

A NEW LIMB-REDUCED, LOAM-SWIMMING SKINK (SQUAMATA: SCINCIDAE: *BRACHYMELES*) FROM CENTRAL LUZON ISLAND, PHILIPPINES

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ABSTRACT: We describe a new species of scincid lizard of the genus *Brachymeles* from montane forests (1400–1450 m) of Mt. Palali, Caraballo Mountain Range, in central Luzon Island, Philippines. The new species is the second known species of *Brachymeles* that has only three digits on both the forelimb and hindlimbs. Additional morphological characters include unique scale pigmentation and absence of a pineal eyespot and an auricular opening. The new species is the eighth known *Brachymeles* from Luzon Island and the twelfth non-pentadactyl species. With this new discovery, the Luzon Faunal Region holds the greatest diversity of species of the genus *Brachymeles* in the world.

Key words: Biodiversity; Endemism; Faunal region; Fossoriality; Limb reduction; Philippines

SCINCID lizards of the genus *Brachymeles* are known from 17 recognized species; all are endemic to the Philippines, except *B. apus* from northern Borneo (Brown and Alcalá, 1980; Hikida, 1982). The genus *Brachymeles* is one of only four scincid genera to possess both fully limbed and limbless species (*Brachymeles*, *Chalcides*, *Lerista*, and *Scelotes*; Brandley et al., 2008; Lande, 1978; Wiens and Slingluff, 2001). Six species of *Brachymeles* are pentadactyl (*B. bicolor*, *B. boulengeri*, *B. gracilis*, *B. schadenbergi*, *B. talinis*, and *B. sp. nov.*; Siler et al., in press *a*); seven are non-pentadactyl with reduced limbs and numbers of digits (*B. bonita*, *B. cebuensis*, *B. elerae*, *B. pathfineri*, *B. samarensis*, *B. tridactylus*, and *B. wrighti*); and four are limbless (*B. apus*, *B. minimus*, *B. vermis*, and *B. sp. nov.*; Siler et al., in press *b*). Among the seven non-pentadactyl species, some have minute limbs lacking digits, whereas others have moderately developed limbs with nearly all digits present (Brown and Alcalá, 1980; Hikida, 1982; Taylor, 1917, 1918, 1922*a*).

The conservative body plans and external morphology within *Brachymeles* have made it difficult to assess species diversity on the basis of morphology alone (Brown, 1956; Brown and Rabor, 1967). Previous studies have

identified three widespread polytypic species (Brown, 1956; Brown and Alcalá, 1980; Brown and Rabor, 1967). Both *Brachymeles gracilis* and *B. schadenbergi* contain two subspecies, and *B. boulengeri* contains four subspecies. All species are semi-fossorial, inhabiting rotting logs, loose soil, and leaf litter. Additionally, all known species exhibit a distinct, serpentine “swimming” mode of locomotion through humus and rotting log loam.

In March 2007, ELR and colleagues conducted herpetological surveys at higher elevations on Mt. Palali in the Municipality of Quezon in central Luzon Island (Fig. 1). Seventeen individuals of an undescribed species of *Brachymeles* were collected between 1400–1450 m. The new species is found in terrestrial microhabitats in the humus of rotting logs and loose soil. Herein, we describe the new species and report on its natural history, ecology, and habitat.

MATERIALS AND METHODS

We examined alcohol-preserved specimens that were fixed in 10% formalin (Appendix 1), and examined sex by gonadal inspection. We measured all specimens with digital calipers to the nearest 0.1 mm. To minimize inter-observer bias and other sources of potential error (Lee, 1990), CDS scored all measurements. Museum abbreviations follow Leviton et al. (1985).

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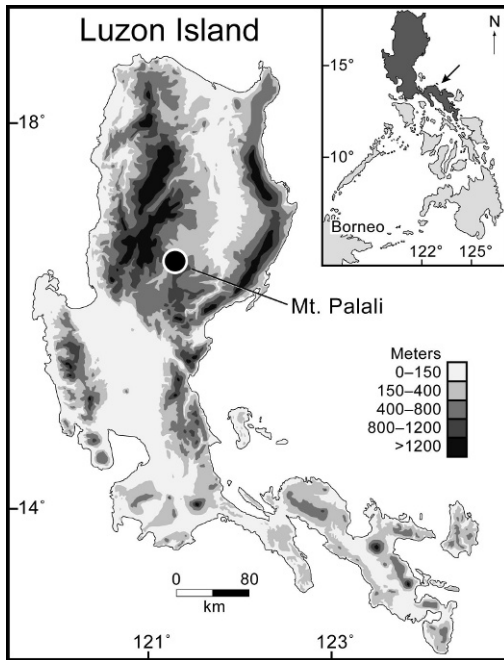


FIG. 1.—Known distribution of *Brachymeles muntingkamay* on Mt. Palali in central Luzon Island, Philippines. The type locality (Barangay Maddiangat, Municipality of Quezon, Nueva Vizcaya Province) is indicated by a black dot.

