not robust to propose closely relationships of *Atopophrynus syntomopus*, *Brachycephalus*, *Dischidodactylus duidensis*, and *Geobatrachus walkeri* with some other clade. Regarding the specific phylogenetic relationships of the genus *Brachycephalus*, it would also be important to include *Brachycephalus hermogenesi* and the morphology of *Brachycephalus didactylus* given that those species were already considered nonrelated to the genus *Brachycephalus* with support from morphology. Finally, I anticipate that further investigations focused in morphological features will provide new characters that will potentially increase our understanding on the evolutionary relationships within this diverse group.

Resumo

Uma grande tendência em estudos de sistemática filogenética é a reintegração de dados morfológicos em análises de evidência total. Até o momento, poucos estudos exploraram os efeitos da incorporação de dados morfológicos conjuntamente com dados moleculares em análises de evidência total. No entanto, aqueles que o fizeram concluíram que mesmo uma pequena base de dados fenômicos pode ter grandes e desproporcionais impactos nos resultados. Dada a demonstrada importância de caracteres morfológicos em testes de relacionamentos filogenéticos, aqui apresento um caso de exploração dos efeitos da incorporação de evidência morfológica como uma fonte independente de evidência filogenética e como importante "framework" para testar hipóteses suportadas por evidência molecular na superfamília Brachycephaloidea. Nesse estudo, 388 espécies de anfíbios foram incluídas, das quais 368 correspondem a espécies da superfamília Brachycephaloidea. Todos os gêneros conhecidos da superfamília foram amostrados. A base de dados completa inclui 13.686 caracteres moleculares (marcadores mitocondriais e nucleares) e 185 caracteres morfológicos, que foram analisados conjuntamente. Ademais, realizei análises adicionais modificando as bases de dados para avaliar os efeitos de amostragem de caracteres e táxons. Como resultado, encontrei que a superfamília Brachycephaloidea não é monofilética, como anteriormente considerada. Da mesma forma, a filogenia resultante da análise de evidência total mostrou que vários outros táxons também não são monofiléticos: as famílias Brachycephalidae e Craugastoridae, assim como os gêneros *Craugastor*, *Psychrophrynella* e *Pristimantis*. Através do exame detalhado do impacto de diferentes amostragens de caracteres e táxons sobre as relações filogenética na superfamília Brachycephaloidea, encontrei que a inclusão de dois táxons chaves (*Atopophrynus syntomopus* e *Dischidodactylus duidensis*) tiveram grandes e desproporcionais impactos na topologia das árvores. Finalmente, eu apresento uma nova taxonomia para esse grupo, reconheço o grupo formalmente como superfamília Eleutherodactyloidea, que contem cinco famílias, das quais três são morfologicamente diagnosticáveis (Eleutherodactylidae, Hypodactylidae e Strabomantidae), enquanto as outras duas são diagnosticáveis apenas com evidência molecular (Ceuthomantidae e

Craugastoridae). Da mesma forma, 12 dos 26 gêneros inclusos em Eleutherodactyloidea são morfologicamente diagnosticáveis.

Abstract

A major recent trend in systematics is the re-integration of morphological data into total evidence analysis. To date, few studies have explored the effects of incorporating morphological and molecular data into total evidence analyses; however, those that have done so have found that even a comparatively small phenomic dataset can have disproportionately large impacts on results. Given the demonstrated importance of morphological characters in testing the phylogenetic relationships, herein I provide a case in point for the exploration of the effects of incorporating morphological evidence as an independent source of phylogenetic evidence, and an important framework to test hypotheses supported by molecular evidence, in the superfamily Brachycephaloidea. In this study, 388 amphibian species are included, of which 368 species correspond to the superfamily Brachycephaloidea. All known genera within the superfamily were sampled. The complete dataset included 13,686 molecular characters (mitochondrial and nuclear markers) and 185 morphological characters, which were analyzed together. In addition, I performed additional analyses modifying the complete datasets to evaluate the effects of character and taxon sampling. As results, I found that the superfamily Brachycephaloidea does not represent a monophyletic as previously thought. Likewise, the phylogeny resulting from this analysis showed several taxa to be nonmonophyletic: Brachycephalidae and Craugastoridae as well as genera *Craugastor*, *Psychrophynella*, and *Pristimantis*. From the detailed examination of the impact of both character and taxon sampling on the phylogenetic relationships of the superfamily Brachycephaloidea, I found that the inclusion of a comparatively small phenomic dataset (185 character) as well as the inclusion of two key taxa (*Atopophrynus syntomopus* and *Dischidodactylus duidensis*) had disproportionately large impacts on the tree topology. Finally, I provide a new taxonomy for this group, recognized it formally as superfamily Eleutherodactyloidea. I recognize five families within Eleutherodactyloidea, of which three are morphologically diagnosable (Eleutherodactylidae, Hypodactylidae, and Strabomantidae) whereas the other two are diagnosable solely with molecular evidence (Ceuthomantidae and Craugastoridae). Likewise, 12 out of 26 genera included within Eleutherodactyloidea are morphologically diagnosable.

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Appendix

Appendix 1. *GenBank accession numbers used in this study.*

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Adelophryneadiastola	JX298263	JX298299		JX298340	JX298391				JX298121	JX298167			JX298221	
Adelophrynegutturosa	JX298264	JX298300		JX298341	JX298392				JX298122	JX298168			JX298222	
Agalychnisspurrelli	AY326043	AY326043												
Alytesobstetricans	DQ283112	DQ283112					DQ284158				DQ283825			DQ283510
Barycholospulcher	EU186727	EU186709								EU186744			EU186765	
Barycholosternetzi		DQ283094					DQ284144				DQ283810		DQ282921	DQ283496
Brachycephalusalipioi	HQ435676	HQ435690			HQ435703					HQ435718			HQ435732	
Brachycephalusdidactylus	JX267389	JX267467								JX267544			JX267681	
Brachycephalusephippium	DQ283091	DQ283091											DQ282919	DQ283494
Brachycephalusferruginus	HQ435681	HQ435695			HQ435708					HQ435723			HQ435737	
Brachycephalusgarbeanus	HQ435680	HQ435694			HQ435707					HQ435722			HQ435736	
Brachycephalusizecksohni	HQ435683	HQ435696			HQ435710					HQ435725			HQ435739	
Brachycephalustoby	HQ435688	HQ435701			HQ435715					HQ435730			HQ435744	
Bryophrynebakersfield	KT276281	KT276287		MF186452					MF186525	KT276276				
Bryophrynecophites	EF493537	EF493537								EF493423			EF493508	
Bryophrynehanssaueri		KY652642		KY672977						KY681084			KY681063	
Bryophrynenubilosus		KY652643		KY672978						KY681085			KY681064	
Bryophrynequellokunka	MF186309	MF186387								MF186526				
Bryophrynetocra	MF186315									MF186541			MF186583	
Bryophrynewilakunka	MF186291	MF186349							MF186520					
Calyptocephalellagayi	DQ283439						DQ284415				DQ284036			DQ283748
Ceuthomantissmaragdinus	GQ345132 GQ345251	GQ345132	GQ345251		GQ345206	GQ345190	GQ345220	GQ345238	GQ345267	GQ345285	GQ345305	GQ345336		GQ345140
Colostethusfraterdanieli	MF624212	MF624212			MF614206						MF614402			
Craugastoralfredi	DQ283318	DQ283318					DQ284318							DQ283649
Craugastorandi	EU186687	EU186687												
Craugastorangelicus	EU186681	EU186681												
Craugastoraugusti	DQ283271	DQ283271												
Craugastoraurilegulus	KR260374			KR260370										
Craugastorbocourti	EF493713			AY273110										
Craugastorbransfordii	EF493822	EF493661												
Craugastorcharadra		KR260375		KR260371										
Craugastorcrassidigitus	EU186733	EU186733												

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Craugastordaryi	EF493531	EF493531								EF493452			EF493480	
Craugastoremcelae	EU186738	EU186738												
Craugastorfitzingeri	AY326001	AY326001												
Craugastorlaevissimus		KR260376		KR260372										
Craugastorlaticeps	EU186731	EU186731												
Craugastorlauraster		KU323365												
Craugastorlineatus	EU186732	EU186732												
Craugastorloki	EU186685	EU186685												
Craugastorlongirostris	EF493395	EF493395								EF493454			EF493482	
Craugastormegacephalus	EU186688	EU186688												
Craugastormelanostictus	EU186683	EU186683		EF629437										
Craugastormexicanus	AY326006	AY326006												
Craugastormontanus	EF493530	EF493530		AY273121						EF493453			EF493478	
Craugastorobesus	EU186737	EU186719												
Craugastoropimus		KR863206		KR862951										
Craugastorpunctariolus	DQ283168	DQ283168					DQ284206				DQ283862			DQ283558
Craugastorpygmaeus	EF493711	EF493711								EF493451			EF493479	
Craugastorraniformis				DQ350200	DQ350243									
Craugastorranoides	DQ283105	DQ283105					DQ284154				DQ283820		DQ282928	DQ283505
Craugastorrhodopis	DQ283317	DQ283317					DQ284317				DQ283960		DQ282968	DQ283648
Craugastorrugulosus	EU186680	EU186680												
Craugastorrupinius	EU186669	EU186669												
Craugastorsandersoni	EF493712	EF493712												
Craugastorspatulatus	EU186674	EU186674								EU186749			EU186770	
Craugastorstuarti	EU186684	EU186684												
Craugastortabasarae		FJ784342		FJ766684										
Craugastortalamancae		KR863210		KR862955										
Craugastortarahumaraensis	EU186702	EU186702												
Craugastorunderwoodi	EF562322	EF562362		EF562394										
Craugastoruno	EU186673	EU186673								EU186748			EU186769	
Craugastorzygodactylus	New	New												
Diasporusdiastema	EU186682	EU186682			GQ345200		GQ345214		GQ345261	GQ345279			EU186773	GQ345135
Diasporusgularis	New	New												
Diasporusquidditus		FJ784405												
Diasporustinker		KT186620								KT119451				

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Eleutherodactylusbilineatu	JX267323	JX267323								JX267555				
Eleutherodactylusalcoae	EF493382	EF493382								EF493406			EF493469	
Eleutherodactylusbarlagne	EF493735	EF493563												
Eleutherodactyluscounousp	EF493719	EF493719												
Eleutherodactylushyposten	EF493757	EF493585												
Eleutherodactylusinoptatus	EF493380	EF493380			HQ831644				HQ831995	HQ831826			EF493463	
Eleutherodactylusjohnstonei		KF981384		KF981378										
Eleutherodactylusmarnocki	DQ283102													
Eleutherodactylusmartinice	EF493343	EF493343								EF493419			EF493456	
Eleutherodactylusnitidus		DQ283316					DQ284316				DQ283959			DQ283647
Eleutherodactyluspaulsoni	EF493815	EF493659												
Eleutherodactyluspipilans	EU186729	EU186711												
Eleutherodactylusrichmonc	EF493541	EF493541								EU186758			EF493461	
Eleutherodactylusricordii	EF493786	EF493636												
Eleutherodactylusunicolor	EF493542	EF493542								EF493398			EF493462	
Euparkerellabrasiliensis	JX267390	JX267468								JX267545			JX267682	
Euparkerellacochranae				KF625059						KF625092			KF625114	
Euparkerellarobusta				KF625054						KF625089			KF625111	
Flectonotuspygmaeus	KR559915	KR270418												
Fritzianafissilis	MG099097 MG099194	MG099194		MG099301								MG099466		
Fritzianagoeldii	MG099102 MG099199	MG099199		MG099306						MG099392		MG099471		
Fritzianaohausi	MG099035 MG099143	MG099143		MG099240										
Gastrothecaargenteoviren	DQ679233	DQ679383												
Gastrothecacornuta	DQ679238	DQ679388												
Gastrothecaruizi	DQ679257 DQ679365	DQ679406	DQ679365							DQ679297				
Geobatrachuswalkeri	New	New												
Haddadusaramunha	KF740845	KF740845												
Haddadusbinotatus	EF493361	EF493361			GQ345198	GQ345183	DQ284142	GQ345231	GQ345259	EF493397	DQ283807	GQ345329		
Heleophryneregis	DQ283115						DQ284161				DQ283828			DQ283513
Holoadenbradei	EF493378 EF493366	EF493366								EF493449			EU186779	
Holoadenluederwaldti	EU186728	EU186710								EU186747			EU186768	
Hypodactylusbrunneus	EF493357	EF493357	GQ345248		GQ345203	GQ345187	GQ345218	GQ345235	GQ345264	EF493422		GQ345333	EF493484	GQ345138
Hypodactylusdolops	EF493394	EF493394								EF493414	GQ345304		EF493483	
Hypodactyluselassodiscus	EF493358	EF493358												
Hypodactyluslatens	New	New												
Hypodactylusmantipus	new	New												
Hypodactylusperaccai	EF493710	EF493710								EF493420			EF493485	

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Ischnocnemaabdita	JX267326	JX267472								JX267551			JX267687	
Ischnocnemabolbodactyla		JX267327								JX267557			JX267692	
Ischnocnemaguentheri	EF493533	EF493533											EF493510	
Ischnocnemaholti	EU186740	EU186722												
Ischnocnemanasuta	JX267434 JX267520	JX267520								JX267637			JX267775	
Ischnocnemaoctavioi	JX267334	JX267521								JX267639			JX267777	
Ischnocnemaparva	EF493532	EF493532												
Ischnocnemavenancioi	JX267321	JX267321								JX267666			JX267806	
Ischnocnemaverrucosa	JX267350	JX267350								JX267670			JX267810	
Lynchiusflavomaculatus	EU186667	EU186667								EU186745			EU186766	
Lynchiusnebulanastes	EU186704	EU186704												
Lynchiusoblitus	KX470776	KX470783								KX470792			KX470799	
Lynchiusparkeri	EU186705	EU186705												
Lynchiussimmonsi	JF809940	JF810004								JF809915			JF809894	
Lynchiustabaconas	KX470773	KX470780							KX470787	KX470789			KX470796	
Mannophrynecollaris	HQ291004	HQ291004	HQ291004											
Melanophryniscusrubriver	KX276224	KX276290								KX276519	KX276533			
Microkaylaadenopleura		MF186340							MF186487	MF186537			MF186565	
Microkaylaankohuma	MF186288	MF186346							MF186509				MF186560	
Microkaylaboettgeri	MF186293	MF186352		MF186456					MF186470					
Microkaylachacaltaya		MF186357								MF186532				
Microkaylachapi	MF186328	MF186417							MF186481	MF186540			MF186562	
Microkaylachilina		MF186411							MF186493					
Microkaylacondoriri	MF186298	MF186358							MF186480					
Microkaylaguillei	AY843720	AY843720					DQ284371						DQ282995	AY844323
Microkaylahuayna	MF186317	MF186399							MF186476					
Microkaylaiatamasi	MF186304	MF186368		MF186461					MF186478	MF186536			MF186558	
Microkaylaillampu	MF186305	MF186369								MF186534			MF186549	
Microkaylaillimani		MF186374							MF186482					
Microkaylakallawaya	MF186306	MF186376											MF186575	
Microkaylakatantika	MF186307	MF186381		MF186455						MF186533			MF186576	
Microkaylakempffi	MF186308	MF186384							MF186504	MF186538			MF186566	
Microkaylasaltator	MF186326	MF186410							MF186508					
Microkaylateqta	MF186322	MF186404							MF186474				MF186554	
Microkaylawettsteini	EU186696 GQ345250 EU186696	EU186696	GQ345250			GQ345189	GQ345219	GQ345237	GQ345266	GQ345284		GQ345335	EU186776	GQ345139
Niceforoniaadenobrachia	New	New												
Niceforonianana	New	New												

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Noblellaheyeri	JX267463	JX267541												
Noblellalochites	EU186699	EU186699								EU186756			EU186777	
Noblellamyrmecoides	JX267464	JX267542												
Noblellapygmaea		KY652645		KY672979						KY681086			KY681066	
Oreobatesamarakaeri	JF809934	JF809996								JF809913			JF809891	
Oreobatesayacucho	JF809933	JF809970								JF809912			JF809890	
Oreobatesbarituensis	JF809935	JF809999								JF809914			JF809892	
Oreobateschoristolemma	JF809921	FJ539067								JF809900			JF809881	
Oreobatescruralis	EU186666	EU186666								EU186743			EU186764	
Oreobatesdiscoidalis	JF809925	EU368896								JF809904			JF809884	
Oreobatesgemcare	JF809930	JF809960								JF809909				
Oreobatesgranulosus	FJ539074	EU368897								JF809908			JF809887	
Oreobatesheterodactylus	FJ438816	FJ438805								JF809902			JF809882	
Oreobateslehri	JF809927	JF809957								JF809906				
Oreobateslundbergi	JF809928	JF809958								JF809907			JF809886	
Oreobatesmachiguenga	JF809932	JF809969								JF809911			JF809889	
Oreobatesmadidi	FJ539075	FJ539070			EU368887					JF809901				
Oreobatespereger	JF809926	JF809955								JF809905			JF809885	
Oreobatesquixensis	EF493828	EF493662												
Oreobatessanctaecrusis	JF809924	JF809951								JF809903			JF809883	
Oreobatessaxatilis	JF809931	JF809962								JF809910			JF809888	
Phrynopusauriculatus	EF493708	EF493708												
Phrynopusbadius	MG896594	MG896571		MG896611						MG896618				
Phrynopusbarthlenae	AM039721	AM039653												
Phrynopusbracki	EF493709	EF493709			GQ345202	GQ345186	GQ345217	GQ345234	GQ345263	GQ345281	GQ345303	GQ345332	EF493507	GQ345137
Phrynopusbufoides	AM039713	AM039645												
Phrynopusdaemon	MG896597	MG896574												
Phrynopusheimorum	AM039703	AM039635								MF186545			MF186580	
Phrynopushorstpauli	AM039715	AM039647												
Phrynopusinterstinctus	MG896598	MG896575		MG896614						MG896621				
Phrynopusinti	MF651913	MF651906								MF651918			MF651921	
Phrynopusjuninensis	AM039725													
Phrynopusjuninensis	MG896600	MG896577								MG896623				
Phrynopuskauneorum	AM039723	AM039655												
Phrynopusmiroslawae	MF186312	MF186393		MF186463						MF186542			MF186585	
Phrynopusmontium	MG896602	MG896579								MG896625				
Phrynopusperuanus	MG896605	MG896582		MG896615						MG896626			MG896631	
Phrynopuspesantesi	AM039724	AM039656												
Phrynopustautzorum	AM039720	AM039652												
Phrynopustribulosus	MF186330	MF186424		MF186467						MF186547			MF186579	
Phrynopusunchog	MG896608	MG896591												
Phrynopusvestigiatus	MG896610	MG896593		MG896617										

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Phyzelaphrynemiriamae	JX298268	JX298304		JX298344	JX298395				JX298126	JX298172			JX298226	
Pleurodemabrachyops	AY843733	AY843733		KP295702	AY843979						AY844721			
Pristimantischalceus	EF493675	EF493675												
Pristimantisacatallelus		JN104675		JN371120									KT898368	
Pristimantisacerus	EF493678	EF493678												
Pristimantisachatinus	JN991485	JN991420		JN991349						JQ025168			JN991552	
Pristimantisactites	EF493696	EF493696								EF493432			EF493494	
Pristimantisacuminatus		EU130579			EU130577									
Pristimantisadiastolus		AY964086												
Pristimantisalbertus	EU186695	EU186695												
Pristimantisaltamazonicus	EF493670	EF493670								EF493441				
Pristimantisaltamnis	KP064142	KP064155		KP064164										
Pristimantisangustilineatus		JN371035		JN371125						KT898304			KT898341	
Pristimantisaniptopalmatu	EU186694	EU186694												
Pristimantisappendiculatu	EF493524	EF493524												
Pristimantisbipunctatus	EF493702	EF493702								EF493430			EF493492	
Pristimantisboulengeri	KY494232	KY494232							KY494195	KY494205			KY494217	
Pristimantisbounides		KY962797		KY962790						KY962774				
Pristimantisbrevifrons		JN370973		JN371055									KT898343	
Pristimantisbriceni	JX155297	JX155297												
Pristimantisbromeliaceus	EF493351	EF493351												
Pristimantisbuccinator		KY652650								KY672966			KY681071	
Pristimantisbuckleyi	EF493350	EF493350												
Pristimantiscajamarcensis	EF493823	EF493663												
Pristimantiscalcaratus		JN104659		JN104668						KT898307			KT898346	
Pristimantiscalcarulatus	EF493523	EF493523												
Pristimantiscapitonis										KT898298			KT898333	
Pristimantiscaprifer	EF493391	EF493391												
Pristimantiscaryophyllace	EU186686	EU186686												
Pristimantiscelator	EF493685	EF493685												
Pristimantisceuthospilus	EF493520	EF493520												
Pristimantischiastonotus	JN690699	JN691311											JN692009	
Pristimantischloronotus	AY326007	AY326007												
Pristimantiscitriogaster	EF493700	EF493700												
Pristimantiscolomai	EF493354	EF493354								EF493440			EF493502	
Pristimantiscondor	EF493701	EF493701												
Pristimantisconspicillatus	EF493529	EF493529								EF493437			EF493499	
Pristimantiscremnobates	EF493528	EF493528								EF493424			EF493486	
Pristimantiscrenunguis	EF493693	EF493693												
Pristimantiscristinae	New	New												
Pristimantiscroceoinguinis	EF493669	EF493669												
Pristimantiscrucifer	EU186736	EU186718												

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Pristimantiscruciocularis	EU186656	EU186656												
Pristimantiscruentus	EF493697	EF493697												
Pristimantiscuentasi	New	New												
Pristimantiscurtipes	EF493513	EF493513								EF493435			EF493497	
Pristimantisdanae		KY652652		KY672984						KY672968			KY681073	
Pristimantisdevillei	EF493688	EF493688												
Pristimantisdiadematus	EU186668	EU186668												
Pristimantisdissimulatus	EF493522	EF493522												
Pristimantisduellmani	AY326003	AY326003												
Pristimantiseriphus	EU186671	EU186671												
Pristimantiseuphronides	EF493527	EF493527								EF493427			EF493489	
Pristimantisfestae	EF493515	EF493515												
Pristimantisgaigei	JN991513	JN991449		JN991378						JQ025186				
Pristimantisgaldi	EU186670	EU186670								EU186746			EU186767	
Pristimantisgentryi	EF493511	EF493511												
Pristimantisglandulosus	EF493676	EF493676												
Pristimantisgutturalis	JN690705	JN691313											JN692012	
Pristimantisinguinalis	EU186676	EU186676												
Pristimantisinusitatus	EF493677	EF493677												
Pristimantisjuanchoi		JN104681								KT898315			KT898353	
Pristimantiskelephus		JN104662		JN104671						KT898321			KT898359	
Pristimantislabiosus	EF493694	EF493694												
Pristimantislanthanites	EF493695	EF493695												
Pristimantislasalleorum	KY494221	KY494221												
Pristimantislatidiscus	EF493698	EF493698												
Pristimantisleoni	EF493684	EF493684								EF493433			EF493495	
Pristimantisleptolophus	KY494226	KY494226							KY494201	KY494216				
Pristimantislirellus	EF493521	EF493521												
Pristimantisluteolateralis	EF493517	EF493517												
Pristimantislymani	EF493392	EF493392												
Pristimantismalkini	EU186663	EU186663												
Pristimantismarmoratus	EU186692	EU186692												
Pristimantismegalops	New	New												
Pristimantismendax	EU186659	EU186659												
Pristimantisminutulus	EU186657	EU186657												
Pristimantismyops		JN371039		JN371131						KT898322			KT898360	
Pristimantisnyctophylax	EF493526	EF493526												
Pristimantisockendeni	EF493519	EF493519								EF493434			EF493496	
Pristimantisocreatus	EF493682	EF493682												
Pristimantisorcesi	EF493679	EF493679												
Pristimantisorestes	EF493388	EF493388												
Pristimantisornatus	EU186660	EU186660												

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Pristimantisorpacobates				JN371133						KT898325			KT898363	
Pristimantispadrecarlosi	New	New												
Pristimantisparectatus	KY494222	KY494222												
Pristimantisparvillus	EF493352	EF493352												
Pristimantispaulodutrai	JX267360	JX267360								JX267573			JX267707	
Pristimantisperaticus	KY494228	KY494228							KY494199	KY494208				
Pristimantispermixtus		DQ195467												
Pristimantisperuvianus	EF493707	EF493707			DQ195492									
Pristimantispharangobate	AY843586	AY843586												AY844213
Pristimantisphoxocephalu	EF493349	EF493349												
Pristimantispycnodermis	EF493680	EF493680												
Pristimantispyrrhomerus	EF493683	EF493683												
Pristimantisquantus		JN104684		JN371136						KT898329			KT898367	
Pristimantisquinquagesim	EF493690	EF493690												
Pristimantisramagii	JX267299	JX267299								JX267576			JX267710	
Pristimantisreichlei		KY652657		KY672989						KY672972			KY681078	
Pristimantisrhabdolaemus	EF493706	EF493706												
Pristimantisridens	EF493355	EF493355												
Pristimantissagittulus	EF493705	EF493705								EF493439			EF493501	
Pristimantissaltissimus	EU186693	EU186693												
Pristimantissamaipatae	FJ438814	FJ438803												
Pristimantisschultei	EF493681	EF493681												
Pristimantisscoloblepharu	KY494229	KY494229												
Pristimantissimonbolivari	EF493671	EF493671												
Pristimantisskydmainos	EF493393	EF493393												
Pristimantissobetes	KM675432	KM675454												
Pristimantisstictogaster	EF493704	EF493704								EF493445			EF493506	
Pristimantissubsigillatus	EF493525	EF493525												
Pristimantissurdus	EF493687	EF493687												
Pristimantistayrona	New	New												
Pristimantisterraebolivari	EU186650	EU186650												
Pristimantisthectopternus		JN104685								KT898330			KT898369	
Pristimantisthymalopsoide	EF493514	EF493514												
Pristimantistoftae	EF493353	EF493353												
Pristimantistruebae	EF493512	EF493512												
Pristimantisunistrigatus	EF493387	EF493387								EF493444			EF493505	
Pristimantisuranobates	KY494231	KY494231												
Pristimantisverecundus	EF493686	EF493686												
Pristimantisversicolor	EF493389	EF493389								EF493431			EF493493	
Pristimantisvertebralis	EF493689	EF493689												
Pristimantisvilarsi		KP149384		KP149181										
Pristimantisvinhai	JX267411	JX267491								JX267592			JX267725	

Appendix 1. Continued.

	12S Tval Tleu	16S	ND1	COI	Cytb	CXCR4	HH3	NCX1	POMC	RAG1	Rhod	SLC8A3	Tyr	28S
Pristimantisw-nigrum	AY326004	AY326004												
Pristimantiswalkeri	EF493518	EF493518								EF493428			EF493490	
Psychrophrynellachirihampatu		KU884559												
Psychrophrynellaglauca		MG837566												
Psychrophrynellausurpator	EF493714	EF493714			GQ345205					EU186762			EU186780	
Rheobatespalmatus	MF624243	MF624243		MF614330	MF614234						MF614424			MF614283
Rhinodermadarwinii	DQ283324	DQ283324		DQ502858	DQ502589		DQ284320				DQ283963			DQ283654
Sooglossussechellensis	DQ283449	DQ283449					DQ284423			DQ872921	DQ284040		DQ283028	DQ283753
Stefaniascalae	KR559925	KR270434							KR270371	KR138428			KR270397	
Strabomantisanomalus	EF493534	EF493534								EF493447				
Strabomantisbiporcatus	EU186691 GQ345249	EU186691	GQ345249		GQ345204	GQ345188		GQ345236	GQ345265	GQ345283		GQ345334	EU186775	
Strabomantisbufoniformis	DQ283165	DQ283165					DQ284203						DQ282942	DQ283555
Strabomantisbufoniformis				FJ766635										
Strabomantisingeri	New	New												
Strabomantislaticorpus														
Strabomantisnecerus	EF493535	EF493535								GQ345299				
Strabomantisruizi	New	New												
Strabomantissulcatus	EF493536	EF493536												
Synapturanussalseri		KM509207		KM509876			KM509611						KM509998	
Tachiramantisdouglasi		KP149380		KP149178										
Tachiramantislentiginosus	KP297386	KP297386								KP297388			KP297390	
Tachiramantisprolixodiscus	KP297385	KP297385								KP297387			KP297389	
Yunganastesashkapara	FJ438807	FJ438796								JF809919			JF809898	
Yunganastesbisignatus	FJ438808	FJ438797												
Yunganastesfraudator	JF809938	FJ539065								JF809916			JF809895	
Yunganastesmercedesae	FJ539071	FJ539066												
Yunganastespluvicanorus	FJ438812	EU192247								JF809917			JF809896	

***Appendix* 2**. *List of morphological characters examined in this study.*

As part of my systematic treatment of the terraranan frogs, I present the morphological characters examined in this study. The morphological knowledge of the terraranan frogs is voluminous (e.g., Lynch 1971; Lynch 1986; Lynch 1997; Lynch and Duellman 1980, 1997; Duellman and Pramuk 1999; Duellman and Lehr 2009; Padial et al. 2007; Starrett 1968; Savage 1975, 1987; Savage and Myers 2002; Taboada et al. 2013). Therefore, I follow the terminology used in those works always that it was possible because most of the characters that follow are derived primarily from these works.

1. DORSAL SKIN TEXTURE (Figure 11): smooth = 0; granulate = 1; rugose = 2; tuberculate = 3; glandular = 4; strongly glandular = 5. Nonadditive.

2. VENTRAL SKIN TEXTURE: smooth = 0; granulate = 1.

3. UPPER EYELID TEXTURE: smooth = 0; rugose = 1; tuberculate =2; glandular = 3.

Although the texture of the dorsal and ventral skin can be affected by several factors (e.g., inadequate preservative or preparation), this problem can be reduce by studying several specimens when is possible. In my definition of the character states, I modified the proposal of Lynch and Duellman (1980, 1997), Savage (1975, 1987), and Duellman and Lehr (2009) because in their proposal the dorsal folds and ridges are considered as the same character. Herein, I consider dorsal folds and ridges as independent characters (see character 4 to 10). The state "smooth" is easily recognized because the surfaces lack of distinct tubercles or granules in appearance to the unaided eye. The state "granulate" is recognized by having closely packed granules. The state "rugose" had been mentioned mainly in works focused in *Craugastor* and *Strabomantis* (Savage, 1975; Savage and Myers 2002), and it resembles to sandpaper. The state "tuberculate" is associated mainly to species of the genus *Pristimantis*. It is recognized by consisting of uniform or composite projections. Recently, Guayasamin et al. (2015) found that *Pristimantis mutabilis* and *P. sobetes* change their skin texture, passing from markedly tubercular to smooth or nearly smooth. Nevertheless, it is also important to clarify that this change does not imply the change between two discrete characters as they argued, because although all the tubercles became reduced in size, in fact, they do not disappear. The state “glandular” and “strongly glandular” is characterized by having warts, being in the later case notoriously evident. The texture glandular is found in species of *Pristimantis* distributed mainly in páramos, and also in species of the genus *Holoaden*.

Figure 11. Dorsal skin texture in preserved specimens. **A**. Smooth—*Pristimantis achatinus* (KU 200143, 31.0 mm SVL). **B**. Granulate—*Pristimantis chalceus* (KU 117649, 24.0 mm SVL). **C**. Rugose—*Strabomantis anomalus* (KU 177631). **D**. Tuberculate—*Pristimantis calcaratus* (ICN 36940). **E**. Glandular—*Hypodactylus elasssodiscus* (KU 130272). **F**. Strongly glandular—*Holoaden luderwaldti* (KU 92869, 31.0 mm SVL).

4. Dorsolateral folds (Figure 12): absent = 0; present = 1.

5. Dorsolateral folds extension (Figure 12B–C): anterior (on scapular region) = 0; reaching posterior surface on sacrum = 1.

6. Dorsolateral folds morphology: continuous = 0; fragmented into a series of pustules = 1.

According to Lynch and Duellman (1997), the dorsolateral folds extend from posterolateral corner orbit and lie lateral to the sacrum and blades of the ilia. When the dorsolateral folds are present, they vary in its extension and morphology (continuous or fragmented into a series of pustules). That is, the dorsolateral folds can be restricted to the scapular region being shorts or extending to sacrum. Lynch and Duellman (1997) and Duellman and Lehr (2009) also recognized the paravertebral folds, which lie above the transverse processes of the vertebrae and are median to the dorsolateral folds (when these are present). Additional dermal folds on scapular and sacral region are found in species of the genus *Craugastor* and *Strabomantis* (Savage and Myers 2002). Based on its position, I considerer the scapular and sacral folds as characters independent (see character 7 to 10).

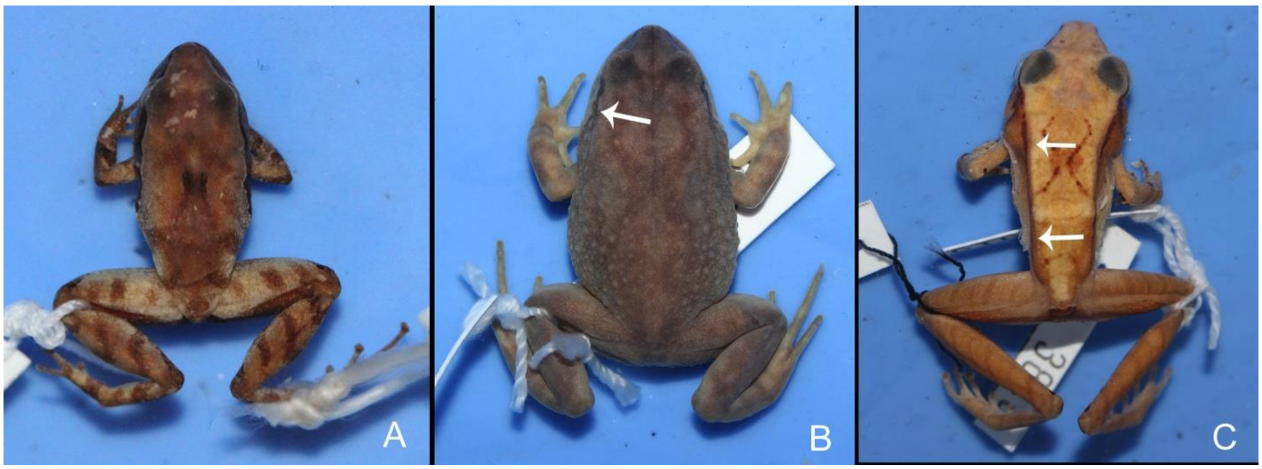


Figure 12. Dorsal views showing dermal folds in the scapular and sacral region in preserved specimens. **A**. Dorsolateral folds absent—*Craugastor podiciferus* (KU 37332, 15.0 m SVL). **B**. Dorsolateral folds restricting to scapular region—*Psychrophrynella wettsteini* (KU 183049, 27.0 mm SVL). **C**. Dorsolateral folds reaching posterior surface of sacrum—*Pristimantis buccinators* (KU 220919, 31.0 mm SVL). Dorsolateral folds indicated by white arrows.

7. SUPRASCAPULAR FOLDS (Figure 13): absent = 0; present = 1.

8. SUPRASCAPULAR FOLDS EXTENSION: restricting to scapular region = 0; reaching up above the groin = 1.

9. PARAVERTEBRAL FOLDS (Figure 13): absent = 0; present = 1.

10. LATEROSACRAL FOLDS (Figure 13): absent = 0; present = 1.

In addition to the dorsolateral folds, other three dermal folds have been recognized on the dorsum of terraranan frogs. Savage and Myers (2002) recognized the important of distinguish those new folds in its morphological revision of the *Eleutherodactylus biporcatus* Group. In this work, Savage and Myers (2002) propose supraescapular, paravertebral and laterosacral plicae as names to refer to these three folds. From these, the paravertebral plicae are equivalent to the paravetrabral folds sensu Lynch and Duellman (1997). For convenience, herein I use the name folds instead of plicae. The supraescapular folds are the given name for the anterior folds extending posteromedially from the eyes onto the occiput sensu Lynch and Duellman (1997). These folds may also extend posteriorly from the eyes to beyond of middle of body. The paravertebral folds are positioned at midbody, separate from the suprascapular folds. As was mentioned by Lynch and Duellman (1997), these folds lie above the transverse processes of the vertebrae and are median to dorsolateral folds (if present). Finally, the paravertebral folds are often less well defined, sometimes comprising only slightly raised, linear rows of small tubercles (Savage and Myers, 2002).

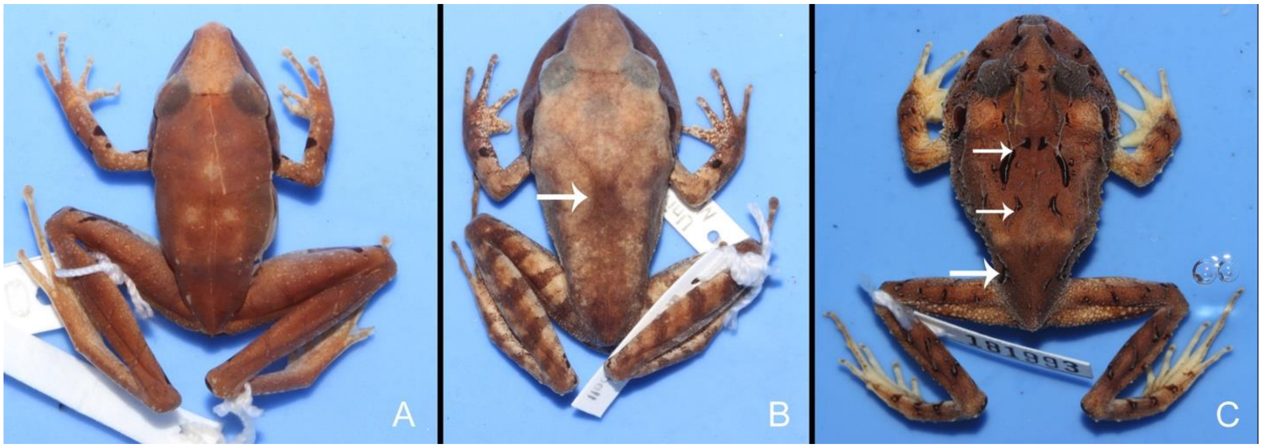


Figure 13. Dorsal view showing dorsal-ridge patterns in preserved specimens. **A**. Dorsal folds absent—*Craugastor mimus* (KU 37126, 27.0 mm SVL). **B**. Paired supraescapular folds—*Craugastor lineatus* (KU 186173, 44 mm SVL). **C**. Paired supraescapular, paravertebral, and laterosacral folds—*Strabomantis ruizi* (KU 181993). Folds indicated by white arrows.

11. POSTRICTAL TUBERCLES (Figure 14A): absent = 0; present = 1.

12. MORPHOLOGY OF THE POSTRICTAL TUBERCLES (Figure 14B–C): one to two separate tubercles = 0; tubercles fused and forming a short ridge that extends ventrolaterally from the tympanum = 1.

Postrictal tubercles are located posteroventral to the tympanum and just anterior to the posterior edge of the jaw musculature (Joglar 1989, Lynch and Duellman 1997, Duellman and Lehr 2009). Lynch and Duellman (1997) mentioned that in few species, those tubercles might be fused so as to form a short ridge that extends ventrolaterally from the tympanum. In addition, some species lack of postrictal tubercles (e.g., *Geobatrachus walkeri*).

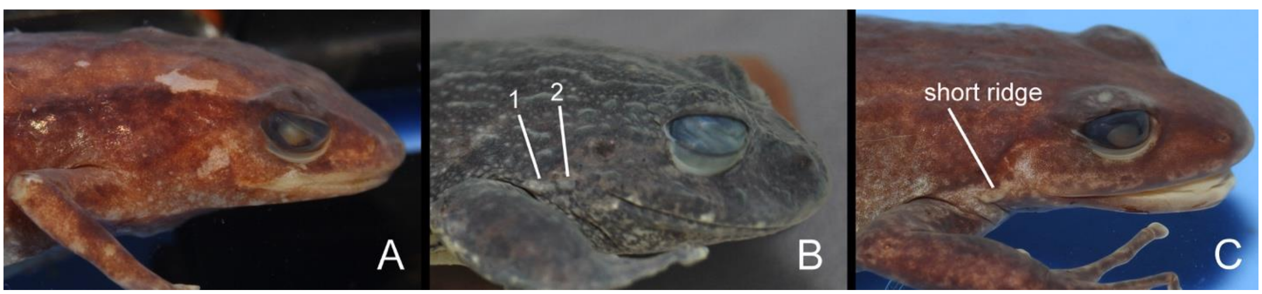


Figure 14. Lateral views showing the condition of postrictal tubercles in preserved specimens. **A**. Postrictal tubercles absent—*Geobatrachus walker* (KU 169367, 21.0 mm SVL). **B**. Two separate postrictal tubercles—*Strabomantis cheiroplethus* (ICN 18013). **C**. Postrictal tubercles forming a short ridge that extends ventrolaterally from the tympanum—*Lynchius nebulanastes* (KU 181400, 33.3 mm SVL).

13. TYMPANIC MEMBRANE (Figure 15): absent = 0; present = 1.

14. TYMPANIC ANNULUS (Figure 15): absent = 0; present = 1.

15. COLUMELLA: absent = 0; present = 1.

The tympanic membrane is an area of skin, much thinner than ordinary skin. Lynch and Duellman (1997) have argued that when the tympanic membrane is present, the annulus also is present, but the absence of a differentiated tympanic membrane does not necessarily imply the absence of the annulus. The same patter occurs with the columella, since the presence of membrane and annulus indicate also the presence of columella. However, the absence of those structures does not signify the absence of the columella (Lynch and Duellman 1997, Pereyra et al. 2016).

16. SIZE OF TYMPANIC MEMBRANE IN REFERENCE TO EYE SIZE IN MALES (Figure 16): smaller, less or equal to ½ = 0; medium, more to 1/2 and to 2/3 = 1; equal or bigger to eye = 2. Additive.

Many authors have noted the pronounced size in the tympanum in adult males of species of the genus *Craugastor* (Campbell and Hills 1989, Lynch and Duellman 1997, Lynch 2000). I corroborated this; however, I also found that at least two states are recognized within the species having pronounced tympanum. Thus, I propose discretized between medium tympanum size and bigger tympanum size. To date, medium tympanum size and bigger tympanum size are found exclusively in species of the genus *Craugastor* (e.g., *Craugastor bransfordi*, *C. lineatus, C. mexicanus*, *C. pygmaeus*). Ontogenetic variation suggests the increase in size of tympanic membrane. Thus, I treated this series of transformation additively.

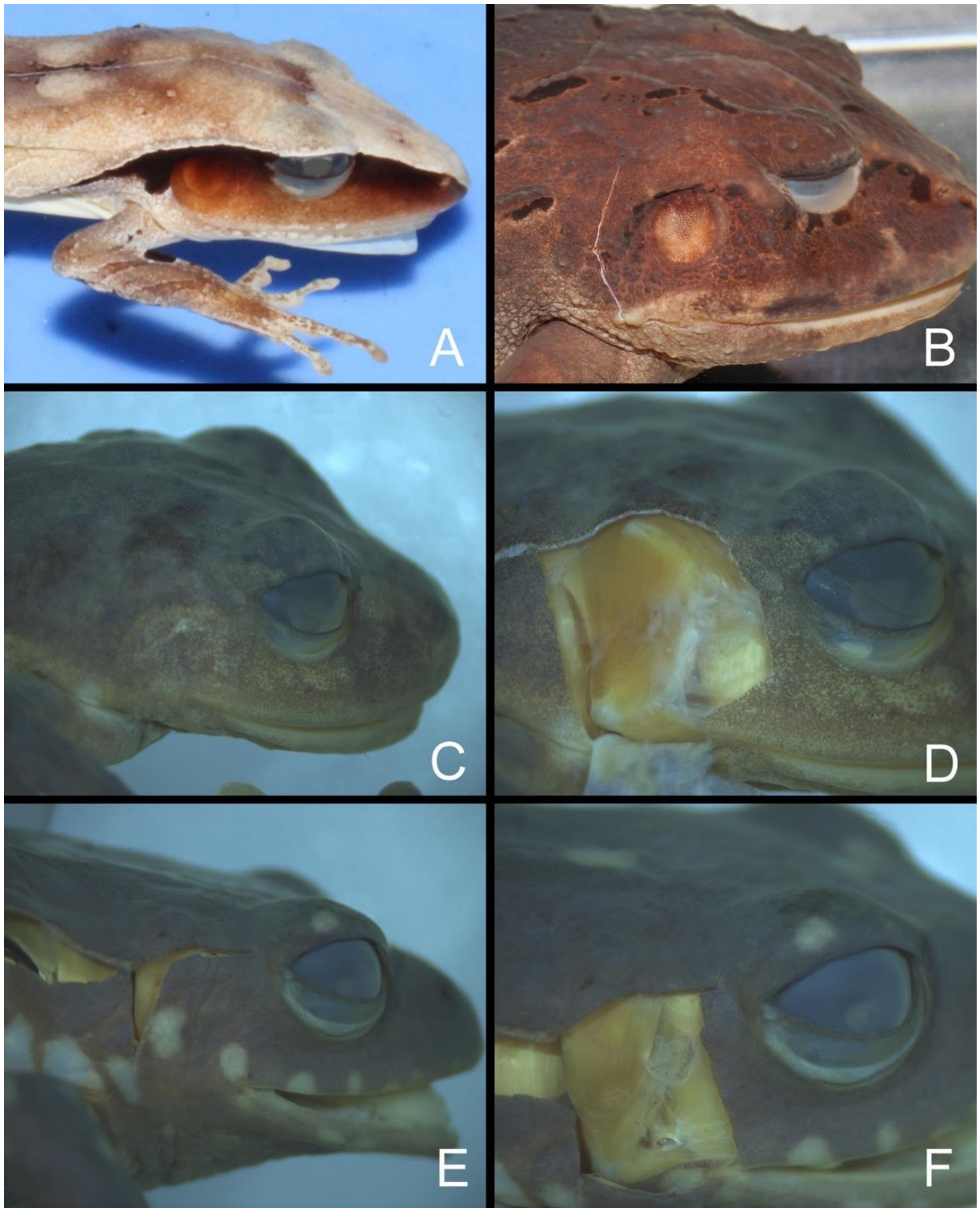


Figure 15. Sides of heads showing comparative distinctness of tympanic annuli and tympanic membrane in preserved specimens. **A**–**B**. Tympanic annulus and tympanic membrane present—*Craugastor gollmeri* (KU 108614, 36.0 mm SVL) and *Strabomantis biporcatus* (KU 185672). **C**–**D**. Tympanic annulus and tympanic membrane absent—*Pristimantis restrepoi* (ICN 16594, 36.4 mm SVL). **E–F**. Tympanic annulus present but tympanic membrane absent—*Pristimantis obmutescens* (ICN 2089, 25.9 mm SVL).

