

## *Gekko ernstkelleri* sp. n. – a new gekkonid lizard from Panay Island, Philippines

HERBERT RÖSLER, CAMERON D. SILER, RAFFAEL M. BROWN, ARNOLD D. DEMEGILLO & MAREN GAULKE

**Abstract.** A new species of the genus *Gekko* is described from Panay, an island in the central-Philippines. The new species is characterized by a combination of the number of preanofemoral pores, dorsal tubercle rows, disposition of caudal tubercles and tubercles on dorsal surfaces of the limbs, number of subdigital lamellae, and distinct diagnostic white spots on head and dorsum. The new species is known from entrances of limestone caves and rocky outcrops in low elevation areas of NW-Panay.

**Key words.** Reptilia, Squamata, Sauria, Gekkonidae, *Gekko*, new species, Panay, Philippines.

### Introduction

In a recent compilation of the herpetofauna of Panay Island, Philippines, FERNER et al. (2001) enumerated the gekkonid genera *Cosymbotus* FITZINGER, 1843; *Cyrtodactylus* GRAY, 1827; *Gehyra* GRAY, 1834; *Gekko* LAURENTI, 1768; *Hemidactylus* GRAY, 1825; *Hemiphyllodactylus* BLEEKER, 1860, and *Lepidodactylus* FITZINGER, 1843. Herpetological investigations in the few remaining, undisturbed habitats in northwestern Panay revealed one species each of two further gekkonid genera, *Luperosaurus* GRAY, 1845, and *Pseudogekko* TAYLOR, 1922 (GAULKE et al. 2003). The members of the genus *Gekko* are widely distributed throughout the Oriental Region. Two species were known from Panay previously. One of them, *G. mindorensis*, is a Philippine endemic, the other one (*G. gekko*), has a wide Southeast Asian distribution. Recently specimens of an additional, unknown *Gekko* were collected in Northwest Panay, and are described here as a new species.

### Material and methods

The new species was discovered independently by two groups of scientists in 2004 and

2005, respectively. The material of Group 1 (HR, ADD, MG) was collected at one locality only. It contains the holotype and part of the paratypes. The material of Group 2 (CDS, RMB), containing other paratypes, was collected at different localities. All specimens were collected on northwest Panay, Philippines and are stored in 70% ethanol. Comparisons are based on data derived from literature (TAYLOR 1919, 1922, 1925; BROWN & ALCALA 1978, RÖSLER et al. 2005) and our own data taken from preserved specimens of *G. mindorensis*, a Philippine species that is phenotypically most similar to the new species.

Abbreviations used are: SVL = snout-vent length, TL = tail length, AG = axilla-groin distance, HL = head length (from tip of snout to posterior margin of auricular opening), HW = maximum head width, HH = maximum head height, SE = distance from snout tip to anterior corner of eye, EE = distance between posterior margin of eye to posterior margin of auricular opening. The following scale counts were taken: supralabials (SPL), supralabial beneath the center of orbit (SCO), infralabials (IFL), nasals (N); nasals in direction from rostral to labial: nasorostrals, supranasals, postnasals; internasals (IN), interorbitals (IO), spiny ciliaries (SC), postmen-

tals (PM), gulars bordering the postmentals (GP), dorsal tubercle rows (DTR), granules surrounding dorsal tubercles (GSDT), ventrals (V), subdigital lamellae on first (LF1) and fourth finger (LF4), subdigital lamellae on first (LT1) and fourth toe (LT4), preanal and femoral pores (PP), post anal tubercles (PAT), dorsal tubercles in the first (DT1) and fifth caudal whorl (DT5), dorsal scale rows in the middle of the third (SR3) and fifth caudal whorl (SR5). The colour description is based on a standardized colour guide (GRALLERT & ROLAND 1960).

Collection and museum abbreviations are: CPHR = Collection H. RÖSLER (will eventually be deposited in the ZMB = Museum für Naturkunde, Berlin), KU = University of Kansas Natural History Museum, PNM = Philippine National Museum, ZSM = Zoologische Staatssammlung München.