Based on Siler et al. (in press *a,b*) we chose the following meristic and mensural characters (Fig. 2): snout-vent length (SVL), axilla-groin distance, total length, midbody width, midbody depth, tail length, tail width, tail depth, head length, head width, head depth, snout-forearm length, eye diameter, eye-narial distance, snout length, internarial distance, forelimb length, hindlimb length, 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. In the species description below, ranges are followed by mean \pm standard deviation in parentheses.

RESULTS

Brachymeles muntingkamay sp. nov.
(Figs. 2–3)

Holotype.—An adult female (PNM 9566; field no. ELR 1388, formerly KU 308923; Figs. 2–4), collected at 10:00 hr on 23 March

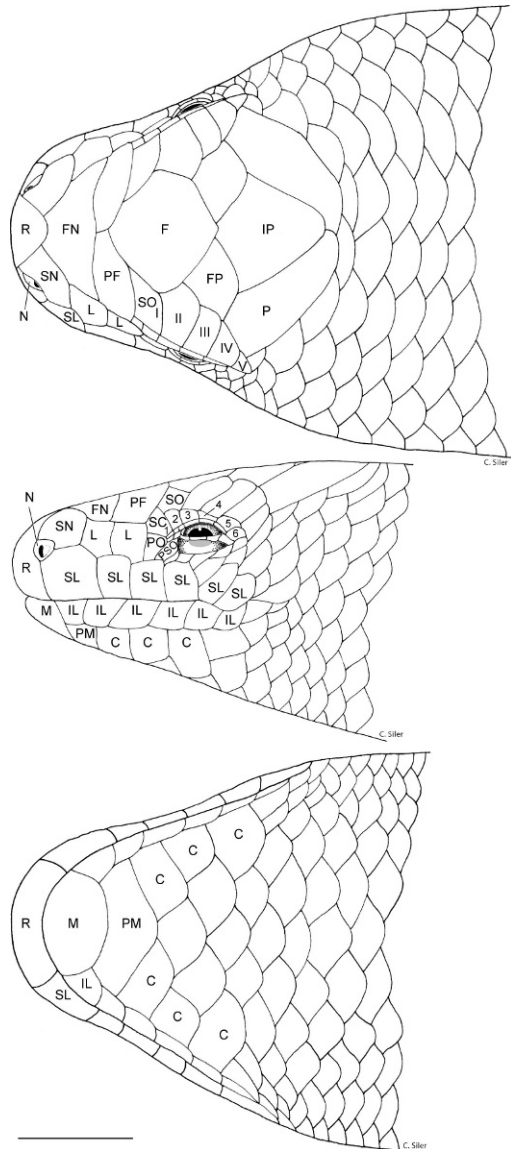


FIG. 2.—Head of female holotype of *Brachymeles muntingkamay* (PNM 9566) in dorsal, lateral, and ventral views. Taxonomically relevant head scales within *Brachymeles* are labeled as follows: C, chin shield; F, frontal; FN, frontonasal; FP, frontoparietal; IL, infralabial; IP, interparietal; L, loreal; M, mental; N, nasal; P, parietal; PF, prefrontal; PM, postmental; PO, preocular; PSO, pre-subocular; R, rostral; SC, supraciliary; SL, supralabial; SN, supranasal; and SO, supraocular. Roman numerals indicate scales in the supraocular series, with numbers indicating scales in the supraciliary series. Scale bar = 2 mm.

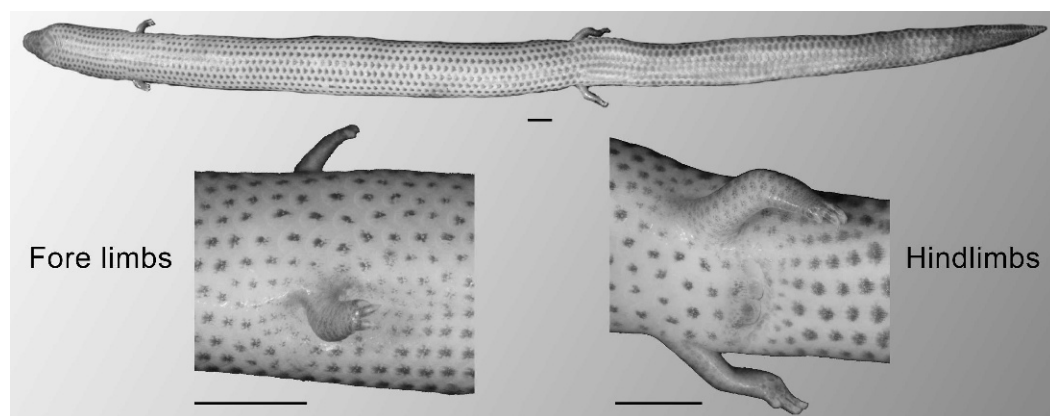


FIG. 3.—Preserved female holotype of *Brachymeles muntingkamay* (PNM 9566), showing dorsal aspect, fore limbs, and hindlimbs. Left = anterior; scale bar = 3 mm.