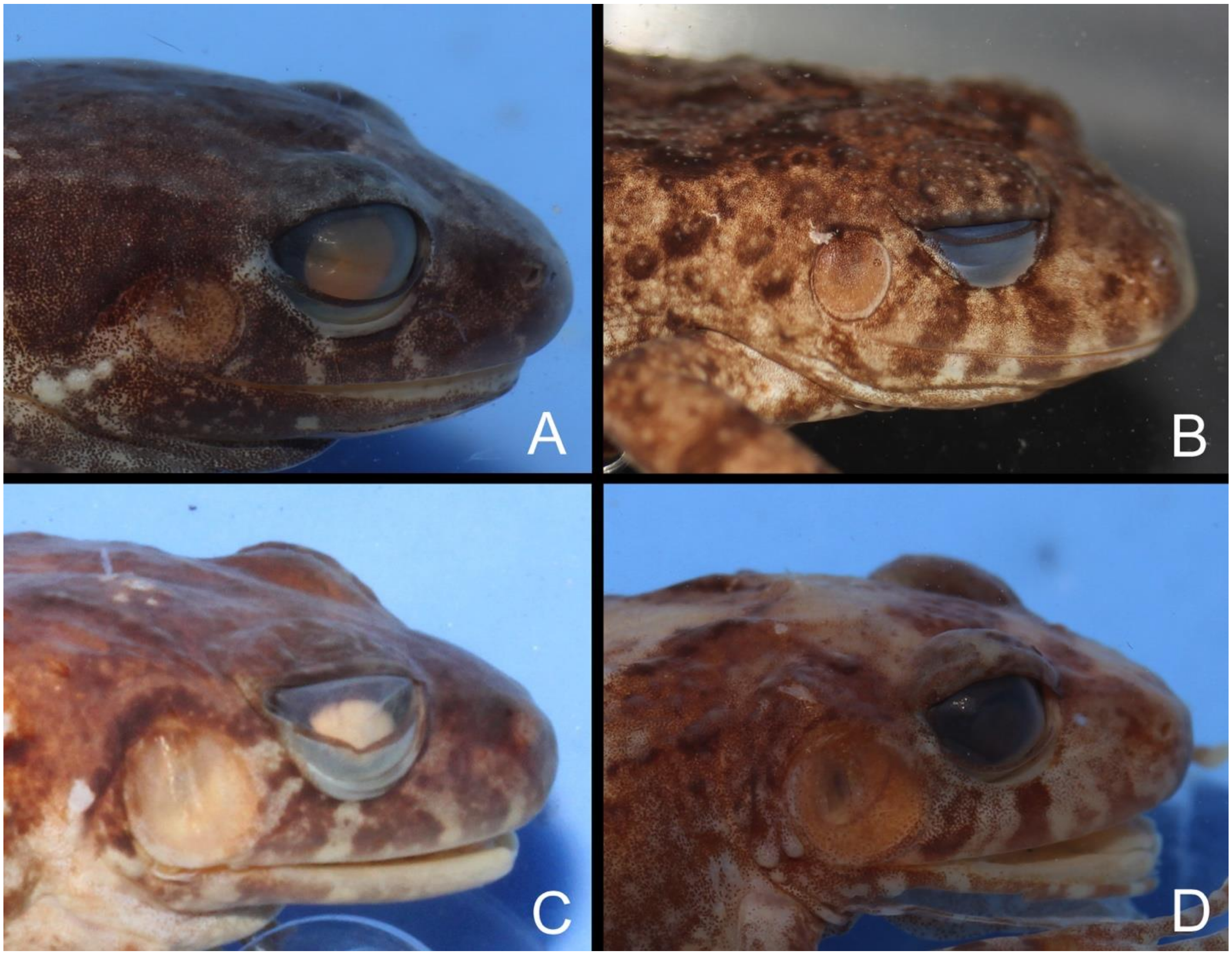


Figure 16. Sides of heads showing relative size of the tympanic membrane in reference to eye size in males of preserved specimens. **A–B**. Tympanic membrane smaller—*Barycholos pulcher* (KU 146044, 21.0 mm SVL) and *Oreobates quixensis* (KU 126233, 42.0 mm SVL). **C**. Tympanic membrane of moderate size (medium size)—*Craugastor rupinius* (KU 44111, 31.0 mm SVL). **D**. Tympanic membrane bigger—*Craugastor pigmaeus* (KU 86882, 16.0 m SVL).

17. ANTERIOR SLIT OF THE *M. DEPRESSOR MANDIBULAE*: absent = 0; present = 1.

The muscle *depressor mandibulae* takes its origin from the dorsal fascia overlaying the scapula and the posterior or posterolateral parts of the *m. levator posterior longus*, from the otic ramus of the squamosal, and from the posterior and ventral borders of the tympanic annulus (Lynch 1993). It inserts upon the posterior end of the lower jaw. It is precisely from the origin of the *m. depressor mandibulae* where considerable variation has been documented (Starrett 1968; Duellman and Trueb 1986; Savage 1987; Lynch 1993). To study that variation in terraranan frogs, Savage (1987) following the Starrett's (1968) study proposed five arrangements: dfsq or dfsqat, a single slip primarily from the dorsal fascia but with a few fibers from the squamosal (sq) or the squamosal and tympanic annulus (sqat); DFSQat, two distinct slips from the dorsal fascia and squamosal with a few fibers from the annulus; DFSQAT, three distinct slips, one each from the dorsal fascia, squamosal, and annulus; DFSQdAT, three distinct slips, with superficial slips from the dorsal fascia, squamosal, and annulus covering deeper one from the squamosal (in species with a reduced auditory apparatus the formula will be DFSQd). Posteriorly, Lynch (1993) published a work criticizing Savage's (1987) work. Lynch's claims are focused mainly in the greater differences than can be observed in the morphologies mentioned by Savage (1987), and also because the variation seems to be continuous. Thus, Lynch (1993) concluded that the *m. depressor mandibulae* has no significance in the systematics of terraranan frogs. Given the above, I conducted a revision of the muscle *depressor mandibulae* in terraranan frogs. From this revision, I found that the muscle *depressor mandibulae* is composed of three slits (anterior, median and posterior), of which the posterior may be absent. The anterior slit arises from fascia of the *m. levator posterior mandibulae subexternus*, tympanic annulus, or squamosal. Therefore, the anterior slit always is present, even in species lacking of tympanic annulus (contra Savage 1987). On the other hand, the median slit always arises from squamosal; however, some species have additional fibers overlapping the squamosal and arising from fascia of *m. levator posterior longus*. Lastly, the posterior slit arises from dorsal fascia overlaying the scapula.

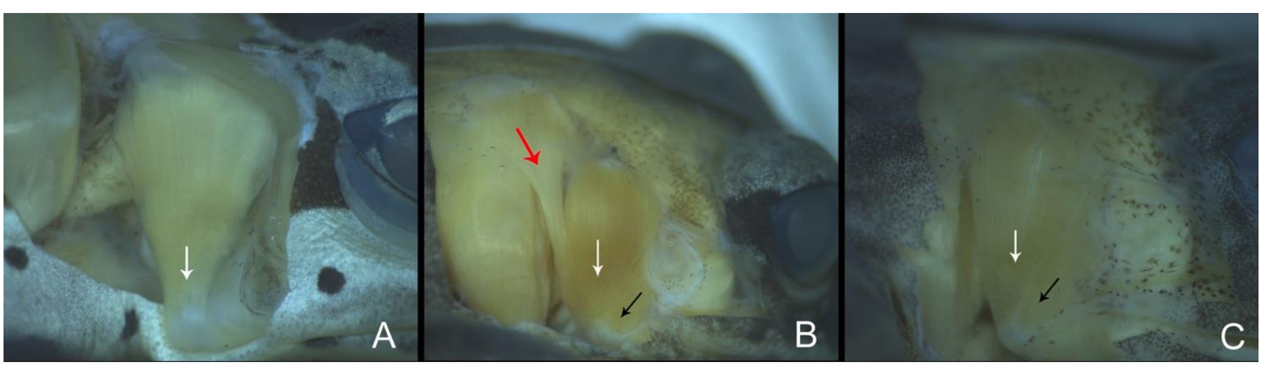


Figure 17. Lateral views of the otic region showing the *m. depressor mandibulae* in preserved specimens. **A**. Single median slip arising from squamosal and inserting upon the

posterior end of the lower jaw—*Atelopus spurelli* (ICN 12050, 29.9 mm SVL). **B**. Anterior, median, and posterior slits of the *m. depressor mandibulae*—*Pristimantis buckleyi* (ICN 21762, 31.2 mm SVL). **C**. Anterior and median slits of the *m. depressor mandibulae*—*Pristimantis alalocophus* (ICN 25510, 22.3 mm SVL). Anterior, median and posterior slits indicated by black, white, and red arrows respectively.

Considering this, I propose the follow series of transformation to study the variation in the origin and insertion of the anterior and median slit of the *m. depressor mandibulae*. Similarly, I propose a series of transformation to quantify the presence and/or absence of posterior slit of the m. *depressor mandibulae* in terraranan frogs:

18. ORIGIN OF ANTERIOR SLIP OF THE *M. DEPRESSOR MANDIBULAE*: from anterior border of the otic ramus = 0, from anterior border and posterior border of the tympanic annulus = 1; from fascia of the *m. levator posterior mandibulae subexternus* = 2. Nonadditive.

The state where the anterior slip arises from the tympanic annulus corresponds to the tympanic slip of Savage (1987); nevertheless, the proposal of Savage (1987) assumed that this slip is absent in species lacking of tympanic annulus. Herein, the anterior slip of the *m. depressor mandibulae* is always present and what varies is its origin. Therefore, in species lacking of tympanic annulus, the anterior slip of the *m. depressor mandibulae* arises from anterior border of the otic ramus or from fascia of the *m. levator posterior mandibulae subexternus.*

19. SUPERFICIAL FIBERS OF MEDIAN SLIP OF THE *M. DEPRESSOR MANDIBULAE* EXCEEDING THE OTIC RAMUS AND REACHING FASCIA OF THE *M. LEVATOR POSTERIOR LONGUS* (Figure 18): absent = 0; present =1.

20. SUPERFICIAL FIBERS OF MEDIAN SLIP OF THE *M. DEPRESSOR MANDIBULAE* TAKE ITS ORIGIN FROM FASCIA OF *M. LEVATOR POSTERIOR LONGUS* OVERLAPPING ½ OF THE ANTERIOR BORDER OF THE OTIC RAMUS (Figure 18B): absent = 0; present = 1.

21. SUPERFICIAL FIBERS OF MEDIAN SLIP OF THE *M. DEPRESSOR MANDIBULAE* TAKE ITS ORIGIN FROM FASCIA OF THE *M. LEVATOR POSTERIOR LONGUS* OVERLAPPING ½ OF THE POSTERIOR BORDER OF THE OTIC RAMUS: absent = 0; present = 1.

22. SUPERFICIAL FIBERS OF MEDIAN SLIP OF THE *M. DEPRESSOR MANDIBULAE* REACH THE FASCIA OF THE *M. LEVATOR POSTERIOR LONGUS* BEHIND THE OTIC RAMUS OF THE SQUAMOSAL (Figure 18C): absent = 0; present = 1.

The median slip of the *m. depressor mandibulae* takes its origin from otic ramus of the squamosal, however, in some species the most superficial fibers exceed the otic ramus and reach the fascia of the *m. levator posterior longus*. In this case, the fibers imply can be overlapping the ½ anterior and/or ½ posterior border of the otic ramus of the squamosal or just passing behind the posterior border of the otic ramus of the squamosal. That is, when the fibers passing behind the posterior border of the otic ramus, these fibers do not overlap the otic ramus of the squamosal. Considering that the fibers imply in each one of these variations have different topographically position, I considered those as characters independent.

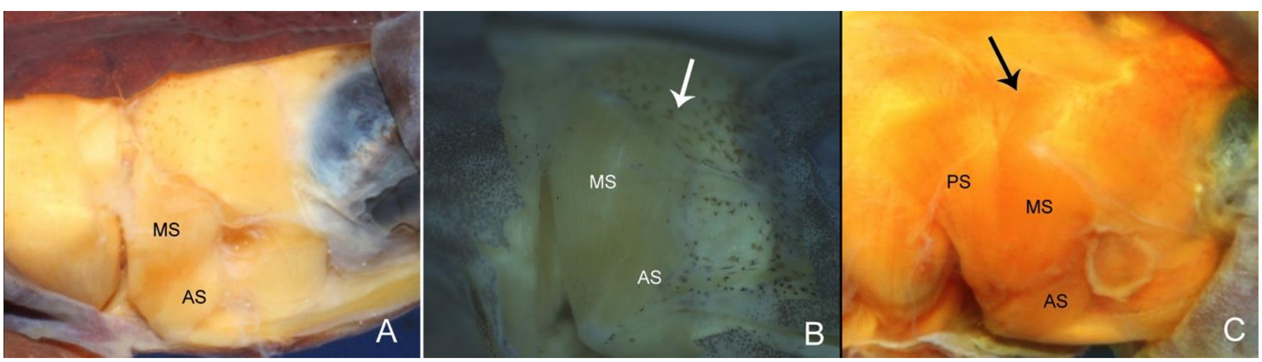


Figure 18. Lateral views of the otic region showing the origin of the superficial fibers of the median slit of the m. *depressor mandibulae* in preserved specimens. **A**. Superficial fibers of the median slip of the *m*. *depressor mandibulae* do not exceed the otic ramus—*Pristimantis quinquagesimus* (KU 179374, 38.0 mm SVL). **B**. Superficial fibers of the median slit of the *m. depressor mandibulae* take its origin from fascia of the of the *m. levator posterior longus* overlapping ½ anterior border of the otic ramus—*Pristimantis alalocophus* (ICN 25510, 22.3 mm SVL). **C**. Superficial fibers of the posterior slit of the *m. depressor*

mandibulae reach the fascia of the *m. levator posterior longus* just behind the otic ramus of the squamosal—*Lynchius flavomaculatus* (KU 119719, 33.0 mm SVL). AS = Anterior slit of the *m. depressor mandibulae*, MS = Median slit of the *m. depressor mandibulae*. PS = Posterior slit of the *m. depressor mandibulae*. Superficial fibers of the median slit of the *m. depressor mandibulae* taking its origin from fascia of the *m. levator posterior longus* are indicated by arrows.

23. POSTERIOR SLIT OF THE *M. DEPRESSOR MANDIBULAE* (Figure 18, Figure 19): absent = 0; present = 1.

24. MORPHOLOGY OF POSTERIOR SLIP OF THE *M. DEPRESSOR MANDIBULAE* ARISING FROM DORSAL FASCIA OVERLYING THE SCAPULA (Figure 19): continuous with the median slit = 0; totally separate of the median slit = 1.

When the posterior slit of the posterior slip of the *m. depressor mandibulae* arising from the dorsal fascia overlying the scapula is present, it may be totally separate or forming a continuum with the median slit of the posterior slip of the *m. depressor mandibulae*. Lynch (1993) registered this posterior slit in *Pristimantis buckleyi* and *P. cryophilius.* In addition, I found this posterior slit in *Phrynopus horstpauli*, *P. juninensis*, *P. kauneorum*, *Bryophryne cophites*, *Holoaden luederwaldti*, *H. bradei*, *Psychrophrynella usurpator*, *Microkayla kempffi*, *Craugastor obesus*, *Pristimantis crenunguis*, and *Pristimantis calcaratus*.

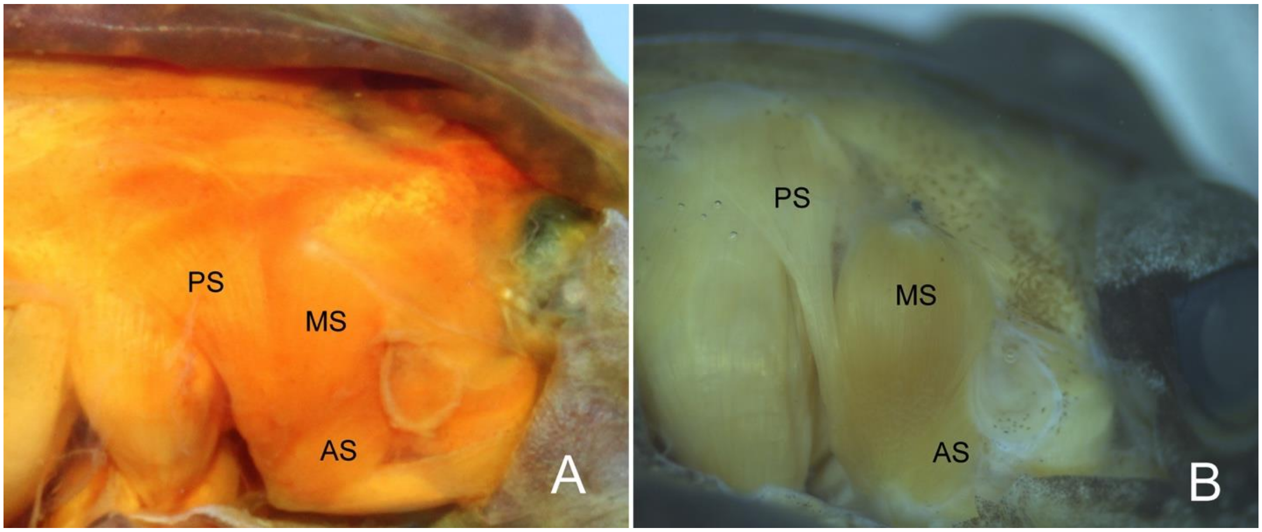


Figure 19. Lateral views of the otic region showing the morphology of the posterior slit of m. *depressor mandibulae* in preserved specimens. **A**. Posterior slit of m. *depressor mandibulae* forming a continuum with the median slit of the m. *depressor mandibulae*—*Lynchius flavomaculatus* (KU 119719, 33.0 mm SVL). **B**. Posterior slit of m. *depressor mandibulae* totally separate of the median slit of the m. *depressor mandibulae*—*Pristimantis buckleyi* (ICN 21762, 31.2 mm SVL).

25. INSERTION OF THE ANTERIOR AND MEDIAN SLIPS OF THE M. DEPRESSOR MANDIBULAE: the anterior slip inserts most external in comparison to the median slip = 0; the anterior and median slips having its insertion to the same level = 1.

Similarly, there is variation reflecting the insertion upon the posterior end of the lower jaw of the anterior and median slips of the *m. depressor mandibulae*. I found that in some species the anterior slip inserts above the most external corner of the end of the lower jaw, being most external in comparison to the median slip of that muscle (Figure 19A). However, in other species both the anterior and median slips of the *m. depressor mandibulae* insert to the same level (Figure 19B).

26. SUPRATYMPANIC FOLD: absent = 0; present = 1.

27. SUPRATYMPANIC FOLD ORIENTATION: (0) only slightly curved downward; (1) distinctly curved downward.

The supratympanic fold arises at the posterior corner of the orbit, extending posteriorly along upper edge of the temporal region (Lynch and Duellman 1997). This fold is evident in several species; however, in a few species the supratympanic fold is absent (e.g., *Phrynopus tribulosus*). When the supratympanic fold is present, its orientation may be slightly curved downward or distinctly curved downward.

28. BLACK SUPRATYMPANIC FOLD COLORATION: absent = 0; present = 1.

29. EXTENSION OF BLACK SUPRATYMPANIC FOLD COLORATION: restricted to supratympanic fold = 0; above all supratympanic fold and extending to postrictal tubercles = 1.

Species having supratympanic fold also may show a black pigmentation associated to it. This black coloration may be restricted to the edges of supratympanic fold or exceeds it and reach the postrictal tubercles. Lynch and Duellman (1997) argued that the variation associated to the supratympanic fold coloration has caused confusion on the extension of this fold.

30. ROSTRAL PAPILLA: (0) absent; (1) present

31. ROSTRAL PAPILLA DEVELOP: poorly, nonforming fleshy proboscis = 0; well-developed, forming fleshy proboscis = 1.

32. SHOVEL-SHAPED SNOUT TIP (Figure 20): absent = 0; present = 1.

Some terraranan frogs show a papilla at the point of the snout (e.g. *Phrynopus montium*, *Pristimantis siopelus*, and *P. galdi*), which in some cases may form a fleshy proboscis as in *P. appendiculatus* and *P. silverstonei*. This papilla tends to be more evident in males.

Another character found in at the point of the snout is the shovel-shaped snout, which was found in species of the genus *Eleutherodactylus*, subgenus *Pelorius* (Hedges et al. 2008). According to Hedges et al. (2008), species having shovel-shaped snouts are specialist in the construction of enclosed underground chambers (e.g., *Eleutherodactylus ruthae*). Herein, I found the shovel-shaped snout tip in *Hypodactulus latens* and *H. mantipus*, both species with digging habits. Another species having shovel-shaped snout tip is *Atopophrynus syntomopus*; however, the knowledge about its ecology is limited to suppose digging habits. To date, the unique information available says that *Atopophrynus syntomopus* was captured along the rock-walled, densely shaded ravine by day (Lynch and Ruiz-Carranza 1982).

Although the rostral papilla and the shovel-shaped are positioned at the point of the snout, I considered these series of transformation as independent based in them shape.

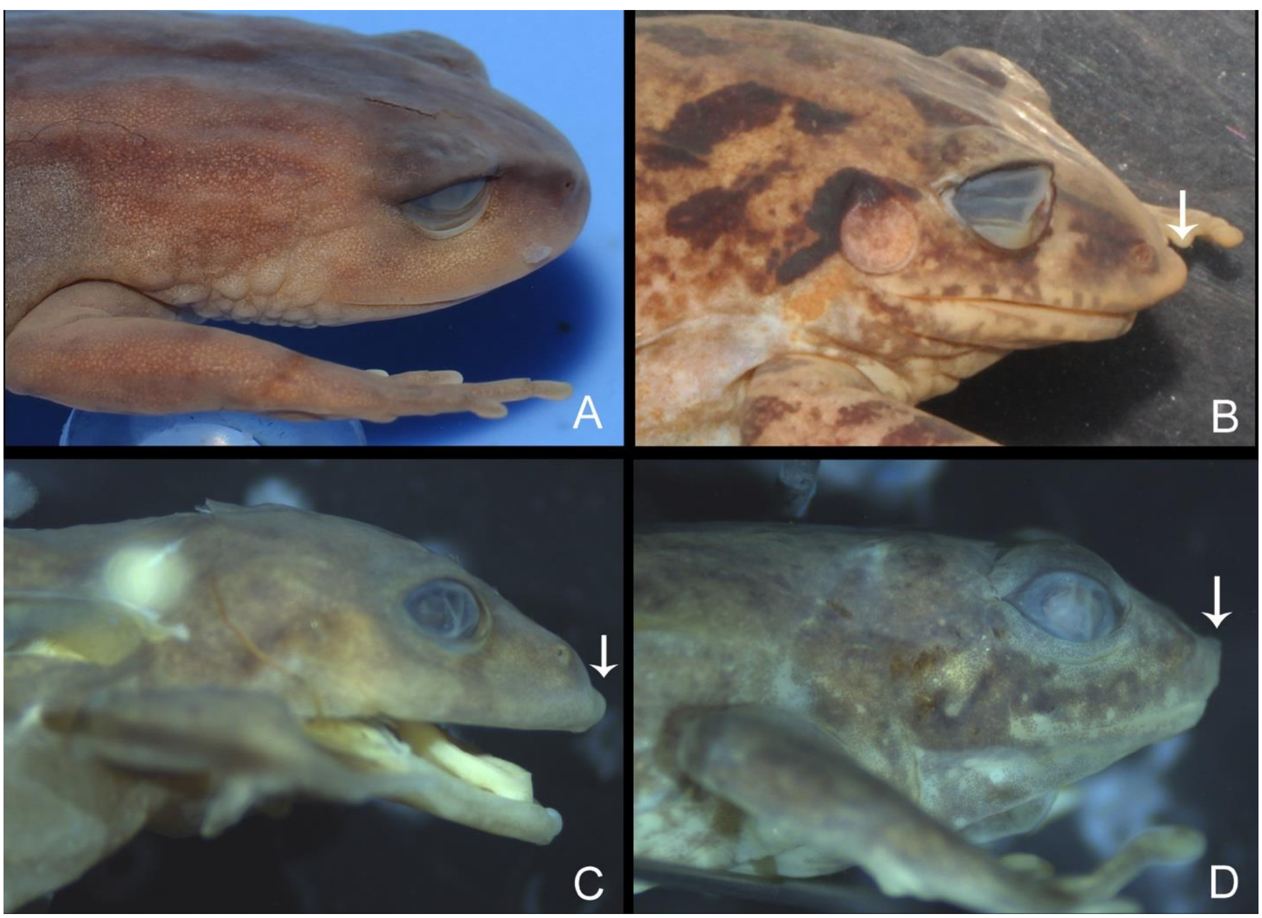


Figure 20. Sides of heads showing variation of the shovel-shaped snout in preserved specimens. **A**. Shovel-shaped snout absent—*Bryophryne cophites* (KU 138884). **B–D**. Shovel-shaped snout present—*Eleutherodactylus ruthae* (KU 285925, 53.3 mm SVL), *Hypodactylus latens* (ICN 39761, 19.0 mm SVL), and *Atopophrynus syntomopus* (ICN 8611). Shovel-shaped snout is indicated by arrows.

33. BLACK SEAT PATCH MARK: absent = 0; present = 1.

34. COLOR PATTERN ON POSTERIOR SURFACES OF THIGHS: uniform cream, lacking of markings or reticulations = 0; with diffuse cream blotches lacking well-defined borders = 1; conspicuous, small, pale spots with well-defined borders =2; transversal black reticulations on white ground = 3.

The patterns of coloration in terraranan frogs primarily have been considered as population variation, and thereby these are considered non useful in systematic works. However, it is not a generality because some of those patterns vary between species and have been used in the systematic of some species of the genus *Craugastor*. For example, the black seat patch mark has been used historically in the *Craugartor gollmeri* group (Savage 1987, McCranie 2018) and the coloration on posterior surfaces of things in the *Craugastor fitzingeri* group (Lynch and Myers 1983, Savage et al. 2004, Ospina-Sarria et al. 2015). Herein, I found that the black seat patch mark used in the *Craugartor gollmeri* group, it is also found in species of the genus *Hypodactyus*, *Phrynopus*, *Strabomantis*, *Oreobates*, *Barycholos*, *Psychrophrynella*, *Eleutherodactylus*, *Ischnocnema*, *Noblella*, and *Pristimantis*. Similarly, the patterns of coloration on posterior surfaces of the thighs used in the *Craugastor fitzingeri* group were also found in species of *Pristimantis*, *Strabomantis*, *Lynchius*, *Tachiramantis*, and *Yunganastes*.

35. SUPRAESCAPULAR BLACK SPOTS: absent = 0; present = 1.

36. SUPRAINGUINAL BLACK SPOTS: absent = 0; present = 1.

The supraescapular black spots are distinctive mark found in species the *Craugastor fitzingeri* group, *Pristimantis conspicillatus* group, and the genus *Yunganastes*. Similarly, the suprainguinal black spots are common in some species of *Hypodactylus*, *Ischnocnema*, *Noblella*, and *Psychrophrynella*.

37. BLACK FACEMASK ON THE LOREAL REGION (Figure 21): absent =0; present = 1.

38. BLACK FACEMASK EXTENSION (Figure 21): exclusively on the loreal region = 0; continuous with the tympanum and reaching to half of the body in lateral view = 1; extending to posterior part of the body in lateral view = 2. Additive.

The black facemask (eye mask sensu Savage 1987) is found in some species of genus *Craugastor* (e.g. *C. laticeps* and *fitzingeri* group), *Phrynopus*, *Lynchius*, *Oreobates*, *Noblella*, *Psychrophrynella*, *Pristimantis* (e.g. *P. conspicillatus*, *P. danae*, *devillei* groups), *Tachiramantis*, *Yunganastes*, and *Ischnocnema*. When it is present, it is restricted to the loreal region or reaches the posterior part of the body in lateral view. Black facemask incorporated the canthal stripe, therefore I did not include the canthal stripe in my study of the morphology.

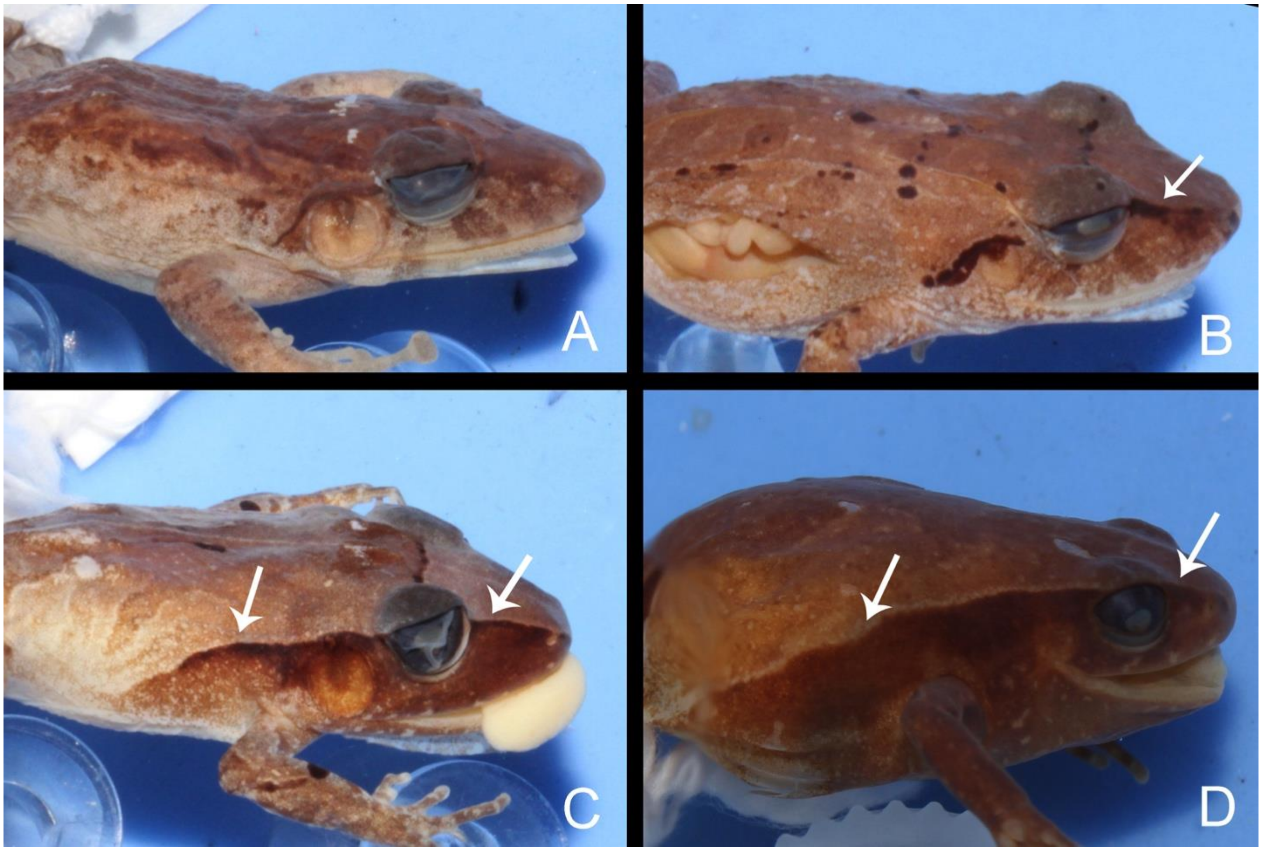


Figure 21. Lateral views of body in terraranan frogs showing the black facemask in preserved specimens. **A**. Black facemask absent—*Craugastor fitzingeri* (KU 53443, 27.0 mm SVL). **B**. Black facemask restricted to loreal region—*Pristimantis skydmainos* (KU 175096, 24.0 mm SVL). **C**. Black facemask continuous with the tympanum and reaching to half of the body in lateral view—*Craugastor chac* (KU 186254, SVL 22.0 SVL). **D**. Black facemask extending to posterior part of the body in lateral view—*Noblella heyeri* (KU 196529). Black facemask is indicated by arrows.

39. BLACK MARKS AROUND INFERIOR BORDER OF EYE: absent = 0; present = 1.

40. WHITE LABIAL STRIPE: absent = 0; present = 1.

Distinctive marks around inferior border of eye are evident in some species of the *Craugastor punctariolus* group (*C. gulosus* series sensu Hedges et al. 2008) and in some species of the genus *Pristimantis* (*Pristimantis ardalonychus*, *P. calcarulatus*). Likewise, the labial stripe is found in *Craugastor talamancae* and some species of the genus *Pristimantis* (e.g. *P. danae*, *P. devillei*), and *Tachiramantis*.

41. BLACK STRIPES ON ANTERIOR SURFACE OF FOREARM: absent = 0; present = 1.

42. BLACK STRIPE ON DISTAL MARGIN OF ANTERIOR SURFACE OF THIGH: absent = 0; present = 1.

43. BLACK STRIPE ON PROXIMAL MARGIN OF ANTERIOR SURFACE OF THIGH TO LATERAL MARGIN OF BODY: absent = 0; present = 1.

Distinctive black stripes on anterior surface of forearm, on distal margin of anterior surface of thigh, and on proximal margin of anterior surface of thigh are broadly distributed on all terraranan genera. To date, black stripes have been mainly used in works focus in species of the *Craugastor laticeps* group (i.e., Savage 1987, McCranie 2018).

44. COLOR PATTERN ON VENTRAL SURFACES OF TARSUS: cream or brown ground color = 0; black ground color = 1.

45. MALE THROAT COLOR: cream, free or almost free of melanophores = 0; black due to absence of iridophores =1; cream with discrete dark spotting/reticulation/marbling = 2; dark with discrete pale spotting/ reticulation/marbling = 3. Nonadditive.

46. PALE GULAR STRIPE: (0) absent; (1) present

The pattern of coloration on throat in males is generally cream or white with dark spotting in terraranan frogs; however, in few species may be totally dark to dark with discrete pale spotting. Additionally, a pale gular stripe appears in some species of the genus *Craugastor* (e.g. *C. fitzingeri*) and *Pristimantis* (e.g. *P. ocreatus*).

47. BLACK PIGMENT ON THE UPPER SURFACES OF THE DIGITAL DISCS: (0) absent; (1) present

48. IRIDOPHORES ON DERMIS OF VENTRAL SURFACES OF BELLY (Figure 22): absent = 0; present = 1.

49. IRIDOPHORES ON DERMIS OF VENTRAL SURFACES OF THROAT (Figure 22): absent = 0; present = 1.

50. IRIDOPHORES ON DERMIS OF VENTRAL SURFACES OF ARM (Figure 22): absent = 0; present = 1.

I found that some species with white or silvery pigments on ventral surfaces, which have been associated with the capacity to reflect light (Duellman and Trueb 1986). Generally, the iridophores layer in amphibian skin in only one cell layer thick; however, Drewes et al. (1977) found that in African rhacophorid frogs of the genus *Chiromantis* containing 3 to 5 layers of iridophores. The quantity of iridophores found in terraranan frogs is less in comparison to the found in *Chiromantis rufescens* (KU 171805).

A fact to consider with this character is the effects of the preservation. Although most specimens retain the silvery white pigment on after many years in preservative; extended periods of light or fixed for long periods in formalin may affected the presence of iridophores (Starrett and Savage 1973; Ruiz-Carranza and Lynch 1991; Harvey and Noonan 2005). Considering this, it possible that the presence of iridophores in terraranan frogs is being underestimated.

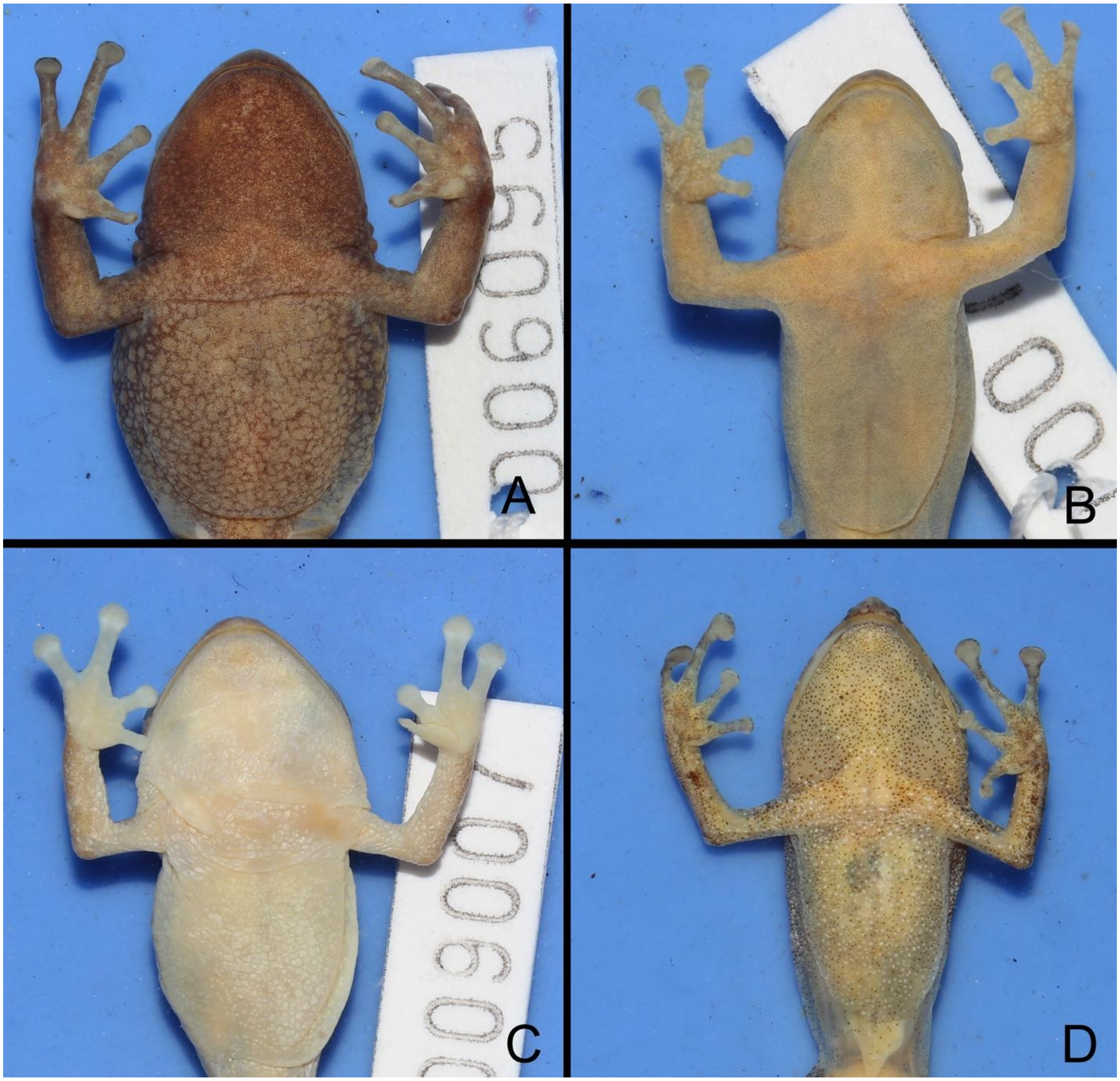


Figure 22. Ventral views showing the absence and presence of iridophores on belly, throat and arm in preserved specimens. **A–B**. Iridophores absent—*Pristimantis gentry* (KU 131541, 23.0 mm SVL) and *Pristimantis celator* (KU 131574, 20 mm SVL). **C–D**. Iridophores present—*Pristimantis chalceus* (KU 117649, 24.0 mm SVL) and *Pristimantis caryophyllaceus* (KU 113879, 21.0 mm SVL).

51. DENTIGEOROUS PROCESS OF THE PREVOMER: absent = 0; present = 1.

Lynch (1971) found considerable variation in dentigerous process of the prevomer. Between them, size, median separation between them, and the relationships of the prevomerine teeth, between or posterior to the choanae (Joglar 1989, Lynch 2001). Also, Lynch (1971) and Lynch and Duellman (1997) reported the absence of dentigerous process of the prevomer in some genera (e.g., *Euparkerella*, *Niceforonia*, and subgenus *Syrrhophus*). Herein I found that other species lacking of dentigerous process of the prevomer are *Phrynopus tribulosus*, *P. horstpauli*, *P. juninensis*, *P. kauneorum*, *Bryophryne cophites*, *Noblella lochites*, *N. heyeri*, *N. myrmecoides*, *Psychrophrynella usurpator*, *Microkayla wettsteini*, *M. kempffi*, *Geobatrachus walker*, *Craugastor pygmaeus*, *Craugastor mexicanus*, *Pristimantis sagittulus*, *P. mendax*, *P. leptolophus*, *P. ocreatus*, *P. quantus*, *P. myops*, *Eleutherodactylus pipilans*, *Ceuthomantis smaragdinus*, *Brachycephalus ephippium*, and *Atopophrynus syntomopus*.

52. VOCAL SLITS IN MALES: absent = 0; present = 1.

The vocal slits are a pair of opening in the floor of the mouth. These are located between the *m. geniohyoideus* medially and the mandible laterally, and they communicate the buccal cavity with the sac in the sound production (Duellman and Trueb 1986). Lynch (1971) registered that the vocal slit are absent in some species (e.g., *Holoaden bradei*, *H. luederwaldti*, and some *Pristimantis*); however, its absence does not prevent the production of sounds in the communication. That is, some species produce sound but lack of vocal sac (e.g., *Pristimantis erythropleurai*). I found species having and lacking of vocal slits in almost all genera of Brachycephaloidea. Vocal slits are present in all species of the genera *Barycholos*, *Tachiramantis*, and *Ceuthomantis*. Conversely, vocal slits are absent in species of the genus *Holoaden, Niceforonia*, and in *Geobatrachus walkeri*.

53. NUPTIAL PADS ON THE DORSAMEDIAL SURFACE OF THE BASE OF THE THUMB IN MALES (Figure 23): absent = 0; present = 1.

When the nonspinous nuptial pads are present, those are located on the dorsomedial and medial surfaces of the base of the thumb (Lynch and Duellman 1997). Duellman and Lehr (2009) mentioned that nuptial pads are absent in *Noblella*, *Psychrophrynella*, and *Strabomantis*. From these, *Strabomantis* has species with and without nuptial pads. The presence and absence of nuptial pads is distributed on almost all genera, except *Niceforonia*, *Barycholos*, *Holoaden*, *Geobatrachus walkeri*, *Eleutherodactylus,* and *Ceuthomantis* that lack of nuptial pads. Nuptial pads are present in all species of the genus *Tachiramantis*.

54. EXTENSION OF THE NUPTIAL PADS ON THE DORSOMEDIAL SURFACE OF THE BASE OF THE THUMB IN MALES (Figure 23B–C): to the distal border of basal subarticular tubercle = 0; to proximal border of disc = 1.

There is variation in the extension of the nuptial pads on the dorsomedial surface of the base of the thumb in males in the genus *Craugastor*. I found that all males of species in the subgenus *Campbellius* have a nuptial pad on the dorsomedial surface of the base of the thumb extending to proximal border of disc. The same condition is found in other *Craugastor* (*C. punctariolus, C. obesus*) and in males of species of the genus *Tachiramantis*. The character state where the extension reaches to the distal border of basal subarticular tubercle is distributed in other genera of the Brachycephalidae.

Figure 23. Dorsal and palmar views of hands showing the absence/ presence of nuptial pads in preserved specimens. **A**. Nuptial pad absent—*Pristimantis devillei* (KU 217991, 28.0 mm SVL). **B**. Nuptial pad present on the dorsomedial surface of the base on the thumb—*Craugastor fitzingeri* (ICN 52789, 28.3 mm SVL). **C**. Nuptial pad present on the dorsomedial surface of the base on the thumb and extending to proximal border of disc—*Craugastor chrysozetetes* (KU 209035, 42.0 mm SVL). **D**. Nuptial pad absent on outer border of prepollex—*Pristimantis danae* (KU 162318, 29.0 mm SVL). **E**. Nuptial pad present on outer border of prepollex—*Craugastor fitzingeri* (KU 53443, 26.0 mm SVL). **F**. Nuptial pad on the dorsomedial surface of the base of the thumb with swelling over metacarpal—*Craugastor fitzingeri* (KU 53443, 26.0 mm SVL). NPT = Nuptial pad on the dorsomedial surface of the base on the thumb. NPP = Nuptial pad on outer border of prepollex.

55. MALES WITH NUPTIAL PADS ON THE DORSAMEDIAL SURFACE OF THE BASE OF THE THUMB WITH SWELLING OVER METACARPAL (Figure 23F): absent = 0; present = 1.

56. NUPTIAL PADS ON OUTER BORDER OF PREPOLLEX IN MALES (Figure 23D–F): absent = 0; present = 1

57. FUSION BETWEEN NUPTIAL PADS FROM DORSAMEDIAL SURFACE OF THE BASE OF THE THUMB AND LATERAL BORDER OF PREPOLLEX IN MALES (Figure 23E): absent = 0; present = 1.

In addition to the nonspinous nuptial pads present on the dorsomedial surface of the base of the thumb mentioned by Lynch and Duellman (1997), I found some males having nuptial pads on outer edge of prepollex. Also, when nuptial pads are present on outer edge of prepollex, these may be accompanied of a swelling over metacarpal (e.g., *Craugastor fitzingeri* species group). Besides, when the nuptial pad on the dorsomedial surface of the thumb and the nuptial pad on outer edge of prepollex are present, they may be fused (e.g., *Craugastor bransfordi*).

58. COLORATION OF THE NUPTIAL PADS IN MALES: cream = 0; dark brown = 1.

Lynch and Duellman (1997) and Duellman and Lehr (2009) argued that nuptial pads in terraranan frogs are white. I corroborated that. However, outside of terraranan frogs, the nuptial pads may be dark (e.g., *Pleurodema brachyops*).

59. WIDTH OF TESTES: small, being same width or slightly less width in reference to kidney = 0; large, being three to five times width than kidneys = 1.

60. TESTES FUSION (Figure 24A–B): absent = 0; present = 1.

Testes fusion was found in some species within the genus *Pristimantis* (*Pristimantis restrepoi*, *P. dorsopictus*, and *P. permixtus*). From these species, *Pristimantis dorsopictus* and *P. permixtus* had been incorporated in previous phylogenetic analyses; however, these species were not recovered as related to each other. To date, testes fused had been not mentioned in anybody amphibian.