## Results

### *Gekko ernstkelleri* sp. n.

Holotype: PNM 9080, adult male, from Philippines, Panay, Antique Province, Municipality of Pandan, Barangay Santo Rosario, entrance of a limestone cave, 80 m a.s.l., collected on 11 August 2005 by A. DEMEGILLO.

Paratypes: CPHR 2170, ZSM 52/2005, adult males, PNM 9083, adult female, collected on 2 October 2005 by A. DEMEGILLO; PNM 9081, adult female, collected on 8 August 2005 by M. GAULKE; PNM 9082, juvenile male, collected on 15 March 2004 by M. GAULKE, all from the type locality; KU 300198, KU 300201-202, adult males, KU 300196, KU 300200, PNM 9152-54, adult females, KU 300197, KU 300199, juvenile females, from Philippines, Panay, Antique Province, Municipality Pandan, Barangay Duyong, Duyong hillside (locally also known as Mt. Lihidan), 300 m a.s.l., collected on 16 October 2004 by L. AVERIA, A. ONG, and C. D. SILER; KU 300203, adult male, PNM 9155, juvenile female, from Philippines, Pa-

nay, Antique Province, Municipality Pandan, Barangay Duyong, 0-25 m a.s.l., collected on 19 October 2004 by C. D. SILER.

Diagnosis: The new species is a medium sized member (total length more than 200 mm) of the genus *Gekko*, with spiny ciliaries, dorsal tubercles on body, hind limbs, and tail, subcaudals enlarged scute-like, nostril in contact with rostral and first supralabial, postmentals two, tubercle rows across mid-body 11-15, ventrals 38-48, preanofemoral pores 36-42, subdigital lamellae: first finger 14-18, fourth finger 16-19, first toe 15-17, fourth toe 17-19; numerous whitish spots on head and nuchal region. From all other members of the genus *Gekko*, *G. ernstkelleri* can be differentiated by a combination of these characters.

Comparisons: *Gekko ernstkelleri* differs from other endemic Philippine *Gekko* species in size (SVL), several scalation characters (number of interorbitals, ventrals, dorsal tubercle rows, presence or absence of enlarged tubercles on extremities, numbers of preanofemoral pores), and colour pattern of dorsum, as summarized in following short diagnosis of the different taxa. *Gekko athymus* BROWN & ALCALA, 1962: SVL up to 117.0 mm, interorbitals 50-54 (versus 39-46), ventrals 32-34 (versus 38-48), preanofemoral pores 22 (versus 36-42), dorsal tubercles absent (versus present). Dorsal ground colour dark greyish-brown to reddish brown with a vague pattern of slightly darker and lighter irregular transverse bands. (BROWN & ALCALA 1962, 1978, ALCALA 1986). *Gekko gigante* BROWN & ALCALA, 1978: SVL up to 103.5, interorbitals 40-46, ventrals 45, preanofemoral pores 55-65 (versus 36-42), dorsal tubercle rows 14-17 (versus 11-15), tubercles relatively small (versus tubercles relatively large). Dorsal ground colour reddish-grey to brownish-grey with some darker brown markings, venter relatively uniform dusky. (BROWN & ALCALA 1978, ALCALA 1986). *Gekko mindorensis* TAYLOR, 1919: SVL up to 86.0 mm, interorbitals 30-40 (versus 39-46),



Fig. 1. Rostral scale of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER.

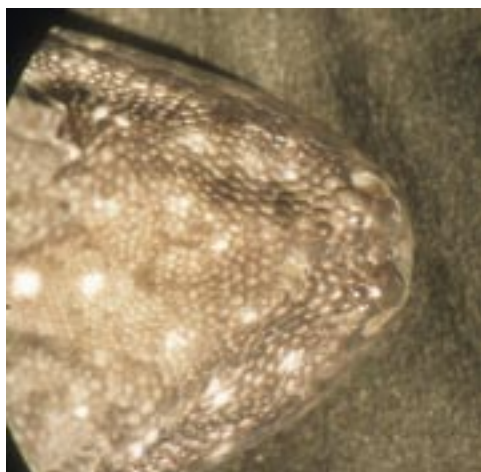


Fig. 2. Nasal region of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER.