2007 at 1424 m elevation on Mt. Palali (16° 26' 21.9" N, 121° 13' 24.1" E; WGS-84) Barangay Maddiangat, Municipality of Quezon, Nueva Vizcaya Province, Luzon Island, Philippines, by Edmond L. Rico.

Paratopotypes.—KU 308865–66, 308900–06, 308908, 308953, PNM 9578–82, 11 adult females and five juveniles of unknown sex collected between 18 and 25 March 2007.

Diagnosis.—*Brachymeles muntingkamay* can be distinguished from congeners by the following combination of characters: (1) presence of limbs, (2) three digits on forelimbs and hindlimbs, (3) small body size, SVL less than 85 mm, (4) pineal eye spot absent, (5) auricular openings absent, (6) prefrontals in contact, (7) frontoparietals not in contact, (8) postnasals absent, (9) postmental wider than mental, (10) first pair of chin shields not in contact, (11) scale spots covering body, (12) midbody scale rows 22–24, (13) paravertebral scale rows 85–90, (14) six supralabials, and (15) six infralabials (Table 1, 2).

Comparisons.—The new species is morphologically most similar to *Brachymeles tridactylus*, the only other species with three forelimb and hindlimb digits, and *B. elerae*, the only other non-pentadactyl species to possess dark scale spots on each scale (Table 2). From *Brachymeles tridactylus*, the new species differs by having a shorter mean tail length, longer limbs, fewer axilla–groin scale rows, more supraciliaries and supraoculars, prefrontals in contact, no contact between the first pair of enlarged chin shields,

and the absence of a pineal eyespot and enlarged, differentiated nuchal scales (Table 1, 2). From *Brachymeles elerae*, the new species differs by having shorter forelimbs, frontoparietals not in contact, postmental wider than mental scale, discontinuous subocular scale row, and enlarged, differentiated subdigital lamellae absent (Table 1, 2). Additional characters distinguishing the new species from all non-pentadactyl, limbed species of *Brachymeles* are summarized in Tables 1 and 2.

Brachymeles muntingkamay differs from all limbless species of *Brachymeles* (*B. apus*, *B. minimus*, *B. vermis*, and *B. sp. nov.*; Siler et al., in press *b*) in having limbs, prefrontals in contact, and fewer paravertebral scale rows (85–90 vs. greater than 91), and in lacking a pineal eyespot. The new species further differs from *B. minimus*, *B. vermis*, and *B. sp. nov.* (Siler et al., in press *b*), in the absence of enlarged, differentiated nuchal scales and lack of contact between the frontoparietals. It differs from *B. minimus* by having more midbody scale rows (22–24 vs. 20), a discontinuous subocular scale row, and a postmental that is wider than the mental. The species can be distinguished from *B. apus* and *B. vermis* by its greater number of infralabial (6 vs. 5) and supraciliary (6–7 vs. fewer than 2) scales and from *B. apus* by its lack of a mental fused to first infralabial.

From all pentadactyl species of *Brachymeles* (*B. bicolor*, *B. boulengeri*, *B. gracilis*, *B. schadenbergi*, *B. talinis*, and *B. sp. nov.*; Siler

TABLE 1.—Continued.

	<i>muntingkamay</i> (12 f)	<i>tridaactylus</i> (9 m, 11 f)	<i>bonitae</i> (6 m, 7 f)	<i>samarensis</i> (5 f)	<i>echuensis</i> (8 f)	<i>derae</i> (2 m, 1 f)	<i>padfinkeri</i> ¹ (1 m, 1 f)	<i>wrighti</i> ¹ (1 f)
Infralabial count	6 (12)	6 (12) 7 (8)	5 (1) 6 (10) 7 (2)	7 (5)	6 (5) 7 (3)	6 (3)	6 (2)	7
Supraciliary count	6 (10) 7 (2)	5 (20)	5 (12) 6 (1)	6 (5)	6 (8)	5 (2) 6 (1)	—	—
Suprocular count	5 (11) 6 (1)	4 (20)	4 (13)	5 (5)	5 (8)	4 (2) 5 (1)	5 (2)	5

¹ Measurements and counts for *Brachymeles padfinkeri* and *B. wrighti* were taken from Taylor (1925) and Brown and Alcala (1980).

² The sex of the single specimen of *B. wrighti* is not found in the literature, and so it is unknown whether the SVL shown is that of a male or female.

et al., in press a), *B. muntingkamay* differs in having a reduced number of digits on forelimbs and hindlimbs (3 vs. 5; Fig. 3); smaller forelimb lengths (3–4 [4 ± 0]% SVL, 4–6 [5 ± 1]% Axilla–groin distance vs. 7–17 [12 ± 2]% SVL, 9–29 [18 ± 3]% Axilla–groin distance); smaller hindlimb lengths (7–9 [8 ± 1]% SVL, 8–11 [10 ± 1]% Axilla–groin distance vs. 10–28 [20 ± 3]% SVL, 16–53 [31 ± 5]% Axilla–groin distance); parietal scale in contact with three supraocular scales (vs. 2); discontinuous subocular scale row (vs. continuous); absence of auricular openings (vs. presence); presence of 22–24 midbody scale rows (vs. 24–26 in *B. gracilis gracilis*, and more than 24 in all other pentadactyl species and subspecies); and, with the exception of *B. bicolor*, presence of 85–90 paravertebral scale rows (vs. less than or equal to 73). With the exception of *B. schadenbergi schadenbergi* and *B. gracilis gracilis*, the new species differs from all pentadactyl species by the absence of a pineal eyespot (vs. presence).

