PHYLOGENY-BASED SPECIES DELIMITATION IN PHILIPPINE SLENDER SKINKS (REPTILIA: SQUAMATA: SCINCIDAE) II: TAXONOMIC REVISION OF BRACHYMELES SAMARENSIS AND DESCRIPTION OF FIVE NEW SPECIES

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ABSTRACT: With robust new datasets from morphology and DNA sequences, we review the limbed, nonpentadactyl species of the Brachymeles samarensis complex (now known to include B. cebuensis, B. minimus, and B. lukbani), and describe five new species in this highly limb-reduced, endemic Philippine clade of scincid lizards. For more than four decades, B. samarensis has been recognized as a single “widespread” species. This perception of the species’ peculiar geographic range has persisted as a result of weak sampling and similar gross morphology (body sizes, scale pigmentation) among populations. However, previous authors have noted morphological variation between different island populations, and our new data build on these observations and extend them to delimit new proposed species boundaries. Our data indicate that the “widespread” species B. samarensis is actually a complex of six distinct lineages, some of which are not each others’ closest relatives, and each of which is genetically unique. The taxa we define possess allopatric geographic ranges and differ from their congeners by numerous diagnostic characters of external morphology, and therefore should be recognized as full species in accordance with any lineage-based species concept. Species diversity in the genus has doubled in the last 3 yr, with these six taxa increasing the total known number of species of Brachymeles to 30.

Key words: Biodiversity; Endemism; Faunal region; Fossorial lizards; Limb reduction; Species delimitation; Taxonomy

Few genera of scincid lizards are known to possess species representing a full spectrum of body forms, from fully limbed, pentadactyl species to limbless species (see Siler et al., 2011b; Siler and Brown, 2011). In the genus Brachymeles, all but two of the 26 recognized species are endemic to the Philippines, with the exceptions being a single species (B. apus) from northern Borneo and another (B. miriamae) from Thailand (Brown and Alcala, 1980; Hikida, 1982; Siler, 2010; Siler et al., 2009, 2010a,b, 2011a,b,c; Siler and Brown, 2010, 2011). Thirteen species are pentadactyl (B. bicolor, B. boholensis, B. boutengeri, B. gracilis, B. kadua, B. makusog, B. mindorenensis, B. orientalis, B. schadenbergi, B. talinis, B. taylori, B. tungaoi, and B. vindumi), eight are nonpentadactyl with incompletely developed limbs and reduced numbers of digits (B. bonitae, B. cebuensis, B. elerae, B. muntingkamay, B. pathfinderi, B. samarensis, B. tridactylus, and B. wrighti), and five are entirely limbless (B. apus, B. minimus, B. miriamae, B. lukbani, and B. vermis).

Among the nonpentadactyl species, numerous studies have documented a wide range of limb- and digit-reduced states, from minute limbs with 0–3 digits (B. bonitae, B. cebuensis, B. muntingkamay, B. samarensis, B. tridactylus), to moderately developed limbs with four to five digits on the hands and feet (B. elerae, B. pathfinderi, B. wright; Duméril and Bibron, 1839; Brown, 1956; Brown and Rabor, 1967; Brown and Alcala, 1980; Taylor, 1917, 1918, 1925; Siler, 2010; Siler et al., 2009, 2010a, 2011a,b,c.; Siler and Brown, 2011). All species are semifossorial and typically found in dry, rotting material inside or underneath decaying logs or in loose soil, forest floor detritus, and leaf litter.

Although the genus was named well over 150 yr ago (Duméril and Bibron, 1839), the rate of Brachymeles species descriptions reached an apparent asymptotic maximum in
1980 (Brown and Alcala, 1980). The one exception is *B. minimus*, a legless species described in 1995 (Brown and Alcala, 1995). For more than a century, limited numbers of specimens in museum collections, combined with the similar body plans and external morphological features among species of *Brachymeles*, limited assessments of species-level diversity (Brown, 1956; Brown and Alcala, 1980; Brown and Rabor, 1967; Taylor, 1917). Recent studies have revealed the species-level diversity within *Brachymeles* to be drastically underestimated, and have identified numerous nonmonophyletic species complexes within the Philippines (Siler and Brown, 2010, 2011; Siler et al., 2011a).

Additionally, several rare, mid-to-high elevation species long represented by only a few specimens (e.g., *B. bicolor*, *B. elerae*, *B. wrighti*, *B. pathfinderi*) have recently been rediscovered (Siler, 2010) and redescribed as valid taxa (Siler et al., 2011a, c). Together, these studies coupled with increased sampling throughout the Philippines and a new, robust molecular dataset, allow us to begin evaluating variation across the isolated populations of widespread species in the Philippines.

In a recent study, Siler and Brown (2010) revised two polytypic species (*B. boulengeri* and *B. schadenbergi*) and one widespread species (*B. talinis*), and inferred the presence of 10 genetically and morphologically distinct allopatric evolutionary lineages (species). Several other species are still recognized as having widespread distributions that span historical faunal demarcations in the Philippines (Brown and Diesmos, 2002, 2009; Brown and Guttman, 2002; Heaney, 1985), including *B. samarensis* and *B. bonitae* (Brown, 1956; Brown and Rabor, 1967; Brown and Alcala, 1980). One of these species (*B. samarensis*) is the focus of this study.

**Taxonomic History**

The genus *Brachymeles* was first described by Dumeril and Bibron (1839) for the small, limb-reduced species *B. bonitae*. Three additional species (*Senira bicolor* Gray, 1845; *Eumeces (Riopa) gracilis* Fischer, 1885; *E. (R.) schadenbergi* Fischer, 1885) were transferred to the genus by Boettger (1886) and Bouleguer (1887). These four species represented the known diversity in the genus for 30 yr, until Taylor published a series of herpetofaunal descriptions in the early 1900s (Taylor, 1917, 1918, 1922, 1925). It would be 50 yr before Brown (1956) described *B. samarensis* from a single juvenile specimen (FMNH 44472) collected in Guiuan, Samar Island, Philippines in 1945. At the time of description, Brown (1956) hypothesized the species was most closely related to *B. elerae* due to similarities in the number of paravertebral scale rows. This single juvenile would remain the only vouchered specimen of this unique biaxial species from Samar Island (Siler and Brown, 2010).

By the time Brown and Rabor (1967) revised the genus *Brachymeles*, samples of specimens morphologically similar to *B. samarensis* had been collected from the islands of Luzon and Leyte. Additionally, Brown and Rabor (1967) reported on a second specimen from Samar Island; however, no information on where the specimen was deposited, or its museum catalog number, was provided. Although Brown and Rabor (1967) treated *B. samarensis* as a single widespread species, they referred to the species as a “complex,” suggesting that they suspected it contained multiple species. They also noted several distinct morphological differences between island populations, including differences in fore- and hind-limb digit number and head scale patterns.

Additional island populations of *B. samarensis* were subsequently sampled by the time Brown and Alcala (1980) revised the genus, including populations from the Lapinig Group islands off the northeast coast of Bohol Island (Fig. 1). Ross and Gonzales (1992) would later report on observations of *B. samarensis* from Catanduanes Island off the northeast coast of the Bicol Peninsula (Fig. 1) and in 2001, RMB (unpublished data) recorded *B. samarensis* on the southern tip of the Bicol Peninsula in the foothills of Mt. Bulusan.

To date, *Brachymeles samarensis* remains a widespread species spanning islands of the Luzon and Mindanao Pleistocene Aggregate Island Complexes (PAICs; Brown and Diesmos, 2002; Brown and Guttman, 2002; Fig. 1). Widespread distributions such as this have been the focus of many recent studies (Brown et al., 2000; Siler and Brown, 2010;
Siler et al., 2010a,b; Welton et al., 2009, 2010a,b), which have revealed that few endemic Philippine reptiles actually possess broad distributions spanning these regional faunistic boundaries (reviewed by Brown and Diesmos, 2009).

The goal of the present study is to revise the taxonomy of the *B. samarensis* complex such that individual units (species) represent independently evolving, cohesive lineage segments (sensu de Queiroz, 1998, 1999; Frost and Hillis, 1990; Simpson, 1961; Wiley 1978). Comprehensive examination of all recently collected specimens from throughout the known range of *B. samarensis* results in the reorganization of the species complex into six distinct evolutionary lineages (species). In this paper we provide a phylogenetic analysis of all of these taxa, fully describe each species, clarify taxonomic boundaries, and provide the first illustrations of all included species. We also provide information on each species’ natural history, ecology, and geographic distribution.

**Materials and Methods**

**Field Work, Sample Collection, and Specimen Preservation**

Fieldwork was conducted on Catanduñas, Lapinig Grande, Leyte, Luzon, and Samar islands, all in the Philippines (Fig. 1) between 2001 and 2009. Specimens were collected between 900 and 1600 h, euthanized in aqueous chloreton, dissected for tissue samples (liver preserved in 95% ethanol or flash frozen in liquid nitrogen), fixed in 10% formalin, and eventually (<2 mo) transferred to 70% ethanol. Newly sequenced specimens are deposited in US and Philippine museum collections (see Acknowledgments and Appendix I, Additional Specimens Examined); voucher information corresponding to data from GenBank sequences is included in Table 1. Museum abbreviations for specimens examined follow Leviton et al. (1985).

**Taxon Sampling and Outgroup Selection for Phylogenetic Analyses**

Because our primary goal was to estimate phylogenetic relationships among the various populations of *Brachymeles samarensis* we sequenced only a few exemplars (2–4) per sampled population. We included samples of *Lygosoma bowringi* as an outgroup based on relationships presented in recent phylogenetic studies of the genus *Brachymeles* (Siler et al., 2011b; Siler and Brown, 2011). Additionally, we included samples of *B. apus, B. bonitae, B. cebuensis, B. lukbani, and B. minimus* to explore the sister group relationships within the *B. samarensis* complex (Siler et al., 2011b; Siler and Brown, 2011). A total of 28 ingroup samples were used in the phylogenetic analyses.

**DNA Extraction, Purification, and Amplification**

We extracted total genomic DNA from tissues (Table 1) using the modified guanidine thiocyanate extraction method of Esselstyn et al.
<table>
<thead>
<tr>
<th>Species</th>
<th>Voucher</th>
<th>Locality</th>
<th>ND1</th>
<th>ND2</th>
<th>α-enolase</th>
<th>PTGER4</th>
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<td>JN981975</td>
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<td>JN981962</td>
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<td>HQ906969</td>
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</table>

1 Holotype.  
2 Paratopotype.  
3 Paratype.
The mitochondrial NADH dehydrogenase subunit 1 (ND1), NADH dehydrogenase subunit 2 (ND2), and the protein-coding nuclear loci, α-enolase and PTGER4, were completely sequenced for nearly all samples using the primers and protocols provided in Siler et al. (2011b) and Siler and Brown (2011). We purified polymerase chain reaction templates with 1 mLo fa2 0 % s o l u t i o n o f E x o S A P - I T (US78201, Amersham Biosciences, Piscataway, NJ). Cycle-sequencing reactions were completed with the same primers and ABI Prism BigDye Terminator chemistry (Ver. 3.1; Applied Biosystems, Foster City, CA). Cycle-sequencing products were purified with Sephadex Medium (NC9406038, Amersham Biosciences) in Centri-Sep 96 spin plates (CS-961, Princeton Separations, Princeton, NJ). We analyzed purified polymerase chain reaction templates with 1 µL of a 20% solution of ExoSAP-IT (US78201, Amersham Biosciences, Piscataway, NJ). Cycle-sequencing reactions were completed with the same primers and ABI Prism BigDye Terminator chemistry (Ver. 3.1; Applied Biosystems, Foster City, CA). Cycle-sequencing products were purified with Sephadex Medium (NC9406038, Amersham Biosciences) in Centri-Sep 96 spin plates (CS-961, Princeton Separations, Princeton, NJ). We analyzed purified products using an ABI Prism 3130xl Genetic Analyzer (Applied Biosystems), and gene sequences were assembled with Sequencher 4.8 (Gene Codes Corp., Ann Arbor, MI).

**Alignment and Phylogenetic Analysis**

Initial alignments of the gene regions were produced in Muscle v3.7 (Edgar, 2004) and manual adjustments were made in MacClade 4.08 (Maddison and Maddison, 2005). No instances of insertions or deletions, or ambiguously aligned regions, were observed in the data, and all data were used for analyses. The final alignment consisted of 2570 nucleotide positions.

