



A new species of *Gekko* (Squamata: Gekkonidae) from central Luzon Island, Philippines

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Abstract

We describe a new species of gekkonid lizard, *Gekko carusadensis*, from low elevation, disturbed and secondary-growth forest in east-central Luzon Island, Philippines. Numerous features of its external morphology distinguish it from other congeners, including the presence of a distinct color pattern, body size, and a unique combination of scale counts. The new species has been found on karst outcrops and cave systems at low elevation. The new species typifies the rapidly expanding known diversity of Philippine gekkonid lizards, and is the third species in the genus to be described in the last three years.

Key words: Biodiversity; Endemism; Faunal region; Gekkonidae; Limestone forest

Introduction

The known diversity of Philippine gekkonid lizards has increased rapidly, and now includes ten genera and 42 described species: *Cyrtodactylus* Gray (6 species), *Gekko* Laurenti (12), *Gehyra* Gray (1), *Hemidactylus* Oken (5; including *platyurus* [Schneider], a species formerly assigned to *Cosymbotus* Fitzinger), *Hemiphyllodactylus* Bleeker (1), *Lepidodactylus* Fitzinger (6), *Luperosaurus* Gray (7), *Pseudogekko* Taylor (4), and *Ptychozoon* Kuhl & van Hasselt (1) (Taylor, 1922a,b; Brown & Alcala, 1978; Brown & Diesmos, 2000; Brown *et al.*, 1997, 1999, 2007, 2008, 2009, 2010; Gaulke *et al.*, 2007; Welton *et al.*, 2009, in press).

There are 12 species of the genus *Gekko* documented in the Philippines, nine are considered to be endemic to the archipelago (Brown *et al.*, 2009). Two species possess broader geographic distributions (*G. gekko* [Linnaeus], and *G. monarchus* [Schlegel]; Taylor, 1922a, b; Brown & Alcala, 1978; Ota *et al.*, 1989), and *Gekko hokouensis* Pope likely is represented in the country's gekkonid fauna in error (Brown *et al.*, 2008, 2009). The remaining nine Philippine endemic species include *G. athymus* Brown & Alcala, *G. gigante* Brown & Alcala, *G. mindorensis* Taylor, *G. palawanensis* Taylor, *G. porosus* Taylor, *G. romblon* Brown & Alcala, *G. ernstkelleri* Rösler, Siler, Brown, Demeglio, & Gaulke, *G. crombota* Brown, Oliveros, Siler, & Diesmos, and *G. rossi* Brown, Oliveros, Siler, & Diesmos. These species are known to share a combination of morphological traits, including: (1) moderate body size and longer, slender limbs; (2) near complete absence of interdigital webbing or cutaneous body expansions; (3) enlarged dorsal tubercles arranged in longitudinal rows on the dorsum (except *G. athymus*, dorsal tubercles absent); (4) scales of dorsum between tubercle rows minute, non-imbricate; (5) scales of venter enlarged, flat, imbricate; (6) differentiated postmentals elongate and slender; and (7) subcaudals enlarged, plate-like (Brown & Alcala, 1978; Brown *et al.*, 2007, 2008, 2009).

Herpetological field surveys in the lower-elevation forest of the Municipality of San Miguel and Doña

Remedios Trinidad in central Luzon Island (Fig. 1) were conducted during the months of January and February 2009. Nine individuals of an undescribed species of *Gekko* were collected on an isolated karst limestone outcrop. To date, this morphologically distinct species is found only in a single terrestrial microhabitat of karst, disturbed and secondary-growth forest. Herein, we describe the new species and report on its natural history, ecology, and habitat.