61. TESTES COLORATION (MESENTERY AROUND TESTES, Figure 24): unpigmented = 0; moderate pigment = 1; entirely pigmented = 2. Additive.

Lynch and Duellman (1997) recognized that some species have mesorchial pigmentation black (*P. curtipes*). Likewise, Lynch (2000) proposed black mesorchia as a character of diagnostic value in the *C. mexicanus* species Series. Herein I found black mesorchia in species of the genus *Eleutherodactylus* (*E. martinicensis*, *E. paulsoni*), *Pristimantis* (*P. celator*, *P. leoni*), and *Tachiramantis*.

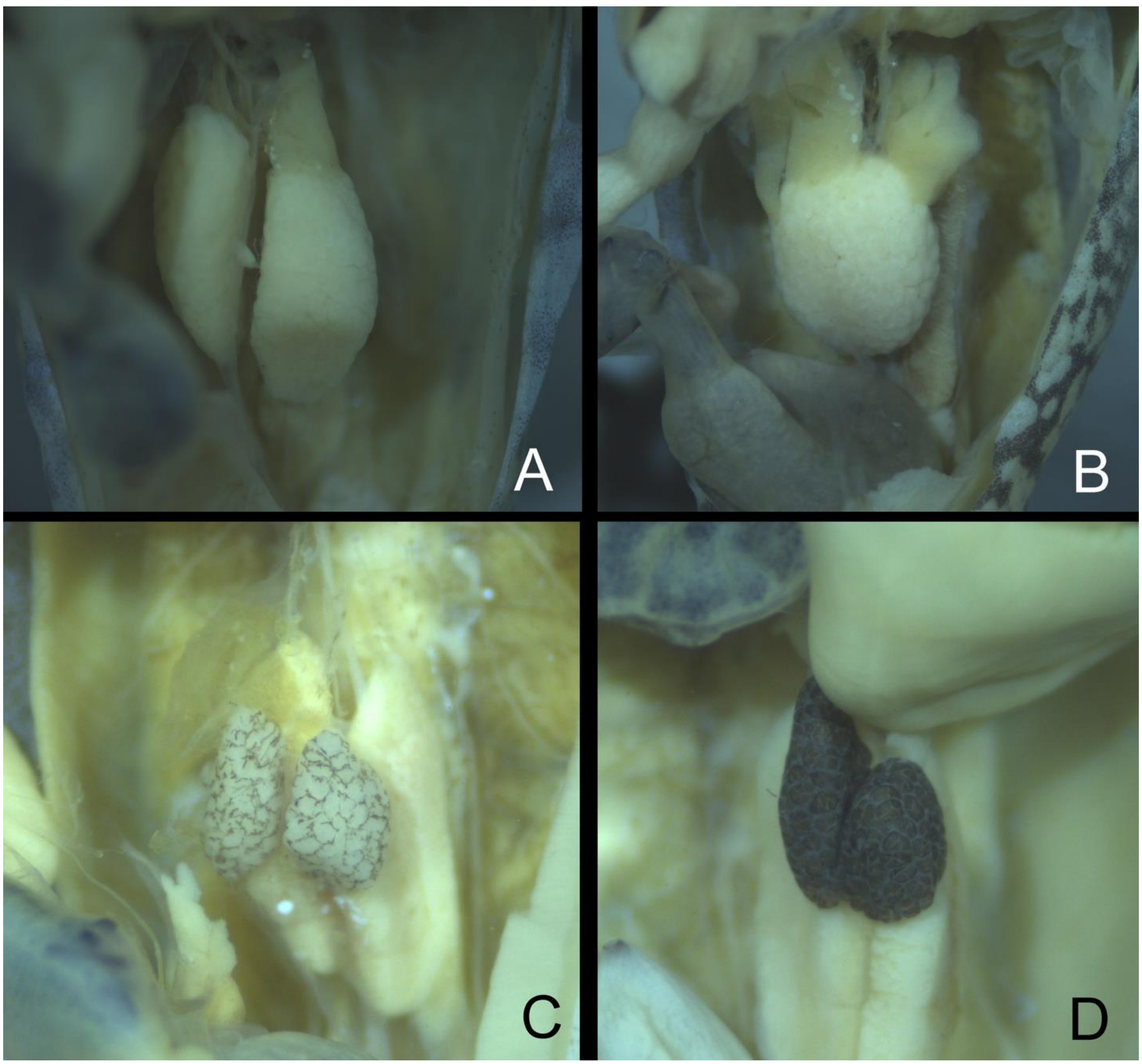


Figure 24. Ventral views of viscera showing testes in preserved specimens. **A**. Testes nonfused and unpigmented—*Pristimantis alalocophus* (ICN 25510, 22.3 mm SVL). **B**. Testes fused and unpigmented—*Pristimantis permixtus* (ICN 8895, 25.1 mm SVL). **C**. Testes nonfused and moderate pigment—*Pristimantis padrecarlosi* (ICN 50083, 22.8 mm SVL). **D**. Testes nonfused and entirely pigmented—*Pristimantis lentiginosus* (ICN 15250, 28.8 mm SVL).

62. LENGTH OF THE SMALL INTESTINE (Figure 25A–B): short, 2 times the stomach length = 0; long; 4 times the stomach length = 1.

63. BLACK PIGMENTATION ON SURFACE AREA OF SMALL INTESTINES (Figure 25C-D): absent = 0; present = 1.

Evident variation associated to the length of the small intestine in comparison to stomach longitude was found in genera of the families Brachycephalidae (*Brachycephalus*) and Craugastoridae (*Pristimantis*, *Phrynopus*, and *Noblellla*). From the Eleutherodactylidae, all the specimens reviewed have short small intestine.

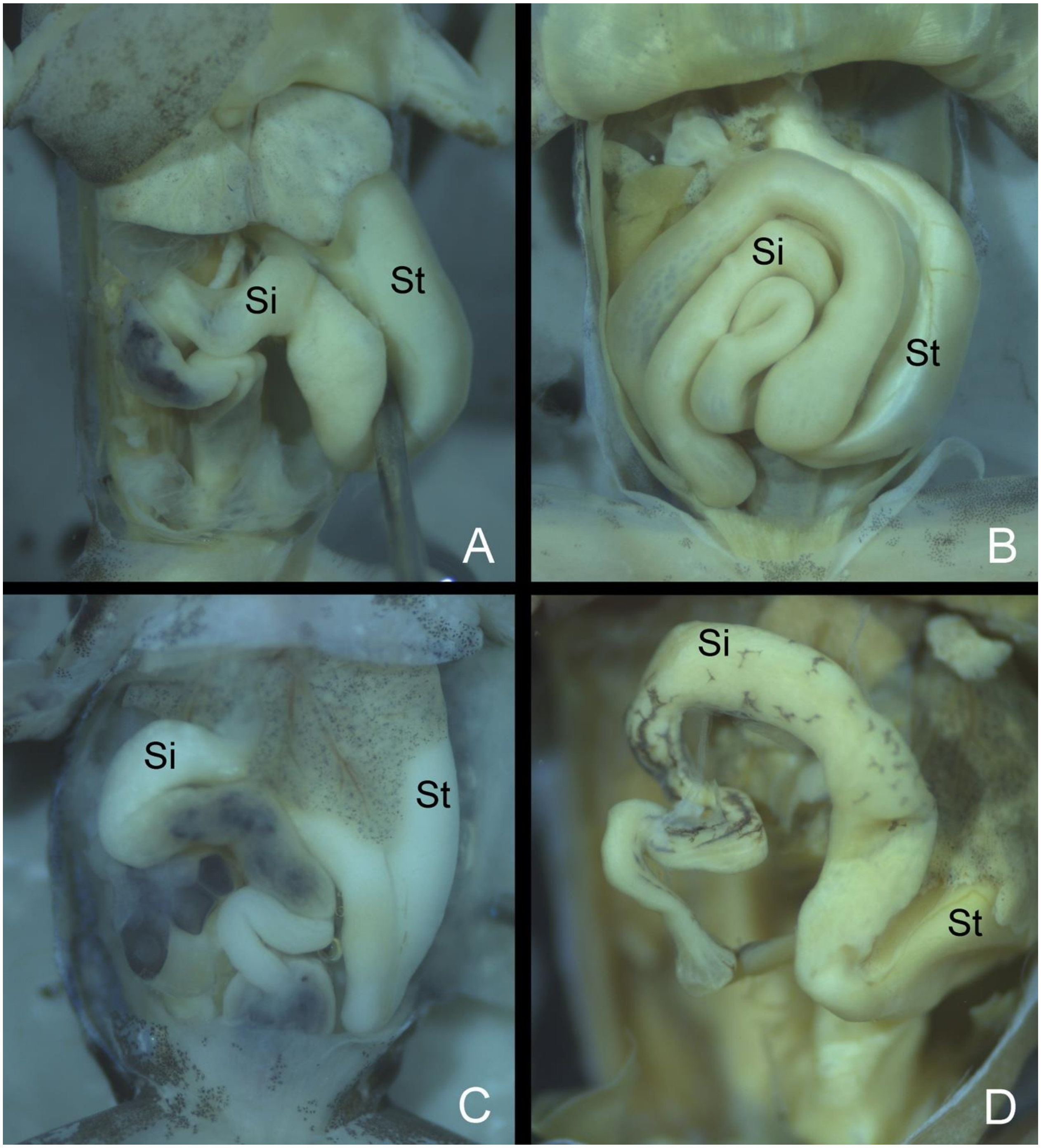


Figure 25. Ventral views of viscera showing stomach and intestines in preserved specimens. **A**. Short small intestine—*Pristimantis malkini* (ICN 20480, 20.2 mm SVL). **B**. Long small intestine—*Pristimantis alalocophus* (ICN 25505, 20.6 mm SVL). **C**. Small intestine unpigmented—*Ceuthomantis* sp. (JDL 32473, 15.1 mm SVL). **D**. Small intestine pigmented—*Hypodactylus latens* (ICN 39761, 19.0 mm SVL).

64. FUSION OF WOLFFIAN DUCTS: absent = 0; present = 1.

65. LOCATION OF FUSION OF WOLFFIAN DUCTS (Figure 26): terminal, Wolffian ducts fused within cloacal wall = 0; subterminal, Wolffian ducts fused immediately anterior to the cloacal wall = 1; anterior, single, common duct extending along posterior, 1/3 of the distance between caudal edge of kidneys and cloacal wall = 2. Additive.

66. BLACK PIGMENTATION ON WOLFFIAN DUCTS: absent = 0; present = 1.

The Wolffian ducts originating on the lateral edge of the kidney carries urine (and in males, sperm) to the cloaca (Duellman and Trueb 1986). Although each Wolffian duct enters the cloaca separately in most anurans, those ducts may be also fused in other anurans (Duellman and Trueb 1986). Taboada et al. (2013) studied the variation associated with the fuse of these ducts within the terraranan frogs, finding that the fusion may be terminal, subterminal or anterior. Herein, I follow the character state proposed by Taboada et al. (2013). In addition, I found species having black pigmentation on Wolffian ducts and therefore I proposed a series of transformation to quantify that variation.

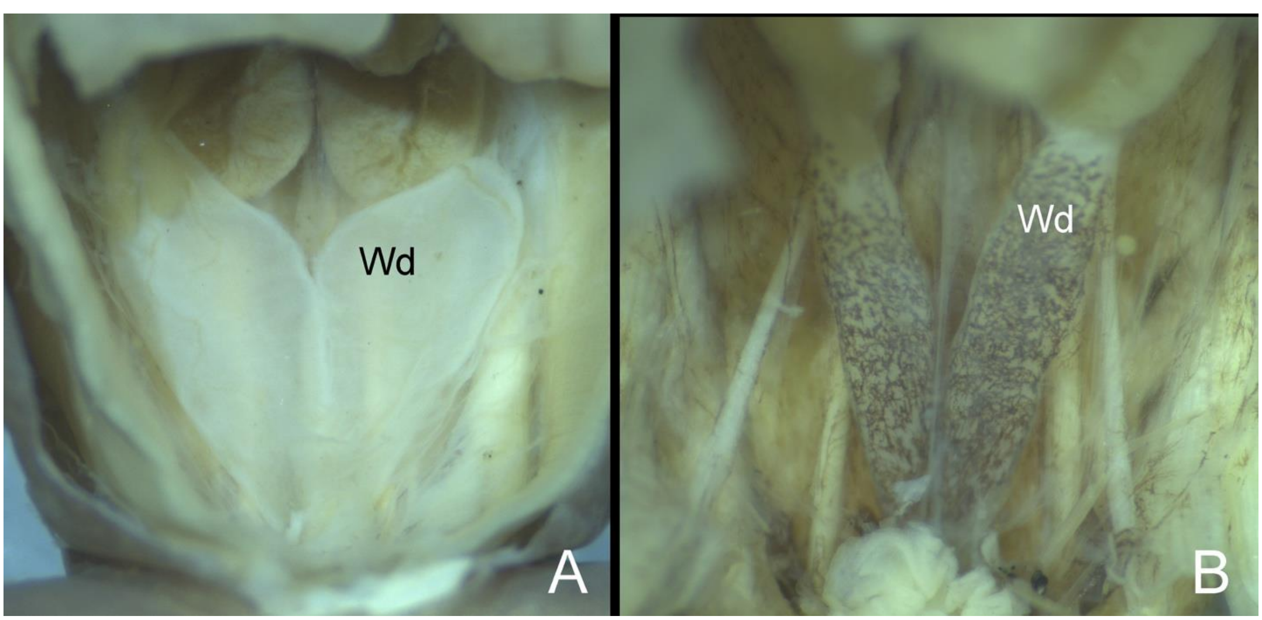


Figure 26. Ventral views of urogenital structures in preserved specimens. **A**. Unpigmented Wolffian ducts—*Pristimantis simotesus* (ICN 767, 26.8 mm SVL). **B**. Pigmented Wolffian ducts—*Niceforonia adenobrachia* (ICN 789).

67. PELVIC LYMPHATIC SEPTUM (Figure 27): absent = 0; present = 1.

68. PECTORAL LYMPHATIC SEPTUM: absent = 0; present = 1.

Anurans differ from other amphibians by having extensive subcutaneous lymph spaces, which are separated by the septa (Duellman and Trueb 1986). Taboada et al. (2013) revising the pelvic lymphatic septum in terraranan frogs, finding in addition to the pectoral and ventral septum, a new septum named pelvic septum. Based on this, they propose two series of transformation to study the presence/absence of those septa. Herein, I follow the proposal of Taboada et al. (2013).

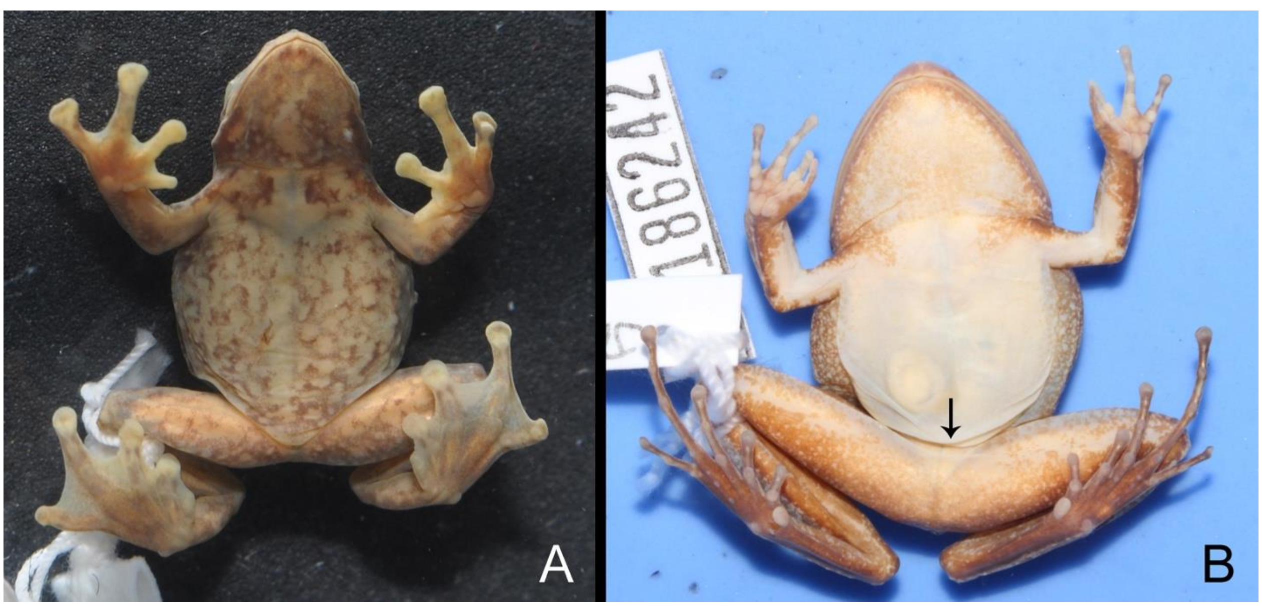


Figure 27. Ventral views showing pelvic lymphatic septum in preserved specimens. **A**. Pelvic lymphatic septum absent—*Atopophrynys syntomopus* (ICN 8611, 19.3 mm SVL). **B**. Pelvic lymphatic septum present—*Craugastor chac* (KU 186242, 32.0 mm SVL). Pelvic lymphatic septum is indicated by black arrrow.

69. INGUINAL GLANDS (Figure 28A): absent = 0; present = 1.

70. LUMBAR GLANDS (Figure 28B): absent = 0; present = 1.

71. GLANDS ON BODY FLANKS (Figure 28C–D): absent = 0; present = 1.

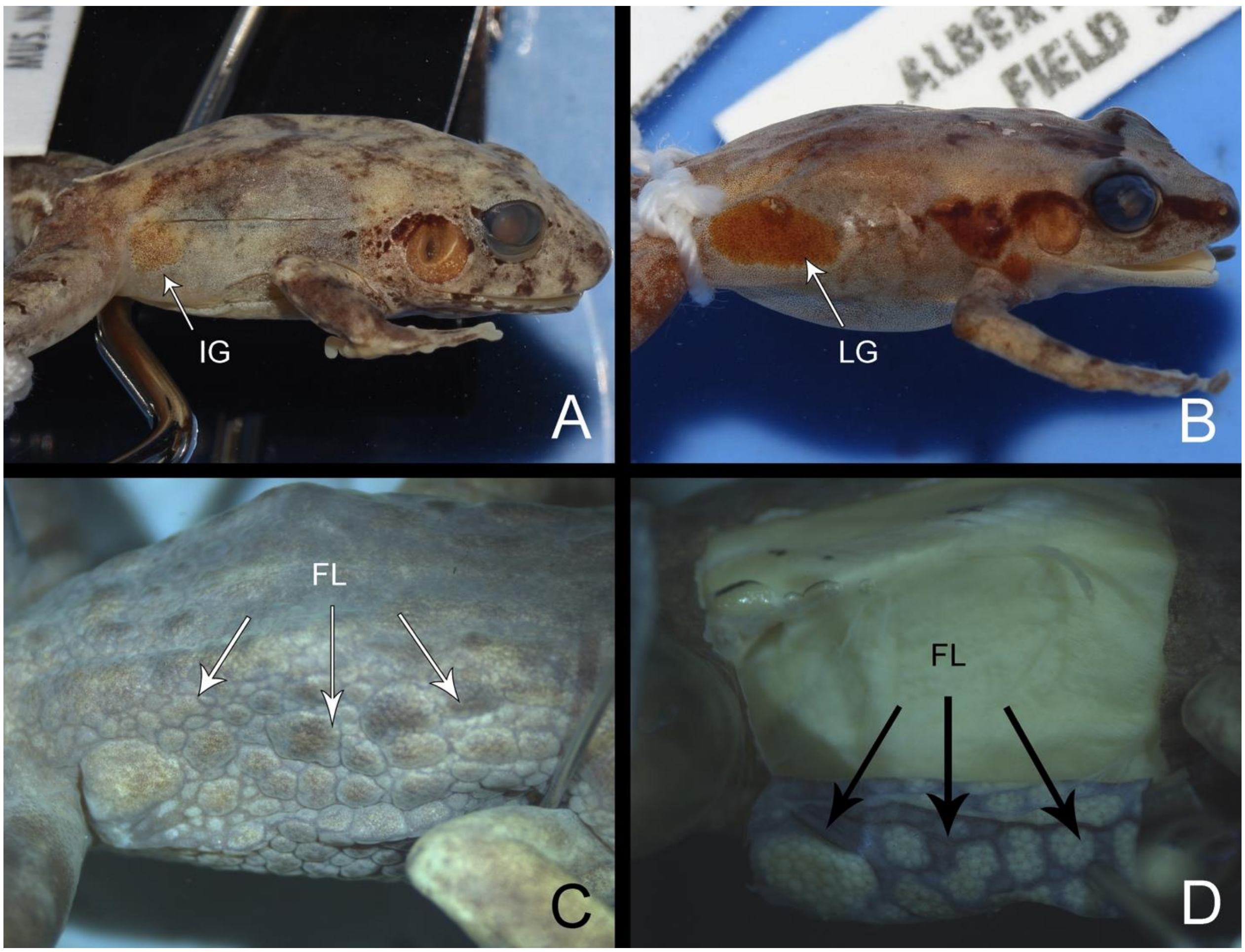


Figure 28. Lateral views of glands in preserved specimens. **A**. Inguinal gland—*Craugastor mexicanus* (KU 86761, 10.0 mm SVL). **B**. Lumbar gland—*Eleutherodactylus martinicensis* (KU 280575, 19.0 mm SVL). **C**–**D**. Flank glands—*Pristimantis simoterus* (ICN 768, 28.4 mm SVL). IG = Inguinal gland. LG = Lumbar gland. FG = Flank glands.

72. AXILLARY GLANDS: absent = 0; present = 1.

73. THROAT GLANDS (Figure 29): absent = 0; present = 1.

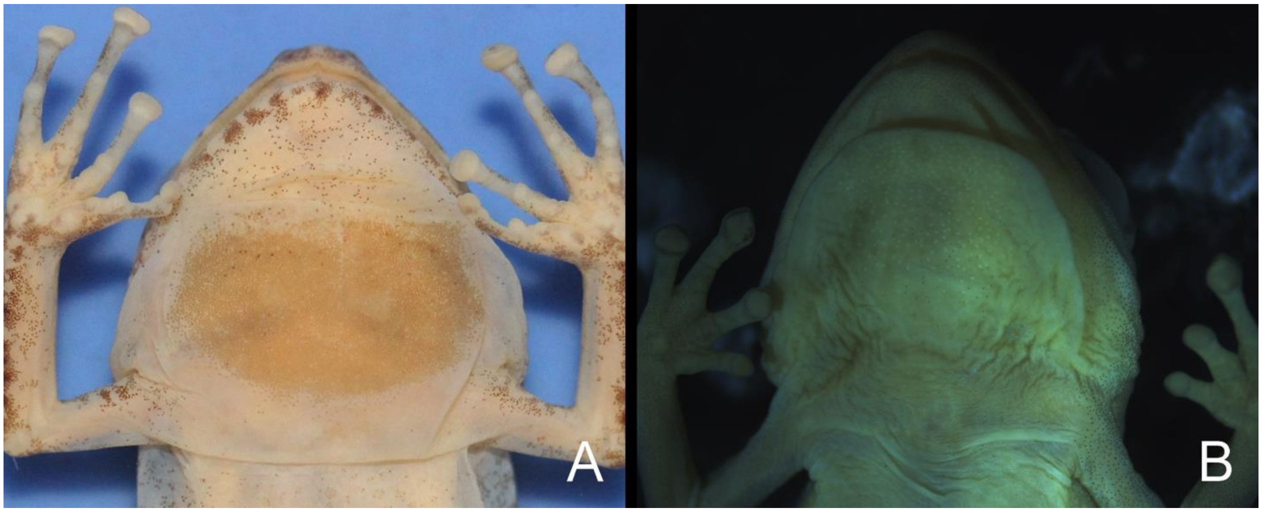


Figure 29. Ventral views of throat glands in preserved specimens. **A**. *Eleutherodactylus mariposa* (KU 21777, 29.0 mm SVL). **B**. *Diasporus gularis* (ICN 45160, 20.5 mm SVL).

74. GLANDS ON SURFACE ANTERIOR OF THIGH IN MALES: absent = 0; present = 1.

75. GLAND BELOW OF TYMPANUM REGION FROM INFERIOR POSTERIOR BORDER OF EYE TO ABOVE OF ARM: absent = 0; present = 1.

Lynch (1971) identified a variety of glands on the body of terraranan frogs. In some cases, the glands may be distributed on all body, as in *Holoaden*; however, the most common is found glands distributed above specific region of body. Between those, Lynch (1971) recognized glands on the region lumbar, inguinal and on the flanks. Herein, I found additional glands on the throat skin, being registered exclusively in genera of the family Eleutherodactylidae (*Diasporus* and *Eleutherodactylus*).

76. SUBARTICULAR TUBERCLES (Figure 30): absent = 0; present = 1.

77. ELEVATION OF THE SUBARTICULAR TUBERCLES BENEATH THE JOINS BETWEEN PHALANGES IN FINGER: low = 0; prominent and conical = 1; projecting = 2.

78. ELEVATION OF THE SUBARTICULAR TUBERCLES BENEATH THE JOINS BETWEEN PHALANGES IN TOES: low = 0; prominent and conical = 1; projecting = 2.

Lynch and Duellman (1997) and Duellman and Lehr (2008) argued that subarticular tubercles occur beneath the joints between phalanges. Hence, they described one subarticular tubercle on the thumb and second finger and two on the third and fourth fingers. On the plantar surface of the foot, they also described a single subarticular tubercle on Toes I and II while Toes III and V each having two, and finally Toe V having three subarticular tubercles. When subarticular tubercles are present, they might vary in elevation, being low, conical, and projecting (Lynch and Duellman 1997). Lynch (1971) mentioned that some species lack of subarticular tubercles; however, he did mentioned which. Herein, I found that the unique terrarana frog lacking of subarticular tubercles is *Geobatrachus walker*

79. ADDITIONAL SMALL TUBERCLES BETWEEN BASAL AND PENULTIME SUBARTICULAR TUBERCLES IN FINGER III: absent = 0; present = 1.

80. ADDITIONAL SMALL TUBERCLES BETWEEN BASAL AND PENULTIMATE SUBARTICULAR TUBERCLES IN FINGER IV: absent = 0; present = 1.

81. ADDITIONAL SMALL TUBERCLES BETWEEN BASAL AND DISTAL SUBARTICULAR TUBERCLES IN TOES III TO V: absent = 0; present = 1.

In addition to the subarticular tubercles occurring beneath the joints between phalanges, I found other small tubercles between subarticular tubercles in *Craugastor augusti* and *C. tarahumaraensis* only. Lynch (1968) proposed the genus *Hylactophryne* to contain those two species based on the lacking terminal grooves. In that description, Lynch (1968) illustrated the small tubercles between subarticular tubercles; however, they were not mentioned.

82. HYPERDISTAL TUBERCLES (Figure 30C–D): absent = 0; present = 1.

83. DEVELOP HYPERDISTAL TUBERCLES: less prominent in comparison to the other subarticular tubercles = 0; equal or bigger than the other subarticular tubercles = 1.

In my revision, I found subarticular tubercles between distal phalanges; however, following Lynch and Duellman (1997) and Duellman and Lehr (2009) proposal, those are not scored. Despite that Lynch (1999) had already highlighted that some species have subarticular tubercles between distal phalanges, he did not mention which species. I found those subarticular tubercles in *Pristimantis*, *Eleutherodactylus*, *Diasporus,* and *Atopophrynus syntomopus*. Some genera lacking of those tubercles are *Oreobates*, *Craugastor*, *Ceuthomantis*, *Dischidodactylus*, *Microkayla*, *Euparkerella*, and *Holoaden.* In species having those tubercles, they may be smaller or greater than underlying subarticular tubercles.

84. PENULTIMATE SUBARTICULAR TUBERCLES OF FINGER III AND IV EXHIBIT A GROOVE ONLY ON THE POSTAXIAL SURFACE: absent = 0; present = 1.

Lynch (2008) mentioned that distal subarticular tubercles normally exhibit a U-shaped groove but pads on penultimate subarticular tubercles or on the only subarticular tubercle of toes I and II may exhibit only the groove only on the postaxial surface. This character state was found only in outgroup representants (*Gastrotheca*), being absent in all the terraranan frogs studied.

85. SUPERNUMERARIES TUBERCLES ON THE FLESHY PART OF THE PALM: absent = 0; present = 1.

86. DISTRIBUTION OF THE SUPERNUMERARY TUBERCLES IN PALM: restricted to the proximal segments of the digits = 0; distributed in the entire palm = 1.

87. ELEVATION ON THE SUPERNUMERARIES TUBERCLES ON THE FLESHY PART OF THE PALM: Low = 0; prominent and conical = 1; projecting = 2. Additive.

88. SUPERNUMERARIES TUBERCLES ON PLANTAR SURFACE: absent = 0; present = 1.

89. ELEVATION ON THE SUPERNUMERARIES TUBERCLES ON THE FLESHY PART OF THE PLANTAR: Low = 0; prominent and conical = 1; projecting = 2. Additive.

90. SUPERNUMERARY TUBERCLE ON BASE OF PHALANGE IN TOE I: absent = 0; present = 1.

91. SIZE OF THE SUPERNUMERARY TUBERCLE ON BASE OF PHALANGE IN TOE: less than 1/2 the basal subarticular = 0; more than 1/2 the basal subarticular = 1.

92. SUPERNUMERARIES TUBERCLES ON BASE OF PHALANGE IN TOE II: absent = 0; present = 1.

93. SIZE OF THE SUPERNUMERARY TUBERCLE ON BASE OF PHALANGE IN TOE II: less than 1/2 the basal subarticular = 0; more than 1/2 the basal subarticular = 1.

94. SUPERNUMERARIES TUBERCLES ON BASE OF PHALANGE IN TOE III: absent = 0; present = 1.

95. SUPERNUMERARIES TUBERCLES ON BASE OF PHALANGE IN TOE IV: absent = 0; present = 1.

96. SUPERNUMERARIES TUBERCLES ON BASE OF PHALANGE IN TOE V: absent = 0; present = 1.

97. ELEVATION OF THE ACCESORY SUPERNUMERARIES TUBERCLES ON THE FLESHY PART OF THE PLANTAR: Low = 0; prominent and conical = 1; projecting = 2. Additive.

To date, these ten series of transformation currently are considered as a unique series de transformation in the literature of the terraranan frogs (supernumeraries tubercles). Supernumerary tubercles may be absent as in *Geobatrachus walker*; however when these are present, they may be discretized based on its topographic positions. In addition, when supernumerary tubercles are found on base of phalanges in Toes, they may be smaller or greater in comparison to basal subarticular tubercle.

98. CIRCUMFERENTIAL GROOVES IN TIP OF FINGER I (DISCS): absent = 0; present = 1.

99. CIRCUMFERENTIAL GROOVES EXTENSION IN FINGER I: only distally = 0; extent distal and laterally = 1.

100. MORPHOLOGY OF THE UNGUAL FLAP IN FINGER I: round or truncate = 0; lanceloate = 1; emarginated = 2.

101. MORPHOLOGY OF THE EMARGINATED CONDITION IN FINGER I: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

102. TIPS OF FINGER I (SPECIES LACKING OF GROOVES): rounded = 0; pointed = 1.

103. CIRCUMFERENTIAL GROOVES IN TIP OF FINGER II (DISCS): absent = 0; present = 1.

104. CIRCUMFERENTIAL GROOVES EXTENSION IN FINGER II: only distally = 0; extent distal and laterally = 1.

105. MORPHOLOGY OF THE UNGUAL FLAP IN FINGER II: round or truncate = 0; lanceloate = 1; emarginated = 2.

106. MORPHOLOGY OF THE EMARGINATED CONDITION IN FINGER II: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

107. TIPS OF FINGER II (SPECIES LACKING OF GROOVES): rounded = 0; pointed = 1.

108. CIRCUMFERENTIAL GROOVES IN TIP OF FINGER IV (DISCS): absent = 0; present = 1.

109. MORPHOLOGY OF THE UNGUAL FLAP IN FINGER IV: ROUND OR TRUNCATE = 0; lanceloate = 1; emarginated = 2.

110. MORPHOLOGY OF THE EMARGINATED CONDITION IN FINGER IV: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

111. CIRCUMFERENTIAL GROOVES IN TIP OF TOE I (DISCS): absent = 0; present = 1.

112. CIRCUMFERENTIAL GROOVES EXTENSION IN TOE I: only distally = 0; extent distal and laterally = 1.

113. MORPHOLOGY OF THE UNGUAL FLAP IN TOE I: round or truncate = 0; lanceloate = 1; emarginated = 2.

114. MORPHOLOGY OF THE EMARGINATED CONDITION IN TOE I: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

115. TIPS OF TOE I (SPECIES LACKING OF GROOVES): rounded = 0; pointed = 1.

116. CIRCUMFERENTIAL GROOVES IN TIP OF TOE II (DISCS): absent = 0; present = 1.

117. CIRCUMFERENTIAL GROOVES EXTENSION IN TOE II: only distally = 0; extent distal and laterally = 1.

118. MORPHOLOGY OF THE UNGUAL FLAP IN TOE II: round or truncate = 0; lanceolate = 1; emarginated = 2.

119. MORPHOLOGY OF THE EMARGINATED CONDITION IN TOE II: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

120. TIPS OF TOE II (SPECIES LACKING OF GROOVES): rounded = 0; pointed = 1.

121. MORPHOLOGY OF THE UNGUAL FLAP IN TOE V: round or truncate = 0; lanceloate = 1; emarginated = 2.

122. MORPHOLOGY OF THE EMARGINATION IN TOE V: indented as *Dischidodactylus duidensis* and *Pristimantis labiosus* = 0; notched as *Ceuthomantis* = 1.

The tips of the digits are laterally expanded in most terrararan frogs (e.g., *Pristimantis*, *Strabomantis*, *Yunganastes*). Conversely, lack any expansion of the digital tips is also found in other genera (*Holoaden*, *Niceforonia*). Similarly, there is variation between fingers and toes. Examples are the species of the genus *Strabomantis*, which show the tips of the toes laterally expanded whereas tips of the fingers lacking any expansion. Lynch (1968, 1971) previously pointed out the value and significance of the lateral expansion in digits, which was related with the presence or absence of a terminal transverse groove on the digital pads (circummarginal groove sensu Savage 1987). That is, species having terminal transverse groove are species having lateral expansion of digits. Savage (1987) noted that when the terminal transverse groove is present on the digital pads, this may be only distal or in some extent laterally.

Another character associated to species having terminal transverse groove is the ungual flap shape, which is the free anterior portion of the disk. The ungual flap may be round or truncate, which is the more common condition observed in terraranan frogs. Nevertheless, other species having an evident emarginated margin are also found. This emarginated condition may be indented (implying a relatively broad and shallow concavity) or notched (deeply notched). Although the conditions indented and notched have been associated mainly *Dischidodactylus* and *Ceuthomantis*, these condition are also found on other species of the genera *Pristimantis*, *Yunganastes*, *Craugastor*, and *Ischnocnema*.

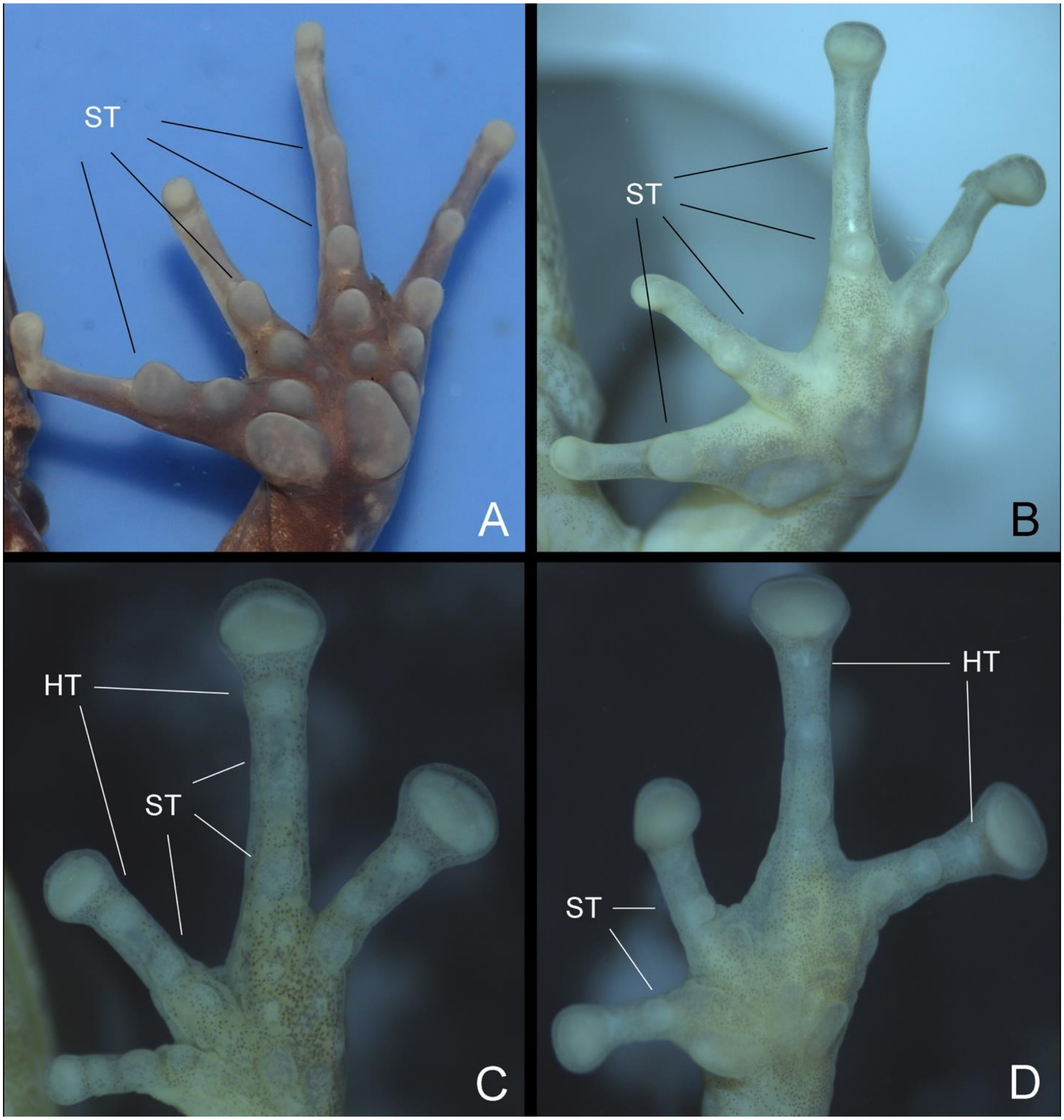


Figure 30. Ventral views of palm showing basal, distal, and hyperdistal subarticular tubercles in preserved specimens. **A**–**B**. Species having basal and distal subarticular tubercles but lacking of hyperdistal tubercles—*Oreobates quixensis* (KU 178249, 50.0 mm SVL) and *Pristimantis achatinus* (ICN 30683, 35.6 mm SVL). **C**–**D**. Species having basal, distal, and hyperdistal subarticular tubercles—*Pristimantis angustilineatus* (ICN 19164, 18.4 mm SVL) and *Pristimantis prolixodiscus* (ICN 15177, 20.6 mm SVL). ST = Subarticular tubercles. HT = Hyperdistal tubercles.

123. SIZE OF THE DISC BETWEEN FINGER II AND I: Discs of Finger II is significantly greater = 0; approximately equal = 1; disc of finger I is significantly greater = 2. Additive.

124. SIZE OF THE DISC BETWEEN FINGER IV AND III: approximately equal = 0; disc of finger III is greater to finger IV = 1.

125. RELATION BETWEEN SIZE OF THE DISC BETWEEN TOES V AND I: Toe V and I equal = 0; Toe V greater that Toe I = 1.

In species having terminal transverse groove on finger or toes, there is variation size between Finger III versus Finger IV and Toe V versus Toe I. Herein, I do not include comparison between Finger I and II because all the species having disc of Finger II being bigger in comparison to Finger I.

126. FINGER FRINGE I (PREAXIAL): absent = 0; present = 1.

127. FINGER FRINGE I (POSTAXIAL): absent = 0; present = 1.

128. FINGER FRINGE II (PREAXIAL): absent = 0; present = 1.

129. FINGER FRINGE II (POSTAXIAL): absent = 0; present = 1.

130. FINGER FRINGE III (PREAXIAL): absent = 0; present = 1.

131. FINGER FRINGE III (POSTAXIAL): absent = 0; present = 1.

132. MORPHOLOGY OF THE FRINGE ON FINGER III (POSTAXIAL): uniform = 0; crenulate = 1.

133. FINGER FRINGE IV (PREAXIAL): absent = 0; present = 1

134. FINGER FRINGE IV (POSTAXIAL): (0) absent, (1) present.

135. MORPHOLOGY OF THE FRINGE ON FINGER IV (POSTAXIAL): uniform = 0; crenulate = 1.

Historically, the fringes or keels on fingers had been treated as a unique series de transformation. However, the presence/absence of fringes varies independently and therefore each side of digits is treated as independent character.

136. TOE I PREAXIAL (FRINGE): absent = 0; present = 1.

137. TOE I POSTAXIAL (FRINGE): absent = 0; fringe = 1; two free = 2; 1.5 free = 3. Additive.

138. TOE II PREAXIAL (FRINGE): absent = 0; fringe = 1; two free = 2; 1.5 free = 3. Additive.

139. TOE II POSTAXIAL (FRINGE): absent = 0; fringe = 1; two free = 2; 1.5 free = 3; one free = 4. Additive.

140. TOE III PREAXIAL (FRINGE): absent = 0; fringe = 1; three free = 2; 2.5 free = 3; two free = 4; 1.5 free = 5. Additive.

141. TOE III POSTAXIAL (FRINGE): absent = 0; fringe = 1; three free = 2; 2.5 free = 3; two free = 4; 1.5 free = 5; one free = 6. Additive.

142. TOE IV PREAXIAL (FRINGE): absent = 0; fringe = 1; four free = 2; 3.5 free = 3; three free = 4; two free = 5. Additive.

143. TOE IV POSTAXIAL (FRINGE): absent = 0; fringe = 1; four free = 2; 3.5 free = 3; three free = 4; two free = 5. Additive.

144. TOE V PREAXIAL (FRINGE): absent = 0; fringe = 1; three free = 2; 2.5 free = 3; two free = 4; 1.5 free = 5; one free = 6.

145. TOE V POSTAXIAL (FRINGE): absent = 0; present = 1.

146. MORPHOLOGY OF THE FRINGE ON TOE V (POSTAXIAL): uniform = 0; crenulate = 1.

There is evidence to consider each side of toes as series of transformation. Also, I reviewed juvenile specimens of species with foot membrane (*Craugastor raniformis, Strabomantis bufoniformis*, *Pristimantis diaphonus*), which ontogenetic variation in extension of fringe suggests that it proceeds distal.

147. UPPER EDGE OF THE HEEL: smooth = 0; rugose = 1; tuberculate = 2.

148. HEEL TUBERCLE: Between two or four calcar tubercles, in the anterior and posterior edge of the heel = 0; Exclusively one posterior calcar tubercle present = 1.

149. APICAL ELEMENT OF M. INTERMANDIBULARIS ARISING FROM THE LINGUAL SURFACE OF THE MANDIBLE, POSTERIOR TO THE SUBMENTALIS. THE FIBERS PASS POSTEROMEDIALLY AND ATTACH UPON THE MEDIAN RAPHE OF THE M. INTERMANDIBULARIS (Figure 31A): absent = 0; present = 1.

150. WHEN A.E.I PRESENTS: large elements, contated each other forming a V = 0; very short, elements no contacted each other = 1.

151. ANTEROLATERAL SUPPLEMENTARY ELEMENT OF M. INTERMANDIBULARIS ORIGINATING ON LINGUAL SURFACE AT THE LEVEL OF POSTERIOR HALF OF MANDIBLE, INSERTING ON THE FASCIA OF M. SUBMENTALIS (Figure 31B): absent = 0; present = 1.

152. POSTEROLATERAL SUPPLEMENTARY ELEMENT OF M. INTERMANDIBULARIS: absent = 0; present = 1.

153. LEVEL OF THE INTERRUPTION BETWEEN CONTRALATERAL PORTIONS OF M. INTERMANDIBULARIS: fibers interrupted by median raphe = 0; fibers interrupted by broad median aponeurosis = 1.

154. NATURE OF THE FIBERS OF M. INTERHYOIDEUS: fibers extending between mandibles without interruption = 0; fibers interrupted medially = 1.

155. INTERRUPTION OF CONTRALATERAL PORTIONS OF M. INTERHYOIDEUS: fibers interrupted by median raphe = 0; fibers interrupted by broad median aponeurosis = 1.

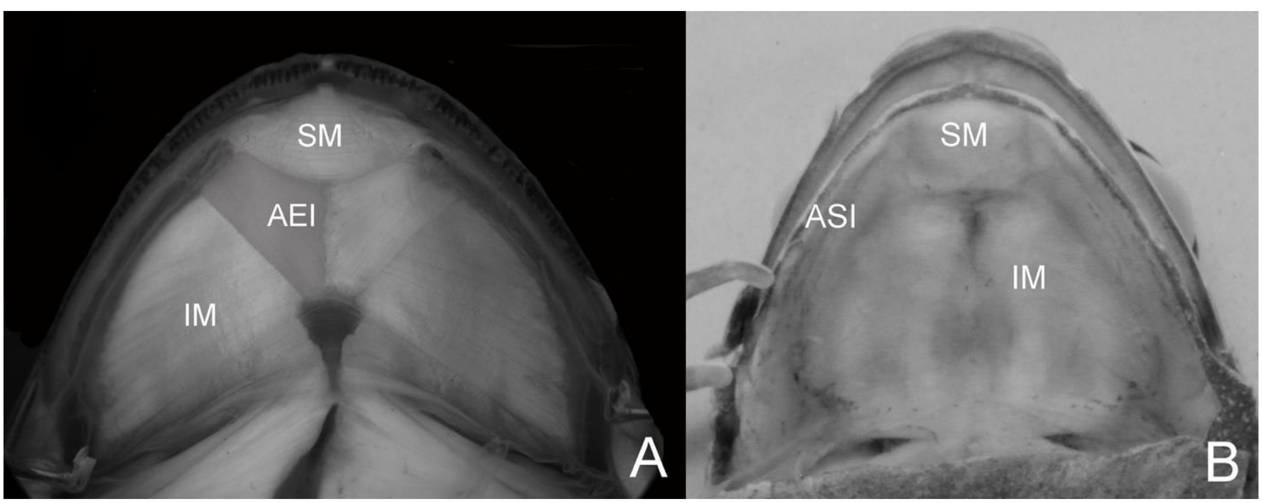


Figure 31. Ventral views of submandibular musculature in preserved specimens. **A**. *Strabomantis cerastes* (ICN 19208, 38.1 mm SVL). **B**. *Psychrophrynella usurpator* (KU 138957, 21.0 mm SVL). SM = *M. submentalis*. IM = *m. intermandibularis*. AEI = Apical

element of the *m. intermandibularis*. ASI = Anterolateral supplementary element of *m. intermandibularis*.