Phylogenetic analyses were conducted using parsimony and likelihood optimality criteria, as well as Bayesian methods. Parsimony (MP) analyses were conducted in PAUP* 4.0 (Swofford, 2002) with all characters weighted equally. Most-parsimonious trees were estimated using heuristic searches with 1000 random addition-sequence replicates and tree bisection and reconnection (TBR) branch swapping. To assess heuristic support, non-parametric bootstrapping was conducted using 1000 replicates, each with 100 random addition-sequence replicates and TBR branch swapping.

Partitioned maximum likelihood (ML) analyses were conducted in RAxMLHPC v7.04 (Stamatakis, 2006). The alignment was partitioned into eight regions consisting of the codon positions of ND1 and ND2, and the two nuclear loci, α-enolase and PTGER4, following the methods of Siler et al. (2011b) and Siler and Brown (2011). Analyses that partition protein-coding genes by codon position have been shown to improve resulting inferences (Brandley et al., 2005). The partitions were run under the same generalized time-reversible model (GTR + I) with 100 replicate best-tree inferences. Each inference was performed with a random starting tree and relied on the rapid hill-climbing algorithm (Stamatakis, 2006). Clade support was assessed with 1000 bootstrap pseudoreplicates. We considered branches receiving ≥70% bootstrap support to be well supported (Wilcox et al., 2002).

The Akaike Information Criterion, as implemented in jModeltest v0.1.1 (Guindon and Gascuel, 2003; Posada, 2008), was used to select the best model of nucleotide substitution for each partition (Table 2). The best-fit model for each of the eight partitions (Table 2) was used for Bayesian analyses performed in MrBayes 3.1 (Ronquist and Huelsenbeck, 2003). The same partitioning strategy used for ML analyses was used for Bayesian inferences. Searches over tree space were conducted with four runs, each with four chains, and were run for $2 \times 10^7$ generations.

<table>
<thead>
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<th>Partition</th>
<th>AIC Model</th>
<th>Model applied</th>
<th>Number of characters</th>
</tr>
</thead>
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<td>GTR + I + G</td>
<td>GTR + G</td>
<td>322</td>
</tr>
<tr>
<td>ND1, 2nd codon position</td>
<td>GTR + I + G</td>
<td>GTR + G</td>
<td>322</td>
</tr>
<tr>
<td>ND1, 3rd codon position</td>
<td>GTR + I + G</td>
<td>GTR + G</td>
<td>322</td>
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<tr>
<td>ND2, 1st codon position</td>
<td>TVM + I + G</td>
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</tr>
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<td>GTR + I + G</td>
<td>GTR + G</td>
<td>287</td>
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<tr>
<td>ND2, 3rd codon position</td>
<td>TVM + I + G</td>
<td>GTR + G</td>
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</tr>
<tr>
<td>α-enolase</td>
<td>TVMef + G</td>
<td>GTR + G</td>
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<tr>
<td>PTGER4</td>
<td>HKY + I + G</td>
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<td>490</td>
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</table>

1 The model GTR + G was used for partitioned RAxMLHPC analyses.
Trees were sampled every 1000 generations, with 4000 samples discarded as burn-in; this left 16,001 post–burn-in trees from each run included in the posterior distribution of topologies. Visual inspection for chain stationarity and high effective sample size (ESS) values (equal to or greater than 800) was conducted within the program Tracer v1.4 (Rambaut and Drummond, 2007). Additionally, correlations of split frequencies and cumulative split frequencies were examined using the program AWTY (Nylander et al., 2008). We considered topologies with posterior probabilities ≥0.95 to be well supported (Leaché and Reeder, 2002; Wilcox et al., 2002).

**Morphological Data**

We examined fluid-preserved specimens (Appendix I) for variation in qualitative and mensural characters. Sex was determined by gonadal inspection, and measurements were taken to the nearest 0.1 mm with digital calipers by C. D. Siler. X-rays were taken with a company cabinet X-ray on Kodak MIN-R 2000 film exposed at 5 mA and 30 V for 1 min 15 s.

Meristic and mensural characters were chosen based on Siler et al. (2009, 2010a,b): snout–vent length (SVL), axilla–groin distance (AGD), total length, midbody width (MBW), midbody height (MBH), tail length (TL), tail width (TW), tail height (TH), head length (HL), head width (HW), head height, snout–forearm length (SnFa), eye diameter (ED), eye–narial distance (END), snout length (SNL), internarial distance (IND), forelimb length (FLL), hind limb length (HLL), midbody scale-row count, paravertebral scale-row count, axilla–groin scale-row count, Finger-III lamellae count, Toe-IV lamellae count, supralabial count, infralabial count, supraciliary count, and supraocular count. Additionally, we counted the number of presacral vertebrae from X-ray images of specimens. In the description, ranges are followed by mean ± SD in parentheses.

**Species Concept**

We follow the general lineage concept of species (de Queiroz, 1998, 1999) as a logical extension of the evolutionary species concept (Frost and Hillis, 1990; Simpson, 1961; Wiley, 1978). We consider as distinct lineages those populations that are morphologically and genetically distinct, especially if allopatric. Lineage-based species concepts have been employed in the recognition of Philippine biodiversity (Brown et al., 2000, 2008b, 2009; Brown and Diesmos, 2002; Brown and Guttman, 2002; Gaulke et al., 2007; Siler and Brown, 2010; Welton et al., 2009, 2010a,b) due to the highly partitioned nature of the archipelago (Brown and Diesmos, 2009), and because the geological history of the islands has been so well documented (Hall, 2002; Voris, 2000; Yumul et al., 2009). In this study we use an estimate of phylogenetic relationships as a guide for delimiting species but restrict our diagnoses of new species to those populations that are clearly identified by diagnostic differences in nonoverlapping morphological character states.

**RESULTS**

**Phylogeny**

Of 2570 mitochondrial and nuclear characters, 848 were parsimony-informative. The maximum parsimony analysis inferred 10 most parsimonious trees (tree length = 2084; topology not shown; bootstrap support summarized in Fig. 2). The resulting 100 inferences from the partitioned RAxML ML analysis show an average likelihood score $-\ln L = 12011.371112$, with a single inference having the highest likelihood score of $-\ln L = 12011.367644$. Trees recovered from ML, MP, and Bayesian analyses are topologically identical. No inferences support the monophyly of *Brachymeles samarensis*. All analyses recover two reciprocally monophyletic clades within the *B. samarensis* complex, each characterized by the presence of multiple highly divergent, genetically distinct lineages (Fig. 2). The Leyte Island and Lapinig Group Islands populations were recovered as a clade, sister to *B. cebuensis* from Cebu Island (Fig. 2). Topotypic *B. samarensis* from Samar Island were recovered as sister to a clade of two limbless species of *Brachymeles* (*B. minimus* and *B. lukbani*) and the Luzon and Catanduánes island populations of *B. samarensis* (Fig. 2). Within Luzon Island, two separate lineages were recovered from the Bicol
Peninsula, with no support for their monophyly (Fig. 2).

In addition to the finding of paraphyly of *B. samarensis* complex members, several other recognized species were recovered as part of this clade. *Brachymeles cebuensis*, one of only two recognized species to have unequal numbers of fingers and toes (Brown and Alcala, 1980), was supported as part of a clade of species formerly part of *B. samarensis* (topotypic *B. samarensis*, *B. sp. nov. [Catan- duanes Island]*, *B. sp. nov. [Southern Bicol Peninsula, Luzon Island]*, *B. sp. nov. [Central Bicol Peninsula, Luzon Island]*; Fig. 2). All three previously recognized species (*B. cebuensis*, *B. lukbani*, *B. minimus*) have geographical distributions that overlap, or are in close proximity to, the known ranges of other species in the *B. samarensis* complex (Fig. 3). All analyses result in the strong support of six genetically distinct lineages within the *Brachymeles samarensis* species complex.

![Figure 2](image-url)

*Fig. 2.*—Maximum likelihood (ML) estimate of combined mitochondrial and nuclear data for samples of *Brachymeles* used for this study (preferred ML tree, −lnL 12011.367644; ND1, ND2, α-enolase, PTGER4). Nodes are shown with numerical values corresponding to maximum parsimony bootstrap proportions, maximum likelihood bootstrap proportions, and Bayesian posterior probabilities, respectively. Terminals are labeled with taxonomic names, fore- and hind limb digit states, and number of presacral vertebrae.
Uncorrected pairwise sequence divergences are low within the lineages defined here as species and high between these lineages (Table 3). Percentage of divergences for the mitochondrial and for the nuclear data, respectively, show that the monophyletic lineages defined by our phylogenetic analyses (B. samarensis, B. sp. nov. [Leyte Island], B. sp. nov. [Lapinig Group Islands], B. sp. nov. [Catanduanes Island], B. sp. nov. [Southern Bicol Peninsula, Luzon Island], B. sp. nov. [Central Bicol Peninsula, Luzon Island]) are distinguished from congeners by levels of genetic divergence similar to, or greater than, those between previously defined species—viz., B. bonitae, B. cebuensis, B. minimus, and B. lukbani (Table 3; Fig. 2). The two most closely related lineages, B. sp. nov. (Catanduanes Island) and B. sp. nov. (Southern Bicol Peninsula, Luzon Island), are separated by 4.1–4.7% mitochondrial sequence divergence.

Mitochondrial sequence divergences among the other three lineages within the B. samarensis species complex (B. samarensis [Samar Island], B. sp. nov. [Lapinig Group islands], B. sp. nov. [Leyte Island]) are greater than 9.2% (Table 3; Fig. 2). Intraspecific sequence divergences are low (0.0–1.9%) in comparison to divergences among monophyletic lineages. Additionally, moderate levels of sequence divergence are observed for nuclear sequence data (Table 3).

**Morphology**

Variation in morphological characters (Tables 4–6) mirrors the results observed in phylogenetic analyses, and supports the recognition of six B. samarensis group lineages. Characters differing among these six lineages include digit number, presacral vertebrae number, degree of digit development, head and body scale counts and patterns, and
pigmentation patterns (Tables 4–6; species accounts below), all of which are typical morphological diagnostic characters employed historically by taxonomists working with this genus (review: Brown and Alcala, 1980). We observed no intraspecific mensural or meristic differences between the sexes of any of the six species.

Superficially, the six lineages within the B. samarensis complex appear morphologically similar in overall body size and general shape; however, upon closer inspection, three distinct body forms are observed. Among the six lineages, two are tridactyl (B. sp. nov. [Leyte Island] and B. sp. nov. [Lapinig Group Islands]), three are bidactyl (B. samarensis, B. sp. nov. [Catanduanes Island] and B. sp. nov. [Central Bicol Peninsula, Luzon Island]), and one is bidactyl, but with small, highly reduced, and nearly imperceptible claws (B. sp. nov. [Southern Bicol Peninsula, Luzon Island]). Additionally, numerous nonoverlapping differences were detected in meristic, mensural, osteological, and color pattern characters for each complex member, readily defining six distinct lineages within the complex (Tables 4–6). In summary, each lineage (most of which are allopatric) possesses unique and nonoverlapping suites of diagnostic character states of morphology, perfectly corresponding to the six clades defined in the phylogenetic analyses of DNA sequence data.

**Taxonomic Conclusions**

Our estimate of phylogeny (Fig. 2); biogeographically separate ranges of island or region endemic species; diagnostic, nonoverlapping morphological character states; and genetic distances between the taxa (Table 3) indicate the distinctiveness of a new species from Catanduanes Island, two new species from the Bicol Peninsula of Luzon Island (one from the central Bicol region and one from the extreme southern tip of the peninsula), a new species from the Lapinig Group Islands, and a new species from Leyte Island (Table 3; Fig. 2). Each of the six species of the B. samarensis complex is morphologically distinct from each other and all other known species in the genus, and the 11 species of *Brachymeles* included in phylogenetic analyses also are genetically distinct. All monophyletic lineages,
with the exception of the two occurring on the Bicol Peninsula of Luzon Island, are endemic to single islands within two isolated PAICs, thereby providing additional support for the distinctiveness of each clade’s evolutionary history and lineage integrity. Accordingly, we recognize *B. samarensis* as a species that occurs only on Samar Island in the eastern Visayan (central) Philippine islands (e.g., Mindanao PAIC; Fig. 3), and hereby recognize the five additional lineages within the *B. samarensis* species complex as new species.