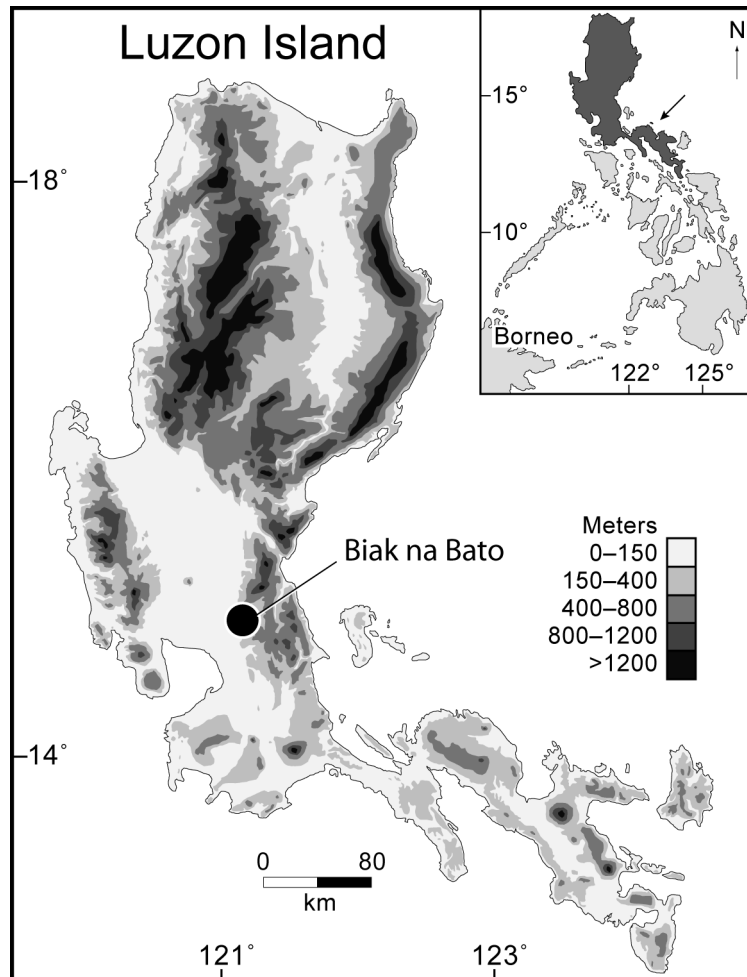


FIGURE 1. Map of the Philippines (inset) and Luzon Island showing topographic relief and the type locality (Biak na Bato park) of *Gekko carusadensis*.

Material and methods

One of us (CWL) collected data from fluid-preserved specimens (Appendix 1). Voucher specimens are deposited in U.S. and Philippine museum collections (institutional abbreviations follow Leviton *et al.*, 1995). Sex was determined by eversion of hemipenes during preservation (males) and confirmed by noting prominent secondary sexual characteristics such as the presence of precloacofemoral pores and enlarged cloacal spurs in males (both absent in females; Brown, 1999; Brown *et al.*, 1997, 2007, 2008, 2009). Gonadal inspection was performed whenever possible. Measurements (to the nearest 0.1 mm) were taken with digital calipers following character definitions by Ota & Crombie (1989), Brown *et al.* (1997, 2007, 2008) and Brown (1999). Character abbreviations include: snout–vent length; tail length; tail width; tail depth; head length; head width; head depth; snout length; eye diameter; eye–narial distance; auricular opening diameter; inter-narial distance; inter-orbital distance; axilla–groin distance; femur length; tibia length; Toe I length; Toe IV length; number of supralabials; infralabials; counted both to the center of the eye and posteriorly to the

point at which labials were no longer differentiated); femoral pore-bearing scales; expanded subdigital scansors on Fingers I–V; expanded subdigital scansors on Toes I–V; midbody ventral transverse scale rows; midbody transverse tubercle rows; paravertebral tubercles (counted dorsally between midpoint of limb insertions).

Systematics

Gekko carusadensis sp. nov.

Figs. 2–5

Holotype. PNM 9715 (ACD Field No. 4537; formerly KU 319968), adult male, collected inside a cave in secondary-growth forest (19:30) in Barangay Biak na Bato, Municipality of San Miguel and Doña Remedios Trinidad, Bulacan Province, Luzon Island, Philippines, N 15.1084, E 121.0724, on 17 January, 2009, collected by Arvin C. Diesmos and Charles W. Linkem.

Paratypes. Five males KU 320484, 320485, 319970, PNM 9717–18, two females PNM 9716, KU 319985, and one juvenile KU 319986 collected on karst formations and in cave systems in secondary-growth forest (18:00–21:00), 17–18 January 2009, other data identical to holotype.

Diagnosis. *Gekko carusadensis* differs from non-Philippine *G. kikuchii* Oshima, *G. shibatai* Toda, Sengoku, Hikida & Ota, *G. tawaensis* Okada, *G. vertebralis* Toda, Sengoku, Hikida & Ota, and *G. vittatus* Houttuyn by the presence of preloacal pores in males; from *G. badenii* Szczerbak & Nekrasova, *G. grossmanni* Günther, *G. petricolus* Taylor, *G. russelltraini* Van Tri, Bauer, Wood, & Grismer, and *G. taylori* Ota & Nabhitabhata by the presence of femoral pores in males; from *G. melli* Vogt, *G. scientiaventura* Rösler, Yiegler, Vu, Herrmann & Böhme, *G. subpalmatus* Günther, and *G. tawaensis* by the presence of dorsal tubercles; from *G. albofasciolatus* Günther, *G. nutaphandi* Bauer, Sumontha & Pauwels, *G. siamensis* Grossmann & Ulber, *G. smithii* Gray, and *G. verreauxi* Tytler by having a smaller adult SVL (< 98 mm vs. > 110 mm); from *G. auriverrucosus* Zhao & Liu, *G. liboensis* Zhao & Li, *G. japonicus* (Schlegel), *G. scabridus* Liu & Zhou, *G. swinhonis* Günther, *G. taibaiensis* Song, and *G. wenzianensis* Zhou & Wang by a larger number of digit IV lamellae (18–20 vs. 9 or fewer); from *G. chinensis* Gray, *G. hokouensis*, and *G. yakuensis* Matsui & Okada by lacking any interdigital webbing; from *G. similignum* Smith by the presence of more dorsal tubercle rows and from *G. palmatus* Boulenger and *G. ulikovskii* Darevsky & Orlov by the presence of more preloacofemoral pores.