156. EXOSTOSIS OVER FRONTOPARIETAL BONES (Figure 32A): absent = 0; present = 1.

157. GROWTH LATERAL OF THE FRONTOPARIETAL BONES (Figure 32B–D): absent = 0; present = 1.

158. DEVELOP OF THE GROWTH LATERAL OF THE FRONTOPARIETAL BONES (Figure 32B–D): poorly develop or hardly visible without cutting of the skin = 0; well develop, easily visible externally = 1.

Historically both exostosis over frontoparietal and growth lateral of the frontoparietal had been considered as cranial crest in terraranan frogs (Lynch and Duellman 1997). However, exostosis is a morphological condition wherein additional membrane bone is laid down on dermal cranial elements to form ridges, crest, and spines (Trueb 1973). On the other hand, growth lateral of the frontoparietal are projections that not imply ridges, crest, or spines. In addition, those growth laterals on frontoparietal may be may be poorly or well develop.

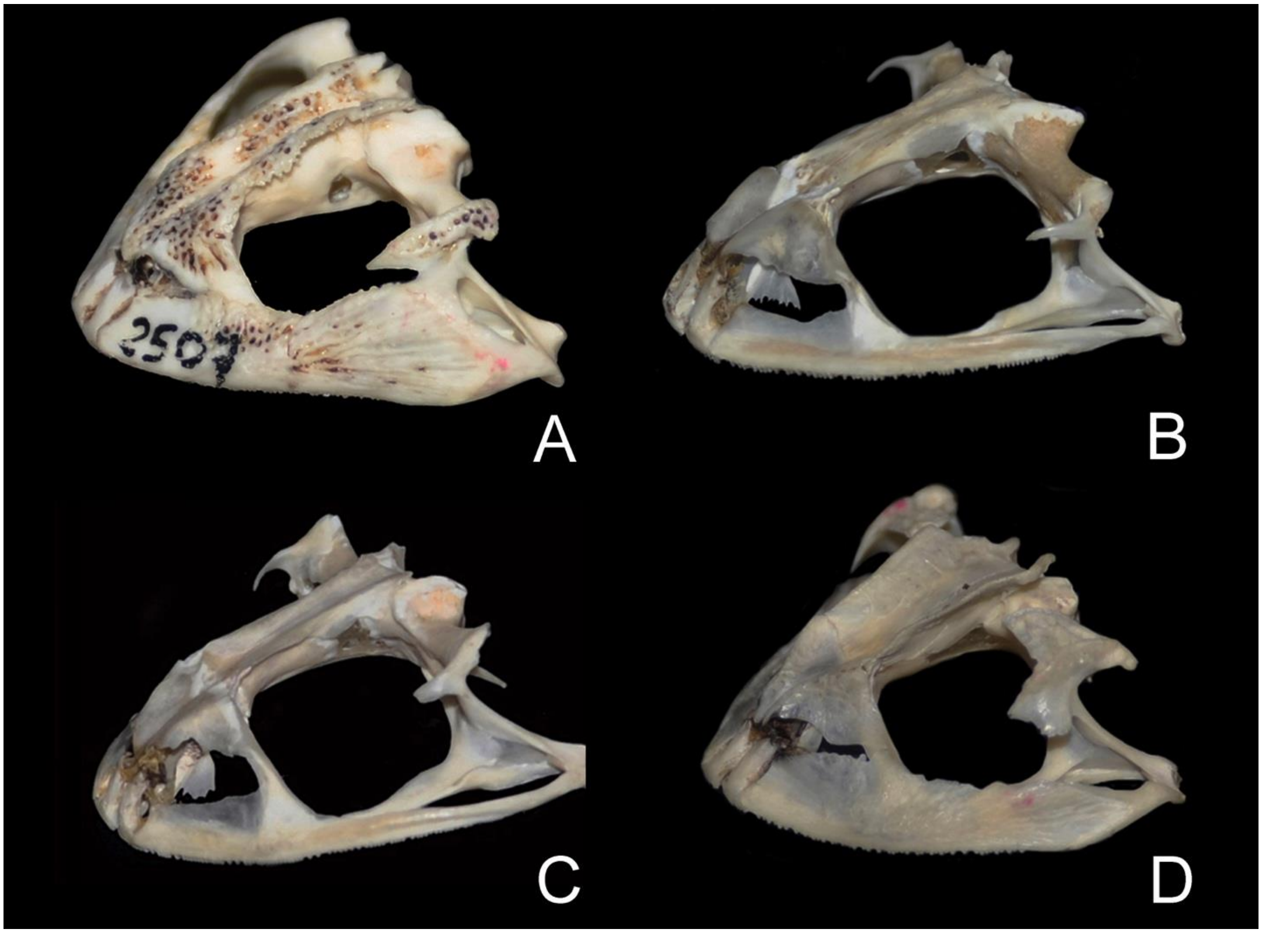


Figure 32. Lateral views of crania showing dermal ornamentations on the paired frontoparietals. **A**. Exostosis on frontoparietals—*Strabomantis ingeri* (ICN 2507). **B**–**C** Growth lateral of frontoparietals poorly develop or hardly visible without cutting of the skin—*Strabomantis cheiroplethus* (ICN 18019) and *Strabomantis necerus* (ICN 13229) respectively. **D**. Growth lateral of frontoparietals well develop, easily visible externally—*Strabomantis ruizi* (ICN 4962).

159. ORIENTATION OF THE ALARY PROCESS OF THE PREMAXILLAE (Figure 33): posterior = 0; nearly vertical = 1.

160. ANTERIOR EXTENSION OF THE NASAL CARTILAGE: short, non-reaching anterior border of the mandible = 0; long, exceeding to anterior border of the mandible = 1.

Snout shape reflects the orientation of the alary processes of the premaxillae and the degree to which the nasal cartilage extend anteriorly (Lynch and Duellman 1997). That is, in dorsal view a posterior orientation of the alary process of the premaxillae reflects a round snout shape whereas a vertical orientation those process reflects an acuminate or subacuminate snout shape. Similarly, in lateral view, a short and long anterior extension of the nasal cartilage reflects a round/truncate or protruding snout shape respectively.

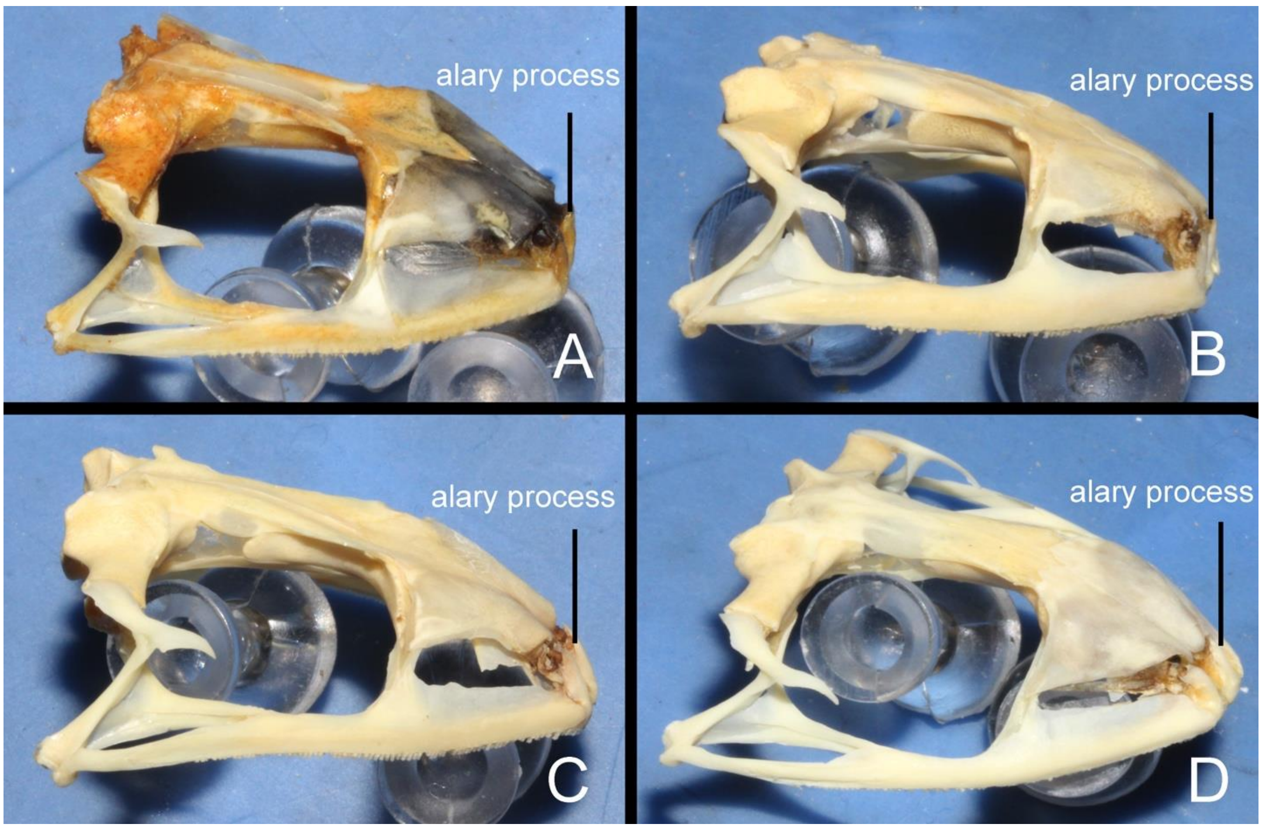


Figure 33. Lateral views of crania showing the orientation of the alary processes of the premaxillae. **A–B**. Alary processes nearly vertical—*Pristimantis w-nigrum* (KU 166287, 78.0 mm SVL) and *P. lymani* (KU 119505, 66.0 mm SVL). **C–D**. Alary processes inclined posteriorly—*Craugastor andi* (KU 35111, mm SVL 79.8 mm) and *Craugastor taurus* (KU 86282, 70.1 mm SVL).

161. RELATIVE LENGTH BETWEEN METACARPAL II AND I (Figure 34): Metacarpal I shorter compared to metacarpal II = 0; equal in length = 1; Metacarpal I longer compared to metacarpal II = 2. Additive.

162. RELATIVE LENGTH BETWEEN METATARSAL III AND V: Metatarsal III shorter compared to metatarsal V = 0; equal in longitude = 1; Metatarsal III longer compared to metatarsal V = 2.

The relative lengths of the digits are used in taxonomic accounts of terraranan frogs (Lynch and Duellman 1997; Duellman and Lehr 2009). Typically, this is expressed as the overall length of a digit; however, digits are composed of several elements (i.e., metacarpals or metatarsals, and phalanges). Thus, digital length may be determined by changes in one or more of these elements. The digits of *Strabomantis bufoniformis* and *S. ingeri* are cases in point. Lynch and Duellman (1997) reported that in these species, Finger I is longer than Finger II, and this is true. Close examination reveals that in *S. bufoniformis*, the greater length of Finger I relative to Finger II is correlated with Metacarpal I being longer than Metacarpal II. In contrast, in *S. ingeri*, basal Phalanx I is longer than basal Phalanx II (Figure 34). Although the character seems to be the same in both taxa on the basis of external examination, the differences in finger lengths are achieved by distinct developmental patterns. Considering this, I compared the length between metacarpal II and I and metatarsal III and IV.

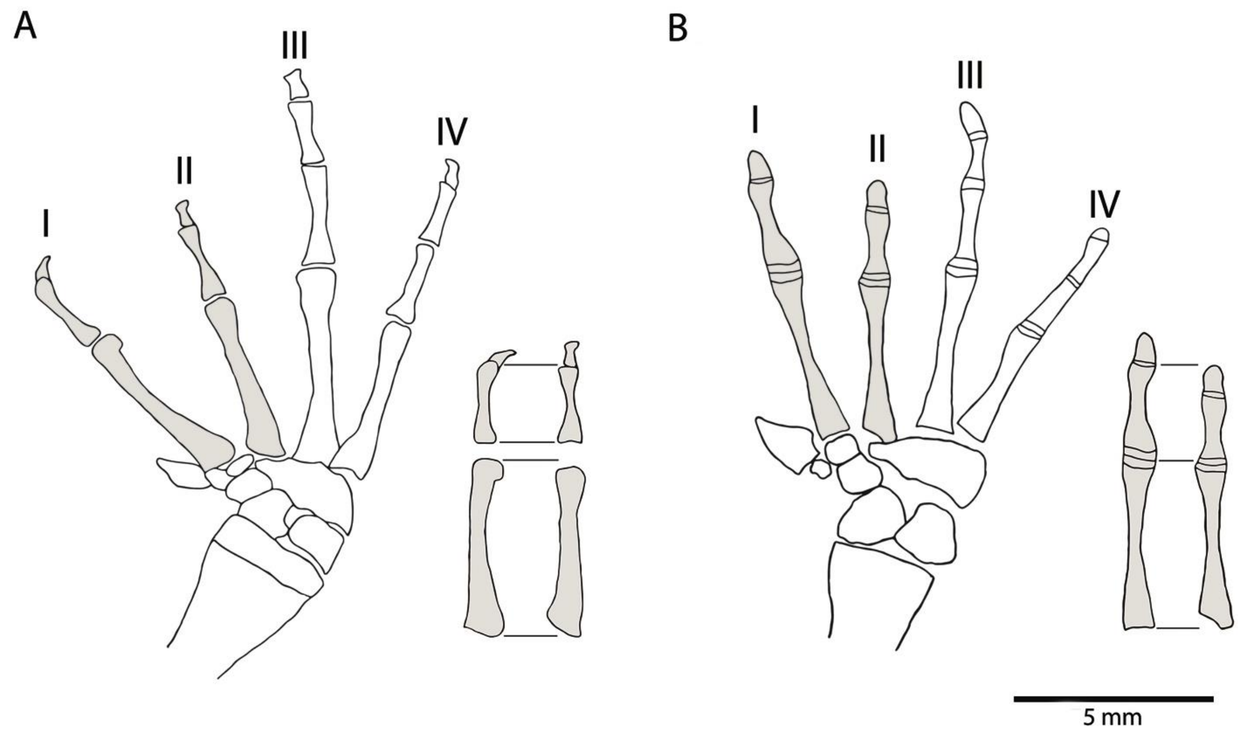


Figure 34. Dorsal views of hands showing relationships between the lengths of Fingers II and I. **A**. Metacarpal I longer compared to metacarpal II—*Strabomantis bufoniformis* (ICN 9322). **B**. Metacarpal I equal in length to metacarpal II—*Strabomantis ingeri* (ICN 13570).

163. TWO OR THREE TUBERCLES FORMING ONE FOLD ON OUTER BORDER OF HAND: absent = 0; present = 1.

164. INNER ELONGATE TUBERCLE ON THE DISTAL TARSUS: absent = 0; present = 1.

165. INNER TARSAL FOLD: absent = 0; present = 1.

166. INNER TARSAL FOLD (Figure 35): separated of outer fringe of Toe I = 0; connected to outer fringe of Toe I = 1.

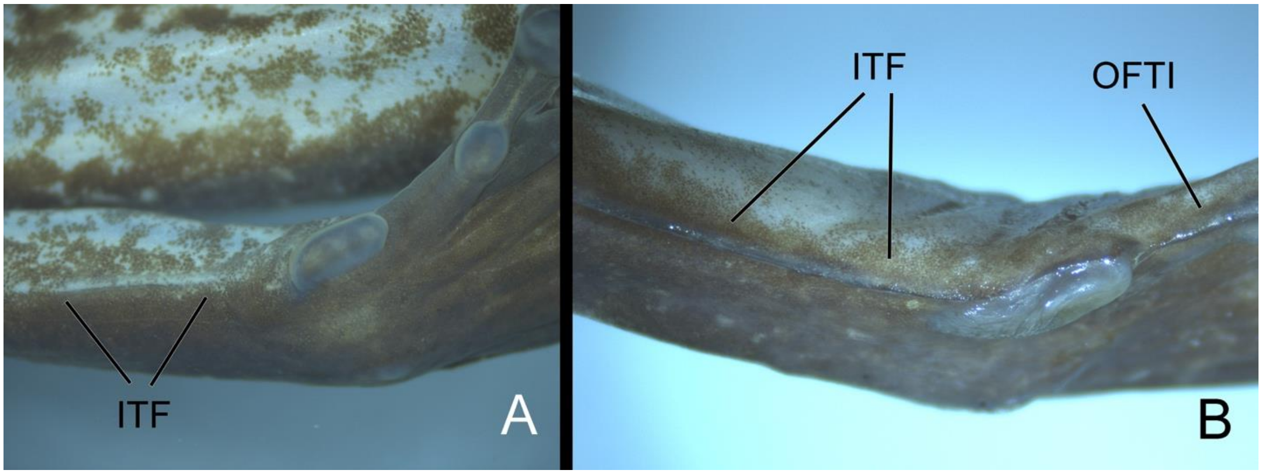


Figure 35. Plantar views of feet showing variation in inner tarsal fold. **A**. Inner tarsal fold separated of outer fringe of Toe I—*Craugastor fitzingeri* (ICN 12510, 46.6 mm SVL). Inner tarsal fold connected to outer fringe of Toe I—*Strabomantis zygodactylus* (ICN 4944, 79.0 mm SVL). ITF = Inner tarsal fold. OFTI = Outer fringe Toe I.

167. INNER TARSAL FOLD EXTENSION: ALONG DISTAL 1/3 OF TARSUS = 0; along distal 1/2 of tarsus = 1; along distal 2/3 of tarsus = 2; along of the entire length of tarsus = 3. Additive.

168. OUTER TARSAL TUBERCLES: absent = 0; present = 1.

169. OUTER TARSAL TUBERCLES: not fused = 0; fused forming fold = 1.

170. TARSAL KEEL: absent = 0; present = 1.

171. TUBERCLES ON THE MEDIAL SURFACE OF THE TARSUS: absent = 0; present = 1.

172. DISTRIBUTION TUBERCLES ON THE MEDIAL SURFACE OF THE TARSUS: distributed uniformly = 0; forming a row of tubercles (no fused) along of the medial surface of the tarsus = 1.

173. ULNAR TUBERCLES: absent = 0; present = 1.

174. MORPHOLOGY OF THE ULNAR TUBERCLES: non-fused = 0; fused in an ulnar fold = 1.

175. EXTERNAL BORDER OF THE OTIC AND ZIGOMATIC RAMUS OF THE SQUAMOSAL: flat or to same level of the muscular fibers inserting in it = 0; cuspidate or elevated with respect to the muscular fibers inserting in it = 1; with exostosis on it = 2.

176. VENTRAL EXPANSION OF THE ZYGOMATIC RAMUS OF THE SQUAMOSAL: absent = 0; present = 1.

177. RELATIONSHIPS OF THE M. ADDUCTOR MANDIBULAE AND THE MANDIBULAR RAMUS OF THE TRIGEMINAL NERVE: trigeminal nerve passes lateral (S) = 0; trigeminal nerve passes medial (E) to the m. adductor mandibulae = 1; as Yunganastes = 2.

178. ORIGIN M. LONGISSIUMUS DORSI: It takes its origin along the anterior part of the coccyx, almost to the sacral level = 0; it takes its origin along of anterior half part of the coccyx = 1.

179. ORIGIN OF M. TENSOR FASCIAE LATAE (Figure 36): the muscle arises along ventral margin of the posterior part of the ilial shaft = 0; the muscle arises from the anterior ventral margin of the shaft = 1; from anterior end of margin of the shaft = 2.

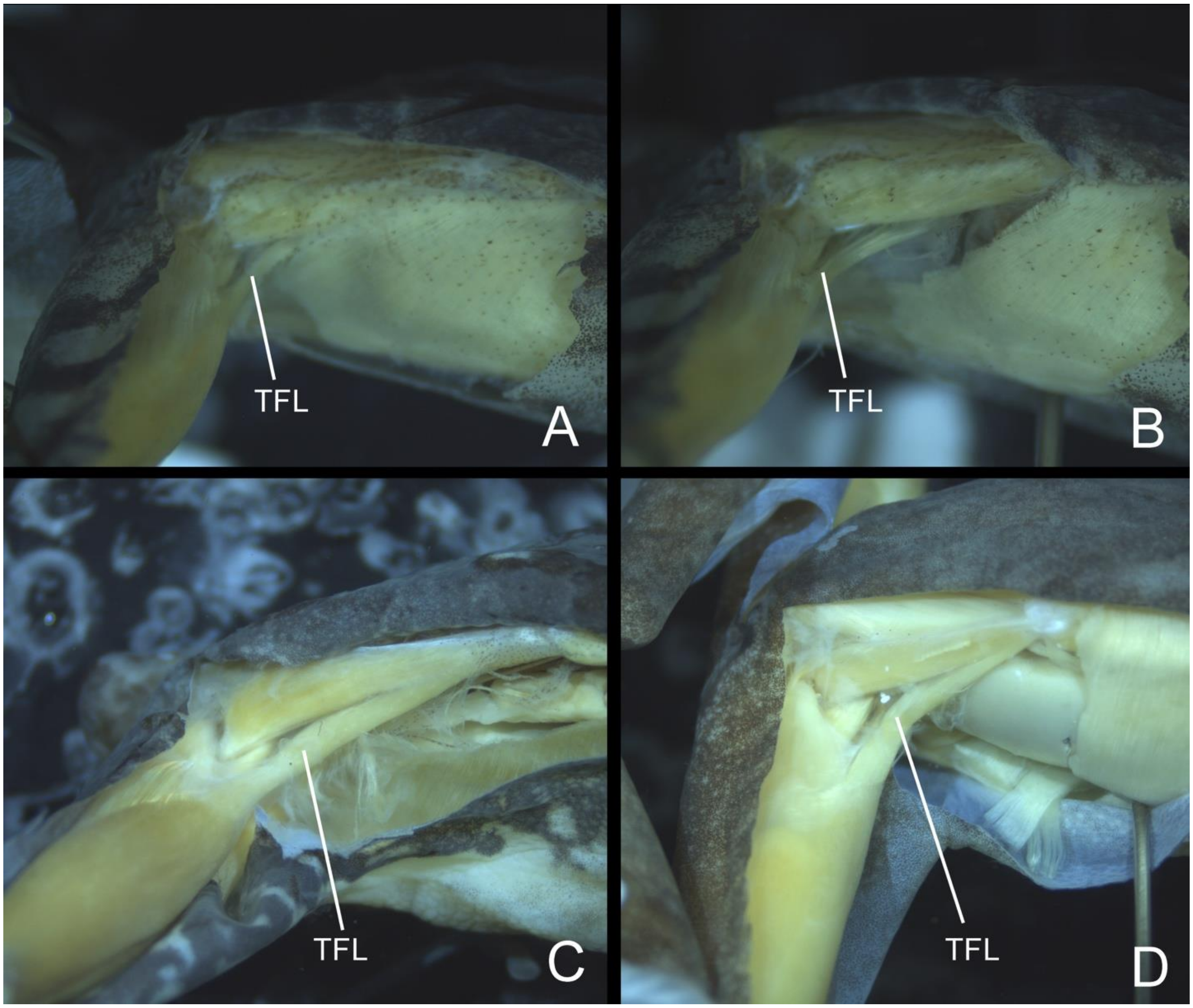


Figure 36. Lateral views showing the position and origin of the tensor fasciae latae in preserved specimens. **A–B**. The muscle arises along ventral margin of the posterior part of the ilial shaft—*Pristimantis kelephus* (ICN 39671, 20.1 mm SVL). The muscle arises from the anterior ventral margin of the shaft—*Pristimantis cristinae* (ICN 3950, 34.7 mm SVL). The muscle arises from anterior end of margin of the shaft—*Craugastor longirostris* (ICN 42787, 29.6 mm SVL). TFL = Tensor fasciae latae.

180. DEVELOPMENT OF THE OF M. TENSOR FASCIAE LATAE: M. tensor fasciae latae poorly developed, slender similar to a nerve = 0; M. tensor fasciae latae well developed = 1.

181. Development of the of m. sartorius: poorly developed (M. sartorius covering the m. adductor magnus exclusively in the distal section) = 0; moderate developed (M. sartorius not covering the m. adductor magnus in proximal section) = 1; well-developed (M. sartorius covering the m. adductor magnus in proximal section) = 2.

182. Extension of the insertion of the m. deltoideus (Figure 37): Ventral margin and anterior surface near the ventral edge of the crista ventralis humeri = 0; Ventral margin and posterior surface near the ventral edge of the crista ventralis humeri = 1; Ventral margin and posterior surface near the ventral edge of the crista ventralis humeri and extending onto the ventral surface of the humerus distal to the lateral epicondyle of the humerus = 2.

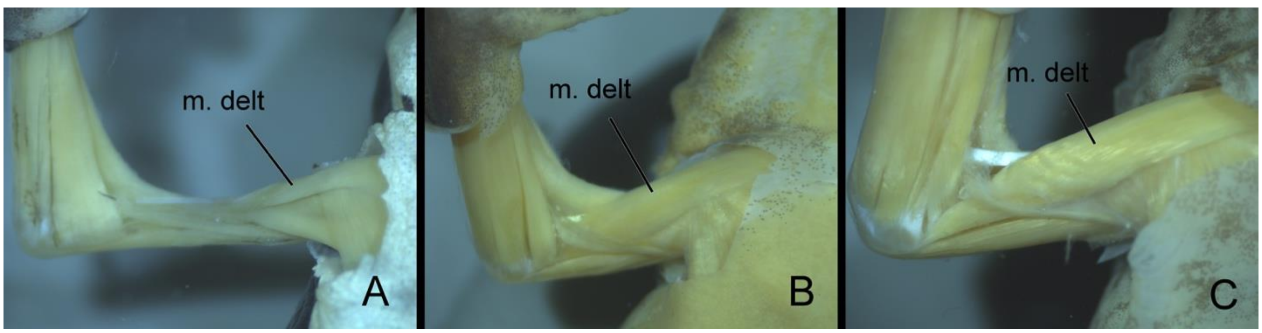


Figure 37. Ventral views showing the points of insertion of the *m. deltoideus* on the humerus in preserved specimens. **A**. The muscle inserts on ventral margin and anterior surface near the ventral edge of the crista ventralis humeri—*Atelopus spurelli* (ICN 12047, 26.8 mm SVL). **B**. The muscle inserts on ventral margin and posterior surface near the ventral edge of the crista ventralis humeri—*Pristimantis restrepoi* (ICN 28849, 28.9 mm SVL). **C**. The muscle inserts on ventral margin and posterior surface near the ventral edge of the crista ventralis humeri and extending onto the ventral surface of the humerus distal to the lateral epicondyle of the humerus—*Strabomantis cheiroplethus* (ICN 30511, mm 41.2 mm SVL).

183. Origin of m. iliacus externus (Figure 38): The muscle takes its origin from the lateral surface of the 1/2 parts of the posterior half of the ilial shaft = 0;

The muscle takes its origin from the lateral surface of the 2/3 parts of the posterior half of the ilial shaft = 1; the muscle takes its origin from the entire length of the ilial shaft = 2.

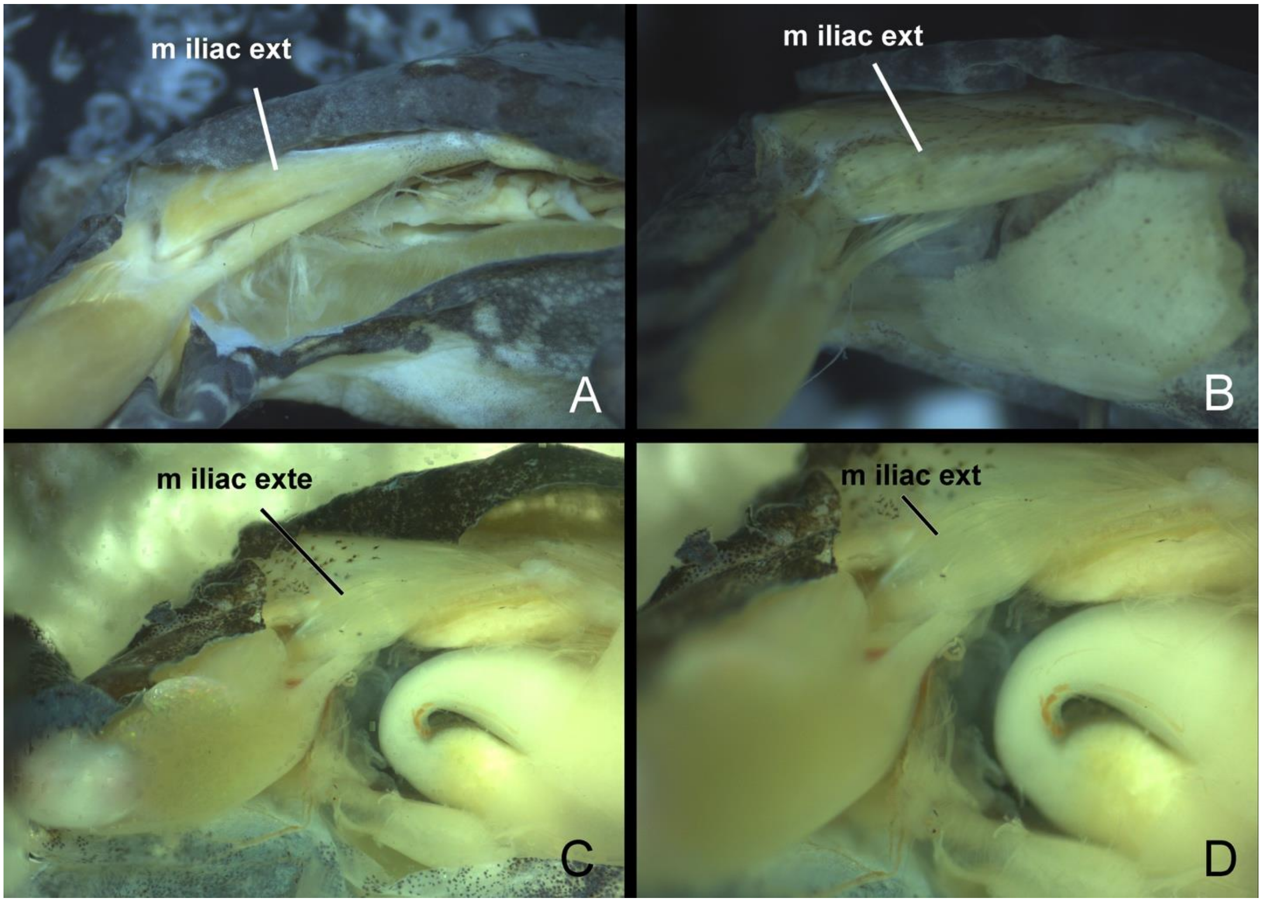


Figure 38. Lateral views showing the origin of the *m. iliacus externus* in preserved specimens. **A**. The muscle takes its origin from the lateral surface of the 1/2 parts of the posterior half of the ilial shaft—*Pristimantis cristinae* (ICN 3950, 37.4 mm SVL). **B**. The muscle takes its origin from the lateral surface of the 2/3 parts of the posterior half of the ilial shaft—*Pristimantis kelephus* (ICN 39671, 20.1 mm SVL). **C–D**. The muscle takes its origin from the entire length of the ilial shaft—*Ceuthomantis* sp. (JDL 32489, 14.2 mm SVL). m iliac ext = *m. iliacus externus*.

184. MUSCLE ADDUCTOR LONGUS ARISING FROM THE VENTROLATERAL ILLIUM AND ANTERIOR PART OF THE PUBIS: absent = 0; present = 1.

185. INSERTION OF THE M. ADDUCTOR LONGUS (Figure 39): It inserts on the proximal section of m. adductor magnus = 0; it inserts at half the length of the femur = 1; its insertion is on 2/3 parts of m. adductor magnus = 2; its insertion is on the distal section, almost to the same level of the m. adductor magnus = 3.

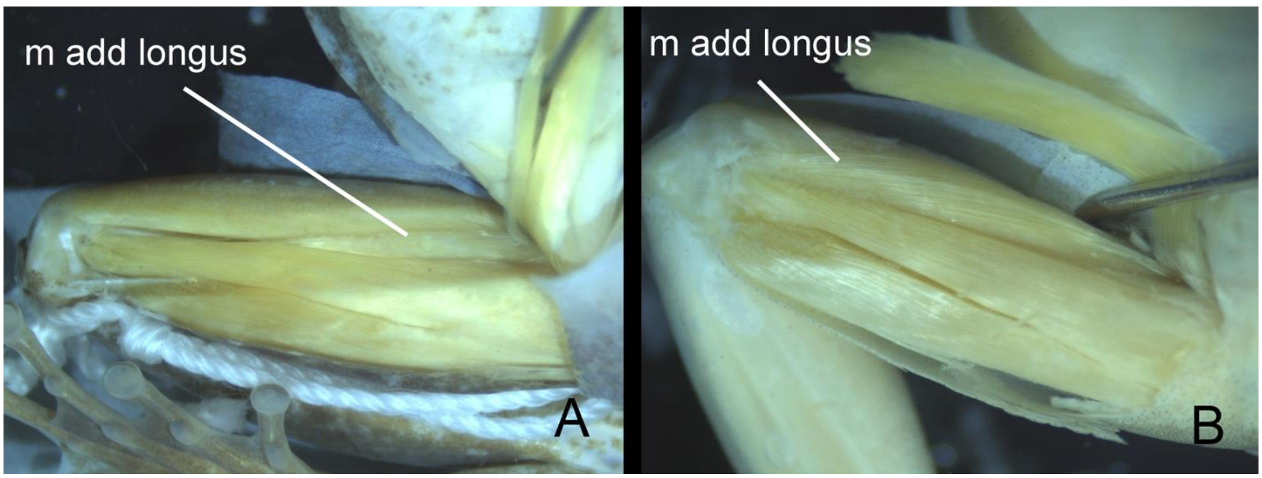


Figure 39. Ventral views showing insertion of *m. adductor longus* in preserved specimens. **A**. The muscle inserts at half the length of the femur—*Craugastor fitzingeri* (ICN 9355, 29.2 mm SVL). The muscle inserts on the distal section, almost to the same level of the m. adductor magnus—*Diasporus gularis* (ICN 45161, 28.3 mm SVL).

***Appendix* 3**. *Data matrix used for phylogenetic analysis with 208 taxa and 185 morphological characters.*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Agalychnisspurrelli	0	1	0	0	-	-	0	-	-	0	0	-	1	1	1	0	1	1	0	-	-	-	1	0	1	1	1	0	-	0
Alytesobstetrican	0	0	1	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	1	1	1	1	0	-	0	-	-	-	0
Atopophrynussyntomopus	0	0	0	0	-	-	0	-	0	0	1	0	-	-	0	-	?	?	?	?	?	?	?	?	?	0	-	-	-	0
Barycholospulcher	0	0	0	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	-	0
Barycholosternetzi	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0
Brachycephalusephippium	1	1	3	0	-	-	0	-	0	0	0	-	-	-	0	-	1	?	0	-	-	-	0	-	1	0	-	-	-	0
Bryophrynecophites	0	1	0	0	-	-	0	-	0	0	1	1	-	-	0	-	1	0	1	1	1	1	1	1	1	0	-	-	-	0
Ceuthomantissmaragdinus	0	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	0	0
Colostethusfraterdanieli	0	0	0	0	-	-	0	-	-	0	0	-	1	1	1	0	1	1	1	1	1	1	1	0	1	0	-	-	-	0
Craugastoralfredi	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	0	-	0
Craugastorandi	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorangelicus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	0	1	0	1	0	0
Craugastoraugusti	1	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	0	-	1	1	1	0	-	0
Craugastoraurilegulus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorbocourti	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Craugastorbransfordii	2	0	1	1	1	0	1	0	0	0	1	1	1	1	1	2	1	0	1	1	1	1	1	0	0	1	0	1	0	0
Craugastorcrassidigitus	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastordaryi	0	0	2	0	-	-	1	0	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	1	1	0	0
Craugastoremcelae	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorfitzingeri	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorlaevissimus	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorlaticeps	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	0&1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorlauraster	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	0
Craugastorlineatus	2	0	1	0	-	-	1	1	0	0	1	0	1	1	1	2	1	0	1	0	0	1	1	0	1	1	0	1	1	0
Craugastorlongirostris	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Craugastormegacephalus	2	0	2	0	-	-	1	0	0&1	0&1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0
Craugastormelanostictus	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastormexicanus	0	0	1	0	-	-	0	-	0	0	1	1	1	1	1	2	1	0	1	0	0	1	1	0	0	1	1	1	1	0
Craugastormontanus	0	1	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	0	-	0
Craugastorobesus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	1	1	1	0	0	-	0
Craugastoropimus	2	1	2	0	-	-	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0
Craugastorpunctariolus	4	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorpygmaeus	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	2	1	0	1	1	0	1	1	0	1	0	-	-	-	0
Craugastorranoides	4	0	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorrhodopis	0	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Craugastorrugulosus	4	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorrupinius	4	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorsandersoni	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Craugastorspatulatus	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	0	-	0

Appendix 3. Continued.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Agalychnisspurrelli	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	1	1	0	0
Alytesobstetrican	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Atopophrynussyntomopus	-	1	0	1	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Barycholospulcher	-	0	1	1	0	1	0	-	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Barycholosternetzi	-	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Brachycephalusephippium	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Bryophrynecophites	-	0	0	1	0	0	0	-	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	1	0
Ceuthomantissmaragdinus	-	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	-	-	0	-	-	0	0
Colostethusfraterdanieli	-	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	-	-	0	-	-	0	0
Craugastoralfredi	-	0	0	1	0	0	0	-	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0
Craugastorandi	-	0	0	2	0	0	0	0	0	0	0	1	1	0	2	0	0	1	1	1	1	1	1	0	1	1	0	0	0	0
Craugastorangelicus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	2	0	1	1	1	1	0	1	1	0	1	1	0	1	0
Craugastoraugusti	-	0	0	1	0	0	0	-	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Craugastoraurilegulus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	1	1	0	0	1	1	0	1	0
Craugastorbocourti	-	0	0	1	0	0	0	-	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0
Craugastorbransfordii	-	0	0	0	0	0	0	-	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0
Craugastorcrassidigitus	-	0	0	1	1	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Craugastordaryi	-	0	1	1	0	0	1	0	0	0	0	1	0	0	3	0	0	0	0	0	1	0	1	1	0	1	1	0	0	0
Craugastoremcelae	-	0	0	1	0	0	0	-	0	0	0	1	1	0	3	3	0	1	1	1	1	1	1	0	1	1	0	0	0	0
Craugastorfitzingeri	-	0	0	2	1	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	1	1	0	1	1	0	0	0	0
Craugastorlaevissimus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastorlaticeps	-	0	0	1	0	0	1	1	0	0	1	1	0	1	2	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Craugastorlauraster	-	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastorlineatus	-	0	1	1	0	0	1	1	0	0	1	1	0	1	2	2	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Craugastorlongirostris	-	0	0	1	1	0	1	0	0	0	0	1	0	0	2	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Craugastormegacephalus	-	0	1	3	0	0	0	-	1	0	0	0	0	1	0	2	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastormelanostictus	-	0	0	1	0	0	1	0	0	0	0	1	1	0	2	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Craugastormexicanus	-	0	0	1	0	0	0	-	0	0	1	1	0	1	2	0	0	1	1	1	0	0	0	-	-	0	-	-	0	0
Craugastormontanus	-	0	0	1	0	0	0	-	0	0	1	1	1	0	3	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastorobesus	-	0	0	2	0	0	0	-	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0
Craugastoropimus	-	0	1	3	0	0	0	-	1	0	1	0	0	1	3	2	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastorpunctariolus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	3	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0
Craugastorpygmaeus	-	0	1	1	0	0	0	-	0	0	1	1	0	1	2	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Craugastorranoides	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Craugastorrhodopis	-	0	0	1	0	0	0	-	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Craugastorrugulosus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Craugastorrupinius	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Craugastorsandersoni	-	0	0	2	0	0	0	-	0	0	0	0	0	0	2	2	0	1	1	1	1	0	1	0	0	1	1	0	0	0
Craugastorspatulatus	-	0	0	1	0	0	0	-	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0

Appendix 3. Continued.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Agalychnisspurrelli	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Alytesobstetrican	-	0	0	0	-	0	1	1	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	1	0	0	0	-	1
Atopophrynussyntomopus	-	?	?	?	?	?	1	?	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	-	-	0	-	0
Barycholospulcher	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	2	1	1	0
Barycholosternetzi	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	2	0	1	0
Brachycephalusephippium	0	1	0	?	?	?	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	-	-	0	-	-
Bryophrynecophites	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Ceuthomantissmaragdinus	0	0	0	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Colostethusfraterdanieli	2	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	0	-	-	0	-	0
Craugastoralfredi	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	1	0	0
Craugastorandi	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorangelicus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastoraugusti	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	0	-	0	1	1	1	1	1	0
Craugastoraurilegulus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorbocourti	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	1	0	0
Craugastorbransfordii	0	0	0	?	?	?	?	?	1	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	1	1	1
Craugastorcrassidigitus	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Craugastordaryi	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Craugastoremcelae	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorfitzingeri	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorlaevissimus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorlaticeps	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	1	0	1
Craugastorlauraster	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	1	1	0
Craugastorlineatus	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Craugastorlongirostris	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastormegacephalus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastormelanostictus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Craugastormexicanus	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Craugastormontanus	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	1	0	1
Craugastorobesus	0	0	0	?	?	?	?	?	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastoropimus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorpunctariolus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorpygmaeus	1	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	0	-	0
Craugastorranoides	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorrhodopis	0	0	0	1	2	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	1	1	0
Craugastorrugulosus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorrupinius	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorsandersoni	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Craugastorspatulatus	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	1	0	0

Appendix 3. Continued

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Agalychnisspurrelli	0	1	0	0	0	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Alytesobstetrican	0	1	0	1	1	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Atopophrynussyntomopus	-	0	-	0	0	0	-	0	-	-	-	0	1	1	0	-	-	1	0	-	1	1	0	-	-
Barycholospulcher	-	1	0	0	0	0	0	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Barycholosternetzi	-	1	0	1	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Brachycephalusephippium	-	0	-	0	0	-	-	0	-	-	-	1	0	-	-	-	1	0	-	-	0	-	-	-	0
Bryophrynecophites	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Ceuthomantissmaragdinus	-	0	-	0	0	0	-	1	1	2	1	-	1	1	2	1	-	1	0	-	1	1	2	1	-
Colostethusfraterdanieli	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Craugastoralfredi	-	1	0	0	0	0	0	1	1	2	0	-	1	1	2	0	-	1	0	-	1	1	0	-	-
Craugastorandi	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorangelicus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastoraugusti	-	1	0	1	1	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Craugastoraurilegulus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorbocourti	-	0	-	0	0	0	?	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	2	0	-
Craugastorbransfordii	0	1	0	1	1	1	1	1	1	1	-	-	1	1	1	-	-	1	0	-	1	1	1	-	-
Craugastorcrassidigitus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastordaryi	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastoremcelae	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorfitzingeri	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorlaevissimus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorlaticeps	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorlauraster	-	1	0	1	1	1	1	1	1	1	-	-	1	1	1	-	-	1	0	-	1	1	1	-	-
Craugastorlineatus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorlongirostris	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastormegacephalus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastormelanostictus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastormexicanus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Craugastormontanus	0	1	0	0	0	0	0	1	1	0	-	-	1	1	0	1	-	1	0	-	1	1	0	-	-
Craugastorobesus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastoropimus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorpunctariolus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorpygmaeus	-	0	-	0	0	0	-	0	-	-	-	0	1	0	0	-	-	1	0	-	0	-	-	-	1
Craugastorranoides	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorrhodopis	-	0	-	0	0	0	-	1	1	1	-	-	1	1	1	-	-	1	0	-	1	1	1	-	-
Craugastorrugulosus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorrupinius	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorsandersoni	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Craugastorspatulatus	-	1	0	1	0	0	0	1	1	2	1	-	1	1	2	1	-	1	0	-	1	1	2	1	-