ventrals more than 30, preanofemoral pores 48-60 (versus 36-42), dorsal tubercle rows 16-19 (versus 11-15). Dorsal ground colour tan to dark greyish tan, generally with diffuse, darker markings, usually forming more or less distinct transverse bands. (TAYLOR 1919, 1922, BROWN & ALCALA 1978, ALCALA 1986, see discussion too). *Gekko palawanensis* TAYLOR, 1925: SVL 63.0 mm (versus up to 92.0 mm), ventrals 36-44, preanofemoral pores 65-70 (versus 36-42), dorsal tubercle rows 8-12 (versus 11-15). Dorsum greyish to reddish-brown, with a series of darker brown

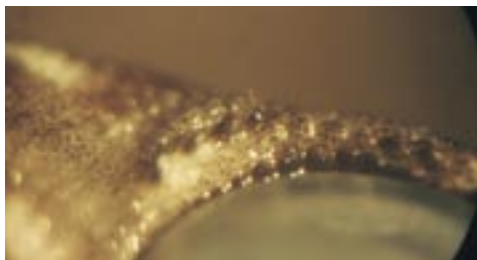


Fig. 3. Cilia of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER.

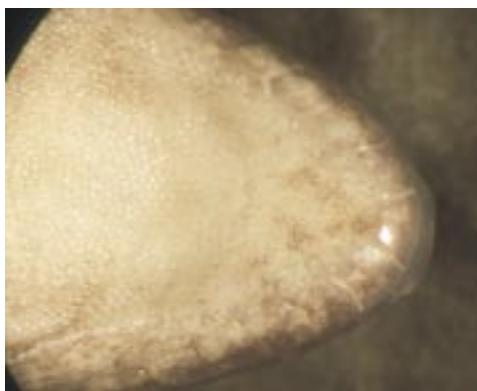


Fig. 4. Mental region of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER.

squarish or quadrangular spots on either side of the vertebral line. (TAYLOR 1925, BROWN & ALCALA 1978, ALCALA 1986, see discussion). *Gekko porosus* TAYLOR, 1922 is only known from one juvenile specimen with a SVL of around 50.0 mm. ventrals 42, dorsal tubercle rows 16 (versus 11-15), dorsal surfaces of extremities with tubercles (versus tubercles on dorsal surface of fore limbs absent). Dorsum tan to light brown, with a faint indication of wide, darker and lighter transverse bands. (TAYLOR 1922, BROWN & ALCALA 1978, ALCALA 1986). *Gekko romblon* BROWN & ALCALA, 1978: SVL up to 88.5 mm, interorbitals 36-38 (versus 39-46), ventrals more than 40, preanofemoral pores 70-81 (versus 36-42), dorsal tubercle rows 12-14; tubercles small. Dorsal ground colour reddish-grey to dark

	PNM 9080 holotype	PNM 9081 paratype	PNM 9082 paratype	PNM 9083 paratype	ZSM 52/2005 paratype	CPHR 2170 paratype
Sex	male	female	male	female	male	male
SVL	83.0	78.8	54.0	71.5	81.5	84.0
TL	112.8*	97.5*	—	89.0*	—	111.5*
AG	38.5	32.5	22.0	32.7	36.0	34.5
HL	23.7	22.0	15.5	19.7	23.3	23.7
HW	17.2	15.4	11.7	13.8	17.0	17.8
HH	10.9	9.9	7.0	8.7	10.8	11.8
SE	10.8	10.2	7.2	8.6	10.1	11.0
EE	8.6	7.8	5.4	7.2	8.5	9.0
SVL/AG	2.16	2.42	2.45	2.19	2.26	2.43
SVL/HL	3.50	3.58	3.48	3.63	3.50	3.54
HL/HW	1.38	1.43	1.32	1.43	1.37	1.33
HL/HH	2.17	2.22	2.21	2.26	2.16	2.01
SE/EE	1.26	1.31	1.33	1.19	1.19	1.22

Tab. 1. Measurements (mm) and proportion indices of holotype and topotypical paratypes of *Gekko ernstkelleri* sp. n. For abbreviations see Material and methods.

brown-grey, with very vague darker blotches. (BROWN & ALCALA 1978, ALCALA 1986).