Gekko carusadensis differs from all other species of Philippine *Gekko* (i.e., *G. athymus*, *G. crombota*, *G. ernstkelleri*, *G. gekko*, *G. gigante*, *G. mindorensis*, *G. monarchus*, *G. palawanensis*, *G. porosus*, *G. romblon* and *G. rossi*) by the following characters (1) moderately large body size (SVL 83.4–97.2 mm for adult males; 79.9–87.5 for females); (2) dorsum gray, with little to no dark gray mottling or transverse bars; (3) moderate number of preloacofemoral pores (46–50) arranged in a continuous, uninterrupted series (pore bearing in males; lacking pores in females); (4) moderate number of mildly conical dorsal body tubercle rows (16–18 midbody; 25–28 paravertebrally).

Gekko carusadensis differs from its phenotypically most similar congener, *G. mindorensis*, by the presence of fewer preloacofemoral pores (46–50 vs 52–66); by having 18–20 scansors beneath toe IV (vs. 12–14); by having on average fewer midbody tubercle rows (14–17 vs. 16–20); and by *G. carusadensis* females being larger than *G. mindorensis* females (79.9–87.5 mm vs. 68.2–70.9). It can be further diagnosed from *G. mindorensis* by the difference in coloration (light gray with small dark gray mottling versus gray with dark thin transverse bands).

The presence of 46–50 preloacofemoral pores distinguishes *Gekko carusadensis* from all Philippine congeners, including *G. rossi* (77–88), *G. crombota* (58–74), *G. porosus* (74–80), *G. monarchus* (31–40), *G. mindorensis* (52–66), *G. romblon* (71–84), *G. gigante* (52–66), *G. ernstkelleri* (36–42), *G. palawanensis* (64–70), *G. athymus* (20–24), and *G. gekko* (12–20). A high number of toe IV subdigital scansors (18–20) distinguish *G. carusadensis* from *G. rossi* (10–16), *G. crombota* (15–18), *G. porosus* (14–16), *G. monarchus* (13–15), *G. mindorensis* (12–14), and *G. romblon* (12, 13). Moderately large body size in males and females

distinguishes *Gekko carusadensis* from the smaller species *G. monarchus* (male 56.2–80.7 mm; female 40.6–69.7 mm), *G. mindorensis* (male 55–88.2 mm; female 68.2–70.9 mm), and *G. palawanensis* (male 57.2–65.7 mm; female 44.5–61.8 mm) and from the larger species *G. athymus* (male 99.2–119.9 mm; female 88.2–117.1 mm), *G. gecko* (male 120.1–166.1 mm; female 119.2–144.1 mm) and female *G. porosus* (91–96.7 mm). *Gekko carusadensis* is further distinguished from *Gekko porosus* by the absence of a modified distal femoral pore-bearing patch (vs. present, composed of a short series of 2 or 3 rows of pore-bearing scales). The new species differs from *G. crombota* (Brown *et al.*, 2008) by small dark mottling on light gray dorsum (vs. presence of trilobed cream bars) on the body trunk; by fewer (16–18) midbody dorsal tubercle rows (vs. 18–22); and precloacofemorals arranged in a continuous series (vs. 1 or 2 scale separation between precloacals and femorals; Brown *et al.*, 2008:fig 4B). Finally, dorsal coloration (light gray with small dark gray mottling) distinguishes *G. carusadensis* from the highly variable range of patterns exhibited by other Philippine *Gekko*. These and other differences are summarized in Table 1.