Description of holotype.—A mature female, gravid, two eggs present in uterus; moderately small *Brachymeles*, SVL 75.8 mm; body moderately slender; head weakly differentiated from neck, nearly as wide as body (Fig. 3); head width 7.6% SVL, 93.5% head length; head length 39.5% snout–forearm length; snout–forearm length 20.5% SVL; snout short, bluntly rounded, snout length 51.0% head length (Fig. 2); ear completely hidden by scales; eyes small; eye diameter 1.2% SVL, 14.8% head length, 43.5% eye–narial distance; pupil horizontally elliptical; body slightly depressed, midbody depth 84.3% midbody width, uniform in thickness; body scales smooth, glossy, imbricate; dorsal scales each with three or four slight longitudinal indentations giving appearance of keels; 22 longitudinal scale rows at midbody; 85 paravertebral scale rows; 65 axilla–groin scale rows; limbs short, with digits reduced to three clawed stumps on both forelimbs and hindlimbs, finger and toe lamellae absent (Fig. 3); forelimb length 4.2% axilla–groin distance and 3.2% SVL, hindlimb length 10.4% axilla–groin distance and 7.8% SVL; order of digits from shortest to longest for hand: I < III < II, for foot: I < II = III; tail not as wide as body (Fig. 3), tapered toward end, tail

TABLE 2.—Summary of qualitative diagnostic characters (present, absent) in *Brachymeles muntingkamay* and specimens of all other known non-pentadactyl species of *Brachymeles*. The pairs of enlarged scales posterior to the postmental scale are abbreviated as chin shield pairs with reference to the 1st, 2nd, and 3rd pairs (when present). Dashes denote missing data in cases where specimens were unavailable for examination.

	<i>muntingkamay</i> (12 f)	<i>tridactylus</i> (9 m, 11 f)	<i>bonitae</i> (6 m, 7 f)	<i>sumaransis</i> (5 f)	<i>cebuensis</i> (8 f)	<i>elerae</i> (2 m, 1 f)	<i>pathfinderi</i> ¹ (1 m, 1 f)	<i>wrighti</i> ¹ (1 —)
Number of digits (fore/hind)	3/3	3/3	0–2 claws/ 0–2 claws	1–3 claws/ 1–3 claws	3/2	4/4	5/4	4/4
Pinal eyespot	Absent	Present	Present	Present	Present	Absent	—	—
Prefrontal contact	Present	Absent	Absent	Absent	Present or Absent	Present	Present	Present
Frontoparietal contact	Absent	Absent	Absent	Present	Present	Present	Present	Present
Postmental vs. mental width	PMW > MW	PMW > MW	PMW < MW	Equal	Equal	Equal	—	—
1 st chin shield pair contact	Absent	Present or Absent	Absent	Present	Present	Absent	Absent	Absent
Chin shield pair size	3 < 1 < 2	3 < 1 < 2	3 < 2 < 1	1 < 3 < 2	1 = 3 < 2	1 < 3 < 2	—	—
Chin shield pair separation ²	1(1); 2(1); 3(3)	1(0/1); 2(1); 3(3)	1(1); 2(1); 3(3)	1(0); 2(1); 3(3)	1(0); 2(1); 3(3)	1(1); 2(1); 3(3)	1(1); 2(1); 3(5)	—
Mental/1 st IFL fusion	Absent	Absent	Present or Absent	Absent	Absent	Absent	—	—
Differentiated nuchals	Absent	Present	Present	Present	Present	Absent	Absent	—
Continuous subocular scale row	Absent	Absent	Present	Present	Present	Present	—	—
Auricular opening	Absent	Absent	Absent	Absent	Absent	Absent	Present	Present ³
Dorsolateral stripes	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent
Longitudinal rows of dark spots	Present, around body	Present, vague to indistinct	Absent	Absent	Absent	Present, around body	Present, 6 rows	Absent

¹ Character states and presence/absence data for *Brachymeles pathfinderi* and *B. wrighti* were taken from Taylor (1925) and Brown and Alcalá (1980).

² Parentheses show the number of small ventral scale rows separating each enlarged pair of chin shields.

³ Auricular opening believed to be present; specimen injury prevented confident assessment of character presence/absence (Taylor, 1925).

width 80.6% midbody width, tail length 79.3% SVL.