From the non-endemic *Gekko* species occurring on the Philippines *G. ernstkelleri* differs as follows: from *G. gecko* LINNAEUS, 1758 by its much smaller size (maximal 92.0 mm versus maximal 155.0 mm), the position of the nostrils (in contact with rostral versus not in contact with rostral), more preanofemoral pores (maximal 42 versus maximal 22), and a completely different colour pattern (BROWN & ALCALA 1978, RÖSLER 2005). From *G. monarchus* SCHLEGEL, 1836 by more interorbitals (39-46 versus 28-34), no tubercles on lower fore limb and dorsal middle part of the tail, less tubercle rows across dorsum (11-15 versus 16-20), and a different colour pattern (BROWN & ALCALA 1978, HR pers. obs.).

Among non-Philippine members of the genus *Gekko*, *G. ernstkelleri* differs as follows: in *G. ernstkelleri* dorsal tubercles are present, while they are missing in *G. melli* VOGT, 1922; *G. scientiadventura* RÖSLER, ZIEGLER, VU, HERRMANN & BÖHME, 2005; *G. subpalmatus* GÜNTHER, 1864; and *G. ta-waensis* OKADA, 1956. By the possession of

more preanofemoral pores *G. ernstkelleri* differs from *G. badenii* NEKRASOVA & SZCZERBAK, 1993; *G. chinensis* GRAY, 1842; *G. grossmanni* GÜNTHER, 1994; *G. hokouensis* POPE, 1928; *G. japonicus* (SCHLEGEL, 1836); *G. palmatus* BOULENGER, 1907; *G. petricolus* TAYLOR, 1962; *G. scabridus* LIU & ZHOU, 1982; *G. similignum* SMITH, 1923; *G. taibaiensis* SONG, 1985; *G. ulikovskii* DAREVSKY & ORLOV, 1994; and *G. yakuensis* MATSUI & OKADA, 1968. By its much smaller size and a completely different colouration, *G. ernstkelleri* differs from *G. albofasciolatus* GÜNTHER, 1867; *G. siamensis* GROSSMANN & ULBER, 1990; *G. smithii* GRAY, 1842; *G. verreauxi* TYTLER, 1864; and *G. vittatus* HOUTTUYN, 1782. In *G. kikuchii* OSHIMA, 1912 at least six tubercles are present in the middle section of its original tail, which are missing in *G. ernstkelleri* (see discussion). *Gekko liboensis* ZHOU & LI has no tubercles on fore- or hindlimbs, while in *G. ernstkelleri* tubercles are present on the hindlimbs.

*G. swinhonis* GÜNTHER, 1864 differs from *G. ernstkelleri* by fewer rows of dorsal tubercles and more ventrals. *Gekko scabridus* and

	PNM 9080 holotype	PNM 9081 paratype	PNM 9082 paratype	PNM 9083 paratype	ZSM 52/2005 paratype	CPHR 2170 paratype
SPL	13/16	13/11	13/14	12/13	12/13	12/14
SCO	10/10	10/10	11/11	11/10	10/10	11/11
IFL	11/10	11/11	10/11	11/9	11/10	8/10
N	3/4	3/3	3/3	3/3	3/3	3/3
IN	1	2	1	1	1	1
IO	40	45	44	45	41	39
SC	4/3	2/3	3/5	5/5	5/5	3/2
PM	2	2	2	2	2	2
GP	8	7	7	5	5	6
DTR	14	15	14	14	14	15
GSDT	10	10	10	12	11	10
V	41	48	46	42	45	41
LF1	17/15	15/14	14/14	17/14	14/15	15/15
LF4	18/16	17/17	17/16	17/15	16/17	16/16
LT1	15/16	15/15	16/15	17/16	17/16	15/15
LT4	19/18	17/18	17/17	18/17	18/18	19/19
PP	40 (19/21)	0	38 (20/18)	0	36 (17/19)	38 (19/19)
PAT	2/2	2/2	2/2	2/2	2/2	2/2
DT1	2	2	—	4	—	2
DT5	0	0	—	0	—	0
SR3	15	13	—	14	—	14
SR5	13	—	—	13	—	12

Tab. 2. Scale counts of holotype and topotypical paratypes of *Gekko ernstkelleri* sp. n. For abbreviations see Material and methods, right/left counts indicated by back slash (/).