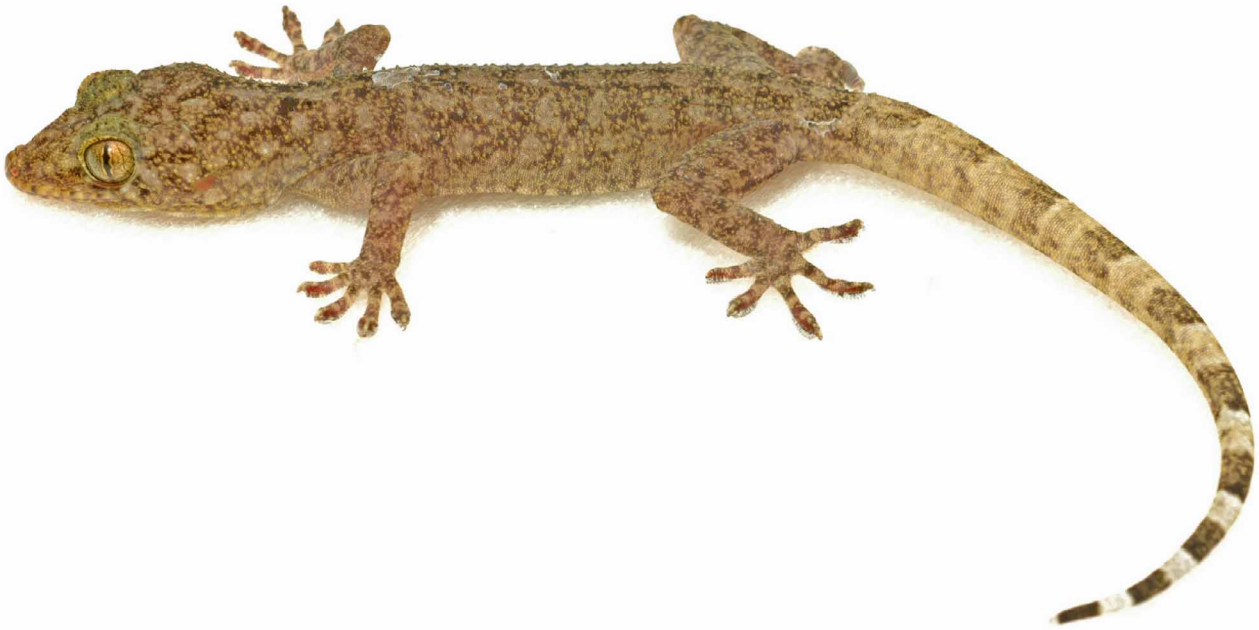


FIGURE. 2. Image of *Gekko carusadensis* in life.

Description of holotype. Adult male (PNM 9715, formerly KU 319968; field No. ACD 4537). Snout–vent length 83.4 mm; habitus robust, limbs well-developed, relatively slender, tibia length 15.7% snout–vent length, 77.9% femur length; tail relatively long, 1/2 regenerated; margins of limbs smooth, lacking cutaneous flaps or dermal folds; small cutaneous fold running along ventrolateral margin of trunk.

Head large, characterized by lightly hypertrophied temporal and adductor musculature, as wide as body at widest point; snout flattened, rounded at tip in dorsal and lateral aspect (Fig. 3); head width 70.1% head length, 20.8% snout–vent length; head length 29.7% snout–vent length; snout length 55.7% head width, 39.1% head length; dorsal surfaces of head relatively smooth, with pronounced concave postnasal, prefrontal, interorbital, and parietal depressions; auricular opening large, oval, oriented slightly lateroposteriorly from beneath temporal swellings on either side of head; tympanum very deeply sunk; orbits large, bordered anteriorly by slightly distinct supraorbital crests; eye large, pupil vertical with crenulated margins (Fig. 3); auricular opening 64.3% eye diameter, interocular diameter 16.1% head width.

Rostral large, rectangular, twice as broad as high, with two dorsomedial depressions between raised posterodorsal projections that form the anterolaterally-projecting edge of the nares and anterior suture of the supranasals; nostril surrounded by rostral, the first labial, an enlarged, round, convex supranasal, and two small postnasals; supranasals separated by two large internasals, anterior and posterior, anterior in contact with rostral.

TABLE 1. Distribution of selected diagnostic characters in *Gekko carusadensis* and other Philippine species of *Gekko* (exclusive of *G. hokouensis* [a Japanese species probably erroneously included in the Philippine herpetofauna]). Measurements are presented in mm and all specimens are considered adults. Data from one juvenile paratype of *G. carusadensis* are excluded. Characters are defined as: (1) dorsal body coloration, (2) number of supralabials, (3) number of precloacofemoral pores, (4) number of scapulars on Toe IV, (5) number of internasals contacting the rostral, (6) number of midbody ventrals, (7) number of midbody tubercle rows, (8) number of vertebral tubercles in axilla–groin distance, (9) number of ventral scales in axilla–groin distance.

	n	Female SVL								
		1	2	3	4	5	6	7	8	9
<i>carusadensis</i>	6m; 2f	83.4–97.2	79.9–87.5	46–50	18–20	1	38–47	14–17	25–28	—
<i>rossi</i>	8m; 8f	95.5–108.2	86.8–100.0	77–88	10–16	1, 2	33–41	16–18	31–37	74–104
<i>crombota</i>	4m; 9f	85.5–117.9	85.1–106.9	58–74	15–18	1	38–42	18–22	29–33	67–85
<i>porosus</i>	3m	91.0–96.7	91.0–96.7	74–80	14–16	1	35–40	15–17	17–24	64–74
<i>monarchus</i>	2m; 1f	56.2–80.7	40.6–69.7	31–40	13–15	1, 2	38–44	16–20	18–23	57–61
<i>mindorensis</i>	22m; 13f	55.0–88.2	68.2–70.9	52–66	12–14	1	40–47	16–20	17–26	58–63
<i>romblon</i>	4m; 6f	62.7–89.2	58.6–72.5	71–84	12, 13	1, 2	37–42	12–15	18–24	63–66
<i>gigante</i>	5m; 3f	89.7–104.7	79.7–87.9	52–66	16–19	1	41–50	12–18	19–28	65–74
<i>ernstkelleri</i>	4m; 6f	82.0–92.1	78.0–88.0	36–42	17–19	1	42–48	10–16	17–25	58–62
<i>palawanensis</i>	3m; 5f	57.2–65.7	44.5–61.8	64–70	16–19	1	38–43	10–20	23–27	54–58
<i>athymus</i>	3m; 2f	99.2–119.9	88.2–117.1	20–24	18–22	1	30–36	—	—	66–72
<i>gecko</i>	9m; 12f	120.1–166.1	119.2–144.1	12–20	17–20	1–3	30–35	10–12	18–22	60–64



FIGURE 3. Dorsal, lateral, and ventral view of the holotype (PNM 9715) of *Gekko carusadensis* showing scalation and coloration. Scale bar = 5 mm.