Appendix 3. Continued.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Agalychnisspurrelli	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	3	3	4	4	6
Alytesobstetrican	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Atopophrynussyntomopus	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	-	-	4	4	6
Barycholospulcher	0	-	-	-	0	-	-	-	-	-	0	0	1	0	1	0	-	0	0	-	1	1	1	1	1	1
Barycholosternetzi	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	1	1	1	1	1	1
Brachycephalusephippium	0	-	-	-	1	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	0
Bryophrynecophites	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Ceuthomantissmaragdinus	1	1	2	1	-	2	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Colostethusfraterdanieli	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastoralfredi	1	1	2	0	-	2	0	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorandi	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastorangelicus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastoraugusti	0	-	-	-	0	-	-	-	-	-	0	0	1	0	1	0	-	0	0	-	0	0	0	0	0	0
Craugastoraurilegulus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	1	2	2	2
Craugastorbocourti	1	1	2	1	-	1	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorbransfordii	1	1	1	-	-	1	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorcrassidigitus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	3	3	3
Craugastordaryi	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastoremcelae	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastorfitzingeri	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastorlaevissimus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	1	1	2
Craugastorlaticeps	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastorlauraster	1	1	1	-	-	1	-	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorlineatus	1	1	0	-	-	0	-	0	0	0	0	0	1	0	1	0	-	0	0	-	1	1	1	1	1	1
Craugastorlongirostris	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastormegacephalus	1	1	0	-	-	0	-	2	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastormelanostictus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastormexicanus	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastormontanus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorobesus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	3	2	4	3	4
Craugastoropimus	1	1	0	-	-	0	-	2	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorpunctariolus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	3	2	4
Craugastorpygmaeus	1	1	0	-	-	0	-	-	0	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorranoides	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	3	2	3
Craugastorrhodopis	1	1	1	-	-	1	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorrugulosus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	2
Craugastorrupinius	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	3	2	3
Craugastorsandersoni	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	3	3	3
Craugastorspatulatus	1	1	2	1	-	2	1	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Agalychnisspurrelli	5	5	6	1	0	0	-	1	1	0	0	1	1	1	0	0	-	1	0	0	1	1	0	1	0	3
Alytesobstetrican	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	0	0	0	2	0	0	0	-	-
Atopophrynussyntomopus	5	5	6	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	2	1	0	0	0	-	-
Barycholospulcher	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	1	1	2	0	0	0	-	-
Barycholosternetzi	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	1	1	2	0	0	0	-	-
Brachycephalusephippium	0	0	-	-	-	0	-	0	-	0	1	1	1	1	1	0	-	0	0	0	-	0	0	0	-	-
Bryophrynecophites	0	0	0	0	-	1	-	0	-	0	0	1	1	0	0	0	-	0	0	0	0	0	0	0	-	-
Ceuthomantissmaragdinus	1	1	1	1	0	2	1	0	-	0	0	?	?	?	0	0	-	1	0	0	0	1	0	0	-	-
Colostethusfraterdanieli	1	1	1	1	0	0	-	0	-	1	0	1	0	-	0	0	-	0	0	1	2	1	0	0	-	-
Craugastoralfredi	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	0	0	0	1	0	1
Craugastorandi	2	2	3	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	2	0	0	1	0	1
Craugastorangelicus	2	2	3	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	1	1	2
Craugastoraugusti	0	0	0	0	-	1	-	0	-	0	0	1	1	0	0	0	-	0	0	2	1	0	0	0	-	-
Craugastoraurilegulus	2	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	1	1	2
Craugastorbocourti	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	0	1	1	0	0	0	-	-
Craugastorbransfordii	1	1	1	1	0	2	0	0	-	0	0	?	?	?	0	0	-	0	0	1	1	0	1	0	-	-
Craugastorcrassidigitus	3	2	3	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	2	0	0	1	0	1
Craugastordaryi	1	1	1	1	0	2	1	1	0	0	0	0	1	0	0	0	-	0	0	1	1	0	0	0	-	-
Craugastoremcelae	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	2	0	0	1	0	2
Craugastorfitzingeri	2	2	3	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	2	0	0	1	0	1
Craugastorlaevissimus	2	2	3	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	1	1	2
Craugastorlaticeps	2	2	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	2	1	0	0	1	1	2
Craugastorlauraster	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	?	0	-	-
Craugastorlineatus	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	0	-	1	0	2	1	0	0	1	0	0
Craugastorlongirostris	2	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	2	0	0	1	0	1
Craugastormegacephalus	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	1	1	0	0	2	2	0	0	1	0&1	1
Craugastormelanostictus	1	1	1	1	0	1	-	0	-	0	0	1	1	0	0	0	-	0	0	1	2	0	0	1	0	0
Craugastormexicanus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	0	-	-
Craugastormontanus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	0	0	-	-
Craugastorobesus	3	3	6	1	0	1	0	0	-	0	0	?	?	?	0	0	-	1	0	1	2	0	0	1	1	1
Craugastoropimus	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	0	-	0	0	2	2	0	0	1	1	1
Craugastorpunctariolus	3	3	2	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	1	1	1
Craugastorpygmaeus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	0	-	-
Craugastorranoides	3	3	2	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	2	1	0	0	1	1	2
Craugastorrhodopis	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	1	0	-	-
Craugastorrugulosus	2	2	3	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	2	1	0	0	1	1	2
Craugastorrupinius	2	2	3	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	2	1	0	0	1	1	1
Craugastorsandersoni	3	3	2	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	1	1	2
Craugastorspatulatus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	1	0	0

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Agalychnisspurrelli	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	0	-
Alytesobstetrican	0	-	0	0	-	0	-	0	0	0	1	2	1	1	1	2	1	2
Atopophrynussyntomopus	0	-	0	0	-	0	-	?	?	?	?	0	1	1	?	0	1	3
Barycholospulcher	0	-	1	0	-	0	-	0	0	0	1	0	1	2	1	2	1	2
Barycholosternetzi	0	-	1	0	-	0	-	0	0	0	1	0	1	2	1	2	1	2
Brachycephalusephippium	0	-	0	0	-	0	-	0	0	0	1	1	1	?	0	2	?	?
Bryophrynecophites	0	-	0	0	-	0	-	0	0	0	0	2	1	2	0	2	1	3
Ceuthomantissmaragdinus	0	-	0	0	-	0	-	0	0	0	1	0	1	2	?	0	1	0
Colostethusfraterdanieli	0	-	1	0	-	0	-	0	0	0	1	0	1	0	2	2	1	3
Craugastoralfredi	0	-	0	0	-	0	-	0	0	1	1	0	1	2	1	2	1	0
Craugastorandi	0	-	0	0	-	0	-	0	0	1	1	1	1	1	1	2	1	2
Craugastorangelicus	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	0
Craugastoraugusti	0	-	0	0	-	0	-	0	0	1	0	0	1	2	1	1	1	0
Craugastoraurilegulus	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	0
Craugastorbocourti	0	-	0	0	-	0	-	0	0	1	1	1	1	2	1	2	1	0
Craugastorbransfordii	1	0	0	1	0	1	0	0	0	1	1	1	1	2	1	2	1	2
Craugastorcrassidigitus	0	-	0	0	-	1	0	0	0	1	1	2	1	1	1	2	1	2
Craugastordaryi	0	-	0	1	0	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastoremcelae	0	-	0	0	-	0	-	0	0	1	1	1	1	1	1	2	1	2
Craugastorfitzingeri	0	-	0	0	-	1	0	0	0	1	1	2	1	1	1	2	1	2
Craugastorlaevissimus	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastorlaticeps	0	-	0	0	-	0	-	0	0	1	1	2	1	1	1	2	1	0
Craugastorlauraster	1	0	0	0	-	1	0	0	0	1	1	2	1	2	1	2	1	2
Craugastorlineatus	1	0	0	0	-	1	0	0	0	1	1	2	1	1	1	2	1	0
Craugastorlongirostris	0	-	0	0	-	0	-	0	0	1	1	2	1	1	1	2	1	2
Craugastormegacephalus	1	0	0	0	-	1	0	2	0	1	1	2	1	2	2	2	1	1
Craugastormelanostictus	1	0	0	0	-	1	0	0	0	1	1	1	1	1	1	2	1	2
Craugastormexicanus	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastormontanus	0	-	0	0	-	0	-	0	0	1	1	0	1	2	1	2	1	0
Craugastorobesus	0	-	0	0	-	1	0	0	0	1	1	1	1	1	1	2	1	2
Craugastoropimus	1	0	0	0	-	1	0	1	0	1	1	2	1	2	2	2	1	1
Craugastorpunctariolus	0	-	0	0	-	1	0	0	0	1	1	2	1	2	1	2	1	2
Craugastorpygmaeus	0	-	0	0	-	0	-	0	0	1	1	1	1	2	0	2	1	?
Craugastorranoides	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastorrhodopis	1	0	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastorrugulosus	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastorrupinius	0	-	0	0	-	0	-	0	0	1	1	2	1	2	1	2	1	2
Craugastorsandersoni	0	-	0	0	-	1	0	0	0	1	1	2	1	2	1	2	1	2
Craugastorspatulatus	0	-	0	0	-	0	-	0	0	1	1	1	1	2	1	2	1	0

Appendix 3. Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Craugastorstuarti	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	0	-	0
Craugastortarahumaraensis	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	0	-	0
Craugastorzygodactylus	4	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0&1	1	0	1	0	1	0	1	1	1	1	1	0
Diasporusdiastema	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	0	-	-	-	1
Diasporusquidditus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	0	-	-	-	0
Diasporustinker	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	0	-	-	-	0
Dischidodactylusduidensis	1	1	3	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Eleutherodactylusalcoae	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	0	0
Eleutherodactylusbarlagnei	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Eleutherodactylusbilineatus	0	0	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	1	1	0
Eleutherodactyluscounouspeus	1	1	3	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0
Eleutherodactylushypostenor	0	1	1	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0
Eleutherodactylusinoptatus	0	0	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Eleutherodactylusmartinicensis	2	1	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Eleutherodactyluspaulsoni	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	0	1	0	0
Eleutherodactyluspipilans	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Eleutherodactylusrichmondi	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	?	1	1	1	1	1	0	1	1	0	1	0	0
Eleutherodactylusricordii	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0
Eleutherodactylusunicolor	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	0	-	0
Euparkerellabrasiliensis	0	0	0	0	-	-	0	-	0	0	0	-	-	-	0	-	1	0	1	1	0	1	1	0&1	1	0	-	-	-	0
Flectonotuspygmaeus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	0	-	1	0	0	1	0	-	-	1	0	0	-	0
Fritzianafissilis	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	0	-	-	1	0	0	-	1
Fritzianagoeldii	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	1	1	-	1	0	0	-	1
Fritzianaohausi	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	1	1	-	1	0	1	1	0
Gastrothecaargenteovirens	4	1	3	1	1	0	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	1	0	-	1	0	0	-	0
Gastrothecacornuta	0	1	2	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	1	0	-	1	0	0	-	0
Gastrothecaruizi	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	0	-	1	0	0	1	1	0	-	1	1	0	-	0
Geobatrachuswalkeri	4	1	0	0	-	-	0	-	0	0	0	-	0	1	1	0	1	1	1	1	1	1	1	0	1	0	-	-	-	0
Haddadusbinotatus	2	0	1	0	-	-	1	1	0	0	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	0	1	0	0
Holoadenbradei	5	1	0	0	-	-	0	-	0	0	0	-	-	-	0	-	1	0	1	1	1	1	1	1	1	0	-	-	-	0
Holoadenluederwaldti	5	1	1	0	-	-	0	-	0	0	0	-	-	-	0	-	1	0	1	1	1	1	1	1	1	0	-	-	-	0
Hypodactuylusperaccai	4	1	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	0&1	1	0	1	1	1	0	1	1	0	0	-	0
Hypodactylusbrunneus	4	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Hypodactylusdolops	2	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	1	0
Hypodactyluslatens	0	0	1	0	-	-	1	0	1	0	1	0	1	1	1	0	1	0&1	1	1	1	1	1	0	1	1	0	0	-	0
Hypodactylusmantipus	4	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Hypodactylusselassodiscus	4	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	0	-	0

Appendix 3. Continued.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Craugastorstuarti	-	0	0	1	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Craugastortarahumaraensis	-	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	1	0
Craugastorzygodactylus	-	0	0	2	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0
Diasporusdiastema	0	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Diasporusquidditus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	-	-	0	-	-	0	0
Diasporustinker	-	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Dischidodactylusduidensis	-	0	0	0	0	0	0	-	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusalcoae	-	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusbarlagnei	-	0	0	0	0	0	0	-	0	0	1	0	0	1	3	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusbilineatus	-	0	0	1	0	0	0	-	0	0	1	1	1	0	2	0	0	0	0	0	1	1	1	0	0	0	-	0	0	0
Eleutherodactyluscounouspeus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	3	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylushypostenor	-	1	0	3	0	0	1	0	0	0	1	1	0	1	0	0	1	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusinoptatus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Eleutherodactylusmartinicensis	-	0	1	0	0	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactyluspaulsoni	-	0	0	0	0	0	0	-	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Eleutherodactyluspipilans	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Eleutherodactylusrichmondi	-	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusricordii	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Eleutherodactylusunicolor	-	0	0	0	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Euparkerellabrasiliensis	-	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Flectonotuspygmaeus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	1	0	1	0	0
Fritzianafissilis	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	0
Fritzianagoeldii	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	-	0	0	0
Fritzianaohausi	-	0	0	0	0	0	0	-	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0
Gastrothecaargenteovirens	-	0	0	2	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	1	1	1	0	0
Gastrothecacornuta	-	0	0	0	0	0	0	-	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Gastrothecaruizi	-	0	0	0	0	0	0	-	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Geobatrachuswalkeri	-	0	0	1	0	1	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Haddadusbinotatus	-	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Holoadenbradei	-	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Holoadenluederwaldti	-	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Hypodactuylusperaccai	-	0	0	1	0	1	0	-	0	0	1	1	1	0	1	1	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Hypodactylusbrunneus	-	0	0	1	0	0&1	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	?	0
Hypodactylusdolops	-	0	0	1	0	0	0	-	0	0	1	1	1	1	3	3	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Hypodactyluslatens	-	1	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Hypodactylusmantipus	-	0	1	1	1	1	0	-	0	0	1	1	0	1	2	2	0	0	0	0	1	0	1	0	0	0	-	0	0	0
Hypodactylusselassodiscus	-	0	0	1	0	0	0	-	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	-	0	0	0

Appendix 3. Continued.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Craugastorstuarti	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Craugastortarahumaraensis	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	0	-	0	1	1	1	1	1	0
Craugastorzygodactylus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Diasporusdiastema	2	0	0	1	1	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Diasporusquidditus	2	0	1	1	1	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	-	-	0	-	0
Diasporustinker	-	?	?	?	?	?	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Dischidodactylusduidensis	0	1	1	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Eleutherodactylusalcoae	0	0	0	1	2	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	1	1	1	1	0	0
Eleutherodactylusbarlagnei	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Eleutherodactylusbilineatus	0	0	0	1	1	0	?	?	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	0	1	0	-	0
Eleutherodactyluscounouspeus	0	0	0	1	1	0	1	1	0	0&1	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	1	1	1
Eleutherodactylushypostenor	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	1	0	0	1	1	1	1	1	1
Eleutherodactylusinoptatus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	1	0	0	1	1	1	0	-	1
Eleutherodactylusmartinicensis	2	0	0	1	1	0	1	1	0	0	0	0	1	0	0	1	1	1	0	0	0	1	0	0	1	1	1	1	0	1
Eleutherodactyluspaulsoni	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	1	0	0	1	1	1	1	0	0
Eleutherodactyluspipilans	0	0	0	1	2	0	1	1	0	1	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	1	1	0
Eleutherodactylusrichmondi	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	0	-	0
Eleutherodactylusricordii	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	1	0	0	1	1	1	1	0	0
Eleutherodactylusunicolor	-	?	?	?	?	?	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Euparkerellabrasiliensis	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	1	0	0
Flectonotuspygmaeus	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Fritzianafissilis	2	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Fritzianagoeldii	2	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Fritzianaohausi	2	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Gastrothecaargenteovirens	0	0&1	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Gastrothecacornuta	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Gastrothecaruizi	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0	1	0	1
Geobatrachuswalkeri	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	-	-	0	-	0
Haddadusbinotatus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	2	0	0	0	0	0	-	0	1	1	1	1	1	1
Holoadenbradei	0	1	0	1	1	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Holoadenluederwaldti	0	?	?	?	?	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	1	0	1
Hypodactuylusperaccai	0	0	0	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Hypodactylusbrunneus	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Hypodactylusdolops	0	0	0	1	0	0	1	1	0	0	0	1	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Hypodactyluslatens	0	0	1	1	2	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Hypodactylusmantipus	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	-	0	1	1	0	0	-	0
Hypodactylusselassodiscus	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0

Appendix 3. Continued.

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Craugastorstuarti	-	1	0	1	0	0	1	1	1	2	0	-	1	1	2	1	-	1	0	-	1	1	2	0	-
Craugastortarahumaraensis	-	1	0	0	0	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Craugastorzygodactylus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Diasporusdiastema	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Diasporusquidditus	-	0	-	0	0	0	-	1	1	1	-	-	1	1	1	-	-	1	0	-	1	1	1	-	-
Diasporustinker	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Dischidodactylusduidensis	-	0	-	0	0	0	-	1	1	2	0	-	1	1	2	0	-	1	0	-	1	1	2	0	-
Eleutherodactylusalcoae	-	1	0	1	1	0	1	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusbarlagnei	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusbilineatus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactyluscounouspeus	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylushypostenor	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusinoptatus	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusmartinicensis	0	1	0	1	1	1	1	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactyluspaulsoni	-	1	0	1	1	0	1	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactyluspipilans	-	1	0	1	1	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Eleutherodactylusrichmondi	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusricordii	-	1	0	1	1	0	1	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Eleutherodactylusunicolor	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Euparkerellabrasiliensis	-	1	0	1	1	0	0	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	1
Flectonotuspygmaeus	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Fritzianafissilis	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Fritzianagoeldii	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Fritzianaohausi	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Gastrothecaargenteovirens	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Gastrothecacornuta	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Gastrothecaruizi	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Geobatrachuswalkeri	-	0	-	0	0	0	-	0	-	-	-	1	0	-	-	-	1	0	-	-	0	-	-	-	1
Haddadusbinotatus	0	1	0	1	1	0	1	1	0	0	-	-	1	0	0	-	-	1	0	-	1	1	0	-	-
Holoadenbradei	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Holoadenluederwaldti	1	1	1	1	1	0	0	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Hypodactuylusperaccai	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Hypodactylusbrunneus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Hypodactylusdolops	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Hypodactyluslatens	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Hypodactylusmantipus	-	0	-	0	0	0	-	1	1	1	-	-	1	1	1	-	-	1	1	-	1	1	1	-	-
Hypodactylusselassodiscus	-	0	-	0	0	0	-	1	1	1	-	-	1	1	1	-	-	1	0	-	1	1	1	-	-

Appendix 3. Continued.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Craugastorstuarti	1	1	2	0	-	2	0	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastortarahumaraensis	1	1	0	-	-	0	-	-	0	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Craugastorzygodactylus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	3	3	4	4	6
Diasporusdiastema	1	1	1	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Diasporusquidditus	1	1	1	-	-	1	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Diasporustinker	1	1	1	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Dischidodactylusduidensis	1	1	2	0	-	2	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	3	2	4
Eleutherodactylusalcoae	1	1	0	-	-	0	-	2	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusbarlagnei	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusbilineatus	1	1	0	-	-	0	-	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactyluscounouspeus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylushypostenor	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusinoptatus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	2	1	2
Eleutherodactylusmartinicensis	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactyluspaulsoni	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactyluspipilans	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusrichmondi	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusricordii	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Eleutherodactylusunicolor	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Euparkerellabrasiliensis	0	-	-	-	1	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Flectonotuspygmaeus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	2	5
Fritzianafissilis	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	0	4
Fritzianagoeldii	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	1	4
Fritzianaohausi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	1	4
Gastrothecaargenteovirens	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	4
Gastrothecacornuta	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	3	2	4	2	6
Gastrothecaruizi	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	2	2	2	2	4
Geobatrachuswalkeri	0	-	-	-	1	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Haddadusbinotatus	1	1	0	-	-	0	-	?	0	0	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Holoadenbradei	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Holoadenluederwaldti	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Hypodactuylusperaccai	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Hypodactylusbrunneus	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Hypodactylusdolops	1	1	0	-	-	0	-	1	0	0	0	0	1	0	1	0	-	0	0	-	0	0	0	0	0	0
Hypodactyluslatens	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Hypodactylusmantipus	1	1	1	-	-	1	-	1	0	0	0	1	1	0	1	0	-	0	0	-	0	1	1	0	1	1
Hypodactylusselassodiscus	1	1	1	-	-	1	-	1	0	0	0	0	1	0	1	0	-	0	0	-	0	0	0	0	0	0

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Craugastorstuarti	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	0	-	-
Craugastortarahumaraensis	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	2	1	0	0	0	-	-
Craugastorzygodactylus	5	5	6	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	2	2	0	0	1	1	2
Diasporusdiastema	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	0	0	-	-
Diasporusquidditus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	0	0	0	0	0	-	-
Diasporustinker	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	0	0	0	0	0	-	-
Dischidodactylusduidensis	3	3	4	1	0	0	-	0	-	0	?	?	?	?	0	0	-	0	0	0	1	0	0	0	-	-
Eleutherodactylusalcoae	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	2	0	0	0	0	-	-
Eleutherodactylusbarlagnei	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	0	0	0	0	0	-	-
Eleutherodactylusbilineatus	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	1	1	2	0	0	0	-	-
Eleutherodactyluscounouspeus	1	1	1	1	0	1	-	0	-	0	0	0	1	0	0	0	-	1	0	2	1	0	0	0	-	-
Eleutherodactylushypostenor	1	1	1	1	0	1	-	0	-	0	0	1	0	-	0	0	-	1	0	2	0	0	0	0	-	-
Eleutherodactylusinoptatus	1	1	3	1	0	2	1	0	-	0	0	1	1	1	0	1	1	1	0	2	0	1	0	1	0	1
Eleutherodactylusmartinicensis	1	1	1	1	0	1	-	0	-	0	0	1	0	-	0	0	-	1	0	1	0	1	0	0	-	-
Eleutherodactyluspaulsoni	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	1	0	0	-	-
Eleutherodactyluspipilans	1	1	1	1	0	0	-	0	-	0	0	0	1	0	0	0	-	1	0	1	1	0	0	0	-	-
Eleutherodactylusrichmondi	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	0	0	0	0	0	0	-	-
Eleutherodactylusricordii	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	0	-	-
Eleutherodactylusunicolor	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	0&1	0&1	0	0	0	-	-
Euparkerellabrasiliensis	0	0	0	0	-	0	-	0	-	1	0	1	1	1	0	0	-	0	0	0	1	0	0	0	-	-
Flectonotuspygmaeus	4	4	2	1	0	1	-	0	-	0	0	0	0	-	0	0	-	0	0	2	1	1	0	0	-	-
Fritzianafissilis	3	3	4	1	0	1	-	0	-	0	0	0	0	-	0	0	-	0	0	2	1	0	0	0	-	-
Fritzianagoeldii	4	4	4	1	0	0	-	0	-	0	0	0	0	-	0	0	-	0	0	2	1	0	0	0	-	-
Fritzianaohausi	4	4	4	1	0	0	-	0	-	0	0	0	0	-	0	0	-	0	0	2	1	0	0	0	-	-
Gastrothecaargenteovirens	4	4	5	1	0	1	-	1	0	0	0	0	1	0	1	0	-	0	0	2	0	0	0	1	1	3
Gastrothecacornuta	5	5	6	1	0	2	1	0	-	0	0	0	1	0	1	1	1	0	0	2	0	1	0	1	1	0
Gastrothecaruizi	4	4	4	1	0	1	-	1	0	0	0	0	1	0	1	0	-	0	0	1	1	0	0	1	1	1
Geobatrachuswalkeri	1	1	1	1	0	0	-	0	-	1	0	1	1	0	0	0	-	1	1	?	?	0	0	0	-	-
Haddadusbinotatus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	2	0	0	0	0	-	-
Holoadenbradei	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	1	0	0	0	-	-
Holoadenluederwaldti	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	0	0	2	1	0	0	0	-	-
Hypodactuylusperaccai	0	0	0	0	-	1	-	0	-	0	0	1	0	-	0	0	-	0	0	1	1	0	0	0	-	-
Hypodactylusbrunneus	0	0	0	0	-	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	0	-	-
Hypodactylusdolops	0	0	0	0	-	0	-	1	0	0	0	1	1	0	0	0	-	1	0	2	1	0	0	0	-	-
Hypodactyluslatens	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	1	0	1	0	2
Hypodactylusmantipus	1	1	1	0	-	1	0	0	-	0	0	0	1	0	0	0	-	1	0	1	2	0	0	0	-	-
Hypodactylusselassodiscus	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	2	0	0	0	-	-

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Craugastorstuarti	0	-	0	0	-	0	-	0	0	1	1	0	1	2	1	2	1	2
Craugastortarahumaraensis	0	-	0	0	-	0	-	0	0	1	0	1	0	2	1	2	1	0
Craugastorzygodactylus	0	-	0	0	-	1	0	0	0	1	1	2	1	2	1	2	1	2
Diasporusdiastema	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Diasporusquidditus	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Diasporustinker	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Dischidodactylusduidensis	0	-	0	0	-	1	0	0	0	0	1	0	0	2	?	1	1	2
Eleutherodactylusalcoae	0	-	0	1	0	1	0	0	0	0	1	2	1	2	1	2	1	3
Eleutherodactylusbarlagnei	0	-	0	0	-	0	-	0	0	0	1	0	1	2	2	2	1	3
Eleutherodactylusbilineatus	0	-	1	0	-	0	-	0	0	0	1	0	1	2	1	2	1	0
Eleutherodactyluscounouspeus	0	-	0	1	0	0	-	0&1	0	0	1	1	1	2	1	2	1	2
Eleutherodactylushypostenor	0	-	0	0	-	0	-	1	0	0	1	1	1	2	1	2	1	1
Eleutherodactylusinoptatus	0	-	0	0	-	1	0	1	0	0	1	1	1	2	1	2	1	1
Eleutherodactylusmartinicensis	0	-	0	0	-	0	-	0	0	0	1	0	1	2	1&2	2	1	3
Eleutherodactyluspaulsoni	0	-	0	1	0	1	0	0	0	0	1	2	1	2	1&2	2	1	3
Eleutherodactyluspipilans	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Eleutherodactylusrichmondi	0	-	0	0	-	0	-	0	0	0	1	2	1	2	2	2	1	3
Eleutherodactylusricordii	0	-	0	0	-	0	-	0	0	0	1	2	1	2	2	2	1	3
Eleutherodactylusunicolor	0	-	0	0	-	0	-	0	0	0	1	2	1	2	2	2	1	3
Euparkerellabrasiliensis	0	-	0	0	-	0	-	0	0	0	1	0	0	2	0	2	1	0
Flectonotuspygmaeus	-	-	0	0	-	0	-	1	0	1	0	0	0	0	1	1	0	-
Fritzianafissilis	-	-	0	0	-	0	-	0	0	1	1	0	0	0	1	2	0	-
Fritzianagoeldii	-	-	0	1	0	0	-	1	0	1	1	0	0	0	1	2	0	-
Fritzianaohausi	-	-	0	0	-	0	-	1	0	1	1	0	0	0	1	2	0	-
Gastrothecaargenteovirens	0	-	0	0	-	0	-	2	0	1	1	0	0	0	1	2	0	-
Gastrothecacornuta	0	-	0	0	-	0	-	2	0	1	1	0	0	0	1	2	0	-
Gastrothecaruizi	0	-	0	0	-	0	-	2	0	?	1	0	0	1	1	2	0	-
Geobatrachuswalkeri	0	-	0	0	-	0	-	0	0	0	1	0	0	2	2	1	1	3
Haddadusbinotatus	0	-	0	0	-	1	0&1	0	0	0	1	1	1	2	2	2	1	1
Holoadenbradei	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Holoadenluederwaldti	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	2
Hypodactuylusperaccai	0	-	0	0	-	0	-	0	0	0	1	2	1	2	2	2	1	2
Hypodactylusbrunneus	0	-	0	0	-	0	-	0	1	0	1	2	1	2	2	2	1	3
Hypodactylusdolops	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	2
Hypodactyluslatens	1	1	0	0	-	1	1	0&1	0	0	1	2	1	1	1	2	1	2
Hypodactylusmantipus	1	0	0	0	-	0	-	0	0	0	1	2	1	1	1	2	1	2
Hypodactylusselassodiscus	0	-	0	0	-	0	-	1	0	0	1	2	1	2	2	2	1	2

Appendix 3. Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ischnocnemabolbodactyla	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Ischnocnemaguentheri	2	0	1	1	1	1	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Ischnocnemaholti	0	1	0	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0
Ischnocnemanasuta	2	0	1	1	1	0	1	0	0	0	1	1	1	1	1	0	1	1	1	0	0	0	1	0	1	1	0	1	1	0
Ischnocnemaoctavioi	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	1	0	1	0	0
Ischnocnemaparva	0	0	0	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0
Ischnocnemavenancioi	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	1	0	1	1	0
Lynchiusflavomaculatus	0	0	0	0	-	-	0	-	0	0	1	1	1	1	1	0	1	0&1	1	1	1	1	1	0	0	1	0	1	0	0
Lynchiusnebulanastes	4	0	1	1	1	1	0	-	0	0	1	1	0	1	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0
Lynchiusparkeri	0	0	1	1	0	0	0	-	0	0	1	1	0	1	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0
Lynchiussimmonsi	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0&1	0	1	0	1	0	0
Mannophrynecollaris	2	0	0	0	-	-	0	-	-	0	0	-	1	1	1	0	1	0&1	1	1	1	1	1	0	1	0	-	-	-	0
Melanophryniscusrubriventris	2	1	1	0	-	-	0	-	-	0	0	-	0	0	?	-	0	-	0	-	-	-	0	-	-	0	-	-	-	0
Microkaylakempffi	0	0	0	1	0	1	0	-	0	0	0	-	1	1	1	0	1	1	1	1	1	1	1	1	1	0	-	-	-	0
Microkaylawettsteini	4	1	0	1	0	1	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	0	1	0	0
Niceforoniaadenobrachia	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0&1	1	1	1	1	1	0	1	1	0	0	-	0
Niceforonianana	4	1	1	0	-	-	0	-	0	0	1	0&1	0	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0	-	0
Noblellaheyeri	0	0	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	1	1	1	1	1	1	0	1	0	-	-	-	0
Noblellalochites	0	0	0	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0
Noblellamyrmecoides	0	0	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	1	1	1	1	1	1	0	1	0	-	-	-	0
Oreobatesgemcare	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	1	1	1	0	0
Oreobateslehri	2	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0	1	1	1	0	0
Oreobatesmachiguenga	2	0	1	0	-	-	1	0	0	0	1	0	1	1	1	0	1	?	?	?	?	?	?	?	?	1	1	1	0	0
Oreobatespereger	4	0	1	1	1	0	0	-	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	1	1	0
Oreobatesquixensis	2	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0	1	1	0	-	0
Oreobatessaxatilis	2	0	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	0	0
Phrynopusauriculatus	0	0	0	1	1	1	0	-	0	0	0	-	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	1	0
Phrynopusbracki	4	1	1	0	-	-	0	-	0	0	1	0	0	0	?	-	1	0	1	1	1	0	0	-	1	0	-	-	-	0
Phrynopushorstpauli	4	0	0	0	-	-	0	-	0	0	0	-	0	0	?	-	1	0	1	1	1	0	1	1	1	1	0	1	1	0
Phrynopusjuninensis	0	0	0	0	-	-	0	-	0	0	0	-	-	-	0	-	1	0	1	1	1	0	1	1	1	1	0	1	0	0
Phrynopuskauneorum	0	0	0	0	-	-	0	-	0	0	0	-	0	0	?	-	1	0	1	1	1	0	1	1	1	1	0	1	0	0
Phrynopusmontium	0	0	0	0	-	-	0	-	0	0	0	-	-	-	0	-	1	0	1	1	1	0	0	-	1	1	0	1	0	1
Phrynopustribulosus	3	0	1	0	-	-	0	-	0	0	1	0	0	0	?	-	1	0	1	1	0	1	1	0	1	0	-	-	-	0
Pleurodemabrachyops	0	0	0	0	-	-	0	-	-	0	0	-	1	1	1	0	1	0&1	1	1	1	1	1	0	1	1	0	0	-	0
Pristimantisacatallelus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Pristimantisacerus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	0	-	-	-	1	0	1	1	0	0	-	1
Pristimantisachatinus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantisactites	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	1	0	0	1	0	0	-	0

Appendix 3. Continued.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ischnocnemabolbodactyla	-	0	0	0	0	0	0	-	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	-	-	0	-	-	1	0
Ischnocnemaguentheri	-	0	1	0	1	1	0	-	0	0	0	1	0	1	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0
Ischnocnemaholti	-	0	0	1	0	0	0	-	0	0	0&1	0	0	0	2	2	0	0	0	0	1	1	1	0	0	1	0	0	1	0
Ischnocnemanasuta	-	0	0	0	0	0	0	-	0	0	1	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Ischnocnemaoctavioi	-	0	0	2	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Ischnocnemaparva	-	0	1	2	0	1	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0
Ischnocnemavenancioi	-	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0
Lynchiusflavomaculatus	-	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Lynchiusnebulanastes	-	0	0	2	0	0	1	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	0	-	-	0	-	-	1	0
Lynchiusparkeri	-	0	0	2	0	0	1	0	0	0	0	0	0	0	3	2	0	0	0	0	1	0	1	0	0	1	0	0	1	0
Lynchiussimmonsi	-	0	0	1	0	0	0	-	0	0	1	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Mannophrynecollaris	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Melanophryniscusrubriventris	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0
Microkaylakempffi	-	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Microkaylawettsteini	-	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Niceforoniaadenobrachia	-	0	0	1	0	1	0	-	0	0	0	0	0	0	2	2	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Niceforonianana	-	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Noblellaheyeri	-	0	1	1	0	1	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	-	-	-	-	-	0	0
Noblellalochites	-	0	0	1	0	1	1	0	0	0	1	1	0	0	-	-	-	0	0	0	0	-	-	-	-	-	-	-	-	-
Noblellamyrmecoides	-	0	1	1	0	1	1	2	0	0	1	1	0	0	-	-	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Oreobatesgemcare	-	0	0	0	0	0	0	-	0	0	1	0	0	1	0	0	0	0	0	0	1	?	?	?	?	?	?	?	?	0
Oreobateslehri	-	0	0	1	0	0	0	-	0	0	1	0	0	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Oreobatesmachiguenga	-	0	0	0	0	0	0	-	0	0	1	1	0	1	?	?	0	0	0	0	1	?	?	?	?	?	?	?	?	0
Oreobatespereger	-	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Oreobatesquixensis	-	0	0	1	0	0	1	0	0	0	1	1	1	0	3	3	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Oreobatessaxatilis	-	0	0	1	0	0	1	0	0	0	1	1	0	0	3	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Phrynopusauriculatus	-	0	1	1	0	0	1	0	0	0	1	1	0	1	-	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Phrynopusbracki	-	0	0	1	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Phrynopushorstpauli	-	0	0	1	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	-	0	0	0
Phrynopusjuninensis	-	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Phrynopuskauneorum	-	0	0	1	0	0	1	0	0	0	1	0	0	0	-	-	0	0	0	0	0	0	0	-	-	0	-	-	?	-
Phrynopusmontium	0	0	0	1	0	0	1	0	0	0	0	0	0	0	-	-	0	0	0	0	0	-	-	-	-	-	-	-	-	-
Phrynopustribulosus	-	0	1	1	0	0	1	0	0	0	1	1	0	1	-	0	0	0	0	0	0	0	0	-	-	0	-	-	0	0
Pleurodemabrachyops	-	0	0	0	0	0	0	-	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	1	0	1	0	0
Pristimantisacatallelus	-	0	0	0	0	0	0	-	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantisacerus	0	0	0	0	0	0	0	-	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0	1	1	0	0	0
Pristimantisachatinus	-	0	0	2	1	1	1	0	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Pristimantisactites	-	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	1	0

Appendix 3.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ischnocnemabolbodactyla	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Ischnocnemaguentheri	0	0	0	?	?	?	?	?	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	1
Ischnocnemaholti	0	0	0	?	?	?	?	?	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Ischnocnemanasuta	-	?	?	?	?	?	-	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Ischnocnemaoctavioi	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	1	0	0
Ischnocnemaparva	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	0	-	0
Ischnocnemavenancioi	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Lynchiusflavomaculatus	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Lynchiusnebulanastes	0	0	?	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Lynchiusparkeri	0	0&1	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Lynchiussimmonsi	-	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	1	1	0
Mannophrynecollaris	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Melanophryniscusrubriventris	0	1	0	0	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	1	0	1
Microkaylakempffi	0	?	0	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Microkaylawettsteini	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Niceforoniaadenobrachia	0	0	1	1	2	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Niceforonianana	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Noblellaheyeri	0	0	0	?	?	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Noblellalochites	-	0	0	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Noblellamyrmecoides	-	1	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Oreobatesgemcare	?	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	0	1	0	-	0
Oreobateslehri	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	1	0	-	0
Oreobatesmachiguenga	?	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	0	-	0
Oreobatespereger	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Oreobatesquixensis	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	2	1	2	1
Oreobatessaxatilis	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	2	2	0	0	0	0	-	0	1	1	2	1	2	1
Phrynopusauriculatus	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Phrynopusbracki	-	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Phrynopushorstpauli	0	0	0	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Phrynopusjuninensis	0	0	0	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Phrynopuskauneorum	-	0&1	1	1	0	0	?	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Phrynopusmontium	-	?	?	?	?	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Phrynopustribulosus	0	?	?	?	?	0	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	0	-	0
Pleurodemabrachyops	0	1	0	0	-	0	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisacatallelus	0	1	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantisacerus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisachatinus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisactites	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	1

Appendix 3.

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Ischnocnemabolbodactyla	-	0	-	0	1	0	-	1	1	0	-	-	1	1	2	1	-	1	2	1	1	1	0	-	-
Ischnocnemaguentheri	0	1	0	1	1	0	-	1	1	2	1	-	1	1	2	1	-	1	2	1	1	1	2	1	-
Ischnocnemaholti	-	1	0	1	1	0	-	1	0	0	-	-	1	1	2	1	-	1	2	1	1	1	2	1	-
Ischnocnemanasuta	-	0	-	0	0	0	-	1	1	0	-	-	1	1	2	1	-	1	2	1	1	1	0	-	-
Ischnocnemaoctavioi	-	1	0	1	1	0	1	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Ischnocnemaparva	-	1	0	1	1	0	-	1	0	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Ischnocnemavenancioi	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	2	1	1	1	0	-	-
Lynchiusflavomaculatus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Lynchiusnebulanastes	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Lynchiusparkeri	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Lynchiussimmonsi	-	0	-	0	0	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Mannophrynecollaris	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Melanophryniscusrubriventris	0	1	0	1	1	1	0	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Microkaylakempffi	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Microkaylawettsteini	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Niceforoniaadenobrachia	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Niceforonianana	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Noblellaheyeri	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Noblellalochites	-	0	-	0	0	0	-	0	-	-	-	1	0	-	-	-	1	1	0	-	0	-	-	-	1
Noblellamyrmecoides	-	0	-	0	0	0	-	0	-	-	-	1	0	-	-	-	1	1	0	-	1	1	1	-	-
Oreobatesgemcare	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Oreobateslehri	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Oreobatesmachiguenga	-	-	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Oreobatespereger	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Oreobatesquixensis	0	1	0	0	0	0	2	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Oreobatessaxatilis	0	1	0	1	1	0	2	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopusauriculatus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopusbracki	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopushorstpauli	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopusjuninensis	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopuskauneorum	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopusmontium	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Phrynopustribulosus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Pleurodemabrachyops	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Pristimantisacatallelus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisacerus	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisachatinus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisactites	1	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-

Appendix 3. Continued.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Ischnocnemabolbodactyla	1	1	2	1	-	2	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Ischnocnemaguentheri	1	1	2	1	-	2	1	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Ischnocnemaholti	1	1	2	1	-	2	1	?	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Ischnocnemanasuta	1	1	2	1	-	2	1	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Ischnocnemaoctavioi	0	-	-	-	0	-	-	-	-	-	0	1	1	0	1	0	-	1	1	0	1	1	1	1	0	0
Ischnocnemaparva	1	1	0	-	-	0	-	0	0	1	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Ischnocnemavenancioi	1	1	2	1	-	2	1	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Lynchiusflavomaculatus	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Lynchiusnebulanastes	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Lynchiusparkeri	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Lynchiussimmonsi	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Mannophrynecollaris	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	3	2	2	2	4
Melanophryniscusrubriventris	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	1	1	1	1	1	1
Microkaylakempffi	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Microkaylawettsteini	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Niceforoniaadenobrachia	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Niceforonianana	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Noblellaheyeri	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Noblellalochites	0	-	-	-	1	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Noblellamyrmecoides	1	1	1	-	-	1	-	-	-	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Oreobatesgemcare	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Oreobateslehri	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Oreobatesmachiguenga	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Oreobatespereger	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Oreobatesquixensis	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Oreobatessaxatilis	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Phrynopusauriculatus	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Phrynopusbracki	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Phrynopushorstpauli	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Phrynopusjuninensis	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Phrynopuskauneorum	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Phrynopusmontium	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Phrynopustribulosus	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Pleurodemabrachyops	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Pristimantisacatallelus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisacerus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisachatinus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisactites	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Ischnocnemabolbodactyla	1	1	1	1	0	2	1	0	-	0	0	1	1	0	0	0	-	1	0	0	0	0	0	0	-	-
Ischnocnemaguentheri	1	1	1	1	0	2	1	0	-	0	0	?	?	?	0	0	-	1	0	1	1	0	0	0	-	-
Ischnocnemaholti	1	1	1	1	0	2	1	0	-	0	0	?	?	?	0	0	-	0	0	0	1	0	0	0	-	-
Ischnocnemanasuta	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	0	-	-
Ischnocnemaoctavioi	1	1	1	1	0	1	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	0	-	-
Ischnocnemaparva	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	0	-	-
Ischnocnemavenancioi	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	0	0	0	0	0	0	-	-
Lynchiusflavomaculatus	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	1	0	0	0	-	-
Lynchiusnebulanastes	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	2	0	0	0	0	-	-
Lynchiusparkeri	1	1	1	1	0	0	-	0	-	0	0	1	1	0	1	1	0	0	0	2	0	0	0	0	-	-
Lynchiussimmonsi	1	1	1	1	0	1	-	0	-	0	0	1	0	-	0	0	-	1	0	2	0	0	0	0	-	-
Mannophrynecollaris	3	3	2	1	0	0	-	0	-	1	0	1	0	-	0	0	-	0	0	0	2	0	0	1	1	0
Melanophryniscusrubriventris	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	1	0	0	0	0	0	0	-	-
Microkaylakempffi	0	0	0	0	-	0	-	0	-	0	0	1	0	-	0	0	-	0	0	1	1	0	0	0	-	-
Microkaylawettsteini	1	1	1	1	0	0	-	0	-	1	0	1	0	-	0	0	-	0	0	1	1	0	0	0	-	-
Niceforoniaadenobrachia	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	1	0	2
Niceforonianana	0	0	0	0	-	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	1	0	0	0	-	-
Noblellaheyeri	1	1	1	1	0	2	0	0	-	0	0	1	1	0	0	0	-	0	0	0	1	0	0	0	-	-
Noblellalochites	1	0	1	0	-	0	-	0	-	0	0	1	0	-	0	0	-	0	0	0	1	0	0	0	-	-
Noblellamyrmecoides	1	1	1	1	0	2	0	0	-	0	0	1	0	-	0	0	-	0	0	0	1	0	0	0	-	-
Oreobatesgemcare	1	1	1	1	0	0	-	0	-	0	0	?	?	?	0	0	-	0	0	2	1	0	0	0	-	-
Oreobateslehri	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	2	0	0	0	0	-	-
Oreobatesmachiguenga	1	1	1	1	0	0	-	0	-	0	0	?	?	?	0	0	-	0	0	1	1	0	0	0	-	-
Oreobatespereger	0	0	0	0	-	0	-	0	-	0	0	1	0	-	0	0	-	0	0	2	1	0	0	0	-	-
Oreobatesquixensis	1	1	1	1	0	1	-	0	-	0	0	1	1	0	0	0	-	0	0	2	2	1	0	0	-	-
Oreobatessaxatilis	1	1	1	1	0	1	-	0	-	0	0	1	0	-	0	0	-	0	0	2	2	1	0	0	-	-
Phrynopusauriculatus	0	0	0	0	-	0	-	1	0	0	0	1	1	0	0	0	-	0	0	1	1	0	0	0	-	-
Phrynopusbracki	1	1	1	1	0	2	0	0	-	0	0	0	1	0	0	0	-	0	0	1	0	0	0	0	-	-
Phrynopushorstpauli	0	0	0	0	-	1	-	1	0	0	0	1	1	1	0	0	-	0	0	1	0	0	0	0	-	-
Phrynopusjuninensis	0	0	0	0	-	0	-	1	0	0	0	1	1	1	0	0	-	0	0	1	0	0	0	0	-	-
Phrynopuskauneorum	0	0	0	0	-	0	-	1	0	0	0	1	1	1	0	0	-	0	0	1	0	0	0	0	-	-
Phrynopusmontium	0	0	0	0	-	0	-	1	0	0	0	1	1	1	0	0	-	0	0	1	0	0	0	0	-	-
Phrynopustribulosus	0	0	0	0	-	2	1	1	1	0	0	1	1	0	0	0	-	1	0	1	1	0	0	0	-	-
Pleurodemabrachyops	0	0	0	0	-	0	-	0	-	0	0	1	1	0	0	0	-	0	0	2	2	0	0	0	-	-
Pristimantisacatallelus	1	1	1	1	0	2	1	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantisacerus	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantisachatinus	1	1	3	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantisactites	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	2	0	0	1	1	0	0

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Ischnocnemabolbodactyla	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Ischnocnemaguentheri	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Ischnocnemaholti	0	-	0	0	-	1	0	0	0	0	0	1	0	1	1	2	1	2
Ischnocnemanasuta	0	-	0	0	-	0	-	0	0	0	1	1&2	1	1	1	2	1	2
Ischnocnemaoctavioi	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Ischnocnemaparva	0	-	0	0	-	1	0	0	0	0	1	1	1	2	1	2	1	2
Ischnocnemavenancioi	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Lynchiusflavomaculatus	0	-	0	0	-	0	-	1	0	0	1	2	1	2	1	2	1	2
Lynchiusnebulanastes	0	-	0	0	-	0	-	1	0	0	1	2	1	2	1	2	1	2
Lynchiusparkeri	0	-	0	0	-	0	-	1	0	0	1	2	1	2	1	2	1	2
Lynchiussimmonsi	0	-	0	1	0	0	-	1	0	0	1	2	1	2	1	2	1	2
Mannophrynecollaris	0	-	0	0	-	0	-	0	0	0	1	1	1	2	2	2	1	3
Melanophryniscusrubriventris	0	-	0	0	-	0	-	0	0	0	1	1	0	2	0	2	0	-
Microkaylakempffi	0	-	0	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Microkaylawettsteini	0	-	1	0	-	0	-	0	0	0	1	2	1	2	1	2	1	3
Niceforoniaadenobrachia	1	1	0	0	-	0	-	0&1	0	0	1	2	1	1	1	2	1	2
Niceforonianana	0	-	0	0	-	0	-	0	0	0	0	2	1	2	1	2	1	2
Noblellaheyeri	0	-	1	0	-	1	0	0	0	0	1	0	1	2	1	2	1	3
Noblellalochites	0	-	1	0	-	0	-	0	0	0	1	?	1	2	1	2	1	3
Noblellamyrmecoides	0	-	1	0	-	0	-	0	0	0	1	0	1	2	1	2	1	?
Oreobatesgemcare	0	-	0	0	-	0	-	0	0	0	?	1	1	?	1	2	?	?
Oreobateslehri	0	-	0	0	-	0	-	1	0	0	1	2	1	2	1	2	1	2
Oreobatesmachiguenga	0	-	0	0	-	0	-	?	?	?	?	?	?	?	?	?	?	?
Oreobatespereger	0	-	0	0	-	0	-	1	0	0	1	2	1	2	1	2	1	2
Oreobatesquixensis	0	-	0	1	0	1	0	1	0	0	1	2	1	2	2	2	1	2
Oreobatessaxatilis	0	-	0	0	-	1	0	1	0	0	1	2	1	2	1	2	1	2
Phrynopusauriculatus	0	-	0	0	-	0	-	0	0	0	0	0	0	?	1	1	?	?
Phrynopusbracki	0	-	0	0	-	0	-	0	0	0	?	?	?	?	1	?	?	?
Phrynopushorstpauli	0	-	0	0	-	0	-	0	0	0	1	1	1	?	1	2	?	?
Phrynopusjuninensis	0	-	0	0	-	0	-	0	0	0	1	0	0	1	0	2	1	3
Phrynopuskauneorum	0	-	0	0	-	0	-	0	0	0	1	0	0	1	0	2	1	3
Phrynopusmontium	0	-	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	3
Phrynopustribulosus	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	3
Pleurodemabrachyops	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	3
Pristimantisacatallelus	1	0	0	0	-	0	-	0	0	0	1	0	1	1	2	2	1	2
Pristimantisacerus	0	-	0	0	-	1	0	0	0	0	1	0	0	1	2	2	1	2
Pristimantisachatinus	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantisactites	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2