**TAXONOMIC ACCOUNTS**

*Brachymeles samarensis* Brown 1956: 6  
Figs. 3–4


**Diagnosis.**—*Brachymeles samarensis* can be distinguished from congeners by the following combination of characters: (1) body size small (SVL 57.9–66.1 mm), (2) limbs bidactyl, (3) limb length short, (4) supralabials six, (5) infralabials six, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 19–22, (9) axilla–groin scale rows 66–69, (10) paravertebral scale rows 86–88, (11) pineal eye spot present, (12) prefrontals not contacting on midline, (13) frontoparietals contact, (14) mental/first infralabial fusion absent, (15) postnasals absent, (16) enlarged chin shields in three pairs, (17) nuchal scales differentiated, (18) fourth supralabial below eye midline, (19) auricular opening absent, (20) presacral vertebrae 45, and (21) uniform body color (Tables 4 and 5).

**Comparisons.**—Characters distinguishing *Brachymeles samarensis* from all nondactyl, limbed species of *Brachymeles* are summarized in Tables 4 and 5. *Brachymeles samarensis* most closely resembles *B. bicolandia*, *B. cobos*, *B. brevidactylus*, and populations of *B. bonitae*, the only other bidactyl species. However, *B. samarensis* differs from these four taxa by having midbody scale rows as few as 19 and axilla–groin scale rows as few as 66 (Table 5). *Brachymeles samarensis* further differs from *B. bicolandia* by having fewer presacral vertebrae and six infralabials (Tables 4 and 5); from *B. brevidactylus* by having fewer presacral vertebrae and fewer paravertebral scale rows (Tables 4 and 5); and from *B. bonitae* by having longer relative hind limb lengths, fewer presacral vertebrae, fewer paravertebral scale rows, six supraoculars, five supraciliaries, and the presence of contact between frontoparietals (Tables 4 and 5).

*Brachymeles samarensis* can be distinguished from all limbless species of *Brachymeles* (*B. apus*, *B. lukbani*, *B. minimus*, *B. miritamae*, *B. verna*) by having limbs; and from all pentadactyl species of *Brachymeles* (*B. boholensis*, *B. boulenieri*, *B. bicolor*, *B. gracilis*, *B. kadwa*, *B. makusog*, *B. mindorensis*, *B. orientalis*, *B. schadenbergi*, *B. talinis*, *B. taylori*, *B. tungaoi*, *B. vindumi*) by having nonpentadactyl limbs, shorter adult forelimb lengths (less than 2.6 mm vs. greater than 5.9 mm), shorter adult hind limb lengths (less than 3.1 mm vs. greater than 10.3 mm), and a narrower body (less than 6.4 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

**Description (based on holotype description and six referred specimens).**—Details of the head scalation of an adult female are shown in Fig. 5. Measurements and character states of the holotype are provided below in square brackets. Body small, slender; SVL 57.9 mm for males, maximum SVL 66.1 mm for females, [43.5 mm, juvenile] (Tables 4 and 5); head weakly differentiated from neck, nearly as wide as body, HW 7.3–9.2% (8.3 ± 0.7) SVL, 91.4–117.8% (102.7 ± 10.8) HL; HL 36.6–42.5% (38.8 ± 2.1) SnFa; SnFa 18.8–23.5% (20.9 ± 1.6) SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 50.9–55.3% (53.3 ± 1.8) HL; ear completely hidden by scales; eyes small, ED 1.3–1.6% (1.4 ± 0.1) SVL, 17.0–18.7% (17.6 ± 0.6) HL, 42.6–48.0% (45.8 ± 2.1) END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 109.1–150.6% (130.4 ± 14.9) MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 19–22 [22]; paravertebral scale rows 86–88 [86]; axilla–groin scale rows 66–69; limbs short, poorly developed, with digits reduced to two claws on both forelimbs and hind limbs, finger and toe lamellae absent;
Table 4.—Summary of meristic and mensural characters in all known limbed, nonpentadactyl species of *Brachymeles*. Sample size, body length, and total length (TotL) among males and females, and general geographical distribution (Pleistocene Aggregate Island Complexes [PAIC], sensu Brown and Diesmos, 2002) are included for reference. SVL = snout–vent length, TotL = total length, TL = tail length, FLL = forelimb length, HLL = hind limb length, ToeIVlam = toe-IV lamellae count. (SVL, TotL, MBW, FLL, and HLL given as range over mean ± SD; all body proportions given as percentage over mean ± SD).

<table>
<thead>
<tr>
<th>Range</th>
<th>B. samarensis (1 male, 5 females)</th>
<th>B. paeforum (3 males, 9 females)</th>
<th>B. libangan (10 males, 25 females)</th>
<th>B. bicocolana (6 males, 10 females)</th>
<th>B. cobos (9 females)</th>
<th>B. brevidactylus (1 male, 2 females)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVL (female)</td>
<td>62.4–66.1 (63.4 ± 1.5)</td>
<td>47.2–61.4 (56.5 ± 4.2)</td>
<td>52.8–66.1 (58.6 ± 3.3)</td>
<td>46.4–67.4 (59.0 ± 6.7)</td>
<td>54.0–64.4 (57.8 ± 3.5)</td>
<td>54.0, 60.0</td>
</tr>
<tr>
<td>SVL (male)</td>
<td>57.9 (63.4 ± 1.5)</td>
<td>62.4–66.1 (56.0 ± 1.6)</td>
<td>52.7–57.4 (61.7 ± 3.5)</td>
<td>56.4–66.1</td>
<td>—</td>
<td>56.8</td>
</tr>
<tr>
<td>TotL (female)</td>
<td>97.7–112.9 (107.3 ± 8.3)</td>
<td>99.5–108.5 (102.6 ± 5.1)</td>
<td>91.4–111.2 (102.2 ± 6.4)</td>
<td>94.1–112.7 (102.1 ± 8.8)</td>
<td>102.2–109.4 (106.2 ± 2.7)</td>
<td>92.3, 95.2</td>
</tr>
<tr>
<td>TotL (male)</td>
<td>93.0 (110.6 ± 5.6)</td>
<td>106.7–114.6 (99.4 ± 4.5)</td>
<td>92.1–103.4 (104.1 ± 4.2)</td>
<td>99.6–107.9 (102.0)</td>
<td>102.0</td>
<td>90–98</td>
</tr>
<tr>
<td>TL/SVL</td>
<td>57–81 (68 ± 12)</td>
<td>69–79 (75 ± 4)</td>
<td>63–84 (72 ± 6)</td>
<td>59–93 (75 ± 12)</td>
<td>76–96</td>
<td>70–11</td>
</tr>
<tr>
<td>FLL</td>
<td>1.1–2.6 (1.8 ± 0.5)</td>
<td>1.3–1.7 (1.5 ± 0.1)</td>
<td>1.1–1.8 (1.3 ± 0.2)</td>
<td>1.1–1.9 (1.4 ± 0.3)</td>
<td>1.4–2.1 (1.7 ± 0.2)</td>
<td>1.5–0.2</td>
</tr>
<tr>
<td>FLL/SVL</td>
<td>2–4 (3 ± 1)</td>
<td>2–4 (2 ± 1)</td>
<td>1.5–3.6 (2 ± 0)</td>
<td>1.5–3.6 (2 ± 0)</td>
<td>3–3</td>
<td>2–3</td>
</tr>
<tr>
<td>HLL</td>
<td>2.5–3.1 (2.9 ± 0.2)</td>
<td>2.3–3.0 (2.6 ± 0.3)</td>
<td>2.0–2.7 (2.4 ± 0.2)</td>
<td>1.9–3.1 (2.6 ± 0.3)</td>
<td>2.5–3.6 (3.0 ± 0.3)</td>
<td>2.1–2.7</td>
</tr>
<tr>
<td>HLL/SVL</td>
<td>4–5 (5 ± 0)</td>
<td>4–5 (4 ± 0)</td>
<td>3–5 (4 ± 0)</td>
<td>3–5 (4 ± 1)</td>
<td>4–6</td>
<td>4–5</td>
</tr>
<tr>
<td>ToeIVlam</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

FLL 2.4–5.7% (3.9 ± 1.3) AGD, 1.8–3.9% (2.9 ± 0.9) SVL; HLL 5.3–7.2% (6.2 ± 0.7) AGD, 4.0–5.0% (4.6 ± 0.4) SVL [6.9]; tail not as wide as body, gradually tapered towards end, TW 70.2–82.6% (76.7 ± 5.0) MBW, TL 56.5–80.6% (68.4 ± 11.6) SVL.

Rostral projecting onto dorsal snout to level in line with middle of nasal, broader than high, in contact with frontonasal; frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterosdorsally; supra- nals present, large, broadly separated; postna- sals absent; prefrontals moderately separated; frontal octagonal-shaped, its anterior margin in moderate contact with frontonasal, in contact with first two anterior supraoculars, 3× wider than anterior supraocular; supraoculars five; frontoparietals moderate, in broad medi- cal contact, each frontoparietal in contact with supraoculars 2–4; interparietal moderate, its length roughly equal to midline length of frontoparietal, longer than wide, diamond- shaped, wider anteriorly; parietals broader than frontoparietals, in broad contact behind interparietal; nuchals enlarged; loreals two, anterior loreal about as long as and slightly higher than posterior loreal; preocular one; presupraborcular one; supralabials six, the an- teriormost contacting prefrontal and separating posterior loreal from first supraocular, poste- riormost extending to posterior edge of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first twice the anteroposterior length of others, fourth below eye midline; infralabials six (Fig. 4).

Mental wider than long, in contact with first infralabials; postmental single, enlarged, its width equal to width of mental; followed by three pairs of enlarged chin shields, first pair in broad medial contact, second pair wider than first, broadly separated by single medial scale, third pair separated by three medial scales (Fig. 4).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales, each with irregular raised anterior edges;
fingers in size; toes unequal in size, middle digit greatest in length, first and third digits equal in length.

Coloration in preservative.—Body ground color medium brown, each dorsal scale light brown posteriorly, with a dark auburn streak on the anterior two-thirds to half of the scale. Dark streaks on each scale consist of four to seven thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, more distinct on venter, where posterior ends of scales are cream, giving greater contrast. Posterior edge of all body scales transparent. Forelimb and hind limb scales same color as body scales. Precloacal scale coloration matches surrounding ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Supraocular, rostral, nasal, supranasal, and supralabial scales gray-cream. Mental, infralabial, postmental, and chin shields scales cream with slight brown mottling, lighter than bordering ventral scales.

Coloration in life.—Coloration in life closely matches the coloration in preservative with minor differences, including a dark brown body color and dark brown to black streaks of pigmentation.

Variation.—Morphometric variation of the series is summarized in Table 6. We observed a single instance of digit variation, where one specimen (KU 310849) has no fingers and two toes. All specimens have two loreals with the exception of a single specimen (KU 310852), which has a single loreal on the right side of the body resulting from the fusion of the two scales in this position. Additionally, the first and second pairs of enlarged chin shields are equal in width among all specimens with the exception of a single specimen (KU 310850), in which the width of the second pair of enlarged chin shields is greater than the width of the first pair.

Distribution.—Brachymeles samarensis is known only from Samar Island (Fig. 3).

Ecology and natural history.—Brachymeles samarensis occurs in primary- and secondary-growth forest habitats. In contrast to the other members of the B. samarensis complex, this species appears to be a forest obligate, and was only observed within rotting logs in...
secondary-growth forest. Three species of *Brachymeles* have been confirmed to occur on Samar Island: *B. gracilis hilong*, *B. orientalis*, and *B. samarensis* (Brown and Alcala, 1980; Siler and Brown, 2010). We have evaluated this species against the International Union for Conservation of Nature (IUCN) criteria for classification, and find that it does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status. *Brachymeles samarensis* has been documented to have a broad geographic distribution across southern Samar Island. We therefore classify this species as having Least Concern status (IUCN, 2011).