FIGURE 4. Preloacal region of the male holotype (PNM 9715) of *Gekko carusadensis* showing the continuous line of preloacofemoral pores and the enlarged scales prior to the pore bearing series. Lower image is of left manus of the holotype showing scapulars and palmar scalation. Scale bar = 1mm

Total number of differentiated supralabials 13/13 (L/R; 10/10 to center of eye), bordered dorsally by one row of slightly differentiated snout scales; total number of differentiated infralabials 11/10 (10/9 to center of eye), bordered ventrally by one row of enlarged scales and four rows of only slightly differentiated chin

scales; mental triangular; mental and first four infralabials greatly enlarged and wrapping onto ventral surfaces of chin, \geq twice the size of infralabials 5–11; mental bordered posteriorly by a pair of slender, elongate postmentals; postmentals in medial contact for $3/4$ their length, bordered posterolaterally by a secondary pair, less than one half the length of first pair, and a tertiary pair of non-elongate, hexagonal lateral postmentals, \leq one quarter the length of primary postmentals; postmentals bordered posteriorly by 1 scale row of slightly enlarged, irregular scales; followed immediately by a sharp transition to non-differentiated chin and gular scales; postrictal scales slightly enlarged, 2 or 3 times the size of gular scales; remainder of undifferentiated gular scales very small, round, juxtaposed (Fig. 3).

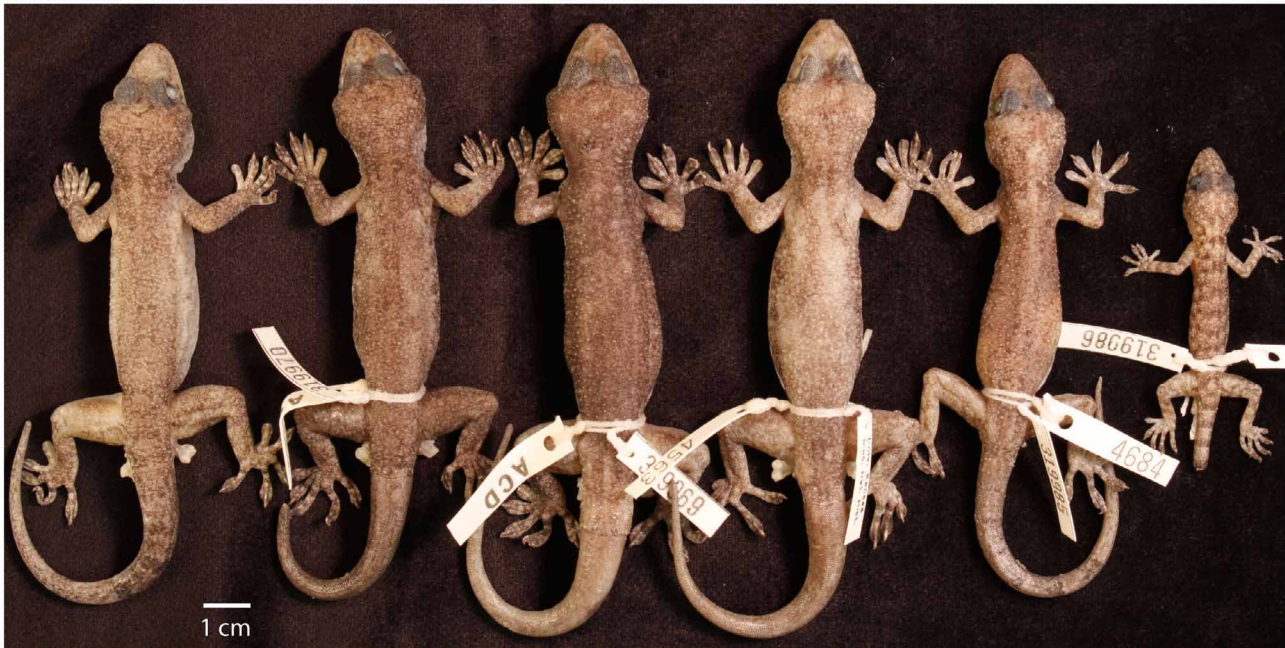


FIGURE 5. Part of the type series showing the lack of dorsal coloration pattern in *Gekko carusadensis* adults. The specimens are (left to right): males PNM 9715, KU 319970, PNM 9718, PNM 9717, female KU 319985, and juvenile KU 319986. Juvenile coloration differs from adults as discussed in the variation section. Female is slightly smaller than males, but shows the same coloration. Scale bar = 1 cm.