*G. liboensis* are synonyms of *G. chinensis* and *G. hokouensis*, respectively, according to ZHAO & ADLER (1993) and KLUGE (2001). However, both species are considered valid by ZHAO et al. (1999).

Description of holotype: Head triangular, more flattened than body, distinct from neck, median indentation on snout; body not much depressed, venter flat; tail cylindrical, tail base scarcely swollen. Total length 196.0 mm, tail length 113.0 mm, posteriorly 39.0 mm regenerated. SVL: 83.0 mm, AG: 38.5 mm, HL: 23.7 mm, HW: 17.2 mm, HH: 10.9 mm, SE: 10.8 mm, EE: 8.6 mm. Ra-

tios: SVL/AG, 2.16; SVL/HL, 3.50; HL/HW, 1.38; HL/HH, 2.17; SE/EE, 1.26.

Rostral about twice as broad as long, concave, with two short clefts (Fig. 1). 13/16 supralabials. Nostril borders rostral and 1. supralabial; 3/4 nasals; nasorostrals larger than supra- and postnasals (Fig. 2). Scales on snout round, slightly convex, nonimbricate, scales of labial region twice the size of median head scales; scales anterior to eyes somewhat enlarged, conical. Iris vertical with four crenulations on both sides. Anterior ciliaries larger than posterior ones, posterior 4/3 ciliaries spiny (Fig. 3). Auricular opening diagonal/oval, approximately 30%



Fig. 5. Dorsal view of anterior part of tail of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER



Fig. 6. Subcaudals of *Gekko ernstkelleri* sp. n., holotype (PNM 9080). Photograph by H. RÖSLER

diameter of eye. Intraorbital scales 40, with the scales adjacent to orbit largest. Head scales granular, half the size of medial snout scales. Head tubercles small, round, convex; tubercles between eye and auricular opening twice as large as tubercles on cranium. Mental triangular, as long as broad, not as wide as rostral. Infralabials 11/10. postmentals two, twice as long as wide, bordered by mental, 1<sup>st</sup> infralabial and 8 small scales (Fig. 4). Gular scales granular, 1.5 times larger than scales on head. Dorsals granular, as large as head scales. Dorsal tubercles round, smooth, convex, approximately four to five times as large as dorsals, arranged in 14 irregular, transverse rows at midbody. Ventrals flat, smooth, subimbricat, two to three times larger than dorsals. Ventrals across mid-



Fig. 7. Holotype (PNM 9080, male, adult) of *Gekko ernstkelleri* sp. n., dorsal view. Photograph by H. RÖSLER



Fig. 8. Holotype (PNM 9080, male, adult) of *Gekko ernstkelleri* sp. n., ventral view. Photograph by H. RÖSLER

body 41. Anteroventral forelimb scales flat, smooth, imbricate; dorsoposterior forelimb scales very small. Dorsal scales on anterior thigh flat, smooth, imbricate; posterior thigh scales very small. A few round, convex tubercles present between finely granular scales of hindlimbs.