Other sympatric lizard species observed on Samar Island include the following: (Agamidae) *Bronchocela cristatella*, *Draco bimaculatus*, *D. ornatus*, *D. reticulates*, *Gonocephalus semperi*, *Hydrosaurus pustulatus*; (Gekkonidae) *Cyrtodactylus annulatus*, *C. sumoroi*, *Gehyra mutilata*, *Gekko gecko*, *Gekko mindorensis*, *Hemidactylus frenatus*, *H. platyurus*, *Hemiphyllodactylus typus*, *Lepidodactylus aureolineatus*, *L. planicaudus*, *Pseudogekko compressicorpus*; (Scincidae) *Emoia atrocostata*, *Eutropis multicarinata*, *Lamprolepis smaragdina*, *Lipinia pulchella*, *L. quadrivittata*, *Sphenomorphus acutus*, *S. cunningi*, *S. fasciatus*, *S. jagori*, *S. cf. mindanensis*, *S. steerei*, *S.

<table>
<thead>
<tr>
<th>Number of digits (fore/hind)</th>
<th>B. samarensis (1 male, 5 females)</th>
<th>B. parviformis (3 males, 5 females)</th>
<th>B. libyani (10 males, 25 females)</th>
<th>B. bicolaedus (6 males, 10 females)</th>
<th>B. coho (9 females)</th>
<th>B. brevidactylus (1 male, 2 females)</th>
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<td>PSV</td>
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<td>6 (16)</td>
<td>6 (9)</td>
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<td>6 (16)</td>
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<td>First chin shield pair contact</td>
<td>Present</td>
<td>Present or Absent</td>
<td>Present or Absent</td>
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<td>1(0); 2(1);</td>
<td>1(0/1); 2(1);</td>
<td>1(0/1); 2(1);</td>
<td>1(0/1); 2(1);</td>
<td>1(0); 2(1);</td>
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<td>Present or Absent</td>
<td>Present or Absent</td>
<td>Present or Absent</td>
<td>Present or Absent</td>
<td>Present or Absent</td>
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</tr>
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<td>Differentiated nuchals</td>
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<td>Present</td>
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<tr>
<td>Continuous subocular scale row</td>
<td>Present</td>
<td>Present</td>
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<td>Dorsolateral stripes</td>
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<td>Longitudinal rows of dark spots</td>
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1Parentheses show the number of small ventral scale rows separating each enlarged pair of chin shields.

2Due to head damage in the nuchal region for both known specimens of *B. wrighti*, the presence of differentiated nuchals remains tentative.
Brachymeles paeforum sp. nov.

Figs. 3, 6, 7

**Holotype.**—PNM 9746 (CDS Field No. 3418, formerly KU 311228), adult female, collected under rotting logs in secondary-growth forest (1000 to 1230 h) on 8 November 2007 in the Sitio San Vicente Tree Nursery, Barangay Pilim, Baybay City, Leyte Province, Leyte Island, Philippines (10°43’35”N, 124°49’05”E; WGS-84), by CDS and J. Fernandez.

**Paratopotypes.**—One adult male (KU 311225), one adult female (KU 311229), and three juveniles (KU 311224, PNM 9747–48) collected between 29 October and 8 November 2007.

**Other paratypes.**—One adult male (CAS-SU 26120), four adult females (CAS-SU 26110, 26112, 26121–22), and two juveniles (CAS-SU 26115, 26123) collected between 1 May and 4 June 1964, in Barrio Tambis, Municipality of Burauen, Leyte Province, Leyte Island, Philippines (11°00’37”N, 124°52’19”E; WGS-84), by D. S. Rabor; one adult male (CAS-SU 26771), two adult females (CAS-SU 26770, 26772), and one juvenile (CAS-SU 26773), collected between 10 June and 17 July 1964, in the Municipality of Mahaplag, Leyte Province, Leyte Island, Philippines (10°35’42”N, 124°59’13”E; WGS-84), by D. S. Rabor.
Table 6.—Summary of univariate morphological variation among mensural characters in series of *Brachymesodes samarensis*, *B. paeforum*, *B. libyani*, *B. biculandia*, *B. cobos*, and *B. brevidactylus*. SVL = snout-vent length, AGD = axilla-groin distance, TotL = total length, MBW = midbody width, MBH = midbody height, TL = tail length, TW = tail width, TH = tail height, HL = head length, HW = head width, HH = head height, SnFa = snout-forearm length, ED = eye diameter, END = eye-narial distance, SNL = snout length, IND = internarial distance, FLL = forelimb length, HLL = hind limb length.

| SVL (male) | 57.9 |
| SVL (female) | 62.4–66.1 (63.4 ± 1.5) |
| AGD (male) | 40.3 |
| AGD (female) | 45.3–50.3 (47.6 ± 1.8) |
| TotL (male) | 93.0 |
| TotL (female) | 97.7–112.9 (107.3 ± 8.3) |
| MBW (male) | 5.7 |
| MBW (female) | 5.2–6.4 (5.7 ± 0.5) |
| MBH (male) | 4.0 |
| MBH (female) | 4.3–4.8 (4.5 ± 0.2) |
| TL (male) | 35.1 |
| TL (female) | 35.3–50.4 (44.5 ± 8.1) |
| TW (male) | 4.1 |
| TW (female) | 4.1–4.6 (4.4 ± 0.2) |
| TH (male) | 3.5 |
| TH (female) | 3.5–3.9 (3.8 ± 0.2) |
| HL (male) | 5.3 |
| HL (female) | 4.8–5.2 (5.0 ± 0.2) |
| HW (male) | 5.1 |
| HW (female) | 4.6–5.8 (5.2 ± 0.5) |
| HH (male) | 3.5 |
| HH (female) | 3.4–4.2 (3.9 ± 0.3) |
| SnFa (male) | 13.6 |
| SnFa (female) | 11.7–14.1 (12.9 ± 0.9) |
| ED (male) | 0.9 |
| ED (female) | 0.8–1.0 (0.9 ± 0.1) |
| END (male) | 1.9 |
| END (female) | 1.8–2.2 (1.9 ± 0.1) |
| SNL (male) | 2.7 |
| SNL (female) | 2.6–2.9 (2.7 ± 0.1) |
| IND (male) | 1.4 |
| IND (female) | 1.1–1.4 (1.3 ± 0.1) |
| FLL (male) | 2.3 |
| FLL (female) | 1.1–2.6 (1.7 ± 0.5) |
| HLL (male) | 2.9 |
| HLL (female) | 2.5–3.1 (2.8 ± 0.2) |
Diagnosis.—*Brachymeles paeforum* can be distinguished from congeners by the following combination of characters: (1) body size small (SVL 47.2–66.1 mm), (2) limbs tridactyl, (3) limb length short, (4) supralabials six, (5) infralabials five or six, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 21–22, (9) axilla–groin scale rows 71–74, (10) paravertebral scale rows 93–96, (11) pineal eye spot present, (12) prefrontals not contacting on midline, (13) frontoparietals contact, (14) enlarged chin shields in three pairs, (15) nuchals enlarged, (16) fourth supralabial below eye midline, (17) auricular opening absent, (18) presacral vertebrae 47, and (19) uniform body color (Tables 4 and 5).
Comparisons.—Characters distinguishing *Brachymeles paeforum* from all nonpentadactyl, limbed species of *Brachymeles* are summarized in Tables 4 and 5. *Brachymeles paeforum* most closely resembles *B. libayani*, *B. muntingkamay*, and *B. tridactylus*, the only other tridactyl species, but differs from these three taxa by having five or six infralabials (Table 5). *Brachymeles paeforum* further differs from *B. libayani* by having longer body lengths among males, longer relative forelimb lengths, a greater number of paravertebral scale rows, and a uniform body color (Tables 4 and 5); from *B. muntingkamay* by having a shorter maximum body length, shorter forelimb lengths, shorter hind limb lengths, a greater number of axilla–groin scale rows, a greater number of paravertebral scale rows, six supraciliaries, five supraoculars, the presence of a pineal eyespot, contact between

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**Fig. 5.**—Illustration of head of adult male holotype *Brachymeles bicolandia* (PNM 9756; formerly KU 324003) and adult female holotype *Brachymeles cobos* (PNM 9761; formerly KU 324023) in dorsal, lateral, and ventral views. Labels for taxonomically diagnostic head scales follow those shown in Fig. 4. Illustrations by CDS, AMF, and RMJ.
from frontoparietals, differentiated nuchals, and a continuous subocular scale row, and the absence of contact between prefrontals and longitudinal rows of spots around the body (Tables 4 and 5); and from *B. tridactylus* by having a shorter maximum body length, shorter relative tail length, shorter forelimb length, a greater number of presacral vertebrae, six supralabials, six supraciliaries, five supraoculars, the presence of contact between frontoparietals, the presence of a continuous subocular scale row, and the absence of longitudinal rows of spots around the body (Tables 4 and 5).

*Brachymeles paeforum* can be distinguished from all limbless species of *Brachymeles* (*B. apus, B. lukbani, B. minimus, B. miriamae, B. vermis*) by having limbs; and from all penta-dactyl species of *Brachymeles* (*B. boholensis, B. boulengeri, B. bicolor, B. gracilis, B. kadwa, B. libayani*).
B. makusog, B. mindorensis, B. orientalis, B. schadenbergi, B. talinis, B. taylori, B. tungaoi, B. vindumi) by having nonpentadactyl limbs, shorter forelimb lengths (less than 1.7 mm vs. greater than 5.9 mm), shorter hind limb lengths (less than 3.0 mm vs. greater than 10.3 mm), a narrower body (less than 5.3 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

Description of holotype.—Details of the head scalation are shown in Fig. 7. Adult female, body small, slender, SVL 59.1 mm; head weakly differentiated from neck, nearly as wide as body, HW 6.5% SVL, 105.5% HL; HL 31.5% SnFa; SnFa 19.5% SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 71.2% HL; ear completely hidden by scales; eyes small, ED 1.7% SVL, 27.5% HL, 56.2% END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 126.7% MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 22; paravertebral scale rows 93; axilla–groin scale rows 71; limbs short, poorly developed, with digits reduced to three claws on both forelimbs and hind limbs, finger and toe lamellae absent; FLL 2.7% AGD, 2.1% SVL; HLL 5.2% AGD, 4.1% SVL; tail not as wide as body, gradually tapered towards end, TW 73.7% MBW, TL 69.4% SVL.

Rostral projecting onto dorsal snout to level in line with posterior edge of nasal, broader than high, in contact with frontoanal; fronto-nasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterodorsally; supranasals present, large, broadly separated; postnasals absent; prefrontals broadly separated; frontal nearly diamond-shaped, its anterior margin in moderate contact with frontoanal, in contact with first two anterior supraoculars, 4× wider than anterior supraocular; supraoculars five; frontoparietals moderate, in narrow medial contact, each frontoparietal in contact with supraoculars 2–4; interparietal moderate, its length roughly equal to midline length of frontoparietal, longer than wide, diamond-shaped, wider anteriorly; parietals as broad as frontoparietals, in broad contact behind interparietal; enlarged nuchals present; loreals two, anterior loreal about as long as and slightly higher than posterior loreal; preocular one; presubocular one; supraciliaries six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular, posteriormost extending to middle of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first twice the anteroposterior length of others, fourth below eye midline; infralabials six (Fig. 6).

Mental wider than long, in contact with first infralabials; postmental single, enlarged, its width greater than width of mental; followed by three pairs of enlarged chin shields, first pair in broad medial contact, equal in width to third pair, second pair wider than first and third, broadly separated by single medial scale, third pair separated by three medial scales (Fig. 6).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales, each with irregular raised anterior edges; fingers equal in size; toes unequal in size, middle digit greatest in length, first and third digits equal in length.

Coloration in preservative.—Body ground color medium brown, each dorsal scale light brown posteriorly, with a dark auburn streak on the anterior two-thirds to half of the scale. Dark streaks on each scale consist of four to six thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, more distinct on venter, where posterior ends of scales are cream, giving greater contrast. Subcaudal scales with reduced dark pigmentation. Postcloacal scale coloration lighter than surrounding ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Rostral, nasal, supranasal, and first supralabial scales cream, lighter than supraocular scales. Supraocular scales light gray-umber. Supralabial, infralabial, postmental, and chin shields scales beige with slight light brown mottling.

Coloration in life.—Coloration in life (Fig. 7) closely matches coloration in preservative with
minor differences, including a dark brown body color and dark brown to black streaks of pigmentation.