Rostral projecting onto dorsal snout to point in line with posterior edge of nasal, broader than high, forming short suture with frontonasal (Fig. 2); frontonasal wider than long; nostril ovoid, in center of single trapezoidal nasal, longer axis directed anteroventrally and posterodorsally; nasals well separated; supranasals present, large, moderately separated; postnasals absent (Fig. 2); prefrontals narrowly connected; frontal shaped as parallelogram, its anterior margin in broad contact with prefrontal, in contact with first two anterior supraoculars, three times wider than anterior-most supraocular; five supraoculars; frontoparietals moderate, separated mesially, each frontoparietal in contact with posterior three supraoculars; interparietal large, its length $2 \times$ midline length of frontoparietal; interparietal longer than wide, diamond-shaped, wider anteriorly, its length nearly equal to length of frontal; parietals as broad as frontoparietals, in narrow contact behind interparietal (left overlaps right); enlarged, differentiated nuchals absent; two loreals, decreasing in size from anterior to posterior, anterior loreal about as long as and slightly higher than posterior loreal; two preoculars, dorsal larger than ventral; six supraciliaries, the anterior-most contacting frontal and separating posterior loreal from first supraocular, posterior-most extending to posterior edge of last supraocular; single subocular row complete, in contact with supralabials; lower eyelid with one row of scales; six supralabials, first $2.5 \times$ size of other supralabials, fourth beneath anterior half of eye; six infralabials (Fig. 2).

Mental wider than long, contacting first infralabial on both sides; single enlarged postmental, its width greater than width of mental; followed by three pairs of enlarged chin shields, none in contact; first pair widest, separated by single row of undifferentiated scales, second and third pairs separated by three rows of undifferentiated scales; second pair one-half as wide as first and third pairs (Fig. 2).

Coloration of holotype in preservative.—The ground color of the body is light brown, with each dorsal scale having a dark, chocolate-brown blotch on the posterior two thirds

of the scale (Fig. 3). Each blotch does not correspond to the scale boundary, but extends to the anterior edge of the next most posterior scale. The blotches are present around the entire body, and gradually reduce in size laterally. Ventral scales have smaller blotches restricted to the posterior one-third of each scale. Caudals and subcaudals have blotches nearly homogeneous in size, and only slightly reduced ventrally, thereby giving the appearance of a darker tail color. Blotches range from irregular smears of dark colors (ventrally) to patterns of three background dots anteriorly followed by a smear of color posteriorly (dorsally). Forelimb scales are mottled light and medium brown with hindlimb scales possessing a weakly defined pattern similar to the body scales. Preloacal scales have a darkly mottled (dark and light brown) pattern in contrast to the surrounding ventral scales. Head scales lack a spotting pattern, have mottled light and dark brown coloration, and are darker than the background body color. Supraocular scales possess the darkest brown coloration of all head scales. The rostral, nasal, supranasal, and first supralabial scales have a dark gray coloration, lacking any brown color. The mental scale is darkly mottled brown and dark brown and the chin shields are mottled brown and dark brown.

Coloration of holotype in life.—Coloration in life remains unrecorded; however, because *Brachymeles* specimens do not change significantly during preservation (CDS and RMB, personal observation), we suspect that the preserved coloration and patterns are much like those in life.

Measurements of holotype (mm).—SVL 75.8; axilla–groin distance 56.4; total length 136.0; midbody width 7.4; midbody depth 6.3; tail length 60.1; tail width 6.0; tail depth 4.3; head length 6.1; head width 5.7; head depth 4.5; snout–forearm length 15.5; eye diameter 0.9; eye–narial distance 2.1; snout length 3.1; internarial distance 1.5; forelimb length 2.4; hindlimb length 5.9; midbody scale-row count 22; paravertebral scale-row count 85; axilla–groin scale-row count 65; Finger III lamellae count 0; Two IV lamellae count 0; supralabial count 6; infralabial count 6; supraciliary count 6; supraocular count 5.

Variation.—Summaries of variation in mensural characters measured in the series are as follows (range followed by mean \pm standard deviation): SVL 61.8–81.3 (73.6 \pm 5.9); axilla-groin distance 49.3–62.1 (55.4 \pm 4.7); total length 107.4–136.0 (124.1 \pm 8.6); midbody width 5.6–8.9 (7.1 \pm 0.9); midbody depth 4.4–6.3 (5.3 \pm 0.6); tail length 40.8–60.1 (48.5 \pm 6.8); tail width 4.4–6.7 (5.5 \pm 0.7); tail depth 3.7–5.0 (4.2 \pm 0.4); head length 5.6–6.7 (6.1 \pm 0.4); head width 5.5–6.9 (6.1 \pm 0.4); head depth 3.5–4.9 (4.4 \pm 0.4); snout-forearm length 14.2–18.1 (15.6 \pm 1.2); eye diameter 0.9–1.4 (1.1 \pm 0.2); eye-narial distance 2.1–2.4 (2.2 \pm 0.1); snout length 2.7–3.6 (3.0 \pm 0.2); internarial distance 1.2–1.7 (1.5 \pm 0.2); forelimb length 2.4–3.0 (2.7 \pm 0.2); hindlimb length 5.3–6.0 (5.7 \pm 0.2). Variation in scale counts are shown in Table 1.

Distribution.—*Brachymeles muntingkamay* is known only from above 1400 m above sea level on Mt. Palali in the Caraballo Mountain Range, (16° 26' 21.9" N, 121° 13' 24.1" E; WGS-84), Barangay Maddiangat, Municipality of Quezon, Nueva Vizcaya Province, central Luzon Island, Philippines (Fig. 1).