Fingers and toes with rudimentary webbing at base, fourth and fifth toe without webbing. Subdigital lamellae: first finger 17/15, fourth finger 18/16, first toe 15/16, and fourth toe 19/18. Preanofemoral pores 40 (19/21), arranged on a small integumentary fold in an angularly bent row; postcloacal tubercles 2/2. Original tail divided in caudal whorls; dorsal tail scales flat, smooth, subimbricate, twice as large as dorsals, arranged in irregular transverse rows along posterior margin of each whorl. Two tubercles present on first caudal whorl, as large as dorsal tubercles but less convex. Dorsal scale rows of third caudal whorl 15. Dorsal tubercles from fifth caudal whorl up to tail tip absent (Fig. 5). Subcaudals flat, smooth, wide, arranged in a



Fig. 9. *Gekko ernstkelleri* sp. n. (KU 300198, male, adult) within its habitat; Panay, Antique Province, Mun. Pandan, Brgy. Duyong, Duyong hillsite. Photograph by C.D. SILER

longitudinal row. Subcaudals divided in first caudal whorl, along rest of tail two relatively short subcaudal scutes interchange with one larger subcaudal scute. The short subcaudal scutes are laterally bordered by two, and the large one by three scales. The first scale of each caudal whorl is a large subcaudal scute (Fig. 6). On regenerated tails, dorsal scales are flat and smooth and ventral scales are enlarged.

Colour in preservative: Snout up to postorbital region, forelimbs, flanks, and dorsal side of tail grey-black; two parallel, short, lilac-black stripes present anterior to eye; back and hindlimbs violet-grey; snout and anterior part of head with small white spots; larger white spots present on posterior head and shoulder. From neck to sacral region seven lilac-black pairs of blotches arranged both sides of the lighter coloured vertebral line; anterior blotches distinct, posterior blurred.

Extremities marbled pale grey above, with stripes and spots. Six bands across original part of tail. The three anterior bands pale grey and narrow, the three posterior bands broader and pale, partly with lilac-black pattern (Fig. 7). Venter violet-grey; middle of venter dark grey. Dark grey markings present at sides of chest, and fine, dark grey spots at center of gular region. Ventral side of tail with pale grey mottling (Fig. 8).

Colour in life: The dorsum of adult *G. ernstkelleri* is olive to brown-olive, with sepia coloured spots especially on head and nuchal region. The distinct white spots and flecks are arranged in irregular transverse rows across dorsum. Some of the white spots are the size of a single dorsal tubercle, others extend on the surrounding scales (Figs. 9-10). The individual scales of the venter are white with a fine brown dotting, given a dirty white overall appearance. In juveniles the contrast between

	KU 300196	KU 300197	KU 300198	KU 300199	PNM 9152	KU 300200
	paratype	paratype	paratype	paratype	paratype	paratype
Sex	female	female	male	female	female	female
SVL	82.0	48.0	92.0	45.0	78.0	85.0
TL	101.0	60.0	119.0*	58.0	83.0**	100.0
AG	36.8	19.0	41.8	20.3	33.7	37.7
HL	20.8	12.4	23.4	12.8	20.5	20.9
HW	16.5	10.4	18.9	9.3	16.0	16.4
HH	8.9	5.5	10.8	5.3	8.8	9.6
SE	8.1	4.2	8.7	5.7	8.0	8.1
EE	7.8	5.1	9.0	4.5	7.3	7.4
SVL/AG	2.23	2.53	2.20	2.22	2.31	2.25
SVL/HL	3.94	3.87	3.93	3.51	3.80	4.07
HL/HW	1.26	1.19	1.24	1.38	1.28	1.27
HL/HH	2.34	2.25	2.17	2.42	2.33	2.18
SE/EE	1.04	0.82	0.97	1.27	1.10	1.09

Tab. 3. Measurements (mm) and proportion indices of non-topotypic paratypes of *Gekko ernstkelleri* sp. n. For abbreviations see Material and methods. \* partly regenerated, see text. \*\* almost completely regenerated.

the violet-black dorsal colour and the white spotting is more pronounced than in adults.