Variation.—Morphometric variation of the series is summarized in Table 6. We observed a single instance of digit variation in which one specimen (KU 311225) has two toes. The pineal eyespot was absent in a single specimen (CAS-SU 26120) and present in all others. The number of infralabials ranged from nearly 70% (11/16) of the specimens possessing six infralabials (CAS-SU 26110, 26112, 26123, 26772, 26120, 26771, KU 311224–8), to five specimens possessing five infralabials (CAS-SU 26121–2, 26770, 26773, KU 311229). Five specimens have enlarged mental scales resulting from fusion with the first infralabial (CAS-SU 26121–2, 26770, 26773, KU 311229). All specimens have two loreals on each side of the head, with the exception of four specimens, which have single, enlarged loreals on both sides of the head (KU 311227) or on only the left side (KU 311224–5, 311229).

Distribution.—Brachymeles paeforum is known only from Leyte Island (Fig. 3).

Ecology and natural history.—Brachymeles paeforum occurs in agricultural habitats, as well as in disturbed and secondary-growth forest. Little lower-elevation original forest remains on Leyte Island, but we assume the species once also occurred in first-growth forest at low elevations. Individuals have been observed in the rotting material within fallen logs and in leaf litter surrounding the root networks of trees. Similar to B. samarensis, this species is found in sympathy with B. orientalis and B. gracilis hilong.

We have evaluated this species against the IUCN criteria for classification, and find that it does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status. Brachymeles paeforum has been documented to have a broad geographic distribution on Leyte Island, and has been observed to be moderately abundant in a variety of habitats. We therefore classify this species as one of Least Concern (IUCN, 2011).

Other lizard species observed in sympathy on Leyte Island include the following: (Agamidae) Bronchocea cristatella, Draco bimaculatus, D. ornatus, D. reticulatus, Gonocephalus semperi, Hydrosaurus pustulatus; (Gekkonidae) Cyrtodactylus annulatus, C. gubao, Gehyra mutilata, Gekko gecko, Gek. mindorensis, Hemidactylus frenatus, H. platyurus, Hemiphyllodactylus typus, Lepidodactylus aureolineatus, L. planicaudus, Pseudegkeko compressicorpus; (Scincidae) Emoia atrocostata, Eutropis multiscarinata, Eu. multifasciata, Lamprolepis smaragdina, Lipinia pulchella, Li. quadricvittata, Sphenomorphus acutus, S. cumingi, S. fasciatus, S. jagori, S. cf. mindanensis, S. steeri, S. variegatus, Tropidophorus misaminus; (Varanidae) Varanus camingi samarensis.

Etymology.—CDS is pleased to name this new species in honor of the Philippine-American Education Foundation (PAEF), in honor of their continued support and contributions to our Philippine biodiversity research program. As the Fulbright Commission in the Philippines, PAEF is responsible for leading the advancement of international exchange programs between the United States and the Philippines, with the mission of promoting mutual understanding between citizens of both countries. Suggested common name: The PAEF Slender Skink.

Brachymeles libayani sp. nov.

Figs. 3, 6, 8

Holotype.—PNM 9749 (CDS Field No. 3700, formerly KU 320466), adult male, collected under rotting coconut husks in secondary-growth forest (1000 to 1230 h) on 21 March 2009, in Barangay Villa Milagrosa, Municipality of President Carlos P. Garcia, Bohol Province, Lapinig Grande Island, Philippines (10°07'16"N, 124°34'30"E; WGS-84), by CDS and J. Fernandez.

Paratopotypes.—Nine adult males (KU 320435, 320444–6, 320451, 320462, 320466,

Other paratypes.—One adult male (CAS-SU 28453) collected on 11 April 1967, under rotting coconut tree, 0.5 km SW of Barrio Pitogo, in the Municipality of Ubay, Bohol Province, Lapinig Grande Island, Philippines (10°07’05”N, 124°33’04”E; WGS-84), by A. C. Alcala; one adult female (CAS-SU 27554) collected on 15 April 1967, under rotting log in secondary-growth forest, in the Municipality of Ubay, Bohol Province, Lapinig Grande Island, Philippines (10°04’11”N, 124°30’14”E; WGS-84), by A. C. Alcala; three adult females (CAS-SU 27556, 28454–5) collected on 20 April 1967, under rotting logs and leaves in a patch of secondary-growth trees, in the Municipality of Ubay, Bohol Province, Lapinig Chico Island, Philippines (10°05’22”N, 124°30’32”E; WGS-84), by A. C. Alcala.

Diagnosis.—Brachymeles libayani can be distinguished from congeners by the following combination of characters: (1) body size small (SVL 52.7–66.1 mm), (2) limbs tridactyl, (3) limb length short, (4) supralabials six, (5) infralabials five, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 22–23, (9) axilla–groin scale rows 72–75, (10) paravertebral scale rows 90–92, (11) pineal eye spot present, (12) frontoparietals contact, (13) enlarged chin shields in three pairs, (14) nuchal scales differentiated, (15) fourth supralabial below eye midline, (16) auricular opening covered with scales, (17) presacral vertebrae 47, (18) fusion of mental and first infralabials, and (19) nonuniform body color (Tables 4 and 5).

Comparisons.—Characters distinguishing Brachymeles libayani from all nonpentadactyl, limbed species of Brachymeles are summarized in Tables 4 and 5. Brachymeles libayani most closely resembles B. paeforum, B. muntingkamay, and B. tridactylus, the only other tridactyl species, but differs from these three taxa by having five infralabials and fusion of the mental and first infralabials (Table 5). Brachymeles libayani further differs from B. paeforum by having shorter body lengths among males, shorter relative forelimb lengths, fewer paravertebral scale rows, and a nonuniform body color (Tables 4 and 5); from B. muntingkamay by having a shorter maximum body length, shorter forelimb lengths, shorter hind limb lengths, a greater number of axilla–groin scale rows, six supraciliaries, five supraoculars, the presence of a pineal eyespot, contact between frontoparietals, differentiated nuchals, and a continuous subocular scale row, and the absence of longitudinal rows of spots around the body (Tables 4 and 5); and from B. tridactylus by having a shorter maximum body length, shorter relative tail length, shorter forelimb length, shorter hind limb lengths, a greater number of presacral vertebrae, six supralabials, five infralabials, six supraciliaries, five supraoculars, the presence of contact between frontoparietals, the presence of a continuous subocular scale row, and the absence of longitudinal rows of spots around the body (Tables 4 and 5).

Brachymeles libayani can be distinguished from all limbless species of Brachymeles (B. apus, B. lukbani, B. minimus, B. miriamae, B. vermis) by having limbs; and from all pentadactyl species of Brachymeles (B. boholensis,
By having nonpentadactyl limbs, shorter forelimb lengths (less than 1.8 mm vs. greater than 5.9 mm), shorter hind limb lengths (less than 2.7 mm vs. greater than 10.3 mm), a narrower body (less than 5.9 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

Description of holotype.—Details of the head scalation are shown in Fig. 7. Adult male, hemipenes everted; body small, slender, SVL 56.3 mm; head weakly differentiated from neck, nearly as wide as body, HW 6.5% SVL, 112.7% HL; HL 31.5% SnFa; SnFa 20.9% SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 65.0% HL; ear completely hidden by scales; eyes small, ED 1.8% SVL, 28.0% HL, 60.8% END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 120.3% MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 22; paravertebral scale rows 90; axilla–groin scale rows 73; limbs short, poorly developed, with digits reduced to three claws on both forelimbs and hind limbs, finger and toe lamellae absent; FLL 3.3% AGD, 2.5% SVL; HLL 5.3% AGD, 3.9% SVL; tail not as wide as body, gradually tapered towards end, TW 81.5% MBW, TL 83.6% SVL.

Rostral projecting onto dorsal snout to level in line with posterior edge of nasal, broader than high, in contact with frontonasal; frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterodorsally; supranasals present, large, broadly separated; postnasals absent; prefrontals moderately separated; frontal nearly diamond-shaped, its anterior margin in contact with frontonasal, in contact with first two anterior supraoculars, 4× wider than anterior supraocular; supraoculars five; frontoparietals moderate, in moderate medial contact, each frontoparietal in contact with interior two supraoculars; interparietal moderate, its length roughly equal to midline length of frontoparietal, longer than wide, kite-shaped, wider anteriorly; parietals as broad as frontoparietals, in moderate contact behind interparietal; enlarged nuchals present; loreals two, anterior loreal about as long as and slightly higher than posterior loreal; preocular one; presubocular one; supraciliary six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular, posteriormost extending to middle of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first twice the anteroposterior length of others, fourth below eye midline; infralabials five (Fig. 6).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales, each with irregular raised anterior edges; fingers equal in size; toes unequal in size, middle digit greatest in length, first and third digits equal in length.

Coloration in preservative.—Body ground color dark brown, each dorsal scale light brown posteriorly, with a dark chocolate-brown streak on the anterior one-third to half of the scale. Dark streaks on each scale consist of four to seven thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, less dominant on venter. Subcaudal scales darker brown than venter. Posterior edge of all body scales transparent. Forelimb and hind limb scales dark brown. Precloacal scale coloration matches surrounding ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Rostral, nasal, supranasal, and first supralabial scales light gray. Supraocular and remaining supralabial scales dark brown. Mental scale cream. Chin shields and postmental scales match bordering ventral scales.

Coloration in life.—Coloration in life (Fig. 8) closely matches coloration in preservative with
minor differences. Head scales mottled medium brown to dark brown or black. Ground color of body medium to dark brown. Streaks of pigmentation on each scale dark brown to black.

Variation.—Morphometric variation of the series is summarized in Table 6. We observed variation in the degree of head scale contact: (1) prefrontals were observed in point contact medially in seven specimens (KU 320444, 320449, 320458–60, 320462, 320465), and separated for the remaining specimens (CAS-SU 27554, 27556, 28453–5, KU 320428–43, 320445–8, 320450–57, 320461, 320463–4, 320466–7); (2) frontoparietals were observed in point contact for a single specimen (KU 320467), and separated for the remaining specimens (CAS-SU 27554, 27556, 28453–5, KU 320428–50, 320452–67).

Additionally, the degree of fusion between loreals on each side of the head was observed to vary among the type series. The majority of specimens have two loreals and no fused scales (CAS-SU 27554, 27556, 28453–55, KU 320431–7, 320439–42, 320445–46, 320448, 320450–51, 320455, 320457–60, 320462, 320464, 320466), five specimens have single, enlarged loreals on both sides of the head (KU 320444, 320449, 320452, 320456, 320467), five specimens have single, enlarged loreals on the left side of the head (KU 320430, 320453–54, 320463, 320465), and six specimens have single, enlarged loreals on the right side of the head (KU 320428–29, 320438, 320443, 320447, 320461).

Distribution.—Brachymeles libayani is known from Lapinig Chico, Lapinig Grande, Tilmubo, and Tintiman islands off the northeast coast of Bohol Island (Fig. 3).

Ecology and natural history.—Brachymeles libayani occurs in agricultural habitats, and disturbed forest habitat. No original forest remains on any of the Lapinig Group Islands, and common habitat consists of grassland, rice fields, agricultural habitats, and human habitations. Surprisingly, B. libayani on Lapinig Grande Island was observed to be more common than any other known species of Brachymeles (C. D. Siler, personal observation). Individuals were regularly observed under piles of rotting coconuts, in loose soil around trees and root systems, and in loose leaf litter. Interestingly, this species seems to be a ubiquitous habitat generalist on the Lapinig Group Islands, but has not been recorded from the nearby island of Bohol, whereas its congener, B. orientalis and B. boholensis, are known. It remains possible that populations of this species will eventually be discovered on the northeast coast of Bohol Island.

We have evaluated this species against the IUCN criteria for classification, and find that it does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status. Brachymeles libayani has been documented to occur throughout the islands of the Lapinig Island Group, and is abundant at all sampled localities. We therefore classify this species as one of Least Concern (IUCN, 2011).

Sympatric lizard species observed in the Lapinig Group islands include (Gekkonidae) Hemidactylus frenatus and H. platyurus.

Etymology.—We are pleased to name this new species in honor of Carlos Polestico Garcia. Born on Bohol Island, Carlos P. Garcia later became the eighth President of the Philippines. He was the first Philippine president to be laid to rest in the Libingan ng mga Bayani, or Cemetery of the Heroes, located within Fort Bonifacio in Manila, Philippines. The municipality of Carlos P. Garcia, and type locality for Brachymeles libayani, was named after this Philippine hero. The word “libayani” is derived from the phrase Libingan ng mga Bayani. Suggested common name: Lapinig Islands’ Slender Skink.