Etymology.—The name of the new species is derived from the Tagalog (Filipino) terms "munti," meaning small, and "kamay," meaning hand, to represent the species' small, reduced limbs, and reduced number of digits. Suggested common name: Caraballo Mountains loam-swimming skink.

Ecology and natural history.—*Brachymeles muntingkamay* occurs in primary and secondary forests. Females were found in the humus material within rotting logs and in loose forest soil. No males have been collected.

Brachymeles muntingkamay was well camouflaged within soil and humus, and individuals were discovered only after the rotting logs and soil habitats were disturbed by collectors. When disturbed, individuals of the new species immediately attempted to burrow back into loose soil or humus, moving in a rapid, serpentine manner. The new species is likely viviparous, as are the other species of *Brachymeles* for which reproductive mode is known (Brown and Alcalá, 1980; Hikida, 1982). Two large eggs were observed in the uterus of gravid females.

Other lizards likely to be sympatric with the new species include *Cyrtodactylus philippi-*

nicus, *Draco spilopterus*, *Eutropis multicarinata borealis*, *Hemidactylus frenatus*, *Lamprolepis smaragdina*, *Sphenomorphus jagori*, and *S. beyeri*.

DISCUSSION

With the new species described here, a total of 18 species of *Brachymeles* are now recognized, 17 of which are endemic to the Philippines. The species total for the country remained nearly constant since Brown and Alcalá's (1980) revision of the genus; however, recent discoveries have begun to increase the known diversity of the group (Brown and Alcalá, 1995; Siler et al., in press *a,b*). Because skinks of the genus *Brachymeles* have highly conserved body morphologies and semi-fossorial lifestyles, it is not surprising that the observed diversity within the genus has remained relatively low. Previous attention to the genus has focused solely on morphological variation, and no studies have focused on the degree of undocumented cryptic diversity that may exist within the group (Brown, 1956; Brown and Alcalá, 1980, 1995; Brown and Rabor, 1967; Hikida, 1982; Taylor 1917, 1918, 1922*a,b,c*, 1923, 1925, 1928).

No past treatments have applied a lineage-based species concept to the group (de Queiroz, 1998, 1999; Frost and Hillis, 1990; Wiley, 1978). Application of such an approach is straightforward in the context of an island archipelago such as the Philippines (Brown and Diesmos, 2002; Brown and Guttman, 2002; Brown et al., 2000*a*). The morphologically diagnosable, allopatric subspecies of the *B. boulengeri*, *B. gracilis*, and *B. schadenbergi* groups eventually may require revision, with the possible partitioning of cryptic diversity along regional faunal region boundaries if Pleistocene Aggregate Island Complexes prove to support cohesive evolutionary lineages. A comprehensive phylogenetic analysis of the genus, combined with a comprehensive review of morphological variation, will be required to investigate the degree to which cryptic species diversity exists within *Brachymeles* (C. Siler, R. Brown, unpublished data).

Brachymeles muntingkamay is the eighth species to be described from Luzon Island and the ninth species within the Luzon Faunal Region (Brown and Alcalá, 1980; Brown and

Diesmos, 2002; Siler et al., in press *a,b*). The discovery of several new species on Luzon Island during the last fifteen years highlights the need for further exploration in the island's complex mountain ranges (i.e., Sierra Madres Cordillera), isolated mountain peaks (e.g., Mt. Palali, Mt. Arayat), and offshore land-bridge islands (Brown et al., 1995*a,b*, 1999, 2000*b*; Ross and Gonzales, 1992; Siler et al., in press *a,b*). Furthermore, surveys focused on semi-fossorial microhabitats need to be conducted throughout the Philippines before a complete assessment of biodiversity and conservation status of fossorial lizard diversity can be achieved.

At present, this distinctive new species is known only from a high-elevation patch of forest in central Luzon Island. Limb-reduced members of this genus usually are quite secretive, with collections per site generally limited to only a few individuals (Siler and Brown, personal observations). However, with the large series of specimens collected for the new species at the type locality, it is our impression that the species is relatively common. Whether this species possesses a wider geographical distribution (throughout the Caraballo, Cordillera, or Sierra Madres mountains) is unknown. The morphologically similar, three-digit species *Brachymeles tri-dactylus* has been recorded from multiple islands in the Visayan Faunal Region (Brown and Alcalá, 1980).

Nothing can be concluded from the fact that the new species has been collected at a single site. Comprehensive faunal surveys throughout Luzon are lacking; thus, negative occurrence data are uninformative. Therefore, we consider the conservation status of the new species "data deficient," pending the collection of additional information on distribution and habitat requirements of this unique species.