Appendix 3. Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pristimantisacuminatus	0	1	0	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	1	1
Pristimantisalbertus	2	0	1	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	0	0
Pristimantisaltamazonicus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Pristimantisaniptopalmatus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	0	0
Pristimantisappendiculatus	0	1	2	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	1
Pristimantisardalonychus	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1	0	1	0	0
Pristimantisbipunctatus	0	0	0	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantisboulengeri	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	0	-	1	1	0	0	-	1
Pristimantisbriceni	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0
Pristimantisbromeliaceus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	0	-	1	1	0	1	0	1
Pristimantisbuccinator	0	0	1	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantisbuckleyi	4	1	1	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	0	0	1	1	0&1	1	1	0	0	-	0
Pristimantiscalcaratus	3	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0
Pristimantiscalcarulatus	0	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0
Pristimantiscapitonis	0	0	1	1	1	0	1	0	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Pristimantiscaprifer	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	1	1	0
Pristimantiscaryophyllaceus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	-	0
Pristimantiscelator	0	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	0	1	1	0	1	1	0	0	-	0
Pristimantisceuthospilus	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	0	0	-	1
Pristimantischalceus	1	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	0	0	-	1	0	-	-	-	0
Pristimantischloronotus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	-	1	1	0	1	0	0
Pristimantiscitriogaster	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantiscondor	0	0	0	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantisconspicillatus	0	0	0	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantiscremnobates	2	1	1	1	0	0	0	-	0	0	1	0	0	1	1	0	1	0	1	1	1	1	1	0	1	1	1	1	0	0
Pristimantiscrenunguis	2	1	1	1	0	0	0	-	0	0	1	0	1	1	1	0	1	1	0	-	-	-	1	1	1	1	1	1	0	0
Pristimantiscruentus	1	1	1	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	1	0
Pristimantiscuentasi	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	0	1	0	0
Pristimantiscurtipes	4	1	0	1	1	0	0	-	0	0	1	0	0	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1	0
Pristimantisdanae	0	1	0	0	-	-	0	-	0	0	1	0&1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantisdevillei	4	1	1	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1	1	1	0	1	1	0
Pristimantisduellmani	0	1	1	1	0	0	0	-	0	0	1	0	0	0	?	-	1	1	1	0	0	1	1	0	1	1	0	0	-	0
Pristimantiseriphus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	-	1	1	0	1	0	0
Pristimantisgaldi	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	1
Pristimantisgentryi	4	1	1	1	1	1	0	-	0	0	1	1	0	1	1	0	1	1	1	0	0	1	1	0	1	1	0	0	-	0
Pristimantisjuanchoi	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Pristimantiskelephas	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Pristimantislabiosus	1	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	0	-	-	-	1	0	1	1	0	1	0	0

Appendix 3.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Pristimantisacuminatus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	?	?	?	1	1	0	-	-	0	-	-	0	0
Pristimantisalbertus	-	0	1	0	0	0	1	0	0	0	1	0	0	0	-	-	0	?	?	?	1	-	-	-	-	-	-	-	-	-
Pristimantisaltamazonicus	-	0	1	2	0	0	0	-	0	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Pristimantisaniptopalmatus	-	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	?	?	?	1	1	0	-	-	0	-	-	0	0
Pristimantisappendiculatus	1	0	1	0	0	0	0	-	0	0	1	1	1	1	1	1	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Pristimantisardalonychus	-	0	1	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Pristimantisbipunctatus	-	0	1	2	1	0	1	0	0	0	1	1	0	1	2	0	0	1	1	1	1	0	0	-	-	0	-	-	0	0
Pristimantisboulengeri	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0
Pristimantisbriceni	-	0	0	0	0	0	1	0	0	0	1	1	0	0	3	3	0	0	0	0	1	0	0	-	?	?	?	?	0	0
Pristimantisbromeliaceus	0	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	?	?	?	1	1	1	0	0	0	-	0	0	0
Pristimantisbuccinator	-	0	1	0	1	0	1	0	0	0	1	1	0	1	-	-	0	?	?	?	1	-	-	-	-	-	-	-	-	-
Pristimantisbuckleyi	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	-	0	1	0
Pristimantiscalcaratus	-	0	0	2	0	0	0	-	0	0	1	1	1	0	2	2	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Pristimantiscalcarulatus	-	0	1	0	0	0	0	-	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantiscapitonis	-	0	1	0	0	0	0	-	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	1	1	1	0	1	0
Pristimantiscaprifer	-	0	0	0	0	0	1	0	0	0	1	0	0	0	3	3	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantiscaryophyllaceus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	1	0
Pristimantiscelator	-	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	1	0
Pristimantisceuthospilus	0	0	0	3	0	0	0	-	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Pristimantischalceus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	-	-	0	-	-	0	0
Pristimantischloronotus	-	0	0	0	0	0	1	0	0	0	1	1	0	0	2	2	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Pristimantiscitriogaster	-	0	0	1	0	0	1	0	0	0	1	1	1	1	2	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Pristimantiscondor	-	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	1	?	1	0	1	1	0	0	0	0
Pristimantisconspicillatus	-	0	1	2	0	0	1	0	0	0	1	1	0	1	0	0	0	?	?	?	1	1	1	0	1	1	0	0	0	0
Pristimantiscremnobates	-	0	0	2	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Pristimantiscrenunguis	-	0	0	1	0	0	0	-	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	-	-	0	-	-	0	0
Pristimantiscruentus	-	0	0	1	0	0	0	-	0	0	1	1	1	0	0	2	0	1	1	1	1	0	1	0	0	1	0	0	0	0
Pristimantiscuentasi	-	0	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	0	1	1	0	0	0
Pristimantiscurtipes	-	0	1	0	0	0	1	0	0	1	0	1	1	0	2	2	0	0	0	0	1	0	1	0	0	1	0	0	1	0
Pristimantisdanae	-	0	0	2	1	0	1	0	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0
Pristimantisdevillei	-	0	0	0	1	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Pristimantisduellmani	-	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	-	0	1	0
Pristimantiseriphus	-	0	0	1	0	0	1	0	0	0	0	0	0	0	2	2	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Pristimantisgaldi	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	1	0	1	1	0	-	-	0	-	-	0	0
Pristimantisgentryi	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Pristimantisjuanchoi	-	0	1	0	1	0	0	-	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantiskelephas	-	0	0	1	0	0	0	-	0	0	1	1	0	0	3	3	0	0	0	0	1	1	1	0	0	1	1	0	0	0
Pristimantislabiosus	-	0	0	0	0	0	0	-	0	0	0	0	0	0	2	2	0	1	1	1	1	1	1	0	1	1	1	0	0	0

Appendix 3. Continued.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Pristimantisacuminatus	0	0	0	1	1	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	-	0
Pristimantisalbertus	-	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisaltamazonicus	1	?	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	1	0	1
Pristimantisaniptopalmatus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisappendiculatus	-	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	1
Pristimantisardalonychus	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantisbipunctatus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	1	0	-	0
Pristimantisboulengeri	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisbriceni	0	1	0	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisbromeliaceus	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisbuccinator	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisbuckleyi	2	1	0	1	2	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantiscalcaratus	1	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1	0	1
Pristimantiscalcarulatus	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0
Pristimantiscapitonis	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	-	0
Pristimantiscaprifer	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantiscaryophyllaceus	0	1	1	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0	0	-	1
Pristimantiscelator	2	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantisceuthospilus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1	0	0
Pristimantischalceus	0	1	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	0	-	0
Pristimantischloronotus	0	0	0	1	1	0	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantiscitriogaster	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	-	0	1	1	0	0	-	0
Pristimantiscondor	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisconspicillatus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Pristimantiscremnobates	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	1	0	1
Pristimantiscrenunguis	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantiscruentus	0	1	1	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	1	0	1
Pristimantiscuentasi	2	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Pristimantiscurtipes	2	0&1	0	1	2	0	1	1	0	1	1	0	0	1	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantisdanae	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisdevillei	0	0	0	1	1	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantisduellmani	0	1	0	1	1	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantiseriphus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisgaldi	0	0	0	1	1	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantisgentryi	1	0	0	1	2	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0
Pristimantisjuanchoi	0	1	0	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	-	0
Pristimantiskelephas	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0
Pristimantislabiosus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	1

Appendix 3. Completed.

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Pristimantisacuminatus	-	0	-	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisalbertus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisaltamazonicus	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	1	-	1	1	0	-	-
Pristimantisaniptopalmatus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisappendiculatus	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	2	0	1	1	0	-	-
Pristimantisardalonychus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisbipunctatus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisboulengeri	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisbriceni	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisbromeliaceus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisbuccinator	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisbuckleyi	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscalcaratus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscalcarulatus	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscapitonis	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscaprifer	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscaryophyllaceus	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscelator	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisceuthospilus	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantischalceus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantischloronotus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscitriogaster	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscondor	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisconspicillatus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscremnobates	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscrenunguis	-	1	0	1	1	0	-	1	1	0	-	-	1	1	2	0	-	1	0	-	1	1	2	0	-
Pristimantiscruentus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscuentasi	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiscurtipes	-	1	0	1	1	0	-	0	-	-	-	0	1	0	0	-	-	1	0	-	0	-	-	-	0
Pristimantisdanae	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisdevillei	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisduellmani	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiseriphus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisgaldi	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisgentryi	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisjuanchoi	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantiskelephas	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantislabiosus	0	1	0	1	1	0	-	1	1	0	-	-	1	1	2	0	-	1	2	0	1	1	2	0	-

Appendix 3. Completed.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Pristimantisacuminatus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisalbertus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisaltamazonicus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisaniptopalmatus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisappendiculatus	1	1	0	-	-	2	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisardalonychus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisbipunctatus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisboulengeri	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisbriceni	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisbromeliaceus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisbuccinator	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisbuckleyi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscalcaratus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscalcarulatus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscapitonis	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscaprifer	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscaryophyllaceus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscelator	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisceuthospilus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantischalceus	1	1	1	-	-	1	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantischloronotus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscitriogaster	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	1	2	1	1
Pristimantiscondor	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisconspicillatus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscremnobates	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscrenunguis	1	1	2	0	-	2	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscruentus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscuentasi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiscurtipes	1	0	0	-	-	0	-	0	1	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisdanae	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisdevillei	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisduellmani	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	1	2
Pristimantiseriphus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
Pristimantisgaldi	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisgentryi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	2	1	2
Pristimantisjuanchoi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiskelephas	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pristimantislabiosus	1	1	2	0	-	2	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Pristimantisacuminatus	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	0	0	1	0	0	0	0	-	-
Pristimantisalbertus	1	1	1	1	0	0	-	0	-	0	0	1	1	0&1	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantisaltamazonicus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	0	1	0	0
Pristimantisaniptopalmatus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	1	0	-	-
Pristimantisappendiculatus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	0	0	0	0	0	-	-
Pristimantisardalonychus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantisbipunctatus	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantisboulengeri	1	1	1	1	0	1	-	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	1	0	-	-
Pristimantisbriceni	1	1	1	1	0	0	-	0	-	0	0	?	?	?	0	0	-	0	0	1	0	0	0	0	-	-
Pristimantisbromeliaceus	1	1	1	1	0	0	-	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	1	0	-	-
Pristimantisbuccinator	1	1	3	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantisbuckleyi	1	1	1	1	0	1	-	0	-	0	0	1	1	1	1	1	0	0	0	1	0	1	1	1	0	0
Pristimantiscalcaratus	1	1	1	1	0	2	1	0	-	0	0	1	1	0	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantiscalcarulatus	1	1	1	1	0	2	1	0	-	0	0	1	0	-	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantiscapitonis	1	1	1	1	0	2	1	0	-	0	0	1	0	-	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantiscaprifer	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	0	-	-
Pristimantiscaryophyllaceus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	1	0	1	0	0	-	-
Pristimantiscelator	1	1	1	1	0	1	-	0	-	0	0	1	1	0	0	0	-	1	0	0	0	0	0	0	-	-
Pristimantisceuthospilus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	1	0	-	-
Pristimantischalceus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	1	0	0	0	-	-
Pristimantischloronotus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantiscitriogaster	1	1	3	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantiscondor	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantisconspicillatus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	2	0	0	0	1	0	0
Pristimantiscremnobates	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	0	1	1	0
Pristimantiscrenunguis	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	-	0	1	0	0	1	0	-	-
Pristimantiscruentus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	0	1	0	0
Pristimantiscuentasi	1	1	1	1	0	2	0	0	-	0	0	1	0	-	0	0	-	0	0	1	0	1	0	0	-	-
Pristimantiscurtipes	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	1	1	0	0
Pristimantisdanae	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	1	1	0	0
Pristimantisdevillei	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	1	1	0	0	1	0	1	1	1	0	0
Pristimantisduellmani	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	1	0	0	0	1	0	0	1	0	-	-
Pristimantiseriphus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	0	0	-	-
Pristimantisgaldi	1	1	1	1	0	2	1	0	-	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0	-	-
Pristimantisgentryi	1	1	1	1	0	2	1	0	-	0	0	1	1	1	1	0	-	0	0	1	0	1	1	0	-	-
Pristimantisjuanchoi	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	0	0	-	-
Pristimantiskelephas	1	1	1	1	1	2	1	0	-	0	0	1	1	0	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantislabiosus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	0	0	-	-

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Pristimantisacuminatus	0	-	0	1	1	0	-	0	0	0	1	0	1	1	1	2	1	2
Pristimantisalbertus	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	?	?
Pristimantisaltamazonicus	0	-	0	0	-	0	-	0	0	0	1	0	0	1	2	2	1	3
Pristimantisaniptopalmatus	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	2
Pristimantisappendiculatus	1	0	0	0	-	0	-	0	0	0	1	0	0	1	2	2	1	2
Pristimantisardalonychus	0	-	0	0	-	0	-	0	0	0	1	0	0	1	2	2	1	3
Pristimantisbipunctatus	0	-	0	0	-	0	-	0	0	0	0	0	1	1	1	2	1	1
Pristimantisboulengeri	1	0	0	1	1	1	0	0	0	0	1	0	1	1	1	2	1	2
Pristimantisbriceni	0	-	0	0	-	0	-	0	0	0	1	1	1	2	1	2	1	2
Pristimantisbromeliaceus	1	0	0	1	1	0	-	0	0	0	1	0	0	1	1	2	1	2
Pristimantisbuccinator	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantisbuckleyi	0	-	0	0	-	0	-	1	0	0	0	0	0	1	1	2	1	3
Pristimantiscalcaratus	1	0	0	0	-	1	0	0	0	0	1	0	0	1	2	2	1	2
Pristimantiscalcarulatus	1	0	0	0	-	1	0	0	0	0	1	0	0	1	2	2	1	3
Pristimantiscapitonis	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	3
Pristimantiscaprifer	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	2
Pristimantiscaryophyllaceus	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	3
Pristimantiscelator	0	-	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	3
Pristimantisceuthospilus	0	-	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	3
Pristimantischalceus	0	-	0	0	-	0	-	0	0	0	0	0	0	1	1	2	1	1
Pristimantischloronotus	1	0	0	0	-	1	0	0	0	0	1	0	0	2	1	2	1	2
Pristimantiscitriogaster	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantiscondor	0	-	0	0	-	0	-	0	0	0	1	0&1	1	1	1	2	1	1
Pristimantisconspicillatus	0	-	0	0	-	0	-	0	0	0	1	0&1	1	1	1	2	1	1
Pristimantiscremnobates	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	2
Pristimantiscrenunguis	1	0	0	0	-	1	0	0	0	0	1	0	1	1	1	2	1	1
Pristimantiscruentus	1	0	0	1	0	1	0	0	0	0	1	0	1	1	1	2	1	2
Pristimantiscuentasi	0	-	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	3
Pristimantiscurtipes	0	-	0	0	-	1	0	1	0	0	0	0	0	2	1	2	1	3
Pristimantisdanae	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantisdevillei	0	-	0	0	-	1	0	1	0	0	0	0	1	1	1	2	1	3
Pristimantisduellmani	0	-	0	0	-	1	0	1	0	0	1	0	1	1	1	2	1	3
Pristimantiseriphus	1	0	0	0	-	1	0	0	0	0	1	0	0	1	1	2	1	1
Pristimantisgaldi	1	0	0	0	-	1	0	2	0	0	1	0	0	1	1	2	1	2
Pristimantisgentryi	0	-	0	0	-	1	0	1	0	0	1	0	0	1	1	2	1	3
Pristimantisjuanchoi	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	2
Pristimantiskelephas	1	0	0	0	-	1	0	0	0	0	1	0	1	1	2	2	1	3
Pristimantislabiosus	0	-	0	0	-	0	-	1	0	0	1	0	1	2	1	2	1	2

Appendix 3. Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pristimantislanthanites	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	0	-	-	-	1	0	1	1	0	1	0	0
Pristimantislatidiscus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0
Pristimantisleoni	2	1	2	1	0	0	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	0	0	-	0	0	-	-	-	0
Pristimantisleptolophus	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	0	0	-	1	1	0	1	0	0
Pristimantislymani	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantismegalops	2	1	1	0	-	-	1	0	0	0	1	0	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantismendax	4	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1
Pristimantismyops	3	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	-	1	0	-	-	-	0
Pristimantisocreatus	4	1	1	1	0	0	0	-	0	0	1	0	1	1	1	0	1	0	1	1	0	0	0	-	0	1	1	1	1	0
Pristimantisornatus	0	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	1	0
Pristimantisorpacobates	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0
Pristimantispadrecarlosi	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	0	0	-	0
Pristimantisperaticus	4	1	1	0	-	-	0	-	0	0	1	0	0	0	?	-	1	0	1	1	1	0	0	-	1	1	0	1	0	0
Pristimantispermixtus	0	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	0	1	1	0	1	1	0	1	0	0
Pristimantisperuvianus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantispharangobates	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantispycnodermis	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0	1	1	1	1	0	-	1	1	0	1	1	0
Pristimantispyrrhomerus	2	1	1	0	-	-	1	0	0	0	1	0	1	1	1	0	1	0	1	1	0	0	0	-	0	1	0	1	0	0
Pristimantisquantus	3	1	2	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	-	1	0	-	-	-	1
Pristimantisquinquagesimus	0	1	1	1	0	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	1	1	1	0	0	-	1
Pristimantisramagii	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	0	0
Pristimantisrhabdolaemus	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantisridens	2	1	0	0	-	-	0	-	0	0	1	0	0	1	1	0	1	1	1	1	1	1	1	0	1	1	0	1	1	0
Pristimantissagittulus	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	1	1	0	0	1	0	-	1	0	-	-	-	0
Pristimantisschultei	4	1	2	0	-	-	0	-	0	0	1	0	1	1	1	0	1	0&1	1	1	1	1	1	0	1	1	1	0	-	1
Pristimantisskydmainos	2	0	1	1	1	0	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantissobetes	2	1	1	1	1	0	0	-	0	0	1	0	0	0	?	-	1	2	1	1	0	1	1	0	1	1	0	0	-	0
Pristimantisstictogaster	2	0	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	0	-	1	1	0	1	1	0
Pristimantissurdus	4	1	1	0	-	-	0	-	0	0	1	0	0	0	?	-	1	2	1	1	0	1	1	0	1	1	0	1	0	0
Pristimantistayrona	0	1	0	0	-	-	0	-	0	0	0	-	1	1	1	0	1	1	1	0	1	0	0	-	1	1	0	1	0	1
Pristimantisterraebolivaris	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantisthectopternus	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantisthymalopsoides	4	1	1	1	0	1	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	0	0
Pristimantistoftae	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantistruebae	4	1	1	1	0	0	0	-	0	0	1	0	0	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0
Pristimantisuranobates	4	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	-	1	1	0	1	0	0
Pristimantisvertebralis	0	1	0	1	1	0	0	-	0	0	1	0&1	1	1	1	0	1	1	1	0	0	1	1	0	1	1	1	1	0	0

Appendix 3. Continued.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Pristimantislanthanites	-	0	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0
Pristimantislatidiscus	-	0	0	1	0	0	0	-	0	0	0	1	1	0	3	3	0	0	0	0	1	0	1	0	0	1	1	0	0	0
Pristimantisleoni	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantisleptolophus	-	0	0	0	0	0	1	0	0	0	1	0	0	0	3	3	1	0	0	0	0	1	0	-	-	0	-	-	0	0
Pristimantislymani	-	0	1	2	0	0	1	0	0	0	1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Pristimantismegalops	-	0	1	0	0	0	0	-	0	0	1	1	0	0	2	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
Pristimantismendax	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	-	-	0	-	-	0	0
Pristimantismyops	-	0	0	1	0	0	0	-	0	0	1	0	0	0	2	2	0	0	0	0	0	1	1	0	0	1	1	0	0	0
Pristimantisocreatus	-	0	0	1	0	0	0	-	0	0	0	0	0	0	2	2	0	0	0	0	0	1	0	-	-	0	-	-	1	0
Pristimantisornatus	-	0	1	0	1	0	1	0	0	0	1	1	0	1	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-
Pristimantisorpacobates	-	0	0	1	0	0	0	-	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Pristimantispadrecarlosi	-	0	0	0	0	0	0	-	0	0	1	0	0	0	1	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0
Pristimantisperaticus	-	0	0	0	0	0	1	0	0	0	0	0	0	0	3	3	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantispermixtus	-	0	0	2	0	0	1	0	0	1	1	1	1	1	2	2	0	1	1	1	1	0	1	0	0	1	1	0	1	1
Pristimantisperuvianus	-	0	1	2	1	0	1	0	0	0	1	0	0	1	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0
Pristimantispharangobates	-	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	0&1	0	0	-	-	0	-	-	0	0
Pristimantispycnodermis	-	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	0	0	0
Pristimantispyrrhomerus	-	0	1	1	0	0	0	-	0	0	1	0	0	0	2	2	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantisquantus	0	0	0	1	0	0	0	-	0	0	1	1	0	0	2	2	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Pristimantisquinquagesimus	0	0	0	0	0	0	0	-	0	1	0	1	0	1	1	1	0	0	0	0	1	0	0	-	-	0	-	-	0	0
Pristimantisramagii	-	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	?	?	?	1	1	0	-	-	0	-	-	0	0
Pristimantisrhabdolaemus	-	0	1	0	1	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	1	1	?	?	?	?	?	?	0	0
Pristimantisridens	-	0	0	0	1	0	0	-	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantissagittulus	-	0	1	2	0	0	1	0	0	1	0	0	0	1	0	0	0	1	1	1	0	1	1	0	0	1	0	0	0	0
Pristimantisschultei	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantisskydmainos	-	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Pristimantissobetes	-	0	0	0	0	0	0	-	0	0	1	1	0	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Pristimantisstictogaster	-	0	1	0	0	0	0	-	0	0	0	0	0	1	-	-	0	?	?	?	1	-	-	-	-	-	-	-	-	-
Pristimantissurdus	-	0	1	2	0	0	1	0	0	0	1	1	1	0	1	3	0	0	0	0	1	0	0	-	-	0	-	-	1	0
Pristimantistayrona	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	-	-	0	-	-	0	0
Pristimantisterraebolivaris	-	0	1	0	1	0	1	0	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	1	1	0	0	0
Pristimantisthectopternus	-	0	1	2	1	0	1	0	0	0	0	1	0	1	0	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0
Pristimantisthymalopsoides	-	0	0	2	0&1	0	1	0	0	0	1	1	0	0	1	1	0	0	0	0	1	0	1	0	0	1	1	0	1	0
Pristimantistoftae	-	0	1	1	0	0	1	0	0	0	1	1	1	1	0	0	0	?	?	?	1	1	0	-	-	0	-	-	0	0
Pristimantistruebae	-	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	-	0	0	0
Pristimantisuranobates	-	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	1	0
Pristimantisvertebralis	-	0	0	1	0	0	1	0	0	0	1	0	0	1	2	2	0	0	0	0	1	0	1	0	0	1	0	0	0	0

Appendix 3. Continued.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Pristimantislanthanites	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantislatidiscus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0
Pristimantisleoni	2	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	1	0	1
Pristimantisleptolophus	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0
Pristimantislymani	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	0	-	0
Pristimantismegalops	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	1	0	1
Pristimantismendax	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantismyops	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0
Pristimantisocreatus	2	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisornatus	-	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisorpacobates	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	1
Pristimantispadrecarlosi	1	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Pristimantisperaticus	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantispermixtus	0	1	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisperuvianus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantispharangobates	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantispycnodermis	0	1	1	1	1	0	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Pristimantispyrrhomerus	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	1	0	1
Pristimantisquantus	0	1	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0
Pristimantisquinquagesimus	0	1	0	1	1	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0
Pristimantisramagii	0	0	1	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisrhabdolaemus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisridens	0	0&1	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	1	0	-	0
Pristimantissagittulus	0	0	0	1	2	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	-	0	1	1	0	1	0	0
Pristimantisschultei	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisskydmainos	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	0	-	0
Pristimantissobetes	-	0	1	1	2	?	1	1	0	0	0	0	0	-	0	1	1	1	0	0	0	1	0	0	1	1	0	0	-	1
Pristimantisstictogaster	-	?	?	?	?	?	?	?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantissurdus	1	0	1	1	2	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	1
Pristimantistayrona	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantisterraebolivaris	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantisthectopternus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	-	0
Pristimantisthymalopsoides	1	0&1	0	1	1	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	0
Pristimantistoftae	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	1	0	1	0	0
Pristimantistruebae	1	0&1	0	1	2	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	-	1
Pristimantisuranobates	0	0	0	1	0	0	1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	1
Pristimantisvertebralis	1	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0	-	1

Appendix 3. Continued.

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Pristimantislanthanites	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantislatidiscus	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisleoni	0	1	0	1	1	0	0	1	0	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisleptolophus	-	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantislymani	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantismegalops	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	2	0	1	1	0	-	-
Pristimantismendax	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantismyops	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisocreatus	-	1	0	1	1	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Pristimantisornatus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisorpacobates	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantispadrecarlosi	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisperaticus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantispermixtus	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisperuvianus	-	1	0	1	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantispharangobates	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantispycnodermis	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantispyrrhomerus	0	1	0	1	1	1	0	0	-	-	-	0	1	0	0	-	-	1	0	-	0	-	-	-	0
Pristimantisquantus	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisquinquagesimus	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisramagii	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisrhabdolaemus	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisridens	-	0	-	0	1	1	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantissagittulus	-	1	0	1	1	0	0	1	0	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisschultei	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisskydmainos	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantissobetes	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisstictogaster	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantissurdus	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantistayrona	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisterraebolivaris	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisthectopternus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisthymalopsoides	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantistoftae	-	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantistruebae	0	1	0	1	1	1	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisuranobates	0	1	0	1	1	0	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Pristimantisvertebralis	0	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-

Appendix 3. Continued.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Pristimantislanthanites	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantislatidiscus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
Pristimantisleoni	1	1	0	-	-	0	-	?	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisleptolophus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantislymani	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantismegalops	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantismendax	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
Pristimantismyops	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pristimantisocreatus	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Pristimantisornatus	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisorpacobates	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantispadrecarlosi	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisperaticus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantispermixtus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisperuvianus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantispharangobates	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantispycnodermis	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantispyrrhomerus	1	0	0	-	-	0	-	-	1	-	1	1	1	1	1	1	0	1	1	0	1	0	1	0	0	0
Pristimantisquantus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pristimantisquinquagesimus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pristimantisramagii	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisrhabdolaemus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisridens	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantissagittulus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisschultei	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisskydmainos	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantissobetes	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pristimantisstictogaster	1	1	0	-	-	0	-	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantissurdus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantistayrona	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisterraebolivaris	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisthectopternus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisthymalopsoides	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantistoftae	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantistruebae	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisuranobates	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantisvertebralis	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Pristimantislanthanites	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	1	1	0	0	0	1	0	0
Pristimantislatidiscus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	1	0	-	-
Pristimantisleoni	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantisleptolophus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantislymani	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	1	0	1
Pristimantismegalops	1	1	1	1	0	2	1	1	0	0	0	1	1	1	0	0	-	0	0	1	1	0	1	0	-	-
Pristimantismendax	1	1	1	1	0	1	-	0	-	0	0	1	1	0	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantismyops	1	1	1	1	1	2	1	0	-	0	0	1	1	1	0	0	-	0	0	0	1	1	0	0	-	-
Pristimantisocreatus	0	0	0	0	-	2	0	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	1	0	-	-
Pristimantisornatus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	1	1	0	0
Pristimantisorpacobates	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantispadrecarlosi	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	1	0	-	-
Pristimantisperaticus	1	1	1	1	0	2	1	0	-	0	0	1	0	-	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantispermixtus	1	1	1	1	0	2	1	0	-	0	0	0	0	-	0	0	-	0	1	0	0	1	1	0	-	-
Pristimantisperuvianus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	1	0	0	0	1	0	0
Pristimantispharangobates	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	1	1	0	0
Pristimantispycnodermis	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	0	0	0	0	0	-	-
Pristimantispyrrhomerus	0	0	1	0	-	1	-	0	-	0	0	1	1	1	0	0	-	1	0	0	0	0	1	0	-	-
Pristimantisquantus	1	1	1	1	1	2	0	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantisquinquagesimus	1	1	1	1	1	2	1	0	-	0	0	1	1	1	1	1	1	0	0	1	0	1	1	0	0	-
Pristimantisramagii	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	2	0	0	0	0	-	-
Pristimantisrhabdolaemus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	1	1	0	0
Pristimantisridens	1	1	1	1	0	2	0	0	-	0	0	1	1	1	0	0	-	0&1	0	1	0	1	1	0	-	-
Pristimantissagittulus	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	0	0	0	0	0	-	-
Pristimantisschultei	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantisskydmainos	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	0	-	0	0	0	0	0	0	1	0	0
Pristimantissobetes	1	1	1	1	1	2	1	0	-	0	0	1	1	1	0	1	1	0	0	1	0	1	1	0	-	-
Pristimantisstictogaster	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	?	?	?	?
Pristimantissurdus	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	1	0	0	0	1	0	0	1	0	-	-
Pristimantistayrona	1	1	1	1	0	0	-	1	1	0	0	1	1	1	0	0	-	0	0	0	0	1	0	0	-	-
Pristimantisterraebolivaris	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantisthectopternus	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	1	0	-	-
Pristimantisthymalopsoides	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	1	0	1	1	0	-	-
Pristimantistoftae	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	1	1	0	0
Pristimantistruebae	1	1	1	1	0	1	-	0	-	0	0	1	1	1	0	1	0	0	0	1	0	0	1	0	-	-
Pristimantisuranobates	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	0	0	0	0	1	1	0	-	-
Pristimantisvertebralis	1	1	1	1	0	0	-	0	-	0	0	1	1	1	0	1	0	0	0	1	0	0	1	0	-	-

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Pristimantislanthanites	0	-	0	0	-	1	0	0	0	0	1	0	1	1	1	2	1	2
Pristimantislatidiscus	0	-	0	0	-	1	0	0	0	0	1	1	1	1	1	2	1	3
Pristimantisleoni	1	0	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	3
Pristimantisleptolophus	1	0	0	0	-	0	-	0	0	0	1	0	0	1	1	1	1	2
Pristimantislymani	0	-	0	0	-	0	-	0	0	0	1	0&1	1	1	1	2	1	1
Pristimantismegalops	0	-	0	0	-	0	-	1	0	0	1	1	1	2	2	2	1	2
Pristimantismendax	1	0	0	1	1	1	0	0	0	0	1	0	0	1	1	2	1	2
Pristimantismyops	1	0	0	0	-	1	0	0	0	0	1	0	0	1	2	2	1	3
Pristimantisocreatus	1	0	0	0	-	1	0	0	0	0	0	0	0	1	1	2	1	3
Pristimantisornatus	0	-	0	0	-	0	-	0	0	0	1	0	0	1	1	2	1	2
Pristimantisorpacobates	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	2
Pristimantispadrecarlosi	1	0	0	0	-	1	0	0	0	0	1	0	0	1	1	2	1	3
Pristimantisperaticus	1	0	0	1	1	1	0	0	0	0	1	0	0	1	1	2	1	2
Pristimantispermixtus	1	0	0	0	-	1	0	0	0	0	1	0	1	1	1	2	1	2
Pristimantisperuvianus	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	1
Pristimantispharangobates	0	-	0	0	-	0	-	0	0	0	0	0	1	1	1	2	1	2
Pristimantispycnodermis	0	-	0	0	-	0	-	0	0	0	1	0	1	2	1	2	1	2
Pristimantispyrrhomerus	1	0	0	0	-	0	-	0	1	0	1	0	0	2	1	2	1	3
Pristimantisquantus	1	0	0	1	0	1	0	0	0	0	1	0	0	2	2	2	1	3
Pristimantisquinquagesimus	0	-	0	0	-	1	0	1	0	0	1	0	0	1	2	2	1	3
Pristimantisramagii	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantisrhabdolaemus	1	0	0	0	-	1	0	0	0	0	0	0	1	1	1	2	1	2
Pristimantisridens	0	-	0	0	-	1	0	0	0	0	1	0	1	2	1	2	1	3
Pristimantissagittulus	0	-	0	0	-	0	-	0	0	0	0	0	1	1	1	2	1	2
Pristimantisschultei	0	-	0	1	1	1	0	0	0	0	1	0	1	1	1	2	1	2
Pristimantisskydmainos	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	1
Pristimantissobetes	0	-	0	0	-	0	-	1	0	0	?	0	1	?	1&2	2	1	3
Pristimantisstictogaster	0	-	0	0	-	0	-	0	0	0	0	0	1	1	1	2	1	2
Pristimantissurdus	0	-	0	0	-	0	-	1	0	0	1	0	1	1	1	2	1	3
Pristimantistayrona	0	-	0	1	1	0	-	0	0	0	1	0	1	1	2	2	1	2
Pristimantisterraebolivaris	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	1
Pristimantisthectopternus	0	-	0	0	-	1	0	1	0	0	1	1	1	1	1	2	1	1
Pristimantisthymalopsoides	1	0	0	0	-	1	0	1	0	0	1	0	1	1	1	2	1	3
Pristimantistoftae	0	-	0	0	-	0	-	0	0	0	0	0	1	1	1	2	1	2
Pristimantistruebae	0	-	0	0	0	1	0	1	0	0	1	0	1	1	2	2	1	3
Pristimantisuranobates	1	0	0	0	-	1	0	0	0	0	1	0	0	1	1	2	1	2
Pristimantisvertebralis	0	-	0	0	-	1	0	1	0	0	1	0	1	1	1&2	2	1	3

Appendix 3. Continued.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pristimantisvilarsi	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Pristimantiswnigrum	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Psychrophrynellausurpator	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0
Rheobatespalmatus	0	0	0	0	-	-	0	-	-	0	0	-	1	1	1	0	1	0&1	1	1	1	1	1	0	1	0	-	-	-	0
Rhinodermadarwinii	0	1	0	0	-	-	0	-	-	0	0	-	0	0	?	-	1	2	1	1	1	1	0	-	?	0	-	-	-	1
Stefaniascalae	0	1	0	0	-	-	0	-	0	0	1	0	1	1	1	0	?	?	1	0	0	1	1	0	?	1	0	1	1	0
Strabomantisanomalus	2	0	1	1	0	1	1	0	0	0	1	0	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	1	0	-	0
Strabomantisbiporcatus	1	1	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	0	0	-	0
Strabomantisbufoniformis	2	0	1	1	0	1	1	0	1	0	1	0&1	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	0	0	-	0
Strabomantisingeri	2	1	2	0	-	-	1	0	1	0	1	0	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	1	1	0	0
Strabomantislaticorpus	2	0	2	0	-	-	1	0	0	0	1	0	1	1	1	0	1	0	1	0	0	1	1	0	1	0	-	-	-	0
Strabomantisnecerus	2	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0&1	1	0	0	1	1	0	1	1	0	0	-	0
Strabomantisruizi	2	1	1	0	-	-	1	0	1	1	1	0&1	1	1	1	0	1	0&1	1	0	0	1	1	0	0	1	1	1	0	0
Strabomantussulcatus	2	1	1	0	-	-	1	0	1	0	1	0	1	1	1	0	1	0&1	1	1	0	1	1	0	0	1	0	0	-	0
Tachiramantislentiginosus	2	1	1	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	0	0
Tachiramantisprolixodiscus	0	1	1	0	-	-	0	-	0	0	1	1	1	1	1	0	1	0	1	0	0	1	0	-	0	1	0	1	0	1
Yunganastesfraudator	0	0	0	1	1	0	0	-	0	0	1	0	1	1	1	0	1	?	?	?	?	?	?	?	?	1	0	1	1	0
Yunganastesmercedesae	0	0	0	0	-	-	0	-	0	0	1	0	1	1	1	0	1	1	1	0	0	1	1	0	0	1	0	1	1	0
Yunganastespluvicanorus	0	0	0	0	-	-	0	-	0	0	1	1	0	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	0

Appendix 3. Continued.

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Pristimantisvilarsi	-	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	?	?	?	1	1	1	0	0	1	0	0	0	0
Pristimantiswnigrum	-	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0
Psychrophrynellausurpator	-	0	0	1	0	0	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Rheobatespalmatus	-	0	0	1	0	0	0	-	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Rhinodermadarwinii	1	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	-	0	-	-	0	0
Stefaniascalae	-	0	0	0	0	0	0	-	0	0	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0
Strabomantisanomalus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Strabomantisbiporcatus	-	0	0	1	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Strabomantisbufoniformis	-	0	0	2	0	0	0	-	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Strabomantisingeri	-	0	0	1	1	0	0	-	0	0	0	0	0	1	3	3	0	0	0	0	1	0	1	0	0	1	0	0	0	0
Strabomantislaticorpus	-	0	0	2	0	0	0	-	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	-	-	0	-	-	0	0
Strabomantisnecerus	-	0	0	2	0	0	0	-	0	0	0	0	0	0	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Strabomantisruizi	-	0	0	1	0	0	0	-	0	0	1	1	1	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Strabomantussulcatus	-	0	0	2	0	0	0	-	0	0	0	1	1	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Tachiramantislentiginosus	-	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0
Tachiramantisprolixodiscus	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	1	0
Yunganastesfraudator	-	0	0	?	0	0	1	0	0	0	?	?	?	?	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Yunganastesmercedesae	-	0	0	2	1	0	1	0	0	0	1	1	1	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-
Yunganastespluvicanorus	-	0	0	2	1	0	1	0	0	0	1	1	1	1	-	-	0	0	0	0	1	-	-	-	-	-	-	-	-	-

Appendix 3. Continued.

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Pristimantisvilarsi	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Pristimantiswnigrum	0	0	0	1	2	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	0	0	0	-	0
Psychrophrynellausurpator	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Rheobatespalmatus	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	0	-	-	0	-	0
Rhinodermadarwinii	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	0	-	-	0	-	0
Stefaniascalae	0	0	0	0	-	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Strabomantisanomalus	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Strabomantisbiporcatus	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	1	1	1
Strabomantisbufoniformis	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Strabomantisingeri	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	0	1	0	0
Strabomantislaticorpus	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Strabomantisnecerus	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	0	1	0	0	0	-	0
Strabomantisruizi	-	0	0	1	0	0	?	?	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	1	1	1
Strabomantussulcatus	-	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	1	1	1	1	1
Tachiramantislentiginosus	2	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1	0	0
Tachiramantisprolixodiscus	2	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	1
Yunganastesfraudator	-	?	?	?	?	?	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Yunganastesmercedesae	-	?	?	?	?	?	1	1	0	1	1	0	0	0	1	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0
Yunganastespluvicanorus	-	0	0	?	?	?	?	?	0	1	0	1	0	0	0	1	1	1	0	0	0	0	-	0	1	0	0	0	-	0

Appendix 3. Continued.

	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
Pristimantisvilarsi	-	1	0	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	0	0	-	-
Pristimantiswnigrum	-	0	-	1	1	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Psychrophrynellausurpator	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Rheobatespalmatus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Rhinodermadarwinii	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	0	-	-	0	-	-	-	0
Stefaniascalae	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Strabomantisanomalus	-	0	-	0	0	0	-	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Strabomantisbiporcatus	0	1	1	1	1	1	1	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Strabomantisbufoniformis	-	0	-	0	0	0	-	1	0	0	-	-	1	0	0	-	-	1	0	-	1	1	0	-	-
Strabomantisingeri	-	1	0	1	1	0	0	0	-	-	-	0	0	-	-	-	0	0	-	-	1	1	0	-	-
Strabomantislaticorpus	-	0	-	0	0	0	-	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Strabomantisnecerus	-	0	-	0	0	0	-	1	0	0	-	-	1	0	0	-	-	1	0	-	1	1	0	-	-
Strabomantisruizi	0	1	0	1	1	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	0	-	-	-	0
Strabomantussulcatus	0	1	0	1	0	0	1	0	-	-	-	0	0	-	-	-	0	1	0	-	1	1	0	-	-
Tachiramantislentiginosus	-	0	-	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Tachiramantisprolixodiscus	0	1	0	1	1	1	0	1	1	0	-	-	1	1	0	-	-	1	0	-	1	1	0	-	-
Yunganastesfraudator	-	0	-	0	0	0	-	1	0	0	-	-	1	0	0	-	-	1	0	-	1	0	0	-	-
Yunganastesmercedesae	-	0	-	0	0	0	-	1	0	0	-	-	1	1	2	0	-	1	0	-	1	1	2	0	-
Yunganastespluvicanorus	-	0	-	0	0	0	-	1	0	0	-	-	1	1	2	0	-	1	0	-	1	1	0	-	-

Appendix 3. Continued.

	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
Pristimantisvilarsi	1	0	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Pristimantiswnigrum	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Psychrophrynellausurpator	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Rheobatespalmatus	0	-	-	-	0	-	-	-	-	-	1	1	1	1	1	1	0	1	1	0	1	3	2	4	3	5
Rhinodermadarwinii	0	-	-	-	0	-	-	-	-	-	0	0	0	0	0	0	-	0	0	-	0	0	0	0	0	0
Stefaniascalae	1	1	0	-	-	0	-	1	0	1	1	1	1	1	1	1	0	1	1	0	1	2	2	3	4	5
Strabomantisanomalus	1	1	0	-	-	0	-	1	0	0	0	0	0	0	0	0	-	0	0	-	1	2	2	4	2	5
Strabomantisbiporcatus	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Strabomantisbufoniformis	1	1	0	-	-	0	-	1	0	0	0	0	0	0	0	0	-	0	0	-	1	2	2	2	2	3
Strabomantisingeri	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Strabomantislaticorpus	1	1	0	-	-	0	-	-	0	0	1	1	1	1	1	1	0	0	0	-	1	1	1	1	1	1
Strabomantisnecerus	1	1	0	-	-	0	-	1	0	0	1	1	1	1	1	1	0	1	1	0	1	2	1	2	1	2
Strabomantisruizi	1	1	0	-	-	0	-	-	0	-	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Strabomantussulcatus	1	1	0	-	-	0	-	-	0	0	0	0	0	1	1	0	-	0	0	-	0	0	1	0	1	0
Tachiramantislentiginosus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Tachiramantisprolixodiscus	1	1	0	-	-	0	-	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Yunganastesfraudator	1	1	2	0	-	2	0	?	0	1	?	?	?	?	?	?	?	?	?	?	1	1	1	1	1	1
Yunganastesmercedesae	1	1	2	0	-	2	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
Yunganastespluvicanorus	1	1	2	0	-	0	-	?	0	0	0	0	1	0	1	0	-	0	0	-	1	1	1	0	1	1

Appendix 3. Continued.

	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
Pristimantisvilarsi	1	1	1	1	0	0	-	0	-	0	0	1	1	0	0	0	-	1	0	1	0	0	0	1	0	0
Pristimantiswnigrum	1	1	1	1	0	2	1	0	-	0	0	1	1	1	0	0	-	1	0	1	0	0	0	1	0	0
Psychrophrynellausurpator	1	1	1	1	0	0	-	0	-	1	0	1	0	-	0	0	-	0	0	0	1	0	0	0	-	-
Rheobatespalmatus	4	4	5	1	0	0	-	0	-	1	0	1	0	-	0	0	-	0	0	1	2	0	0	1	1	0
Rhinodermadarwinii	0	0	0	0	-	2	1	1	0	0	0	?	?	?	0	0	-	0	0	2	1	0	0	0	-	-
Stefaniascalae	4	4	6	1	0	0	-	1	0	0	0	1	1	0	0	0	-	1	0	2	0	0	0	1	1	2
Strabomantisanomalus	4	4	6	1	0	1	-	1	0	0	0	1	1	1	0	0	-	1	0	2	2	0	0	1	0	1
Strabomantisbiporcatus	1	1	1	1	0	1	-	1	0	0	0	1	1	1	0	1	1	0	0	2	2	1	0	1	0	1
Strabomantisbufoniformis	3	3	4	1	0	1	-	1	0	0	0	1	1	1	0	1	0	1	0	2	2	0	0	1	0	1
Strabomantisingeri	1	1	1	1	0	2	0	1	0	0	0	1	1	1	1	0	-	0	0	2	1	1	0	1	0	2
Strabomantislaticorpus	0	0	0	0	-	2	0	1	0	0	0	1	1	1	0	1	1	0	0	2	1	1	0	0	-	-
Strabomantisnecerus	2	1	1	1	0	1	-	1	0	0	0	1	1	1	0	1	0	0	0	2	2	0	0	1	0	0
Strabomantisruizi	1	1	1	1	1	2	0	1	0	0	0	1	1	1	1	1	1	0	0	2	2	1	0	1	0	2
Strabomantussulcatus	0	0	0	0	-	1	-	1	0	0	0	1	1	1	1	1	1	0	0	2	2	1	0	1	0	1
Tachiramantislentiginosus	1	1	1	1	0	2	1	0	-	0	0	1	0	-	0	0	-	0	0	1	0	1	1	0	-	-
Tachiramantisprolixodiscus	1	1	1	1	0	2	0	0	-	0	0	1	1	0	0	0	-	0	0	1	0	1	0	0	-	-
Yunganastesfraudator	1	1	1	1	0	0	-	1	0	0	0	1	1	0	0	0	-	1	0	1	0	0	0	?	?	?
Yunganastesmercedesae	1	1	1	1	0	0	-	1	0	0	0	0	0	-	0	0	-	1	0	1	0	0	0	1	1	0
Yunganastespluvicanorus	1	1	0	1	0	2	1	0	-	0	0	?	?	?	0	0	-	0	0	1	0	0	0	1	1	1

Appendix 3. Continued.