Brachymeles bicollandia sp. nov.
Figs. 3, 5

Holotype.—PNM 9756 (CDS Field No. 4050, formerly KU 324003), adult male, collected under rotting coconut husks in secondary-growth forest (1000 to 1230 h) on 1 June 2009, in Barangay Common, Municipality of Tabaco City, Albay Province, Luzon Island, Philippines (13°14′N, 123°38′E; WGS-84), by CDS and J. Fernandez.

Paratopotypes.—Four adult males (KU 324015–6, PNM 9759–60), six adult females (KU 323087, 324005–7, 324009–10), and four
juveniles (KU 324008, 324011, PNM 9757–58), collected between 1 and 23 June 2009.

Other paratypes.—One adult male (CAS 152025) and two adult females (CAS 140065, 152026) collected on 16 December 1991, in an Abaca plantation, Barangay Labnig, Municipality of Malinao, Albay Province, Luzon Island, Philippines (13°22'38"N, 123°40'59"E; WGS-84), by C. A. Ross; two adult females (CAS-SU 24173, 24413) collected between 26 March and 22 April 1961, on Mt. Isarog, Bario Curry, Municipality of Pili, Camarines Sur Province, Luzon Island, Philippines (13°38'35"N, 123°21'4"E; WGS-84), by D. S. Rabor.

Diagnosis.—Brachymeles bicolor is a species from the Philippines with a combination of characters that distinguish it from congeners: (1) body size small (SVL 46.4–66.1 mm), (2) limbs bidactyl, (3) limb length short, (4) supralabials six, (5) infralabials five or six, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 85–90, (9) axilla–groin scale rows 68–73, (10) paravertebral scale rows 85–90, (11) pineal eye spot present, (12) prefrontals not contacting on midline, (13) postnasals absent, (14) enlarged chin shields in three pairs, (15) nuchals enlarged, (16) fourth supralabial below eye midline, (17) mental and first infralabials fused or separated, (18) auricular opening absent, (19) presacral vertebrae 46–49, and (20) uniform body color (Tables 4 and 5).

Comparisons.—Characters distinguishing Brachymeles bicolor from all nonpentadactyl species of Brachymeles are summarized in Tables 4 and 5. Brachymeles bicolor is most closely related to B. samarensis, B. cobos, B. brevidactylus, and populations of B. bonitae, the only other species to be bidactyl or have bidactyl populations. However, B. bicolorida differs from these four taxa by having five or six infralabials (Table 5). Brachymeles bicolorida further differs from B. samarensis by having a greater number of presacral vertebrae, and a tendency toward a greater number of midbody, axilla–groin, and paravertebral scale rows (Table 5); from B. cobos by having a smaller relative forelimb length and a greater number of presacral vertebrae (Tables 4 and 5); from B. brevidactylus by having a smaller relative forelimb length, and a tendency towards having fewer axilla–groin and paravertebral scale rows (Tables 4 and 5); and from B. bonitae by having longer relative fore- and hind limb lengths, six supralabials, five or six infralabials, six supraciliaries, five supracoculars, and a tendency towards fewer presacral vertebrae, axilla–groin, and paravertebral scale rows (Tables 4 and 5).

Brachymeles bicolorida can be distinguished from all limbless species of Brachymeles (B. apus, B. lukbani, B. minimus, B. miritamae, B. vernis) by having limbs; and from all pentadactyl species of Brachymeles (B. boholensis, B. boulenzeri, B. bicolor, B. gracilis, B. kadwa, B. makusog, B. mindorensis, B. orientalis, B. schadenbergi, B. talinis, B. taylori, B. tungaoi, B. vindumi) by having nonpentadactyl limbs, shorter forelimb lengths (less than 1.9 mm vs. greater than 5.9 mm), shorter hind limb lengths (less than 3.1 mm vs. greater than 10.3 mm), a narrower body (less than 5.1 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

Description of holotype.—Details of the head scalation are shown in Fig. 6. Adult male, body small, slender, SVL 60.2 mm; head weakly differentiated from neck, nearly as wide as body, HW 6.7% SVL, 104.9% HL; HL 33.1% SnFa; SnFa 19.3% SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 58.2% HL; ear completely hidden by scales; eyes small, ED 1.4% SVL, 22.6% HL, 55.4% END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 124.0% MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 22; paravertebral scale rows 85; axilla–groin scale rows 68; limbs short, poorly developed, with digits reduced to two claws on both forelimbs and hind limbs, finger and toe lamellae absent; FLL 2.7% AGD, 2.1% SVL; HLL 6.1% AGD, 4.7% SVL [6.9]; tail nearly as wide as body, gradually tapered at end, TW 88.9% MBW, TL 65.6% SVL.

Rostral projecting onto dorsal snout to level just past posterior edge of nasal, broader than high, in broad contact with frontonasal; frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterodorsally; supranasals present, large, broadly separated; postnasals absent; prefrontals moderately

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separated; frontal octagonal, its anterior margin in moderate contact with frontonasal, in contact with first two anterior supraoculars, 5× wider than anterior supraocular; supraoculars five; frontoparietals moderate, just barely separated by anterior point of interparietal in contact with frontal, each frontoparietal in contact with supraoculars 2–4; interparietal large, its length roughly 1.5× midline length of frontoparietal, longer than wide, diamond-shaped, wider anteriorly; parietals as broad as frontoparietals, in broad contact behind interparietal; enlarged nuchals present; anterior and posterior loreals fused into single, enlarged loreal (Fig. 5), or distinct; preocular one; presubocular one; supraciliaries six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular, posteriormost extending to middle of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first 1.5× size of other supralabials, fourth below eye midline; infralabials five (Fig. 5).

Mental wider than long, fused with first infralabials; postmental single, enlarged, its width less than width of mental; followed by three pairs of enlarged chin shields, first pair in broad medial contact, greater in width than third pair, narrower than second pair, second pair broadly separated by single medial scale, third pair separated by three medial scales (Fig. 5).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales, each with irregular raised anterior edges; fingers equal in size; toes unequal in size, second digit greatest in length.

**Coloration in preservative.**—Body ground color medium brown, each dorsal scale light brown posteriorly, with a dark auburn streak on the anterior two-thirds to half of the scale. Dark streaks on each scale consist of four to five thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, more distinct on venter, where posterior ends of scales are sandy brown, giving greater contrast. Subcaudal scales with reduced dark pigmentation. Posterior edge of all body scales transparent. Forelimb and hind limb scales dark brown, with weakly defined scale boundaries. Precloacal scale coloration darker than surrounding ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Rostral, nasal, supranasal, and first supralabial scales cream, lighter than supraocular scales. Supraocular scales dark brown. Mental, infralabial, postmental, and chin shields scales cream with light brown mottling.

**Coloration in life.**—Coloration in life unrecorded; however, because *Brachymeles* specimens do not change significantly during preservation (C. D. Siler and R. M. Brown, personal observation), we suspect that the preserved coloration and patterns are much like those in life.

**Variation.**—Morphometric variation of the series is summarized in Table 6. A single instance of digit variation was observed, in which one specimen (KU 324006) has three forelimb claws and two hind limb claws. We observed variation in the degree of head scale contact and the number of infralabials: (1) frontoparietals were observed in point contact medially for a single specimen (KU 324003), in moderate to broad contact medially for 11 specimens (CAS-SU 24173, 24413, CAS 140065, KU 323087, 324006–8, 324011–3, 324018), and separated for eight specimens (CAS 152025–6, KU 324003, 324014–6, 324009–10); (2) parietals were observed in point contact medially for a single specimen (CAS-SU 24173, 24413), in moderate to broad contact medially for 17 specimens (CAS-SU 24173, CAS 140065, CAS 152025–6, KU 323087, 324003, 324005–9, 324011, 324013–6, 324018), and separated for two specimens (KU 324010, 324012); (3) first pair of enlarged chin shields were observed in point contact medially for a single specimen (CAS 152025), in moderate to broad contact medially for 17 specimens (CAS-SU 24173, CAS 140065, CAS 152025–6, KU 323087, 324003, 324005–9, 324011, 324013–6, 324018), and separated for two specimens (KU 324010, 324012); (4) the number of infralabials varied among the type series, with eight specimens observed to have six infralabials (CAS-SU 24413, KU 324009–14, 324018), and 12 observed to have five infralabials (CAS-SU 24173, CAS 140065,
Additionally, the degree of fusion between loreals, and between the mental and first infralabials, varies in the type series. All specimens have two loreals on each side of the head, with the exception of a single specimen (KU 324003) with single, enlarged loreals on both sides of the head. Eleven specimens have an enlarged mental scale resulting from fusion with the first infralabial on both sides of the head (CAS-SU 24173, CAS 152025–6, KU 323087, 324003, 324005–8, 324015–6), a single specimen has fused scales only on the right side of the head (CAS 140065), and eight specimens have distinct mentals and infralabials, with no scale fusion (CAS-SU 24413, KU 324009–14, 324018).

**Distribution.**—*Brachymeles bicolandia* is known only from the central Bicol Peninsula of Luzon Island (Fig. 3).

**Ecology and natural history.**—*Brachymeles bicolandia* occurs in agricultural habitats, as well as in disturbed and secondary-growth forest, and is found in sympatry with *B. boulengeri* and *B. makusog*. Three additional species of *Brachymeles* have also been recorded from the Bicol Peninsula of Luzon Island: *B. brevidactylus*, *B. kadwa*, and *B. lukbani*.

We have evaluated this species against the IUCN criteria for classification, and find that it does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status. *Brachymeles bicolandia* has been documented to occur throughout much of the central Bicol Peninsula of Luzon Island, and is abundant at all sampled localities. We therefore classify this species as one of Least Concern (IUCN, 2011).


**Etymology.**—The specific epithet is chosen in reference to the biogeographically and culturally distinct Bicol Region of southern Luzon Island (Albay, Camarines Norte, Camarines Sur, Catanduães and Sorsogon provinces). Inhabited by peaceful and particularly hospitable *Bicolanos*, the unique central Bicol peninsula is home to many dozens of endemic vertebrates, delicious local cuisine, unique linguistic stock, and rich cultural traditions. Suggested common name: Bicol Slender Skink.

**Brachymeles cobos** sp. nov. Figs. 3, 5

**Holotype.**—PNM 9761 (CDS Field No. 5255, formerly KU 324023), adult female, collected under rotting coconut husks in secondary-growth forest (1000 to 1230 h) on 8 October 2009, in Barangay Palta Small, Municipality of Virac, Catanduães Province, Catanduães Island, Philippines (13°34′44″N, 124°13′52″E; WGS-84), by J. Fernandez.

**Paratopotypes.**—Eight adult females (KU 306311, 308077, 324019–20, 324025–26, PNM 9562–63) and one juvenile (KU 324021) collected between 4 and 7 June 2009 by CDS and J. Fernandez.

**Diagnosis.**—*Brachymeles cobos* can be distinguished from congeners by the following combination of characters: (1) body size small (SVL 54.0–64.4 mm), (2) limbs bidactyl, (3) limb length short, (4) supralabials six, (5) infralabials six, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 21–22, (9) axilla–groin scale rows 68–72, (10) paravertebral scale rows 21–22, (9) axilla–groin scale rows 68–72, (10) paravertebral scale rows 85–89, (11) pineal eye spot present, (12) prefrontals not contacting on midline, (13) frontoparietals contact, (14) postnasals absent, (15) enlarged chin shields in three pairs, (16) nuchals enlarged, (17) fourth supralabial below eye midline, (18) auricular opening absent, (19) presacral vertebrae 45, (20) nonfusion of mental and first infralabials, (21) nonfusion of loreals, and (22) uniform body color (Tables 4 and 5).

**Comparisons.**—Characters distinguishing *Brachymeles cobos* from all nonpentadactyl, limbed species of *Brachymeles* are summarized in Tables 4 and 5. *Brachymeles cobos* most closely resembles *B. saimarensis*, *B.
bicolandia, B. brevidactylus, and populations of B. bonitae, the only other species to be bidactyl or have bidactyl populations. However, B. cobos can be distinguished from B. samarensis by having a tendency toward a greater number of axilla–groin scale rows (Table 5); from B. bicolandia by having a greater relative forelimb length, fewer presacral vertebrae, and six infralabials (Tables 4 and 5); from B. brevidactylus by having fewer presacral vertebrae, a greater number of midbody scale rows, fewer axilla–groin and paravertebral scale rows, and the presence of contact between the first pair of enlarged chin shields (Table 5); and from B. bonitae by having longer relative fore- and hind limb lengths, fewer presacral vertebrae, fewer axilla–groin and paravertebral scale rows, and the presence of contact between the first pair of enlarged chin shields (Tables 4 and 5).