Acknowledgments.—We thank the Protected Areas and Wildlife Bureau (PAWB) of the Philippine Department of Environment and Natural Resources (DENR) for facilitating collecting and export permits necessary for this and related studies, wherein we are particularly grateful to M. Lim, C. Custodio, and A. Tagtag. Fieldwork by Conservation International Philippine staff and ELR was provided by CI's Critical Ecosystem Partnership Fund. Financial support for fieldwork for CDS was provided by a Panorama Fund grant from The University of Kansas Natural History Museum and Biodiversity Center, a

Madison and Lila Self Fellowship from the University of Kansas, as well as an NSF DEB 0804115 to CDS and NSF EF-0334952 and DEB 0743491 funds to RMB. For the loans of specimens we thank J. Vindum and A. Leviton (CAS), R. Sison and A. C. Diesmos (PNM), J. Ferner (CMNH), A. Resetar and H. Voris (FMNH), R. Crombie (USNM), and T. LaDuc (TNHC). Critical reviews of the manuscript were provided by L. Trueb and J. Oaks. CDS thanks the Madison and Lila Self Graduate Fellowship Program of the University of Kansas, the Philippine-American Education Foundation (administrators of Full-right funding), A.C. Alcalá and family, and the Diesmos family for their continued support, as well as CAS's Stearns Fellowship for funding a recent visit to examine comparative material.

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Accepted: 18 November 2009

Associate Editor: Michael Harvey

APPENDIX I

Specimens Examined

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 sub-adult specimens which were excluded from morphometric analyses.

Brachymeles apus.—(1) BORNEO: MALAYSIA: Sabah: Mt. Kinabalu National Park, Sayap Sub-Station: SP 06915.

Brachymeles bicolor.—(11) LUZON ISLAND: CAGAYAN PROVINCE: Municipality of Bagbao: Sitio Hot Springs: CAS 186111; Isabela Province, Sierra Madres Mountain Range: PNM 9568–77.

Brachymeles bonitae.—(13) MASBATE ISLAND: MASBATE PROVINCE: Municipality of Mobo: Tugbo Barrio: CAS 144223; Mapuyo Barrio: Palangkahoy: CAS 144270; MINDORO ISLAND: MINDORO ORIENTAL PROVINCE: Mt Halcon: SE slope of Barawan Peak: CAS-SU 25713, 25793, 25886–88, 25904; Sumagui: CAS 62064 (Paratype); POLILLO ISLAND: QUEZON PROVINCE: Municipality of Polillo: Barangay Pinaglubayan: KU 307747–49, 307755.

Brachymeles boulengeri boholensis.—(19) BOHOL ISLAND: BOHOL PROVINCE: 6 km S of Municipality of Sierra Bullones: Teachers Park: CAS-SU (Holotype) 24528; 13 km SE of Municipality of Sierra Bullones: Dusita Barrio: CAS-SU (Paratypes) 24502–04, 24518, 24520–25, 24541, 24543, CAS-SU 25443–44, 25447; 1 km E of Dusita Barrio: Abacjanan: CAS-SU 24867; Municipality of Sierra Bullones: Sandayong: CAS-SU 18709, 18717.

Brachymeles boulengeri boulengeri.—(15) POLILLO ISLAND: QUEZON PROVINCE: Municipality of Polillo: CAS (Paratypes) 62272–73, 62276–77; LUZON ISLAND: LAGUNA PROVINCE: Municipality of Los Banos: CAS 61096; Mt. Maquilang: CAS 61297; POLILLO ISLAND: QUEZON PROVINCE: Municipality of Polillo: Barangay Pinaglubayan: KU 307439, 307750–54, 307756–58.

Brachymeles boulengeri mindorensis.—(18) MINDORO ISLAND: MINDORO ORIENTAL PROVINCE: 30 km SE of Municipality of Calapan: Bank of Tarogin River: CAS-SU (Holotype) 24487; SE slope of Mt Halcon, Tarogin

Barrio: CAS-SU (Paratypes) 24549–54, 24561–62, 24564; 24566, 24568, 24573–74, 24577–79; Mt Halcon, SE slope of Barawan Peak: CAS-SU (Paratype) 24570.

Brachymeles boulengeri taylori.—(21) NEGROS ISLAND: NEGROS ORIENTAL PROVINCE: 3 km W of Municipality of Valencia: Cuernos de Negros Mountain Range: Sitio Lunga: Ridge on North Side of Maiti River: CAS-SU (Holotype) 18615, CAS-SU 21873; Ridge on South Side of Maiti River: CAS-SU (Paratype) 18641, 18656–57, 18748; Cuernos de Negros Mountain Range: CAS-SU (Paratype) 18649; Top of Dayungan Ridge: CAS-SU 21877, 21880, 21883–84; 24 km NW of Bondo Barrio: Bantolinao: CAS-SU 22355–56; CEBU ISLAND: CEBU PROVINCE: 10 km from Municipality of Carcar: Tapal Barrio: Sitio Mantalongon: CAS 154671, 154673, 154678–82, 154686.

Brachymeles cebuensis.—(8) CEBU ISLAND: 40 km SW of Cebu City: Tapal Barrio, Sitio Mantalongon: CAS-SU (Holotype) 24400, (Paratypes) 24396–97, 24399, 24401, 24403; 10 km from Municipality of Carcar: Tapal Barrio: CAS 102405 (Paratype); 3 km NW of Cebu City, Buhisan Barrio, Buhisan Reforestation Project: CAS-SU 27537.