	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185
Pristimantisvilarsi	0	-	0	0	-	0	-	0	0	0	1	1	1	1	1	2	1	1
Pristimantiswnigrum	0	-	0	0	-	0	-	1	0	0	1	1	1	1	2	2	1	1
Psychrophrynellausurpator	0	-	1	0	-	0	-	0	0	0	1	2	1	2	1	2	1	2
Rheobatespalmatus	0	-	0	0	-	0	-	0	0	0	1	1	1	0	2	2	1	3
Rhinodermadarwinii	0	-	0	0	-	0	-	0	0	1	1	0	1	2	0	0	1	2
Stefaniascalae	0	-	0	0	-	0	-	1	0	1	1	1	1	1	1	1	0	-
Strabomantisanomalus	0	-	0	0	-	1	0	0	0	1	1	2	1	2	2	2	1	2
Strabomantisbiporcatus	0	-	0	1	0	1	0&1	0	0	1	1	2	1	1	2	2	1	0
Strabomantisbufoniformis	0	-	0	0	-	1	0	0	0	1	1	2	1	2	2	2	1	2
Strabomantisingeri	1	0	0	1	0	1	1	2	1	0	1	2	1	1	2	2	1	2
Strabomantislaticorpus	1	0	0	0	-	1	0	0	1	0	1	2	1	1	2	2	1	2
Strabomantisnecerus	0	-	0	0	-	1	0	0	0	1	1	2	1	2	2	2	1	2
Strabomantisruizi	1	0	0	1	0	1	0	1	1	0	1	2	1	1	2	2	1	2
Strabomantussulcatus	0	-	0	1	0	1	0	1	1	0	1	2	1	1	2	2	1	2
Tachiramantislentiginosus	0	-	0	0	-	0	-	0	0	0	1	0	1	1	1	2	1	2
Tachiramantisprolixodiscus	0	-	0	1	0	0	-	0	0	0	1	0	0	1	2	2	1	2
Yunganastesfraudator	?	?	?	?	?	?	?	?	?	2	?	0	1	?	?	2	?	?
Yunganastesmercedesae	0	-	0	0	-	0	-	0	0	2	?	0	1	?	?	2	?	?
Yunganastespluvicanorus	0	-	0	0	-	0	-	0	0	2	?	1	1	2	1	2	1	0

Appendix 4. *List of examined material and museum acronyms used in the morphological study*.

Institutional abbreviations are: **ICN** (Instituto de Ciencias Naturales, Museo de Historia Natural, Universidad Nacional de Colombia, Bogotá); **KU** (Biodiversity Institute, University of Kansas); **BMNH** (The British Museum Natural History); **AMNH** (American Museum of Natural History, Division of Vertebrate Zoology); **MVZ** (Museum of Vertebrate Zoology, University of California, Berkeley); **MZUSP** (Universidade de São Paulo, Museu de Zoologia); **UTA** (University of Texas at Arlington, Department of Biological Sciences); **USNM** (National Museum of Natural History, Division of Amphibians and Reptiles, Washington).

Adelophryne

Adelophryne adiastola: KU 220564, 50251.

Agalychnis

Agalychnis spurelli: ICN 52031

Alytes

Alytes obstetricans: ICN 4153.

Allobates

Allobates talamancae: ICN 13414.

Atelopus

Atelopus ebenoides: ICN 37005.

Atelopus spurrelli: ICN 12074.

Atelopus quimbaya: ICN 36148.

Atopophrynus

Atopophrynus syntomopus: ICN 8611.

Barycholos

Barycholos pulcher: KU 217781, 146044, 130325, 135314.

Barycholos ternetzi: MZUSP: 152236–8, 151654, 1948, 151858, 151659.

Brachycephalus

Brachycephalus ephippium: AMNH 77354.

Brachycephalus didactylus: AMNH 129471.

Bryophryne

Bryophryne cophites: KU 173497, 138885, 138913.

Ceuthomantis

Ceuthomantis cavernibardusi: AMNH 131541, 131536, 131538, 131539.

Ceuthomantis smaragdinus: KU 300000.

Colostethus

Colostethus fraterdanielli: ICN 1810.

Craugastor

Craugastor andi: KU 35116, 35111, 35113, 35117.

Craugastor anciano: KU 208999, 209000, 209001.

Craugastor angelicus: KU 65789, 65772, 65851, 65808.

Craugastor adamastus: KU 189797, 189799, 189803.

Craugastor alfredi: KU 26929, 26932.

Craugastor augusti: KU 87608, 86711, 86710, 62260, 41587, 56193.

Craugastor aurilegulus: KU 209005, 209029, 209031, 209026, 209025.

Craugastor azuroensis: KU 114840, 114845, 114839, 114831.

Craugastor bransfordiiii: KU 30911, 31540, 31541, 30909, AMNH 124398, 114643.

Craugastor berkenbuschiii: KU 137396, 148675, 137404, 137399.

Craugastor brocchi: KU 189624, 189641, 189628.

Craugator bocourti: KU 189615, 189180.

Craugastor chac: KU 186254, 186242, 186263, 186256.

Craugastor chrysozetetes: KU 209035, 209036.

Craugastor crassidigitus: KU 28373, 28360, 28371, 28365.

Craugastor cruzi: KU 209037, 209038.

Craugastor decoratus: KU 125417, 194599, 125420, 154638, 151936.

Craugastor daryi: KU 186202, 189796, 189794, 189793, 189795.

Craugastor emcelae: KU 115230, 115240, 115243, 115226.

Craugastor emleni: KU 209138, 209140, 192300.

Craugastor escoces: KU 103346, 103343, 103345.

Craugastor fecundus: KU 209085, 209093.

Craugastor fitzingeri: KU 53443, 28387, 53438, 53446, 53441.

Craugastor fleischmannii: KU 53183, 65850, 65861.

Craugastor laevissimus: KU 209118, 209116, 209115, 209130.

Craugastor gollmeri: KU 108614, 114594, 114595, 114597.

Craugastor greggi: KU 93995, 58625, 58947.

Craugastor guerreroensis: KU 86873, 86870, 86871.

Craugastor gulosus: KU 200312, 108421.

Craugastor hobartsmithi: KU 75255, 75262, 75253, 182526.

Craugastor jota: KU 115212, 115212, 115215, 115213.

Craugastor laticeps: KU 186261, 66025, 189845, 189862.

Craugastor lineatus: KU 189682, 186173, 189670.

Craugastor longirostrisi: KU 165502, 165500, 165499.

Craugastor matudai: KU 58627, 58626, 103134.

Craugastor megacephalus: KU 108426, 108427, 79990, 108429, 198407, 108416, 108418, 108419, 108420, 108414, 79978, 108408, 108411, 108406, 157704.

Craugastor melanosticus: KU 103387, 103385, 103388, 103389.

Craugastor mexicanus: KU 86761, 86771, 86765.

Craugastor megalotympanumi: KU 109978.

Craugastor milesi: KU 209107, 209052, 209071.

Craugastor mimus: KU 37126, 37127, 37128.

Craugastor montanus: KU 283434, 283429, 283437, 283397

Craugastor noblei: KU 103393, 34115, 214778.

Craugastor occidentalis: KU 102621, 102602, 67927, 29824.

Craugastor omiltemanus: KU 129160.

Craugastor omoensis: MVZ 115286, MVZ 115286, MVZ 115281, MVZ 115284.

Craugastor palenque: KU 171219, 93998, 94003, 171222.

Craugastor pelorus: KU 171216, 75242, 58579.

Craugastor psephosypharusi: KU 186272, 189811.

Craugastor punctariolus: KU 86279, 103413.

Craugastor *podiciferus*: KU 37332, 37542, 53229, 37286.

Craugastor pygmaeus: KU 86882, 86883, 100893, 100891.

Craugastor pelorus: KU 171216, 75243, 75242, 171218.

Craugastor raniformis: KU 145004, 145003, 145005.

Craugastor ranoides: KU 115257, 115261, 115259.

Craugastor rayo: KU 65986.

Craugastor rugulosus: KU 53400, 65878.

Craugastor rupinius: KU 44111, 289861.

Craugastor rostralis: KU 209113, 209110, 209112, 209111.

Craugastor rhodopis: KU 58655, 56860, 58668, 58664.

Craugastor sabrinus: KU 297222, 297223, 297217, 297220.

Craugastor sabdersoni: KU 186223, 186230, 186232.

Craugastor spatulatus: KU 137446, 137466.

Craugastor stejnegeianus: KU 53684, 53654, 53663, 53601.

Craugastor stuarti: KU 151896, 125416.

Craugastor talamancae: KU 36994, 36996, 36976.

Craugastor tarahumaraensis: KU 47293, 44554.

Craugastor taurus: KU 43871, 43868, 43869.

Craugastor vocalis: KU 63336, 28140, 63340.

Craugastor vulcani: KU 58586, 58582, 58583, 58581.

Craugastor xucanebi: KU 186199, 66085, 186193.

Craugastor yucatanensis: KU 171210, 71095.

Cryptobatrachus

Cryptobatrachus boulengeri: ICN 35281.

Cryptobatrachus fuhrmanni: KU 208892.

Cryptobatrachus pedroruizi: ICN 37802.

Diasporus

Diasporus anthrax: ICN 41696.

Diasporus diastema: KU 85016.

Diasporus gularis: ICN 53771.

Diasporus hylaeformis: KU 76307.

Diasporus quiditus: KU 172393, 172402.

Diasporus tinker: KU 132734.

Diasporus vocator: KU 37000.

Dischidodactylus

Dischidodactylus duidensis: AMNH 23190, 23194, 23192.

"*Eleutherodactylus*" *bilineatus*: MZUSP 132290, 132291.

Eleutherodactylus

Eleutherodactylus counouspeus: KU 281372.

Eleutherodactylus inoptatus: KU 280323.

Eleutherodactylus hypostenor: KU 280046.

Eleutherodactylus richmondi: KU 285850.

Eleutherodactylus unicolori: KU 285074

Eleutherodactylus johnstonei: KU 280779.

Eleutherodactylus barlagnei: KU 265935

Eleutherodactylus martinicensis: KU 282764

Eleutherodactylus alcoae: KU 265974

Eleutherodactylus ricordii: KU 203418.

Eleutherodactylus paulsoni: KU 284428.

Eleutherodactylus glaphycompus: KU 232326.

Eleutherodactylus marnockiiii: KU 342251.

Eleutherodactylus nitidus: KU 102645.

Eleutherodactylus pipilans: KU 58899.

Euparkerella

Euparkerella brasiliensis: KU 112370, 112371.

Flectonotus

Flectonotus pygmaeus: KU 166742.

Flectonotus fitzgeraldi: KU 181982.

Fritziana

Fritziana fissilis: KU 187471.

Fritziana ohausi: KU 92228.

Fritziana goeldii: KU 92236.

Gastrotheca

Gastrotheca argenteovirens: KU 169408

Gastrotheca dendronastes: KU 169398.

Gastrotheca cornuta: KU 116352.

Gastrotheca gracilis: KU 185807.

Gastrotheca megacephala: KU 193297.

Gastrotheca microdiscus: KU 154610.

Gastrotheca nicefori: KU 153485.

Gastrotheca ovifera: KU 166761.

Gastrotheca prasina: KU 35406.

Gastrotheca rebeccae: KU 196807.

Gastrotheca recava: KU 335407.

Gastrotheca ruizi: KU 196268.

Gastrotheca weinlandii: KU 143104.

Gastrotheca walker: KU 166675.

Gastrotheca riobambae: KU 202685.

Geobatrachus

Geobatrachus walker: KU 169367, 169371.

Haddadus

Haddadus binotatus: KU 74198, 74197.

Hemiphractus

Hemiphractus fasciatus: KU 107246.

Hemiphractus proboscideus: KU 123152.

Hemiphractus helioi: KU 156672.

Holoaden

Holoaden luederwaldti: KU 92869.

Holoaden bradei: KU 92865, 107086.

Hypodactylus

Hypodactylus cf. *nigrovittatus*: KU 222020, 222018, 222019, 123547, 123546, 123527

Hypodactylus babax: KU 200202.

Hypodactylus brunneus: KU 202652, 178259, 178261.

Hypodactylus dolops: KU 165866, 165868

Hypodactylus elassodiscus: KU 177282, 130272, 177283, 143415.

Hypodactylus fallaciosus: KU 212219, 220916.

Hypodactylus latens: ICN 397761.

Hypodactylus lucida: KU 162435, ICN 08323.

Hypodactylus mantipus: KU 143970, 143972, ICN 24605, ICN 9166.

Hypodactylus nigrovittatus: KU 123550.

Hypodactylus peraccai: KU 178266, 178267, 111430.

Ischnocnema

Ischnocnema bolbodactylai: KU 92734, 92736.

Ischnocnema guntheri: AMNH 104025, 104031, 104029, 104019.

Ischnocnema holti: AMNH 104043, 104045.

Ischnocnema nasuta: KU 92821.

Ischnocnema octavioi: KU 92824, 92826

Ischnocnema parva: AMNH 72332, 51927.

Ischnocnema venancioi: KU 92201.

Ischnocnema pusilla: AMNH 81353.

Leptodactylus

Leptodactylus fragilis: ICN 27677.

Lynchius

Lynchius flavomaculatus: KU 119719, 218210, 119741.

Lynchius nebulastes: KU 181408, 181409, 181400.

Lynchius parkeri: KU 135300–5, 135279–82.

Lynchius simmonsi: KU 147068, 147069.

Mannophryne

Mannophryne collaris: ICN 32411.

Melanophryniscus

Melanophryniscus rubriventris: ICN 30014

Niceforonia

Niceforonia nana: KU 169125, 169123.

Niceforonia adenobrachia: ICN 791.

Noblella

Noblella lochites: KU 177356, 147070.

Noblella lynchi: KU 212319, 212318.

Noblella heyeri: KU 217337, 196529, 196530.

Noblella myrmecoides: KU 206120, 220587, 220577, 220579.

Oreobates

Oreobates cruralis: KU 215462.

Oreobates discoidales: KU 154522, 154525–6, 154527–9.

Oreobates gemcare: AMNH 153087, 11714, 153085.

Oreobates granulosa: AMNH 06064, 06060, 06067.

Oreobates lehri: KU 173231, 173233.

Oreobates machiguenga: AMNH 153045, 153046.

Oreobates pereger: KU 151908–9.

Oreobates quixensis: KU 178249, 297257, 104462, 126235–6.

Oreobates saxatilis: KU 217327–30.

Osornophryne

Osornophryne talipes: ICN: 12262.

Pleurodema

Pleurodema brachyops: ICN 13780.

Phrynopus

Phrynopus auriculatus: KU 291633.

Phrynopus bracki: KU 286919

Phrynopus dagmarae: KU 196592

Phrynopus horstpauli: KU 291400, 291399.

Phrynopus kauneorum: KU 311451.

Phrynopus juninensis: KU 138880, 138881.

Phrynopus montium: KU 206649.

Phrynopus thompsoni: KU 288712.

Phrynopus tribulosus: KU 29160.

Psychrophrynella

Psychrophrynella bagrecito: KU 196514, 196521, 196528, 196515.

Psychrophrynella usurpator: KU 138957, 138959, 138962, 138943, 138956.

Psychrophrynella wettsteini: KU 183049, 154558, 183060, 183059, 183067, 183052.

Pristimantis

Pristimantis achatinus: KU 217823.

Pristimantis actites: KU 131212, 141778, 131246, 131225.

Pristimantis acuminatus: KU 2094664–67.

Pristimantis albertus: KU 291675, 171101.

Pristimantis angustilineatus: ICN 19164.

Pristimantis apiculatus: KU 212534–38.

Pristimantis aureolineatus: KU 148906.

Pristimantis bipunctatus: KU 206096, 291638, 206095.

Pristimantis boulengeri: KU 144046, 144050–52, 169050–54, 169056–62.

Pristimantis briceni: AMNH 10563, 314.3

Pristimantis brevifrons: KU 169006–13.

Pristimantis bromeliaceus: KU 174524–25.

Pristimantis caryophyllaceus: KU 113813, 76468, 113805, 113808.

Pristimantis cerasinus: KU 303177, 114025, 114024, 114041.

Pristimantis citriogaster: KU 212284, 212278, 212282.

Pristimantis condor: KU 146992, 147023, 146995, 147021.

Pristimantis conspicillatus: KU 123413, 123437, 123418, 119526.

Pristimantis chalceus: KU 119484, 177648, 177643, 119481.

Pristimantis chiastonotus: KU 140880, 140879.

Pristimantis cremnobates: KU 166054, 166044, 166051, 166056.

Pristimantis crenunguis: KU 120128, 120126, 120129, 120215.

Pristimantis cruentus: KU 114156, 114167, 114151, 114172.

Pristimantis cuentasi: ICN 46189.

Pristimantis danae: KU 162330, 162309, 162308, 162316.

Pristimantis devillei: KU 217991, 217992, 202401.

Pristimantis duellmani: KU 179255, 179284, 179288.

Pristimantis enigmaticus: KU 146976.

Pristimantis eremitus: KU 179086, 180248.

Pristimantis erythropleura: KU 168044, 168199, 144998.

Pristimantis eugeniae: KU 165899–904, 179382–3.

Pristimantis festae: KU 218250, 218244, 218245, 218240.

Pristimantis galdi: KU 146978, 143416, 143980.

Pristimantis gaigei: KU 114590, 114587, 114586, 114584.

Pristimantis gentry: KU 131549, 131542, 131550, 131541.

Pristimantis gladiator: KU 143513, 143515, 143515.

Pristimantis hectus: KU 212540, 212544, 212539, 212541.

Pristimantis hybotragus: KU 168135, KU 168132.

Pristimantis labiosus: KU 145001, 145000.

Pristimantis lacrimosus: KU 110783.

Pristimantis lanthanites: KU 123870, 146152, 123877, 123871.

Pristimantis laticlavius: KU 200191, KU 200188.

Prisitmantis latidiscus: KU 141957, 291199, 218017.

Pristimantis loustes: KU 179242, 179242, 179250, 179246.

Pristimantis leptolophus: KU 169038, 169042, 169036.

Pristimantis limoncochensis: KU 126101, 221682.

Pristimantis lymani: KU 196468, 181267, 196466, 202417.

Pristimantis malkini: KU 175113, 206092, 222008, 222013.

Pristimantis mendax: KU 173234–5.

Pristimantis myersi: KU 168437.

Pristimantis nyctophylax: KU 110896–97, 110899–904, 110906–911, 110914–17, 110919–22, 110924–28, 110930–38.

Pristimantis ocreatus: KU 117576, 117574, 117577, 17575.

Pristimantis omeviridis: KU 175105.

Pristimantis ornatus: KU 303042, 303043.

Pristimantis orpacobates: KU 168128, 168124, 168115.

Pristimantis pharangobates: KU 173242, 173246, 173240, 173242, 173241.

Pristimantis padrecarlosi: ICN 50083.

Pristimantis pardalinus: KU 303044–45.

Pristimantis peraticus: KU 168914, 168917, 168916.

Pristimantis petersi: KU 143508–12.

Pristimantis peruvianus: KU 154836, 196473, 171872.

Pristimantis pseudoacuminatus: KU 126165–66.

Pristimantis pyrrhomerus: KU 131608, 142168, 152038, 131607.

Pristimantis quinquagesimus: KU 167874, 167858, 167872, 167870.

Pristimantis ramagii: KU 137752, 137751.

Pristimantis terraebolivaris: KU 166383, 166383, 166382.

Pristimantis rhabdolaemus: KU 175084, 183009, 175082, 175083.

Pristimantis richlei: KU 207708, 215487, 154857.

Pristimantis schultei: KU 212220–24.

Pristimantis sagittulus: KU 291576, 291575, 291549, 206100.

Pristimantis scolodiscus: KU 212548, 212546, 200198.

Pristimantis siopelusi: KU 212551, 212551, 212553, 212552.

Pristimantis sobetes: KU 179389, 179390.

Pristimantis subsigillatus: KU 131569, 165587.

Pristimantis surdus: KU 177851, 177855, 130890, 177857.

Pristimantis tayrona: KU 169071, 169070, 169069.

Pristimantis thymalopsoides: KU 177873, 177868, 177875, 177867.

Pristimantis vertebralis: KU 177982, 132757, 132747.

Pristimantis zimmermanae: KU 153287.

Pristimantis zeuctotylusi: KU 69663, 140881.

Rheobates

Rheobates palmatusi: ICN 40164

Rhinoderma

Rhinoderma daewini: ICN 3382.

Scinax

Scinax sugillatus: ICN 37373.

Stefania

Stefania scalae: KU 167233

Stefania ayangannae: KU 315002

Strabomantis

Strabomantis anatipes: KU 177625, 177626, 144984.

Strabomantis anomalus: KU 167898, 177631, 165130.

Strabomantis biporcatus: KU 185672, 166373.

Strabomantis bufoniformis: KU 107092, 113788; BMNH 1947.2.15.68.

Strabomantis cadenai: ICN 13731.

Strabomantis cerastes: KU 144994, 144993.

Strabomantis cheiroplethus: ICN 18013.

Strabomantis cornutus: KU 165222.

Strabomantis ingeri: ICN 37594.

Strabomantis laticorpus: AMNH 100002, 100001; KU 76228, 76227.

Strabomantis necerus: KU 179079, 179077.

Strabomantis necopinus: ICN 37604

Straboamtnis ruizi: KU 181993.

Strabomantis sulcatus: KU 126171, 146120

Strabomantis zygodactylus: KU 168531, 168539, 168541.

Tachiramantis

Tachiramantis douglasi: ICN 15261.

Tachiramantis prolixodiscus: KU 132730.

Tachiramantis lentiginosus: ICN 15220.

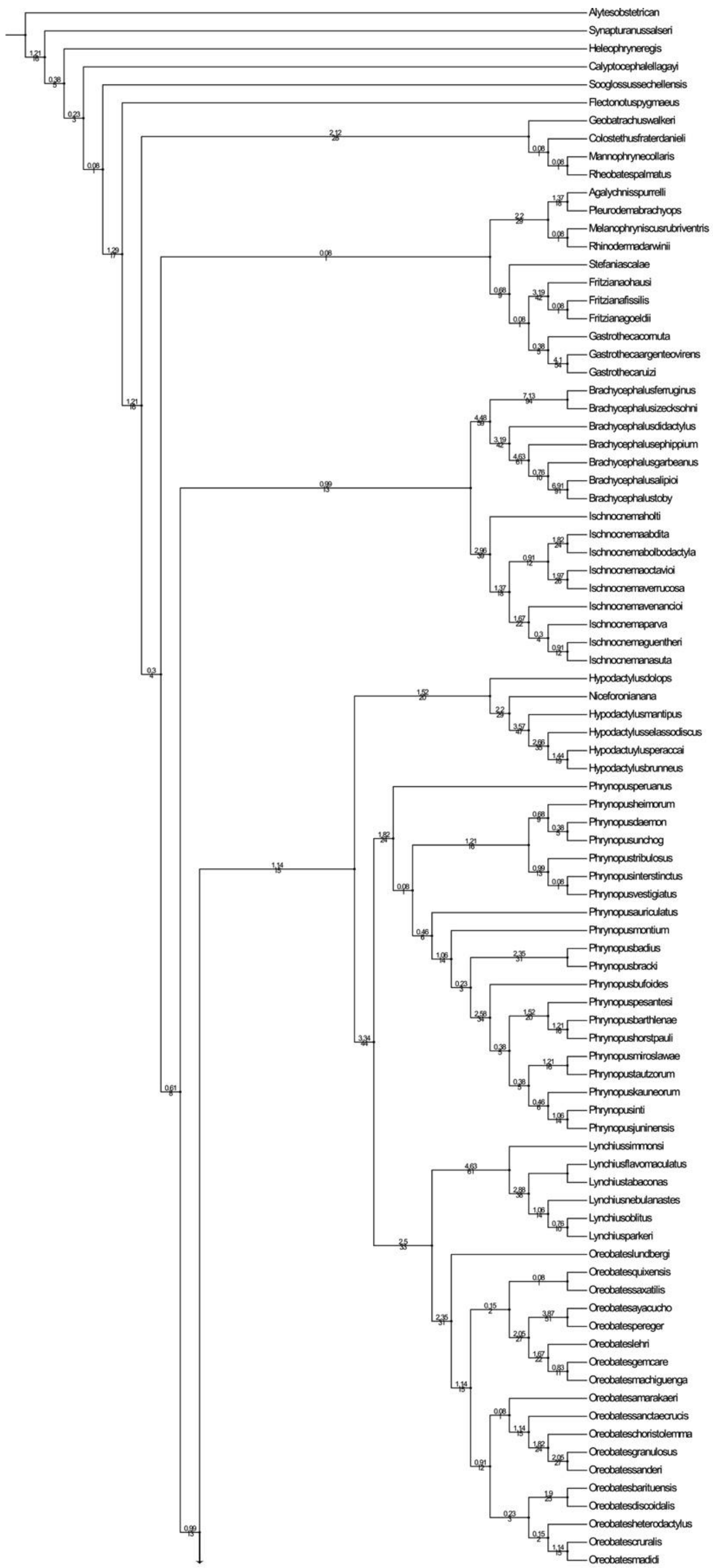
Yunganastes

Yunganastes pluvicanorus: AMNH 165194, 165193, 16521.

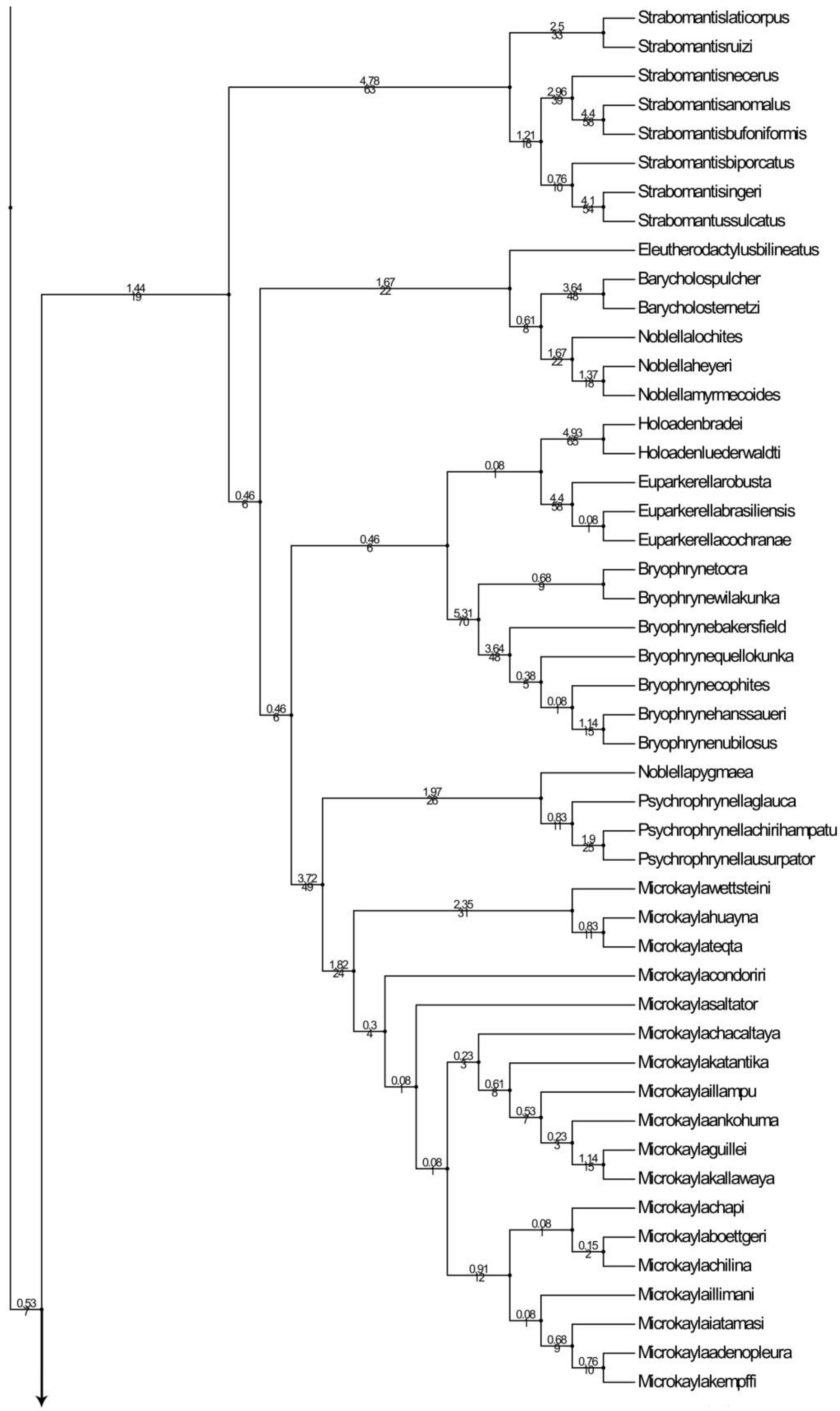
Yunganastes mercedesae: UTA 53291, USNM 346140.

Yunganastes fraudator: USNM 146568.

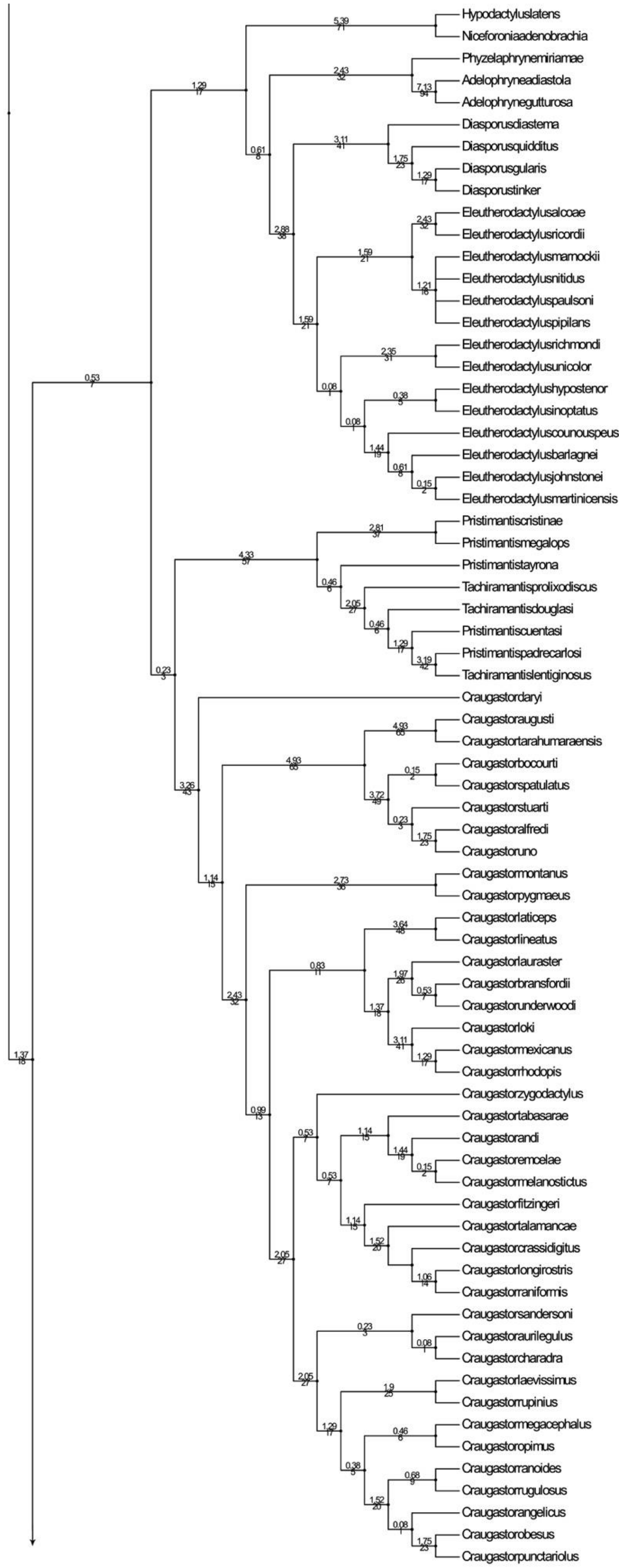
Appendix 5. *Phylogenetic relationships of Brachycephaloidea as recovered in one of the 460 most parsimonious trees inferred from molecular dataset. Values below branches are Goodman-Bremer support and above branches are REP support.*



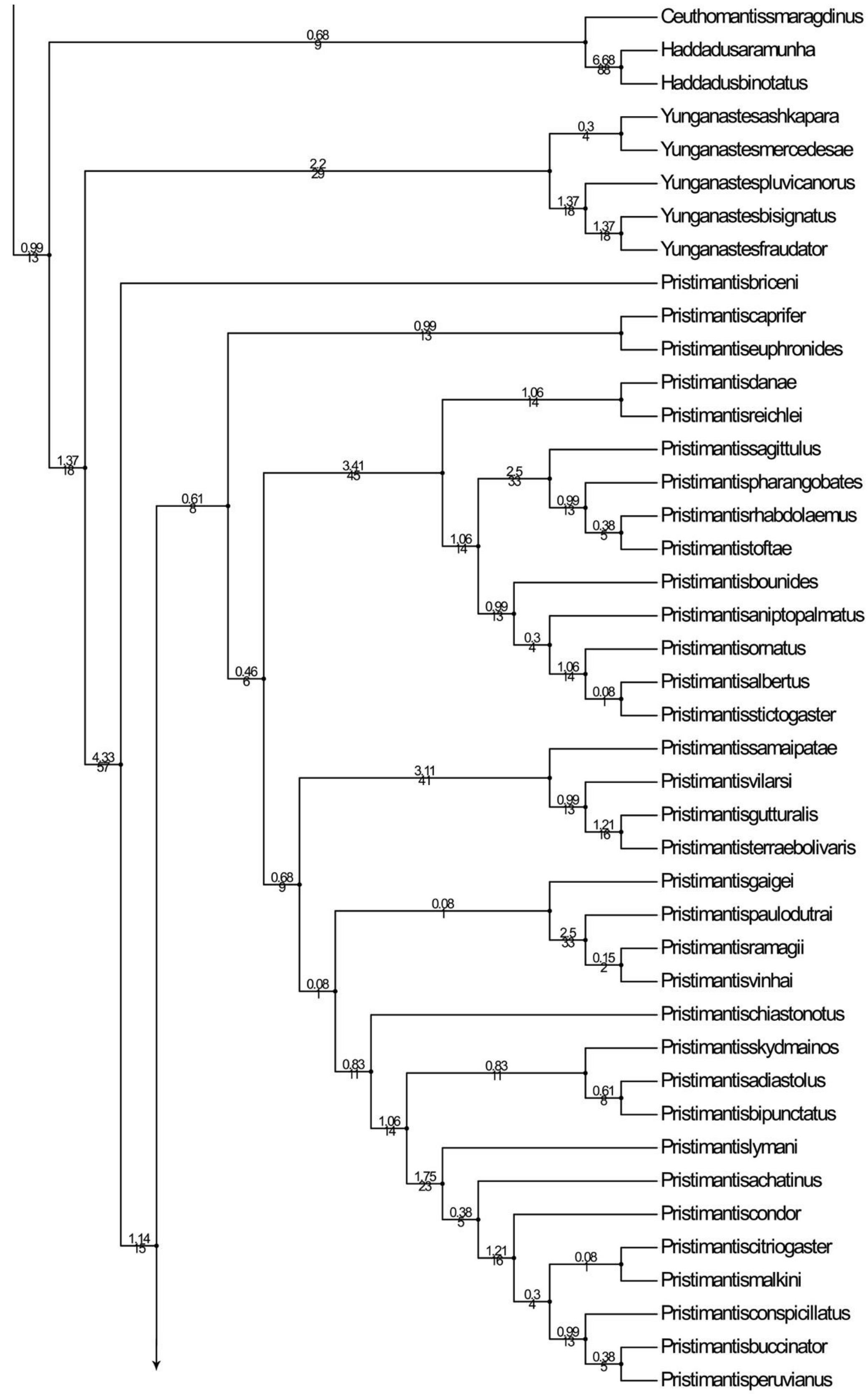
Appendix 5. Continued.



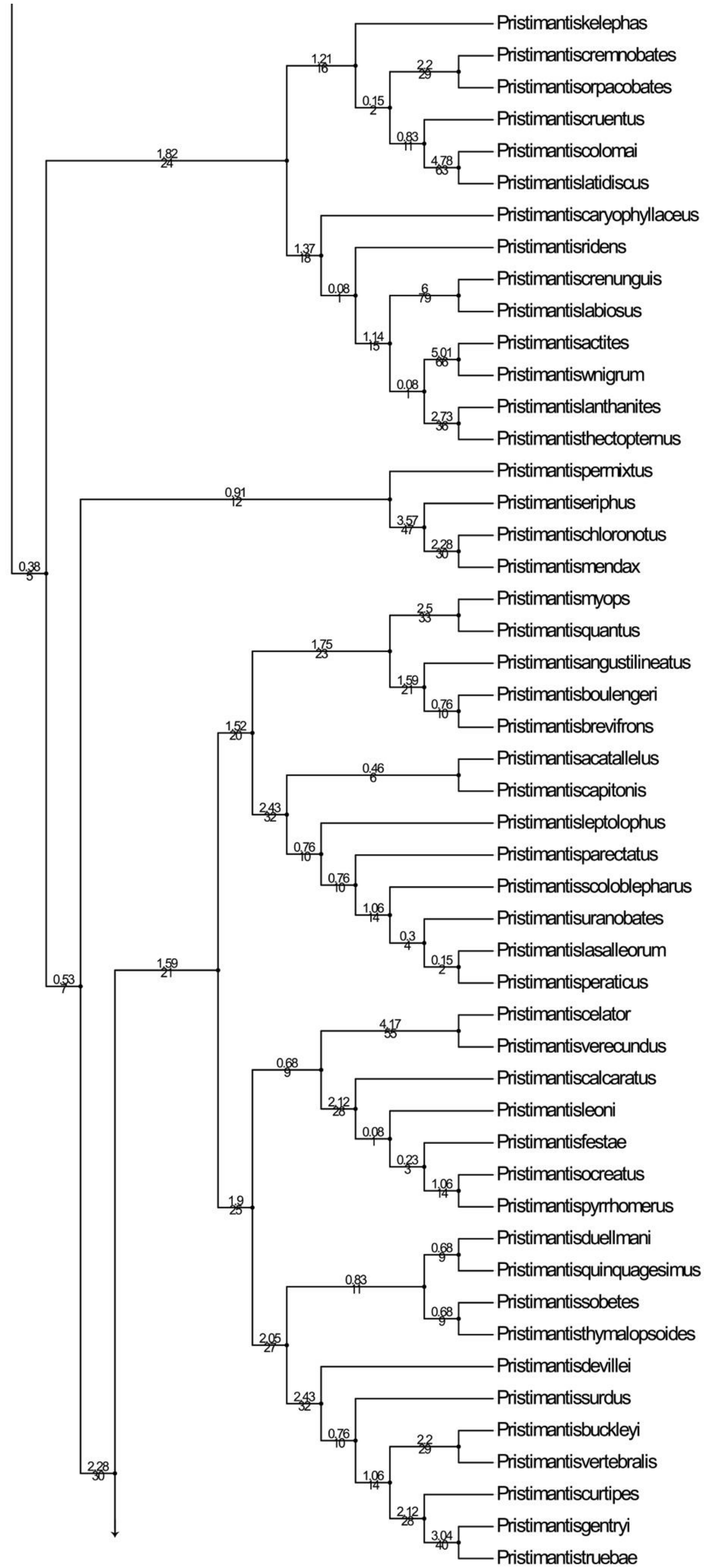
Appendix 5. Continued.



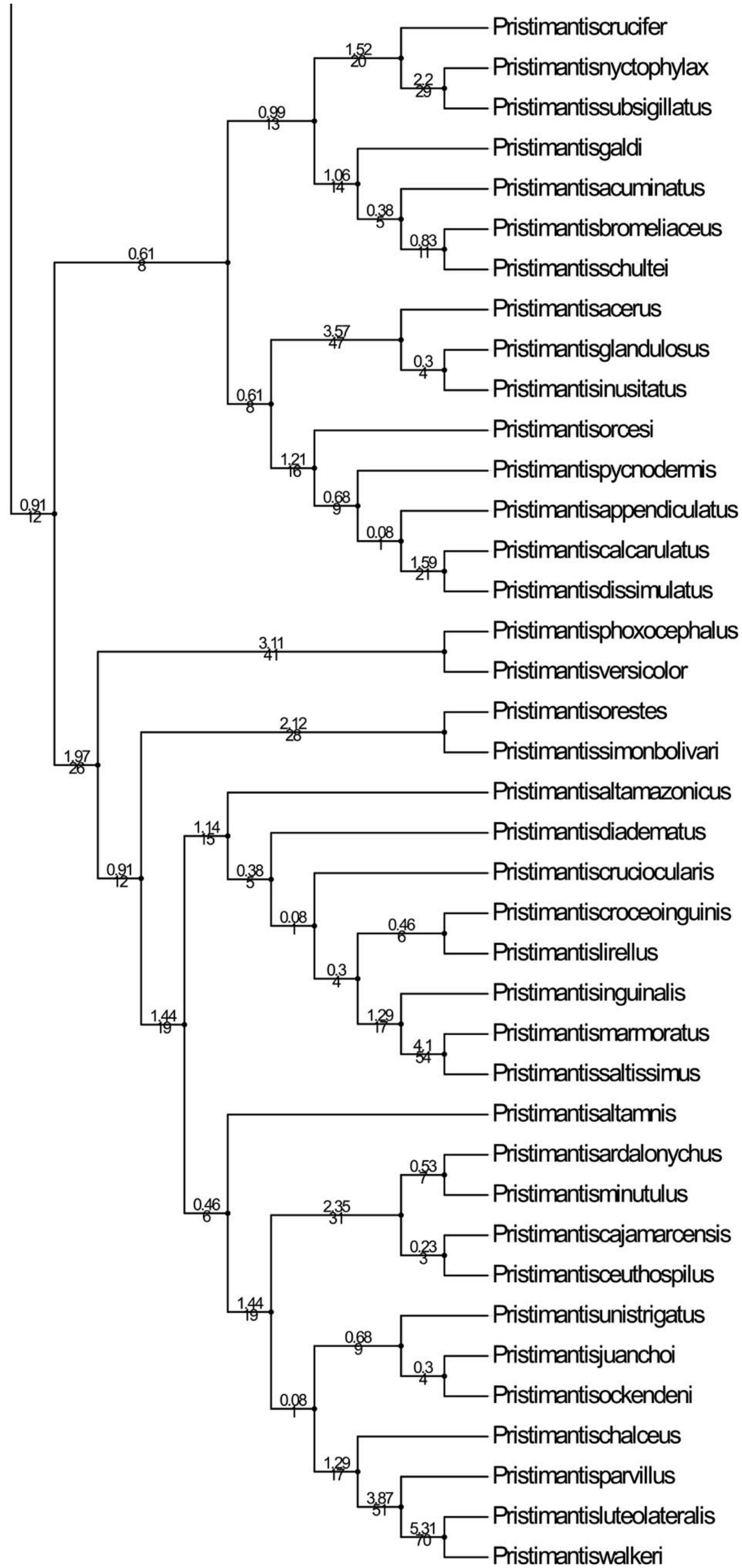
Appendix 5. Continued.



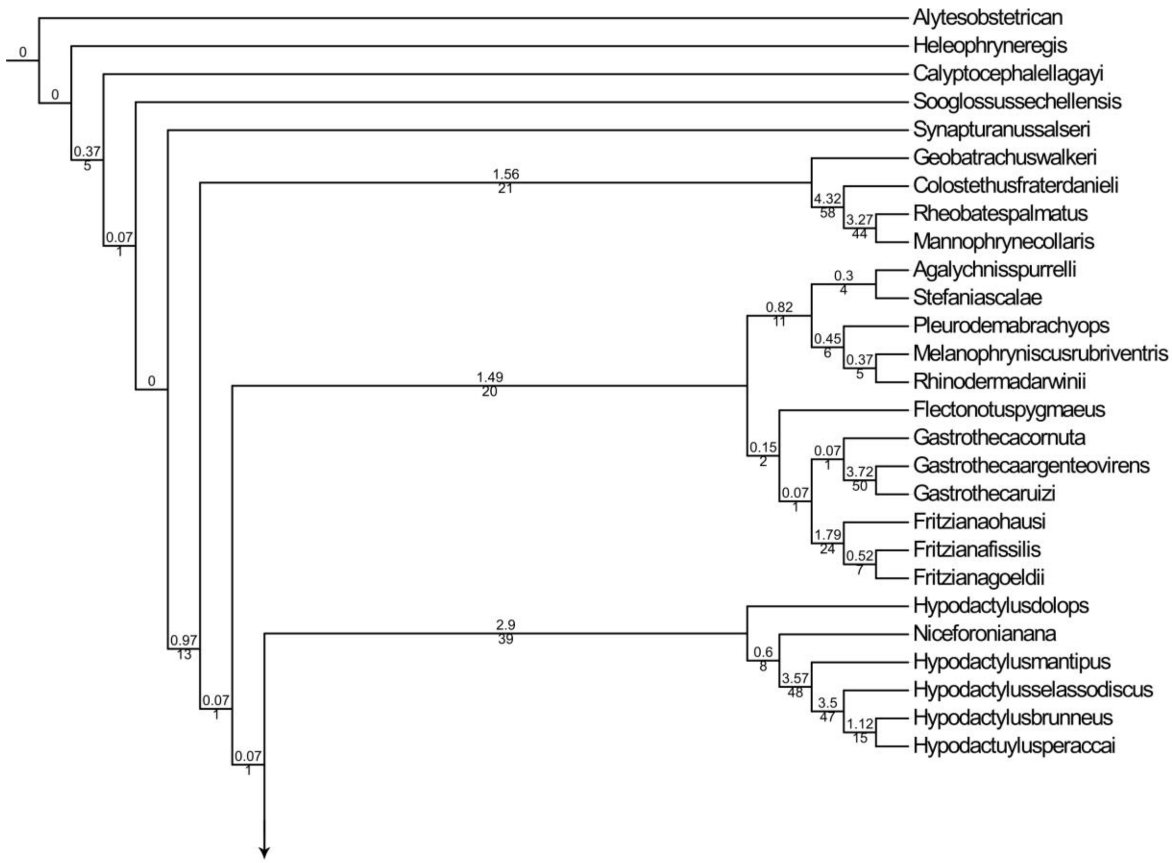
Appendix 5. Continued.