Brachymeles cobos can be distinguished from all limbless species of Brachymeles (B. apus, B. lukbani, B. minimus, B. mirianae, B. vermis) by having limbs; and from all pentadactyl species of Brachymeles (B. boholensis, B. boulengeri, B. bicolor, B. gracilis, B. kadua, B. makusog, B. mindorensis, B. orientalis, B. schadenbergi, B. talinis, B. taylori, B. tungaoi, B. vindumi) by having nonpentadactyl limbs, shorter forelimb lengths (less than 2.1 mm vs. greater than 5.9 mm), shorter hind limb lengths (less than 3.6 mm vs. greater than 10.3 mm), a narrower body (less than 5.4 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

Description of holotype.—Details of the head scalation are shown in Fig. 6. Adult female, body small, slender, SVL 60.2 mm; head weakly differentiated from neck, nearly as wide as body, HW 7.0% SVL, 107.1% HL; HL 33.8% SnFa; SnFa 19.2% SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 63.0% HL; ear completely hidden by scales; eyes small, ED 1.7% SVL, 26.5% HL, 62.7% END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 120.4% MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 22; paravertebral scale rows 85; axilla–groin scale rows 68; limbs short, poorly developed, with digits reduced to two claws on both forelimbs and hind limbs, finger and toe lamellae absent; FLL 3.4% AGD, 2.6% SVL; HLL 6.2% AGD, 4.7% SVL; tail as wide as body, tail tip regenerated, sharply tapered at end, TW 87.6% MBW, TL 75.6% SVL.

Rostral projecting onto dorsal snout to level in line with middle of nasal, broader than high, in contact with frontonasal; frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterodorsally; supranasals present, large, broadly separated; postnasals absent; prefrontals moderately separated; frontal octagonal-shaped, its anterior margin in moderate contact with frontonasal, in contact with first two anterior supraoculars, 4X wider than anterior supraocular; supraoculars five; frontoparietals large, in broad medial contact, each frontoparietal in contact with supraoculars 2–4; interparietal moderate, its length equal to midline length of frontoparietal, longer than wide, diamond-shaped, wider anteriorly; parietals narrower than frontoparietals, in broad contact behind interparietal; nuchals enlarged; loreals two, anterior loreal about as long as and slightly higher than posterior loreal; preocular one; presubocular one; supraciliaries six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular, posteriormost extending nearly to middle of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first twice the anteroposterior length of others, fourth below eye midline; infralabials six (Fig. 5).

Mental wider than long, fused with first infralabials; postmental single, enlarged, its width greater than width of mental; followed by three pairs of enlarged chin shields, first pair in broad medial contact, its width greater than width of third pair, narrower than second pair, second pair broadly separated by single median scale, third pair separated by three median scales (Fig. 5).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales,
each with irregular raised anterior edges; fingers equal in size; toes unequal in size on right foot, second digit greatest in length, digits absent on left foot.

Coloration in preservative.—Body ground color medium brown, each dorsal scale light brown posteriorly, with a dark auburn streak on the anterior two-thirds to half of the scale. Dark streaks on each scale consist of four to seven thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, more distinct on venter, where posterior ends of scales are cream, giving greater contrast. Subcaudal scales match ventral scale coloration. Posterior edge of all body scales transparent. Forelimb and hind limb scales dark brown, with weakly defined scale boundaries. Preoccipal scales match ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Rostral, nasal, supranasal, and first supralabial scales cream. Supraocular scales dark brown. Mental, postmental, and chin shields scales mottled brown to light cream.

Coloration in life.—Ground color of body medium to dark brown; streaks of darker pigmentation on body dark-brown.

Variation.—Morphometric variation of the series is summarized in Table 6. We observed no variation among the type series in digit number, head scale counts, or in the degree of head scale contact.

Distribution.—Brachymeles cobos is known only from Catanduanes Island (Fig. 3).

Ecology and natural history.—Brachymeles cobos occurs in residential and agricultural habitats, as well as in disturbed and secondary-growth forest. No original, low-elevation forest remains on Catanduanes Island, but we assume the species once also occurred in first-growth forest at low elevations when these habitats persisted. Individuals have been observed under piles of rotting coconut husks, in the rotting material within fallen logs, and in loose soil and leaf litter surrounding the root networks of trees. This species occurs sympatrically with the pentadactyl species, B. makuosog, and the limbless species, B. minimus. On Catanduanes Island, both B. makuosog and B. minimus have only been observed in disturbed, secondary-growth forest, whereas B. cobos appears to be a habitat generalist.

We have evaluated this species against the IUCN criteria for classification, and find that it does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status. Brachymeles cobos has been documented to be widely distributed on the island of Catanduanes, and is abundant at all sampled localities. We therefore classify this species as one of Least Concern (IUCN, 2011).

Sympatric lizard species occurring on Catanduanes Island include the following: (Agamidae) Bronchocea cristella, Draco spiloterus, Gonocophalus sophiae, Hydrosaurus pustulatus; (Gekkonidae) Cyrtodactylus philippinicus, Hemidactylus frenatus, H. platyurus, Gehyra muntilata, Gekko gecko, Gek. mindorensis, Luperosaurus cumingii, Pseudogekko smaragdina, P. compresscorpus; (Scincidae) Enoa atrocostata, Eutropis multicarinata borreals, Eu. indeprena, Eu. multifasciata, Lamprolepis smaragdina, Lipinia pulchella pulchella, Sphenomorphus abdictus, S. decipiens, S. cumingi, S. jagori, S. laterinaeulatus, S. lauonti, S. steerei, Tropidophorus grayi; (Varanidae) Varanus marmoratus, V. olivaceus.

Etymology.—The specific epithet is chosen in recognition of the Catanduanes indigenous people’s group for which the first adopted name for the island, “Isla de Cobos,” was coined. The name was adopted by the Spanish conquistadores who encountered the original Catanduanes tribes living in thatched huts called “cobos.” Suggested common name: Catanduanes Slender Skink.

Brachymeles brevidactylus sp. nov.
Figs. 3–4

Holotype.—PNM 9764 (CDS Field No. 4099, formerly KU 324017), adult male, collected under pile of rotting coconut husks in secondary-growth forest (1000 to 1230 h) on 18 June 2009, in the Municipality of Irosin, Sorsogon Province, Luzon Island, Philippines (15°50’ N, 123°55’ E; WGS-84), by J. Fernandez.

Paratypes.—Adult female (TNHC 62469) collected in a rotting log on ridge above Lake Bulusan on 24 November 2001, 500–700 m elevation, Mt. Bulusan National Park, Barangay San Roque, Municipality of Irosin, Sorsogon Province, Luzon Island, Philippines, by...

**Diagnosis.**—*Brachymeles brevidactylus* can be distinguished from congeners by the following combination of characters: (1) body size small (SVL 54.0–60.0 mm), (2) limbs bidactyl, (3) limb length short, (4) supralabials six, (5) infralabials six, (6) supraciliaries six, (7) supraoculars five, (8) midbody scale rows 20, (9) axilla–groin scale rows 73–77, (10) paravertebral scale rows 90–94, (11) pineal eye spot present, (12) prefrontals not contacting on midline, (13) frontoparietals contact, (14) postnasals absent, (15) enlarged chin shields in three pairs, (16) muals enlarged, (17) fourth supralabial below eye midline, (18) auricular opening absent, (19) presacral vertebrae 47–48, (20) nonfusion of mental and first infralabials, (21) nonfusion of loreals, and (22) uniform body color (Tables 4 and 5).

**Comparisons.**—Characters distinguishing *Brachymeles brevidactylus* from all nonpentadactyl, limbed species of *Brachymeles* are summarized in Tables 4 and 5. *Brachymeles brevidactylus* most closely resembles *B. samarensis, B. bicolorandia, B. cobos*, and populations of *B. bonitae*, the only other species to be bidactyl or have bidactyl populations. However, *B. brevidactylus* can be distinguished from *B. samarensis* by having a greater number of presacral vertebrae, and a greater number of axilla–groin and paravertebral scale rows (Table 5); from *B. bicolorandia* by having a greater relative forelimb length, six infralabials, and a tendency toward a greater number of axilla–groin and paravertebral scale rows (Tables 4 and 5); from *B. cobos* by having a greater number of presacral vertebrae, fewer midbody scale rows, and a greater number of axilla–groin and paravertebral scale rows (Tables 4 and 5); and from *B. bonitae* by having longer relative fore- and hind limb lengths, fewer midbody scale rows, six supralabials, six infralabials, six supraoculars, the presence of contact between frontoparietals, and a tendency towards fewer presacral vertebrae, axilla–groin, and paravertebral scale rows (Tables 4 and 5).

*Brachymeles brevidactylus* can be distinguished from all limbless species of *Brachymeles* (*B. apus, B. lakbani, B. minimus, B. miriamae, B. vernis*) by having limbs; and from all pentadactyl species of *Brachymeles* (*B. boholensis, B. boulenegeri, B. bicolor, B. gracilis, B. kadua, B. makusog, B. mindorensis, B. orientalis, B. schadenbergii, B. talinis, B. taylori, B. tungaoi, B. vinduni*) by having nonpentadactyl limbs, shorter forelimb lengths (less than 2.1 mm vs. greater than 5.9 mm), shorter hind limb lengths (less than 3.6 mm vs. greater than 10.3 mm), a narrower body (less than 5.4 mm vs. greater than 7.9 mm), and by the absence of a postnasal scale and auricular opening (vs. presence).

**Description of holotype.**—Details of the head scalation are shown in Fig. 5. Adult male, body small, slender, SVL 56.8 mm; head weakly differentiated from neck, nearly as wide as body, HW 7.0% SVL, 103.6% HL; HL 32.4% SnFa; SnFa 20.9% SVL; snout short, bluntly rounded in dorsal and lateral profile, SNL 59.2% HL; ear completely hidden by scales; eyes small, ED 1.6% SVL, 24.2% HL, 59.6% END, pupil subcircular; body slightly depressed, nearly uniform in thickness, MBW 125.2% MBH; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 20; paravertebral scale rows 90; axilla–groin scale rows 73; limbs short, poorly developed, with digits highly reduced to two small claws on both forelimbs and hind limbs, finger and toe lamellae absent; FLL 3.3% AGD, 2.5% SVL; HLL 5.9% AGD, 4.5% SVL; tail nearly as wide as body, gradually tapered at end, TW 91.5% MBW, TL 79.5% SVL.

Rostral projecting onto dorsal snout to level just past posterior edge of nasal, broader than high, in broad contact with frontonasal; frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anterodorsally and posterodorsally; supranasals present, large, broadly separated; postnasals absent; prefrontals broadly separated; frontal octagonal-shaped, its anterior margin in broad contact with frontonasal, in contact with first two anterior supraoculars, 5× wider than anterior supraocular; supraoculars five; frontoparietals large, in moderate medial contact, each frontoparietal in contact with supraoculars 2–4; interparietal large, its
length greater than midline length of frontoparietal, longer than wide, diamond-shaped, wider anteriorly; parietals as broad as frontoparietals, in broad contact behind interparietal; nuchals enlarged; loreals two, anterior loreal about as long as and slightly higher than posterior loreal; preocular one; presubocular one; supraciliaries six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular, posteriormost extending to middle of fifth supraocular; subocular scale row single, complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first twice the anteroposterior length of others, fourth below eye midline; infralabials six (Fig. 4).

Mental wider than long, fused with first infralabials; postmental single, enlarged, its width narrower than width of mental; followed by three pairs of enlarged chin shields, first pair in broad medial contact, its width greater than width of third pair, narrower than second pair, second pair broadly separated by single medial scale, third pair separated by three medial scales (Fig. 4).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits wrapping around lateral edges of digits; lamellae absent; palmar surfaces of hands and plantar surfaces of feet with several small, irregular scales, each with irregular raised anterior edges; fingers absent on left hand, highly reduced to two small claw tips on right hand; toes unequal in size, first digit highly reduced to small claw tip, second digit greatest in length.