Dorsal cephalic scales highly heterogeneous and varied in shape and disposition; scales posterior the nares and loreal region somewhat enlarged, round, oval to subrectangular, and convex; postnasal, prefrontal, and interorbital depressions with noticeably smaller scales; palpebral scales homogeneous, larger than adjacent interorbital region intermixed on posterior half with slightly raised tubercles; undifferentiated temporal region scales granular, flat to irregularly convex, reducing in size posteriorly, interspersed with numerous highly enlarged, protuberant and conical tubercles; nuchal region with small, juxtaposed, flat trunk scales interspersed with enlarged sharply conical body tubercles; pectoral region with enlarged cycloid, imbricate scales, increasing posteriorly through venter, becoming very enlarged and strongly imbricate.

Ornamental occiput scalation includes numerous tubercles on posterolateral portions of head (temporal, supratympanic, and postrictal regions; Fig 3) and a short curved series of 2 enlarged, bluntly conical preorbital scales anterior to a row of slightly enlarged preorbitals (Fig. 3); circumorbitals differentiated into the following distinct regions: (1) 12 minute precircumorbitals, dorsal three with spine-like projections, (2) 8 enlarged, flat, squarish circumorbitals dorsoanterior to orbit, (3) 17 transversely elongated fringe-like spiny cilia across dorsoposterior margin of orbit.

Axilla–groin distance 42.8% snout–vent length; undifferentiated dorsal body scales round to irregularly octagonal, convex, nonimbricate, relatively homogeneous; dorsals sharply transition to imbricate ventrals along the ventrolateral adipose fold; dorsals lack interstitial granules but interspersed with 14 irregularly transverse rows (26 paravertebral rows) of slightly enlarged and protuberant dorsal body tubercles; 43 transversely arranged ventrals; scales on dorsal surfaces of limbs larger than dorsals, with interspersed

enlarged tubercles extending down limbs, especially concentrated on radioulnar segment of forelimb and the anteriodorsal region of femur and entirety of dorsal tibia/fibia region of hind limb, terminating at the dorsal surfaces of hands and feet; enlarged patches of distinct imbricate scales present on wrist, anterior (prebrachial) surface of upper arm and anterior thigh, on knee, and on distal ventral surface of hind limb, just before attachment of foot; scales on dorsal surfaces of hands and feet similar to dorsal limb scales; ventral body scales flat, cycloid, strongly imbricate, much larger than lateral or dorsal body scales, largest at midventral line and pectoral region; gular scales small and granular, smaller than lateral and dorsal head scales.

Forty-nine dimpled pore-bearing scales (Fig. 4) in a continuous precloacofemoral series each punctured with light orange exudate; precloacofemorals arranged in a wavy, obtuse, inverted "V" and continuing just past mid-thigh; inferred "precloacal" pores 2–3 times the diameter of inferred "femoral" pores (Fig. 4); precloacofemorals preceded by three similarly enlarged but non-dimpled scale rows; precloacals followed by enlarged scales that extend down to the edge of the cloaca, femoral series followed abruptly by small scales which continue around the posterior edge of the hind limb.

Digits moderately expanded and covered on palmar/plantar surfaces by bowed, unnotched, undivided scansors (Fig. 4); no interdigital webbing; scansors of manus: 14, 13, 14, 16, and 16 on right digits I–V respectively; pes: 14, 14, 17, 18, and 16 on right digits I–V respectively; scansors of manus and pes bordered basally (on palmar and plantar surfaces) by 1–4 slightly enlarged scales that form a near-continuous series with enlarged scansors; all but first digit clawed; terminal claw-bearing compressed phalanges, with large recurved claws, not free until beyond dilated portion of digit.

Tail base bordered by a double, greatly enlarged conical postcloacal spur on each side of vent; postcloacal swellings pronounced; hemipenes completely everted; half of tail regenerated; tail depth (not including basal postcloacal swelling) 85.5% tail width; tail slightly depressed, ovoid; dorsal surface with small infrequent tubercles, concentrated along posterior edge of annulations, caudals similar in size to dorsals, but arranged in rows; subcaudals enlarged, plate-like, 2 rows per annulus, widely expanded to cover most of ventral surface; distal portion regenerated; tail with clear autotomy scar and distally regenerated portion, 8 annuli before autotomy scar (37 mm), autotomized portion 48 mm.

Measurements of holotype (in mm). Snout–vent length 83.4; axilla–groin distance 35.7; Tail length 82.5; Tail width 6.9; Tail height 5.9; head length 24.8; head width 17.4; snout length 9.7; eye–narial distance 8.2; interorbital distance 3.7; internarial distance 2.8; eye diameter 5.6; auricular diameter 3.6; tibia length 13.1; femur length 16.8; Toe I length 5.9; Toe IV length 8.4.

Coloration of holotype in preservative. Dorsal ground coloration of head, body, tail and dorsal surfaces of limbs light gray with scattered, irregular, dark gray mottling. The mottling of dark gray is without pattern, slightly increased in concentration around the vertebral, nuchal, scapular, and sacral regions. Dark bands on original portion of tail just prior to autonomy scar

Dorsal and lateral surfaces of head similar to dorsal ground color; supraocular region dark black from eyes; rostral and supralabial regions light gray; infralabials very light gray; infra-auricular region light gray, slightly lighter than medium gray supra-auricular region.