Brachymeles elerae.—(4) LUZON ISLAND: KALINGA PROVINCE: Municipality of Balbalan: CAS 61499–500, PNM 9563–4.

Brachymeles gracilis gracilis.—(18) MINDANAO ISLAND: DAVAO DEL SUR PROVINCE: Municipality of Malalag: Sitio Kibawalan: CAS-SU 24163, 24165, CAS 124811, 139307–09; Davao City: Buhangin, Kabanti-an: CAS 124803–04, 139293–95, 139303–05; Digos City: Tres de Mayo Barrio: CAS 124806–08, 139300.

Brachymeles gracilis hilong.—(20) MINDANAO ISLAND: ACUSAN DEL NORTE PROVINCE: Municipality of Cabadbaran: Diuata Mountain Range: Mt. Hilonghilong: Balangbalang: CAS-SU (Holotype) 24407, (Paratype) 102406, 133578, CAS-SU 24411, 133577, 133581–82, 133609, 133612, 133692–93, 133703–06, 133743, 133745–47; SURIGAO DEL SUR PROVINCE: Municipality of Lanuza: Diuata Mountain Range: Sibuhay Barrio: CAS-SU (Paratype) 24315.

Brachymeles minimus.—(6) CATANDUANES ISLAND: CATANDUANES PROVINCE: Municipality of Gigmoto: Barangay San Pedro: KU 308129–31, 308210–12.

Brachymeles samarensis.—(7) SAMAR ISLAND: EASTERN SAMAR PROVINCE: Municipality of Taft: Barangay San Rafael: KU 310849–50, 310852, 311294–6; LEYTE ISLAND: LEYTE PROVINCE: Municipality of Baybay: Barangay Pilim: Sitio San Vicente: KU 311225.

Brachymeles schadenbergi orientalis.—(21) BOHOL ISLAND: BOHOL PROVINCE: Municipality of Sierra Bullones: Dusita Barrio: CAS-SU (Holotype) 24436, CAS-SU (Paratypes) 24428, 24434, 24437, CAS (Paratype) 102404, CAS-SU 25452; Dusita Barrio: Abacjanan: CAS-SU (Paratypes) 24446–51, CAS-SU 25460; Cantaub Barrio: CAS-SU (Paratypes) 18702, 24442, 24458; MINDANAO ISLAND: ACUSAN DEL NORTE PROVINCE: Municipality of Cabadbaran: Diuata Mountain Range: Mt. Hilonghilong: Kasinganan: CAS-SU 133301, 133616, 133749, 133752, 133754.

Brachymeles schadenbergi schadenbergi.—(20) MINDANAO ISLAND: MISAMIS OCCIDENTAL PROVINCE: 2 km NW of Masawan: CAS 23468–69; 4 km NW of Masawan: CAS 23471; 3 km NW of Masawan: South Bank of Dapitan River: CAS 23479–81, 23484–85; ZAMBOANGA DEL NORTE PROVINCE: Dapitan River: CAS-SU 23494–96; BASILAN ISLAND: BASILAN PROVINCE: Port Holland: Sawmill: CAS 60493; CAMIGUIN SUR ISLAND: CAMIGUIN PROVINCE: Municipality of Catarman: Mt. Mambajao: Sitio Sangangan: CAS 110976–83.

Brachymeles talinis.—(21) NEGROS ISLAND: NEGROS ORIENTAL PROVINCE: 6 km West of Municipality of Valencia: Cuernos de Negros Mountain Range: Ridge on North Side of Maite River: CAS-SU (Holotype) 18358, (Paratype) 89813; Cuernos de Negros Mountain Range: Dayungan Ridge: CAS 133871; Dumaguete City: CAS-SU (Paratype) 12225; Municipality of Siaton: 20 km North of Bondo Barrio: CAS-SU 22311–12, 22317, 22323; INAMPULAGAN ISLAND: GUIMARAS PROVINCE: Municipality of Sibunag: 8 km West of Pulupandan Town: CAS-SU 27972, 27996–97; PANAY ISLAND: ANTIQUE PROVINCE: Municipality of San Remigio: KU 306651, 306756, 306758, 306760, 306765–66, 306772–74, 306786.

Brachymeles tridactylus.—(20) NEGROS ISLAND: NEGROS OCCIDENTAL PROVINCE: 16 km East of Municipality of La Castellana: Barrio Cabagna-an: Southern Slope of Mt. Canlaon: CAS-SU 19424, 19426–27, 19429, 19452, 19458; 20 km East of Municipality of La Castellana: Sitio Kalapnagan: CAS-SU 27082–83; NEGROS ORIENTAL PROVINCE: Hills North and Northwest of Mayaposi: CAS-SU (Holotype) 18354; PANAY ISLAND: ANTIQUE PROVINCE: Municipality of Culasi: Barangay Alojipan: KU 307726–36.

Brachymeles vermis.—(5) JOLO ISLAND: SULU PROVINCE: CAS-SU (Paratype) 62489, CAS-SU 60720–22, 60857.