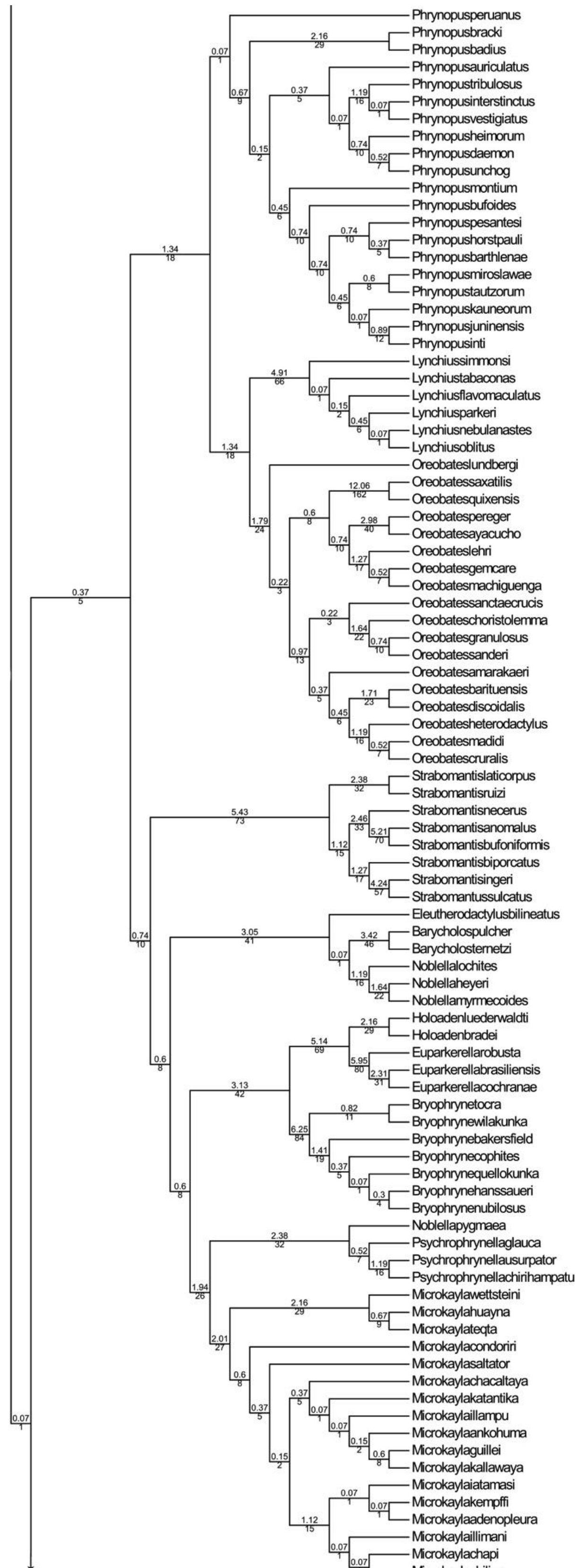
Appendix 5. Continued.



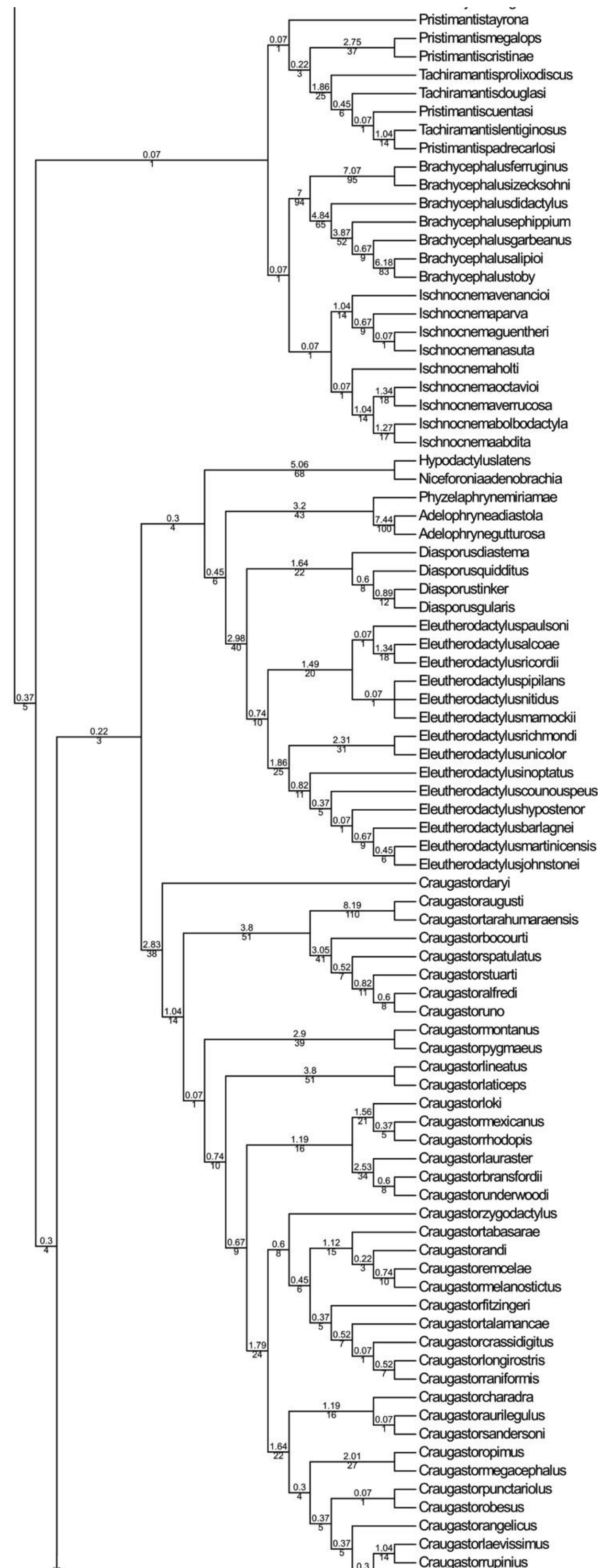
***Appendix 6**. Phylogenetic relationships of Brachycephaloidea as recovered in one of the 205 most parsimonious trees inferred from combined dataset. Values below branches are Goodman-Bremer support and above branches are REP support.*



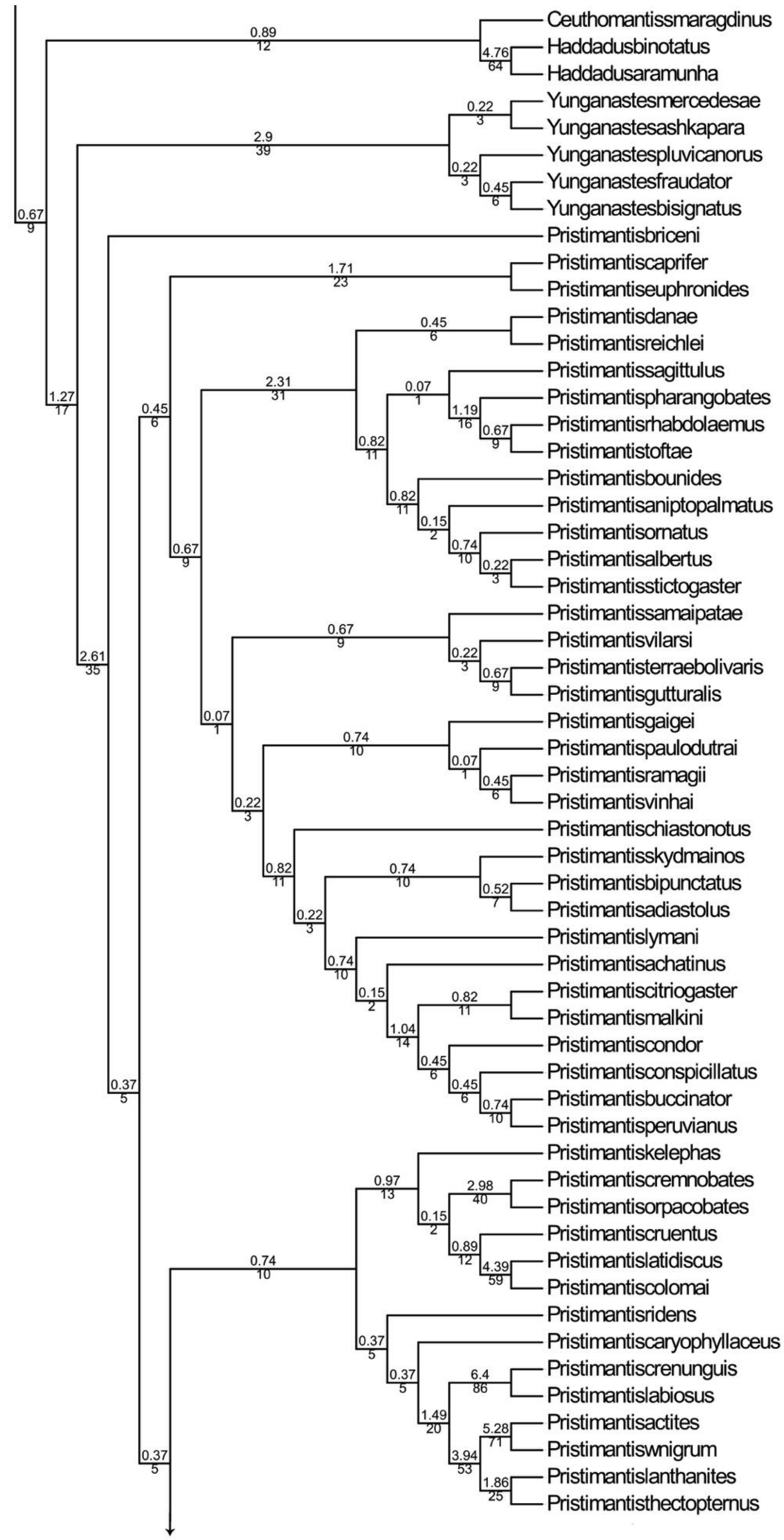
Appendix 6. Continued.



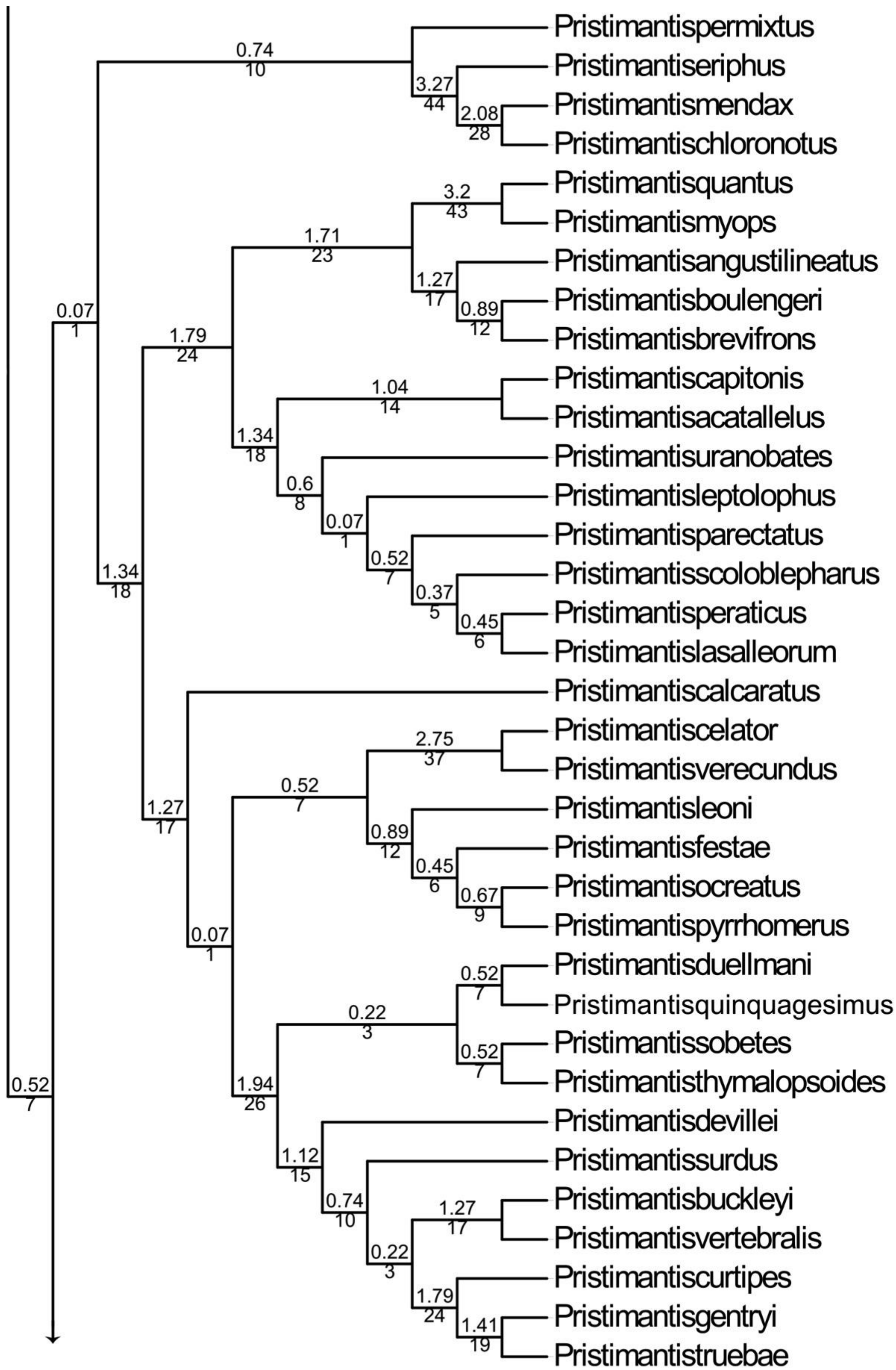
Appendix 6. Continued.



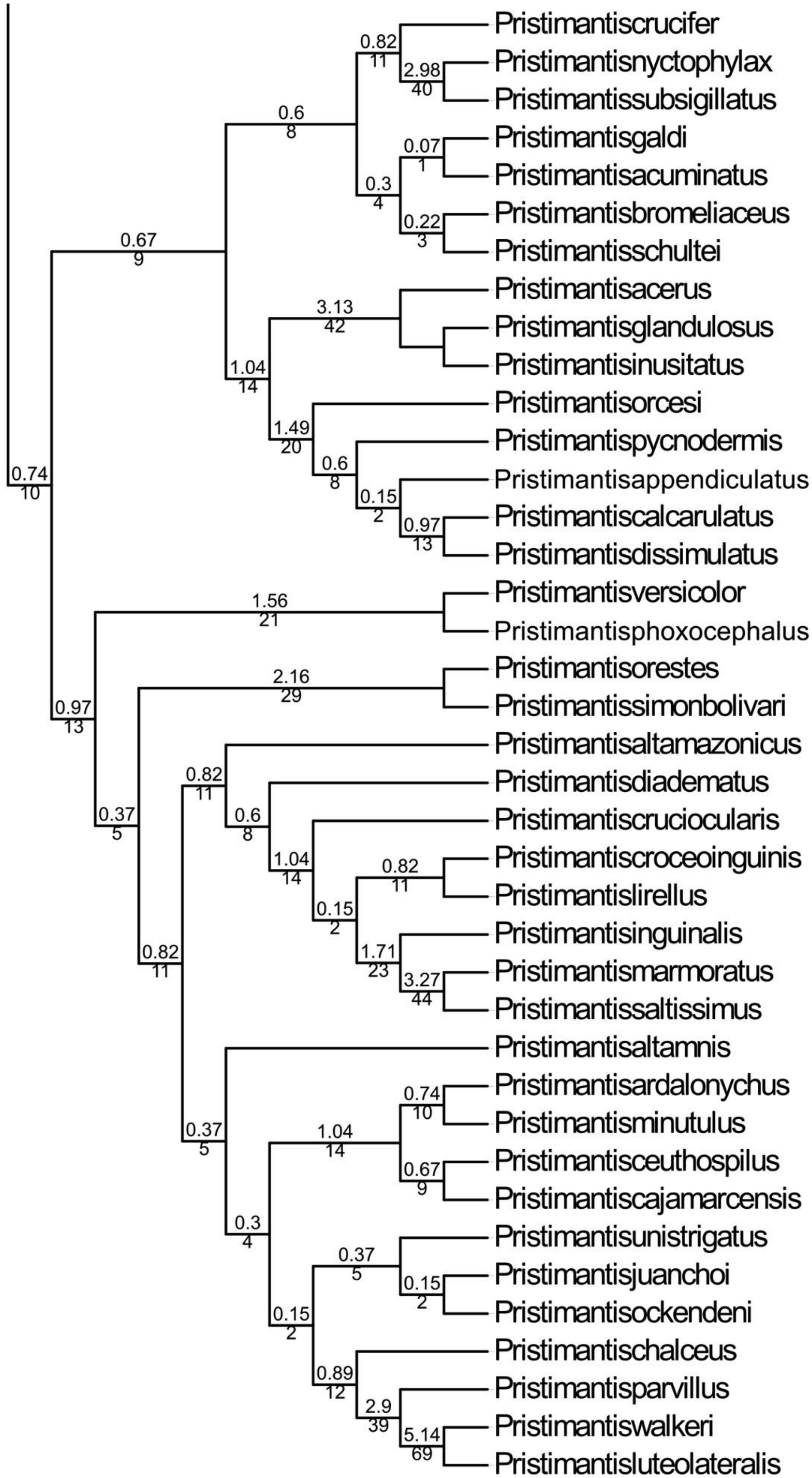
Appendix 6. Continued.



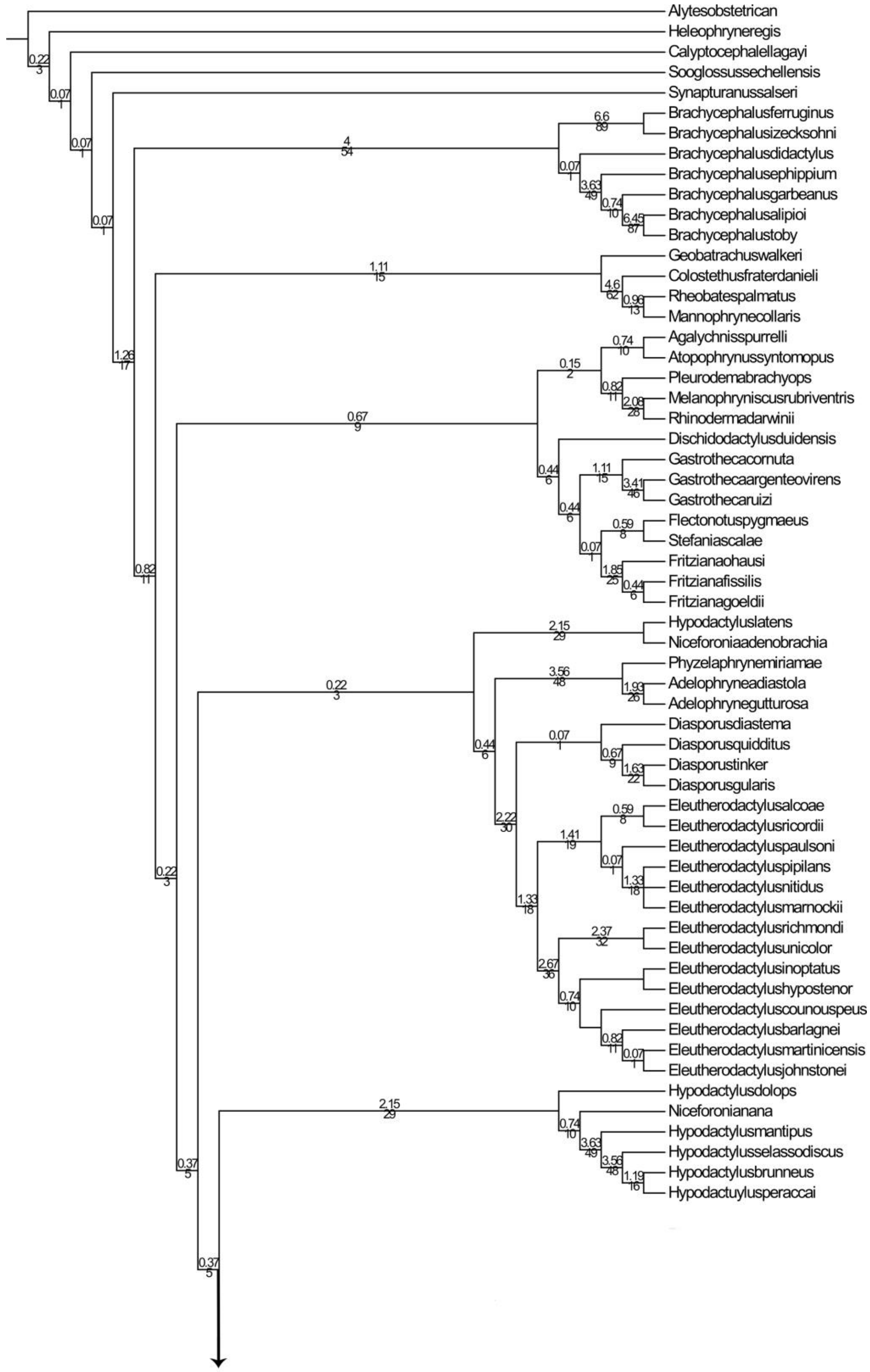
Appendix 6. Continued.



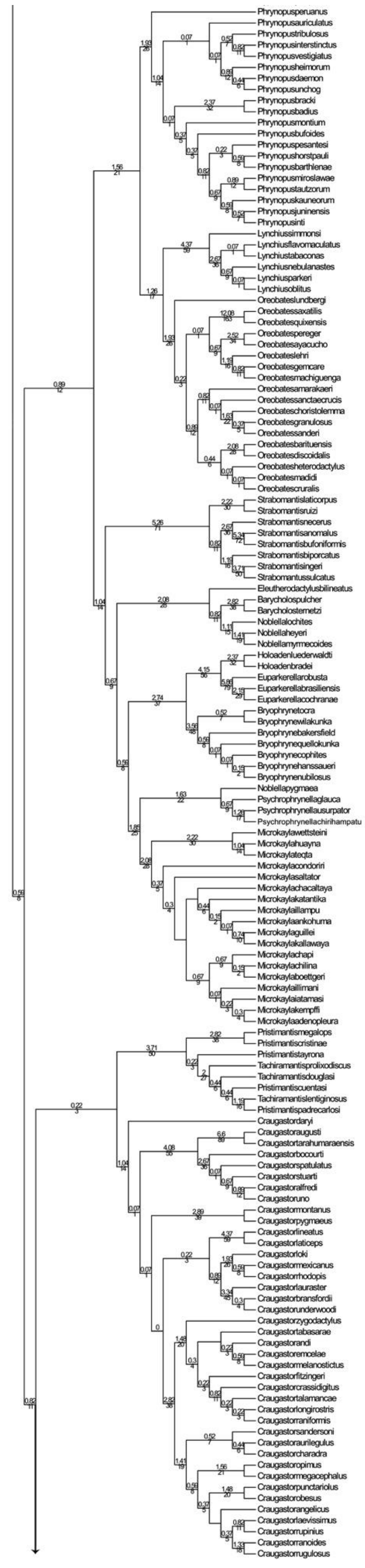
Appendix 6. Continued



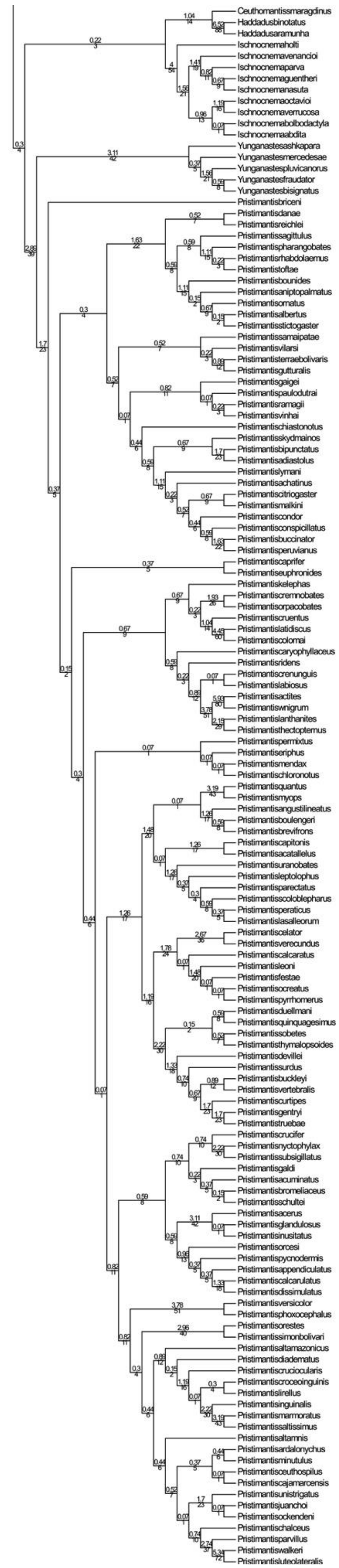
Appendix 7. *Phylogenetic relationships of Brachycephaloidea as recovered in one of the 205 most parsimonious trees inferred from combined dataset. Values below branches are Goodman-Bremer support and above branches are REP support.*



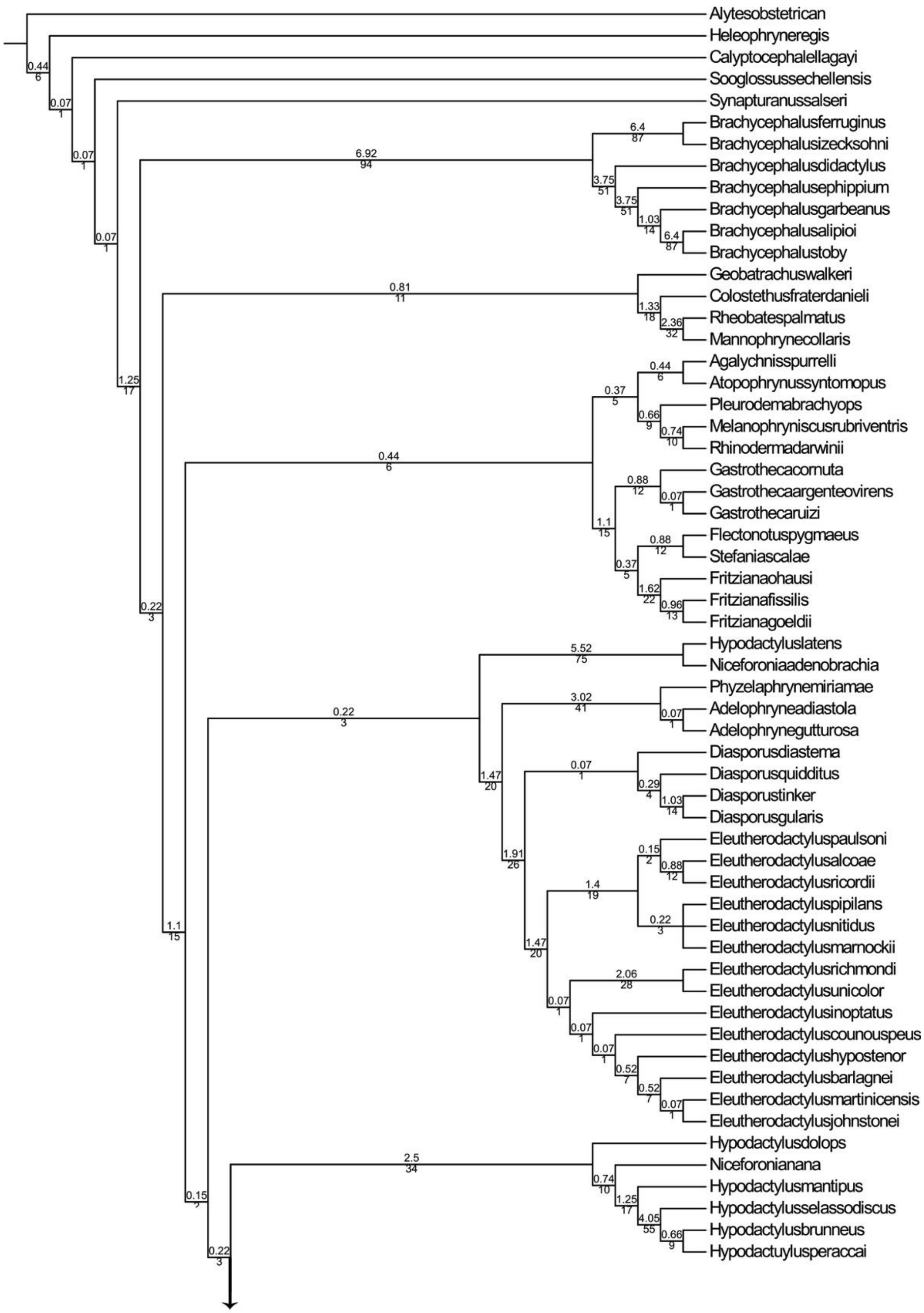
Appendix 7. Continued.



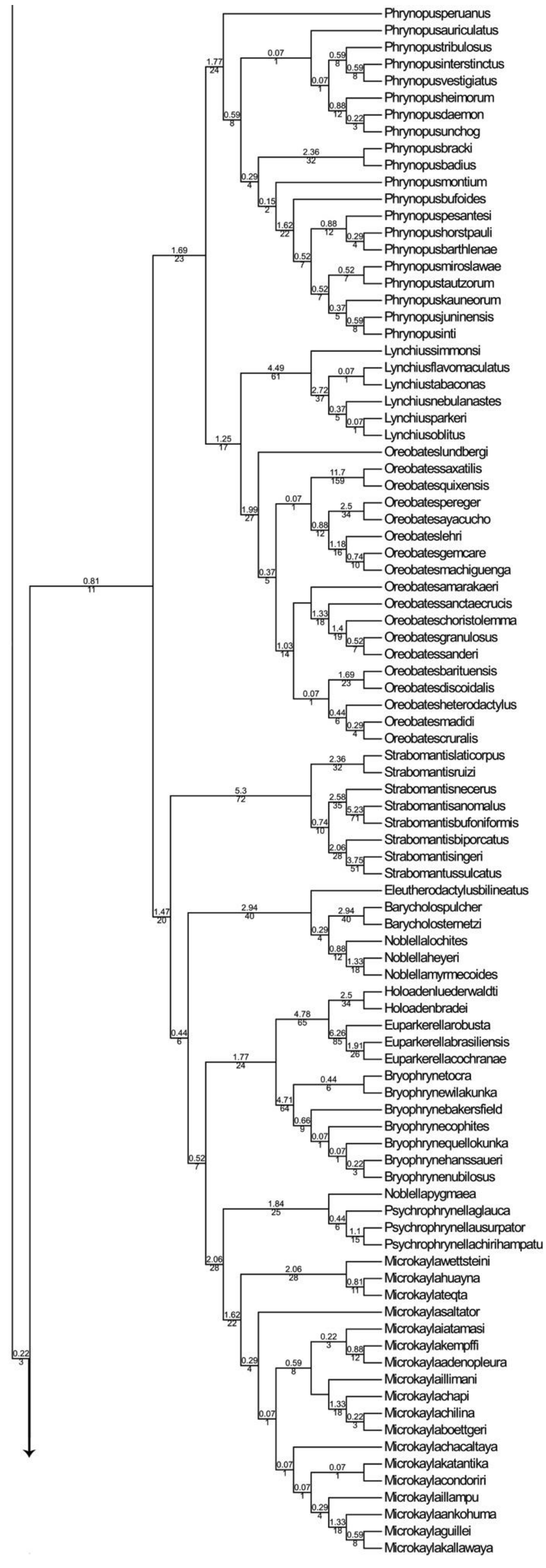
Appendix 7. Continued.



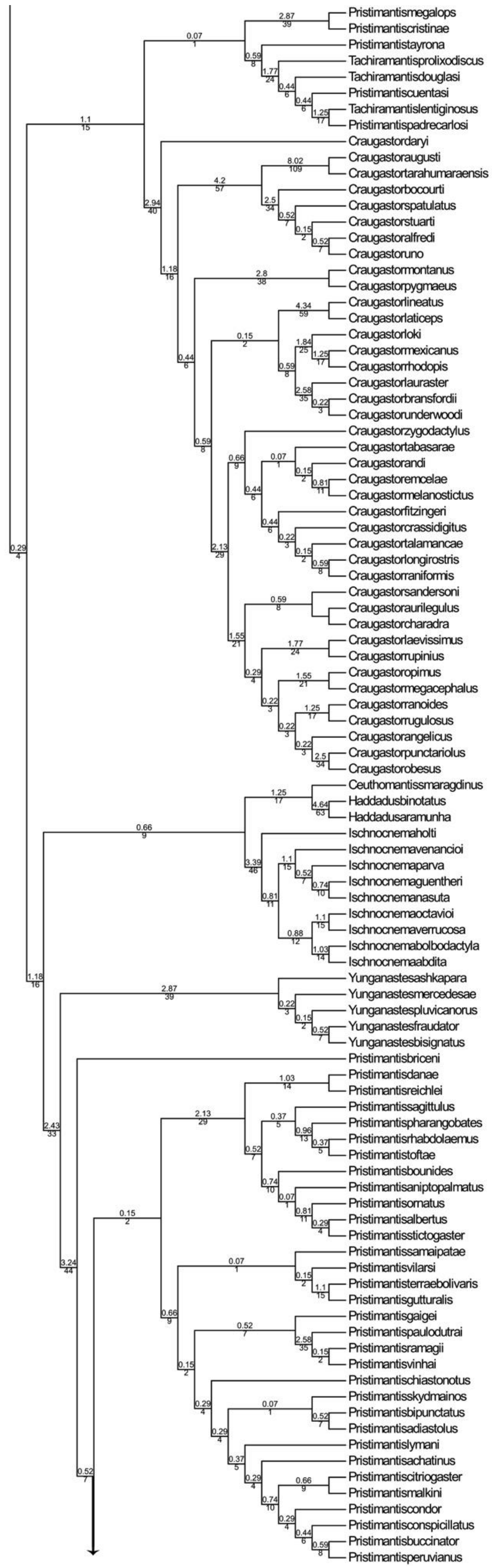
***Appendix 8**. Phylogenetic relationships of Brachycephaloidea as recovered in one of the 325 most parsimonious trees inferred from combined dataset plus Atopophrynus syntomopus. Values below branches are Goodman-Bremer support and above branches are REP support.*



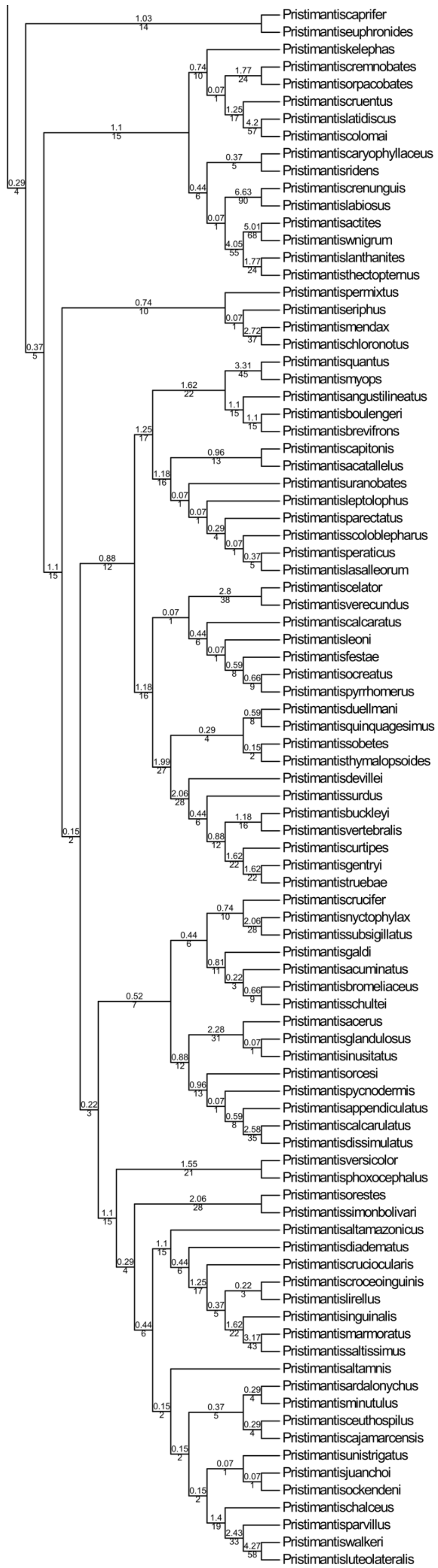
Appendix 8. Continued.



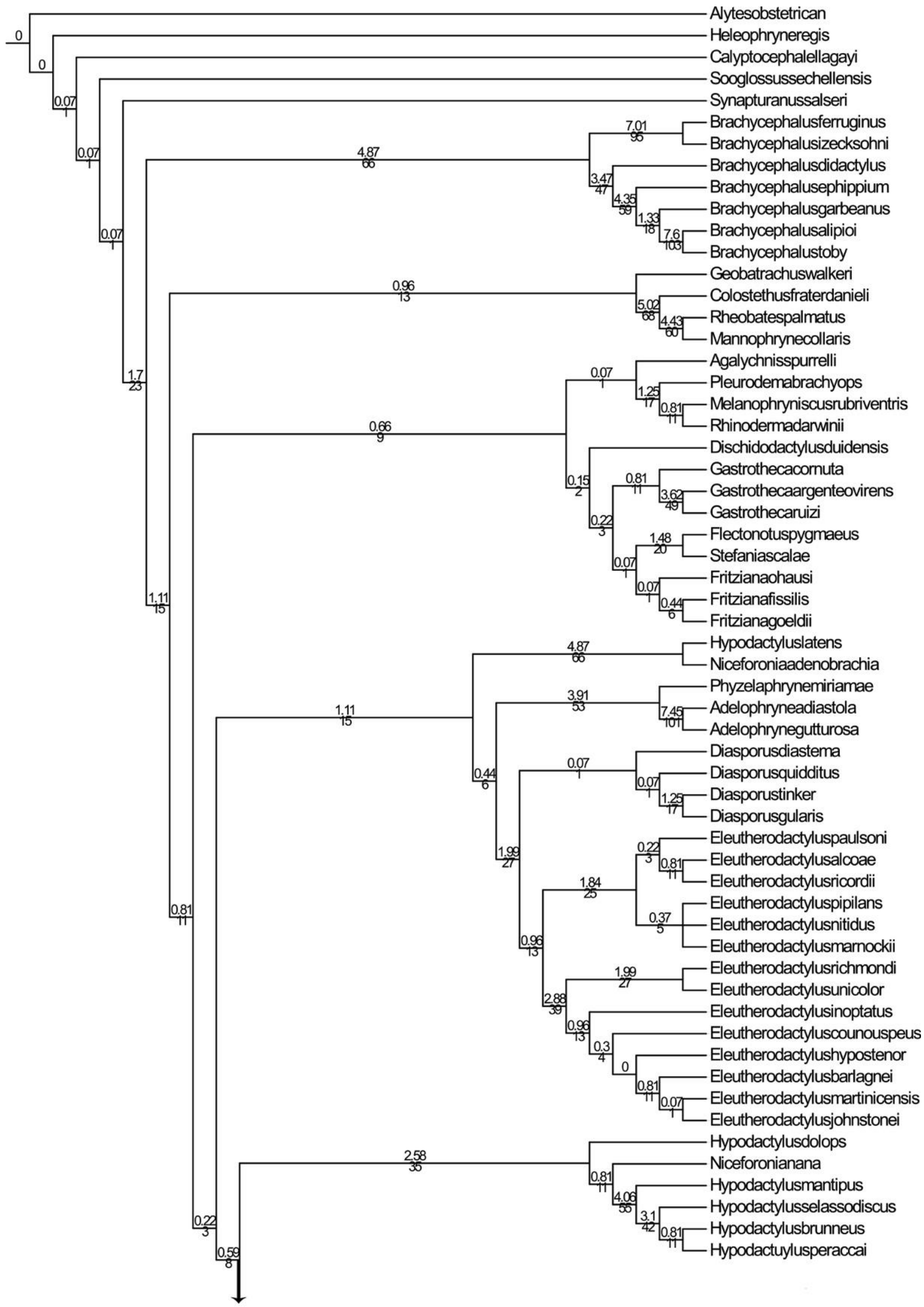
Appendix 8. Continued.



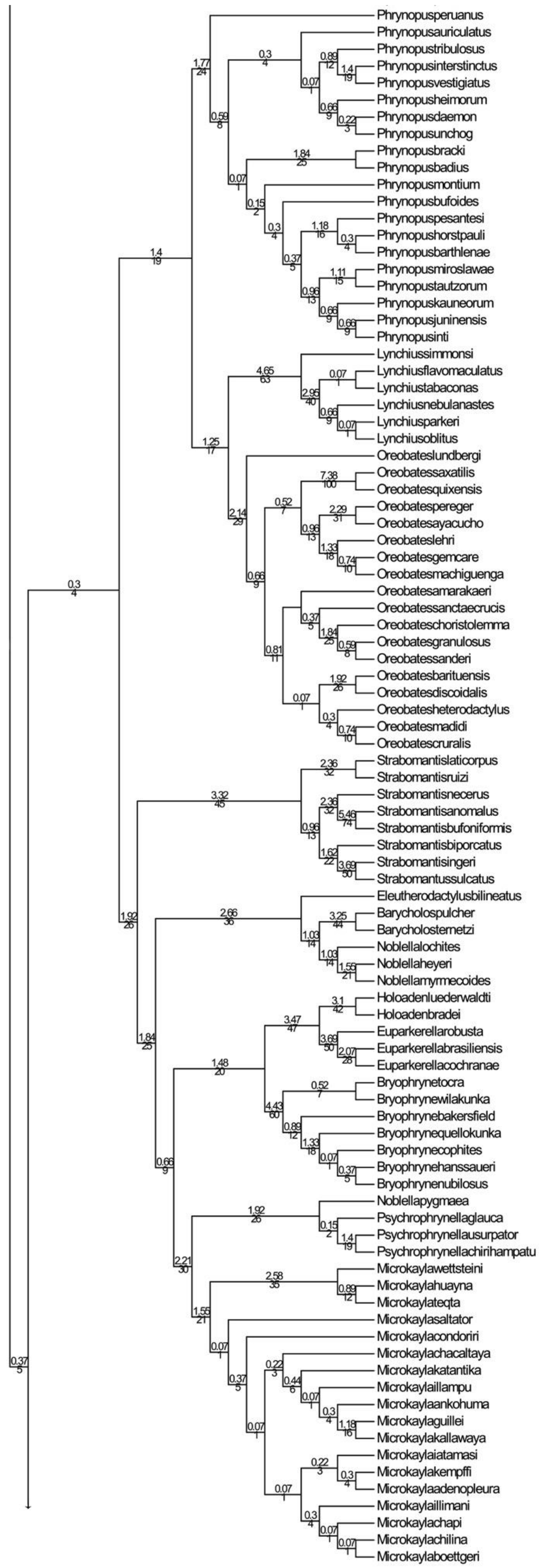
Appendix 8. Continued.



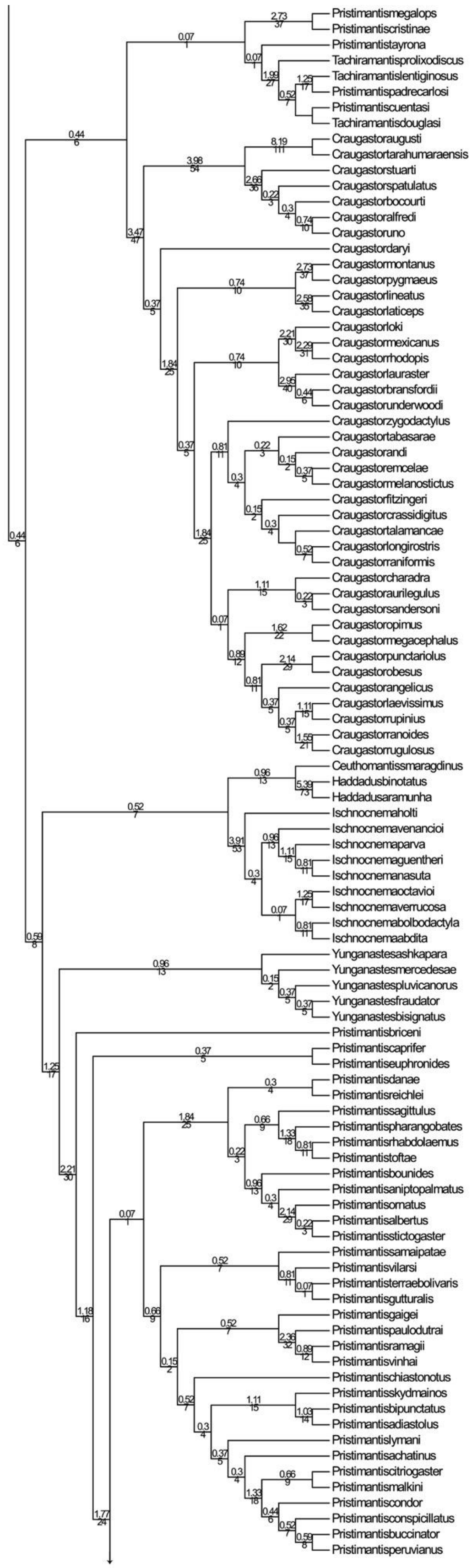
Appendix 9. *Phylogenetic relationships of Brachycephaloidea as recovered in one of the 446 most parsimonious trees inferred from combined dataset plus Dischidodactylus duidensis. Values below branches are Goodman-Bremer support and above branches are REP support.*



Appendix 9. Continued.



Appendix 9. Continued.



Appendix 9. Continued.