Limbs colored as torso, lacking transverse banding; dorsal surfaces of hands and feet light gray with heavy dark gray mottling; digits medium gray with cream spots; tail medium gray with dark gray bands on distal portion of original tail, no bands for proximal 1/3 of tail; regenerated portion dark gray.

Ventral head, neck, and torso white; ventral surfaces of limbs slightly darker with black flecks; ventral surfaces of digits (scansors) dark gray; palmar and plantar surfaces medium gray; precloacofemoral region white with light orange pores; ventral surfaces of tail medium gray, not banded.

Variation. The type series contains six large adult males with hemipenes everted, two gravid females, and one juvenile.

Dorsal color pattern is similar across the type series (Fig 5). All males exhibit nearly identical coloration, with a lack of distinct pattern; specimens (KU 320484–5) are slightly darker than the other males. A single female (PNM 9716) has more concentrated dark mottling, but still lacks a distinct pattern. The mottling in the single juvenile (KU 319986) is concentrated into transverse bands starting at the scapular region and continuing down the tail, with 9 bands from head to tail margin. The juvenile banding is assumed to fade and

disappear in the adults.

Ventral coloration is more variable than dorsal coloration: ventral body surfaces are white to medium gray; subcaudal coloration is medium to dark gray. Two males (KU 319970, PNM 9717) have dark gray speckling concentrated in the axilla–groin region and two others (KU 320484–5) have diffuse speckling throughout the ventral surface, including the gular region. Females with a lighter ventral color, more similar to the holotype, but not as immaculate.

Etymology. *Gekko carusadensis* is derived from the word “Carusadus” which refers to a region in Slovenia with extensive Karst topography (Kranjc, 2001). This region is considered the origin of the term “Karst” (Kranjc, 1998), the current term for the type of topography in which the new species occurs. Suggested common name, Luzon Karst Gecko.

Distribution. *Gekko carusadensis* is known only from the type locality (Fig. 1).

Ecology and natural history. We observed the new species to be very common in karst habitat within the Biak na Bato park. Lizards were only found on the karst rock, never on vegetation. They were common within the caves and crevices that make up the park habitat and could be found on the outside surfaces of the caves at night. Sympatric gekkonid species include *Cyrtodactylus philippinicus* (Steindachner), *Gekko gekko* (Linnaeus), *Gehyra mutilata* (Wiegmann), *Hemidactylus frenatus* Schlegel, and *Hemidactylus platyurus* (Schneider). None of the sympatric species occupied the karst habitat, but were found in abundance in the more disturbed areas of the park near or on buildings. *Cyrtodactylus philippinicus* could be found on trees near the karst rocks.

Discussion

The description of *Gekko carusadensis* brings the total number of endemic Philippine species of the genus *Gekko* to 10 (13 when nonendemics *G. gekko* and *G. monarchus* are included and the single doubtful record of *G. hokouensis* is excluded). The known species diversity within the genus has increased steadily over the last three years (Brown *et al.*, 2008; 2009), and we are confident that the currently recognized species diversity is still highly underestimated (Brown *et al.*, 2008, 2009).

In addition to the new species reported here, numerous Philippine gekkonid taxa continue to await description, including several additional species of *Gekko* from the Babuyans and Batanes island groups (Brown *et al.*, 2009), morphologically cryptic *Gekko* lineages masquerading in the taxonomy of “widespread” species complexes such as *G. mindorensis* (Siler *et al.*, unpublished data), several undiagnosed lineages of the genus *Cyrtodactylus* (Siler *et al.*, in press), and undescribed species of the genus *Luperosaurus* (Brown *et al.*, 2007; Gaulke *et al.*, 2007; 2010).

It is very clear that Philippine gekkonid diversity is substantially underestimated (Brown *et al.*, 2007; 2008; 2009; in press; Gaulke *et al.*, 2007; Welton *et al.*, 2009, in press). Based on current studies in progress (Siler *et al.*, pers. comm.) we expect the number of Philippine gekkonid taxa to increase by 30–50% in the near future and we hope an improved understanding of the evolutionary diversity in this conspicuous group of Philippine vertebrates will contribute to conservation efforts aimed at preserving the remaining forested regions of the country.

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Specimens examined

All specimens examined are from the Philippines unless otherwise noted. Numbers in parentheses indicate the number of specimens examined for each species.

Gekko athymus (7 specimens): PALAWAN ISLAND, PALAWAN PROVINCE, ca. 10 km WSW of Iwahig: CAS 137677; ca. 8–9 km S. of Balico: CAS-SU 23119 (holotype); ca. 20 km SW of Iwahig: CAS-SU 23121 (paratype); Municipality of Brooke's Point, Barangay Mainit: KU 309335; Barangay Samariñana; Mt. Mantalingahan, 900 m: KU 309331–309334;

Gekko carusadensis (9 specimens): This manuscript

Gekko crombota (21 specimens): BABUYAN CLARO ISLAND, CAGAYAN PROVINCE, Municipality of Calayan, Barangay Babuyan Claro: PNM 9280 (holotype); KU 304807–304809, 304814, 304821, 304825–304826 3043830, 304836, 304845, 304848; PNM 9281–9284, PNM 9090, 9095–9098.