Coloration in preservative.—Body ground color medium brown, each dorsal scale light brown posteriorly, with a dark auburn streak on the anterior one-third to half of the scale. Dark streaks on each scale consist of four to six thin longitudinal lines with smudges between lines. Streaks on scales present around entire body, more distinct on venter, where posterior ends of scales are sandy brown, giving greater contrast. Subcaudal scales with reduced dark pigmentation. Posterior edge of all body scales transparent. Forelimb and hind limb scales sandy brown. Forelimb scales with weakly defined scale boundaries. Precaudal scale coloration matches surrounding ventral scale coloration. Head scales mottled light and dark brown, matching dorsal background coloration. Rostral, nasal, supranasal, and supralabial scales light beige. Supraocular scales dark brown. Mental and infralabial scales cream. Chin shields and postmental scales cream with slight brown mottling.

Coloration in life.—Coloration in life unrecorded; however, because Brachymeles specimens do not change significantly during preservation (C. D. Siler and R. M. Brown, personal observation), we suspect that the preserved coloration and patterns are much like those in life.

Variation.—Morphometric variation of the series is summarized in Table 6. We observed no variation among the type series in digit number, head scale counts, or in the degree of head scale contact.

Distribution.—Brachymeles brevidactylus is known only from the southern Bicol Peninsula (Fig. 3).

Ecology and natural history.—Brachymeles brevidactylus occurs in disturbed and secondary-growth forest, and is found in sympatry with B. boulengeri; however, B. brevidactylus, B. kadua, B. lukbani, and B. makusog are also recognized to occur on the Bicol Peninsula of Luzon Island. We have evaluated this species against the IUCN criteria for classification, and find that it qualifies for the status of Vulnerable (VU) based on the following criteria: VU B2ab(iii); D2 (IUCN, 2011).

Sympatric lizard species occurring in the Bicol Peninsula include the following: (Aga- midae) Bronchocela cristatella, Draco spiloterus, Gonocephalus sophiae, Hydrosaurus pustulatus; (Gekkonidae) Cyrtodactylus philippinicus, Hemidactylus frenatus, H. platyurus, Gehyra mutilata, Gekko gecko, Gek. mindorensis, Luperosaurus cumingii, Pseudo gekko compressicorpus, P. smaragdina; (Scin- cidae) Enoia atrocostata, Eutropis multicarinata borealis, Eu. multifasciata, Lamprolepis smaragdina, Lipinia pulchella pulchella, Sphenomorphus abdictus abdictus, S. cu mingi, S. decipiens, S. jagori, S. laterimaculatus, S. leucospilos, S. steerei, Tropidophorus grayi; (Varanidae) Varanus marmoratus, V. olivaceus.

Etymology.—The name of the new species is derived from the Latin root word “brevis,” meaning short, and “dactylus,” meaning digit,
to represent the species’ small, highly reduced digits. Suggested common name: Southern Bicol Slender Skink.

**DISCUSSION**

The six species recognized in this paper are inferred to be part of two clades with markedly different body plans (Fig. 2). One of these clades (B. cebuensis, B. libayani, and B. paeforum) consists of species with three digits on their forelimbs and two or three digits on their hind limbs (Fig. 2). In contrast, the remaining species (B. brevidactylus, B. bicollandia, B. cobos, B. samarensis) are part of a second clade consisting of limbless and bidactyl body forms (Fig. 2). Two of the five recognized species of limbless Brachymeles (B. minimus and B. lukbani) are sister to a clade of bidactyl species from the Bicol Peninsula of Luzon Island and Catanduñas Island. As previously recognized, B. samarensis spanned two distinct, recognized faunal regions: Luzon and Mindanao PAICs (Brown and Diesmos, 2002, 2009). Given this formerly wide geographical distribution, it is not surprising that populations between the two PAICs are inferred herein to be distinct; however, we were surprised to discover high levels of intra-PAIC species diversity (Fig. 2).

The new species recognized in this paper increase the total number of known species of Brachymeles to 30, and all but two of these are endemic to the Philippines. Species diversity within the genus has doubled in the last 2 yr as the result of large-scale sampling efforts across the Philippines and the detailed analyses of morphological variation among species and populations (Siler, 2010; Siler et al., 2009, 2010a,b, 2011a,b,c; Siler and Brown, 2010, 2011). Brachymeles has long been considered a small clade of Southeast Asian lizards (Brown, 1956; Brown and Alcala, 1980; Brown and Rabor, 1967; Taylor, 1917), and estimates of species diversity had remained nearly constant for more than 30 yr (but see Brown and Alcala, 1995). This vast underestimation of true diversity within the genus is a testament to the extent of morphological similarity among species and, until recently, a lack of systematic studies of the group (Siler, 2010; Siler et al., 2009, 2010a,b, 2011a,b,c; Siler and Brown, 2010, 2011).

Despite the past taxonomic assessments (reviewed by Brown and Alcala, 1980), it comes as little surprise that allopatric populations of “B. samarensis” from the Luzon and Mindanao PAICs have proven, with improved sampling, to be a series of morphologically diagnosable, independent evolutionary lineages. We now recognize nine species as part of the B. samarensis complex (Fig. 2).

This study also adds to a growing body of literature suggesting a need for reevaluation of amphibian and reptile species boundaries within the Philippines (Brown et al., 2008a; Brown and Stuart, in press; Diesmos and Brown, 2011). Few examples exist of truly “widespread” reptile species that have geographic distributions spanning recognized zoogeographic boundaries, and as is often the case, these species frequently turn out to constitute multiple evolutionary lineages (Brown et al., 2009; Gaulke et al., 2007; McGuire and Alcala, 2000; Siler and Brown, 2010; Welton et al., 2009, 2010a,b). The exceptions, in contrast, appear to be invasive species and human-mediated range expansions (Brown et al., 2010; Diesmos et al., 2006).

All species of Brachymeles live a semifossorial existence, specializing in dry rotting material inside and underneath fallen decomposing logs, leaf litter, and other forest floor detritus. Many are habitat specialists found exclusively in rotting logs, loose soil, or leaf litter, whereas others are common beneath piles of rotting coconut husks in disturbed, agricultural habitat. We assume that the species now found in residential and agricultural areas were once native to forested habitats and were possibly forest edge specialists.

Prior to recent, focused survey efforts, the modest sample sizes of specimens of Brachymeles available in museum collections limited appropriate, lineage-based species delimitations. Although the rarity of Brachymeles in collections may be due to their secretive, semifossorial lifestyle, focused survey efforts that target the appropriate microhabitat have proven effective in sampling Brachymeles in their native environments (C. D. Siler, personal observation; Siler and Brown, 2010; Siler et al., 2011a,c).
Recent fine- and broad-scale phylogenetic analyses of species of the genus *Brachymeles* have made it apparent that species diversity in the clade has been considerably underestimated; accordingly, discovery of additional undocumented (possibly cryptic) diversity is anticipated in other *Brachymeles* species groups (e.g., Siler et al., 2009, 2010a,b, 2011a,b,c; Siler and Brown, 2010, 2011). A number of studies have shown that the evolution of a burrowing lifestyle is correlated with decreasing dispersal abilities (Nevo, 1979; Patton and Feder, 1978; Patton and Yang, 1977; Selander et al., 1974; Siler et al., 2011b). Many *Brachymeles* lineages have experienced reduction or loss of limbs, which may further reduce vagility (Siler and Brown, 2010, 2011; Siler et al., 2011b). Through time, reduced dispersal abilities and semifossorial lifestyles may lead to increasingly patchy distributions, reduced gene flow among populations, and the accumulation of interpopulation differences (Nevo, 1979). Still, the role that reduced dispersal abilities associated with fossoriality play on the dispersal abilities and diversification patterns of *Brachymeles* species remains unknown. Regardless of which processes produce species diversity, we suspect that additional species await discovery.

Following the recognition of *B. bicolandia*, *B. brevidactylus*, *B. cobos*, *B. libayani*, *B. paeforum*, and *Brachymeles samarensis* there are now 13 nonpentadactyl, limbed species of *Brachymeles*. Of these, four species are bidactyl (*B. bicolandia*, *B. brevidactylus*, *B. cobos*, *B. samarensis*), four are tridactyl (*B. libayani*, *B. muntingkamay*, *B. tridactylus*, *B. paeforum*), and two are tetradactyl (*B. elerae*, *B. wrighti*). Additionally, two species have unequal fore- and hind limb digit numbers (*B. cebensis*, 3/2; *B. pathfinderi*, 5/4), and populations of *B. bonitae* have been observed to have 0–2 fingers and toes. All nonpentadactyl species have smaller body lengths with the exception of *B. wrighti* (Taylor, 1925; Siler et al., 2011c). Interestingly, the distribution of limbed, nonpentadactyl species in the Philippines is relatively uneven across the major biogeographic regions of the Philippines, with seven species known to occur in the Luzon Faunal Region, four in the Mindanao Faunal Region, two in the Visayan Faunal Region, and one in the Mindoro Faunal Region (Brown and Alcala, 1980, Brown and Alcala, 1995; Brown and Diesmos, 2002; Siler et al., 2011a,c).

Additionally, the distribution of total species diversity in the genus is also uneven, with 13 species known from the Luzon Faunal Region vs. eight in the Mindanao Faunal Region, six in the Visayan Faunal Region, and only two in the Sulu archipelago and Mindoro Faunal Region, respectively (Brown and Alcala, 1980, 1995; Brown and Diesmos, 2002; Siler et al., 2009, 2010a,b, 2011a,c; Siler and Brown, 2010). New species discoveries on Luzon Island have occurred with consistency during the last two decades; given the island’s complex mountain ranges (Sierra Madres, Cordillera, Zambales, Bicol Peninsula volcanoes) and geographic complexity (Defant et al., 1989; Yumul et al., 2009), the increase in the faunal region’s diversity is likely to continue (Brown et al. 1995a,b, 1999, 2000; Linkem et al., 2010; Ross and Gonzales, 1992; Siler et al., 2009, 2010a,b,c; Welton et al., 2010a). It is worth noting that efforts to survey Mindanao have been less extensive than efforts on Luzon; this may account for some of the differences in diversity between the regions—which may be artifacts of sampling biases.

At present there remains one polytypic species (*B. gracilis*) and one “widespread” species (*B. bonitae*) recognized in the genus, both with distributions spanning boundaries between recognized faunal regions (Brown and Alcala, 1980; Siler and Brown, 2010; Siler et al., 2011a,b,c). Recent phylogenetic studies of the genus *Brachymeles* have not supported the monophyly of either of these species, an indication that taxonomic revisions are needed (Siler and Brown, 2011; Siler et al., 2011b). As our understanding of the total diversity within *Brachymeles* increases, it is important that continued efforts be made to conduct surveys focused on rotting log and leaf litter microhabitats throughout the ranges of all species. Accurate data on the distributions of these species will allow for a complete assessment of the geographic ranges of the species and appropriate assessment of conservation status can be made. At present, eight of the nine species of the *B. samarensis* complex are...
known or believed to be common throughout their ranges. Although these species currently inhabit highly disturbed, agricultural and residential areas, no studies on the long-term effect of deforestation and habitat modification on populations of *Brachyphylax* exist.

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**Literature Cited**


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**APPENDIX I**

**Additional Species Examined**

Numbers in parentheses indicate the number of specimens examined. With the exception of *Brachymeles apus* and *B. miriamae*, all specimens examined are from the Philippines. Numbers in parentheses indicate the number of specimens examined for each species. Several sample sizes are greater than those observed in the description due to the examination of subadult specimens, which were excluded from morphometric analyses.


Brachymeles brevicaducus (3).—See type description.


Brachymeles cebuensis (10).—See type description.


Brachymeles libyani (46).—See type description.


Brachymeles paflorus (17).—See type description.


Brachymeles vermisis (5).—Jolo Island: Sulu Province: CAS-SU (Paratype) 62489, CAS-SU 60720–22, 60857.

Brachymeles vindumi (4).—Jolo Island: Sulu Province: CAS (Holotype) 60724, CAS (Paratypes) 60723, 60725, MCZ (Paratype) 26577.

Brachymeles wrighti (2).—Luzon Island: Benguet Province: Municipality of La Trinidad: MCZ (Holotype) 26589, USNM 140756.