Variation: Individual size and scalation variation in the type series is presented in Tables 1 to 4. Ranges in measurements of the topotypic paratypes are as follows: SVL, 54.0-84.0 mm; TL, 89.0-112.8 mm (some of the paratypes possess partly regenerated tails); AG, 22.0-38.5 mm; HL, 15.5-23.7 mm; HW, 11.7-17.8 mm; HH, 7.0-11.8 mm; SE, 7.2-11.0 mm; EE, 5.4-9.0 mm. Size ratios and ranges in scale counts are as follows (mean  $\pm$  SD): SVL/AG, 2.16-2.45 ( $2.32 \pm 0.13$ ); SVL/HL, 3.48-3.63 ( $3.54 \pm 0.06$ ); HL/HW, 1.32-1.43 ( $1.38 \pm 0.04$ ); HL/HH, 2.01-2.26 ( $2.17 \pm 0.09$ ); SE/EE, 1.19-1.33 ( $1.25 \pm 0.06$ ). Supralabials, 11-16 ( $12.91 \pm 1.28$ ); supralabial beneath center of eye, 10-11 ( $10.45 \pm 0.52$ ); infralabials, 8-11 ( $10.18 \pm 0.94$ ); nasals, 3-4 ( $3.09 \pm 0.29$ ); internasals, 1-2 ( $1.17 \pm 0.41$ ); interorbitals, 39-45 ( $42.33 \pm 2.66$ ); spiny ciliares, 2-5 ( $3.91 \pm 1.22$ ); postmentals, 2; gulars bordering postmentals, 5-8 ( $6.33 \pm 1.21$ ); back tubercle rows, 14-15 ( $14.33 \pm$

0.52); granules surrounding dorsal tubercles, 10-12 ( $10.50 \pm 0.84$ ); ventrals, 41-48 ( $43.83 \pm 2.93$ ); subdigital lamellae on first finger, 14-17 ( $14.91 \pm 1.08$ ), on fourth finger, 15-18 ( $16.55 \pm 0.80$ ), on first toe, 15-17 ( $15.73 \pm 0.78$ ), on fourth toe, 17-19 ( $17.82 \pm 0.79$ ); preanal and femoral pores, 36-40 ( $38.00 \pm 1.63$ ); postanal tubercles, 2; dorsal tubercles in first caudal whorl, 2-4 ( $2.50 \pm 1.00$ ); dorsal tubercles in fifth caudal whorl, 0; dorsal scale rows in the middle of third caudal whorl, 13-15 ( $14.00 \pm 0.82$ ); dorsal scale rows in the middle of fifth caudal whorl, 12-13 ( $12.67 \pm 0.58$ ).

One female topotypic paratype (PNM 9081) has a partly regenerated tail; tail tubercles are present up to the fourth caudal whorl. The dorsal scales of the 30 mm long regenerated tail portion are of the same size as on the original tail, but irregularly arranged. The longitudinally arranged subcaudals on the regenerated portion are broader than those of the original portion, but only half as long. The colouration of PNM 9081 differs from the colour of the holotype mainly in intensity.

PNM 9153 paratype	KU 300201 paratype	PNM 9154 paratype	KU 300202 paratype	KU 300203 paratype	PNM 9155 paratype
female	male	female	male	male	female
78.0	88.0	81.0	88.0	82.0	55.0
76.0**	97.0**	–	98.0**	109.0	–
33.7	37.5	35.2	34.5	34.1	22.6
20.1	23.5	22.7	23.5	21.1	15.0
15.9	18.8	17.8	19.2	17.1	11.6
8.8	11.5	10.0	11.9	8.2	6.0
7.9	9.8	8.2	9.0	8.0	5.4
7.2	8.2	8.0	8.5	7.7	4.9
2.31	2.35	2.30	2.55	2.40	2.43
3.88	3.74	3.57	3.74	3.89	3.67
1.26	1.25	1.28	1.22	1.23	1.29
2.28	2.04	2.27	1.97	2.57	2.50
1.10	1.20	1.03	1.06	1.04	1.10

The ground colour is darker and the white brighter, resulting in a pronounced contrast especially on head, neck- and scapular region. The white spots are larger than in the holotype, and arranged in transverse rows on the dorsum including the vertebral region. The broad posterior tail bands on the original portion of the tail are less accentuated than in the holotype, the subcaudal region is uniform dark lilac-black. The regenerated tail is not banded dorsally (Fig. 11). The ventral side of PNM 9081 is only partly pigmented. The ground colour of a second female (PNM 9083) is lighter than that of PNM 9081. The enlarged scales anterior to the cloaca are dark, and there is a large, roundish area in the middle of the venter with heavily pigmented ventrals. The dorsal colour pattern on the regenerated portion of the tail of PNM 9083 consists of short, dark stripes on a light background.