Gekko ernstkelleri (10 specimens): PANAY ISLAND, ANTIQUE PROVINCE, Municipality of Pandan, Barangay Duyong, Duyong Hillside (= "Mt. Lihidian"), 300 m.a.s.l.: PNM 9152–54; KU 300196–300202.

Gekko gekko (13 specimens): LUBANG ISLAND, OCCIDENTAL MINDORO PROVINCE, Municipality of Lubang, Barangay Paraiso: KU 303960–303972.

Gekko gigante (13 specimens): SOUTH GIGANTE ISLAND, ILOILO PROVINCE, Municipality of Carles, Tantangan: CAS 124315–17 (paratypes); NORTH GIGANTE ISLAND, ILOILO PROVINCE, Municipality of Carles: CAS 124866–124867 (Paratypes); Barangay Asloman: KU 302716–302720, 305138–305140.

Gekko hokouensis (1 specimen): Philippines, Tablas Island (presumably in error): FMNH 17812 (*Luperosaurus amissus* holotype).

Gekko mindorensis (56 specimens): NEGROS ISLAND, NEGROS ORIENTAL PROVINCE, Himangpangon Cave, Manjayod: CAS-SU 28656–28660; GUIMARAS ISLAND, GUIMARAS PROVINCE, Municipality of Buenavista, Barangay Old Poblacion: KU 302721, 302725; NEGROS ISLAND, NEGROS OCCIDENTAL PROVINCE, Municipality of Cauayan, Barangay Camalandaan: KU 302722–302724; MASBATE ISLAND, MASBATE PROVINCE, Municipality of Mandaon, Barangay Poblacion: KU 302726–302728; PANAY ISLAND, CAPIZ PROVINCE, Municipality of Pilar, Barangay Natividad: KU 302729–302732; LUBANG ISLAND: OCCIDENTAL MINDORO PROVINCE, Municipality of Lubang, Barangay Vigo: KU 303913–303916, 303917–303951.

Gekko monarchus (6 specimens): PALAWAN ISLAND, PALAWAN PROVINCE, ca. 1.5 km. WSW of Iwahig: CAS-SU 28416; ca. 5 km SSE of Iwahig: CAS-SU 28496; ca. 7 km WNW of Iwahig: CAS-SU 28554; Municipality of Brookes Point, Mt. Mantalingahan: KU 309362; INDONESIA, SULAWESI ISLAND: BSI 340, 819 (Uncataloged specimens, deposited at Museum Zoologicum Bogoriense, Chibnong, Jakarta, Indonesia).

Gekko palawanensis (24 specimens): PALAWAN ISLAND, PALAWAN PROVINCE, 7 km WNW of Iwahig: CAS 17318; 8 km W of Iwahig: CAS 17319; ca. 9 km W of Iwahig: CAS 17320–17322; 19 currently uncataloged specimens at KU (RMB 7460, 7531, 7561–7562, 7589–7590, 7615, 7642. 7726–7727, 7780, 7878, 7922–7924, 7930–7931, 7937–7938).

Gekko porosus (8 specimens): BATAN ISLAND, BATANES PROVINCE, 3 km ENE of Basco Town: USNM 266519, 291387; Mahatao: USNM 266517; Municipality of Basco, outskirts of Basco Town, near airport: PNM 9532–36; ITBAYAT ISLAND: CAS 60526 (holotype).

Gekko romblon (15 specimens): SIBUYAN ISLAND, ROMBLON PROVINCE, Taclobo Barrio: CAS 139180–139182 (paratypes); ROMBLON ISLAND, ROMBLON PROVINCE, Municipality of Romblon, Barangay Li-O: KU 302733–42, 303977–303978.

Gekko rossi (19 specimens): CALAYAN ISLAND, CAGAYAN PROVINCE, Municipality of Calayan, Barangay Magsidel, "Macarra:" PNM 9543 (Holotype), 9542, 9537–42, KU 304876, 304885, 304916–304919, 304923–304924, 304927, 304931 (Paratypes); Barangay Longog: PNM 9091 (Paratype).

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Gekko sp. A (35 specimens): DALUPIRI ISLAND, CAGAYAN PROVINCE, Municipality of Calayan, Nipa Creek; KU 307022–307039, 307040–307057.

Gekko sp. B (24 specimens): CAMIGUIN NORTE ISLAND, CAGAYAN PROVINCE, Municipality of Calayan, Barangay Balatubat; KU 304583, 304585, 304586, 304588, 304605–304611, 304617, 304673, 304728–304733, 304738, 307990, 308043; Magas-asok: PNM; 9099; Pomoctan Isl. (small island adjacent to Camiguin Norte Isl): PNM 9100.