Females of *G. ernstkelleri* have no pre-anofemoral pores. PNM 9081 possesses 19 enlarged, angular bend preanal scales, which are less pigmented than surrounding ventrals. They do not extend to the middle of the thigh as in males. The smaller female (PNM 9083) possesses approximately 25 preanal scales,

having a similar fine dark speckling as the ventrals. In both females the white dorsal spots are larger than in males.

Only a part of the original tail of the juvenile male PNM 9082 is present, the rest was lost during capture. The recovered part of the broken piece has a length of 37.0 mm, caudal whorls are weakly developed, and tubercles not present. Colour pattern of PNM 9082 is more similar to PNM 9081 than the holotype. The dorsal pairs of dark blotches are most pronounced in this juvenile (PNM 9082), the tail is banded black and white (Fig. 12). The tail of ZSM 52/2005 is partly regenerated, and forked at a second fracture zone of the regrown part. The scalation of the anterior part of the regenerated tail corresponds to that of PNM 9081, while both branches of the forked part differ in the size of their irregular arranged dorsal scales. The subcaudals of the forked tails are a mixture of enlarged and small scales. A few scales on the lower fore limbs of ZSM 52/2005 are about twice as large as the surrounding scales (3/2, r/l-distribution). CPHR 2170 (male) has a similar colouration than PNM 9081 (female), but the white dorsal spots are distinctively smaller.



Fig. 10. Life portrait of *Gekko ernstkelleri* sp. n. (PNM 9081, female, adult); Panay, Antique Province, Mun. Pandan, Brgy. Sto Rosario. Photograph by M. GAULKE.



Fig. 12. Paratype (PNM 9082, male, juvenil) of *Gekko ernstkelleri* sp. n., dorsal view. Photograph by H. RÖSLER.



Fig. 11. Paratype (PNM 9081, female, adult) of *Gekko ernstkelleri* sp. n., dorsal view. Photograph by H. RÖSLER.



Fig. 13. *Gekko mindorensis* from Panay, Iloilo Province, Mun. Dingle, Bulaboc Puti-an Nationalpark. Photograph by M. GAULKE.

The non-topotypic paratypes of *G. ernstkelleri* have a SVL of 45.0-92.0 mm and a TL of 60.0-119.0mm. Their variation range of scalation characters is: supralabials, 12-15; supralabial beneath center of eye, 10-12; infralabials, 10-13; nasals, 3; internasal single; interorbitals, 41-46; spiny ciliaries, 4 or 5; postmentals, 2; scales bordering postmentals, 6-8; tubercle rows across midbody, 11-14; dorsal tubercles surrounded by 10-11 granules; ventrals, 38-44; subdigital lamellae on first finger, 14-18, on fourth finger, 16-19, on first toe, 15-16, on fourth toe, 17-19; preanofemoral pores, 36-42; postcloacal tubercles, 2.

The non-topotypic paratype series consists of eight females (three of them juveniles) and four adult males. Five specimens have a partly to almost completely regenerated tail, in two specimens the tail is missing.

Two of the juveniles have their original tails, which are banded white and black posterior. In KU 300196 and 300198 two tail tubercles are present up to caudal whorl 7, in KU 300203 isolated tubercles are recognizable up to caudal whorl 10.

Generally, topotypic and non-topotypic paratypes are in good agreement regarding their scalation and their colour pattern. In several characters (e.g. SPL, IO, LT1, LT4) the non-topotypic paratypes fall within the variation range of the holotype and the topotypic paratypes. For some characters (e.g. IFL, DTR, PP, V) the range of variation observed in the non-topotypic paratype series is slightly greater than that observed in the holotype and topotypic paratypes.

**Etymology:** The new species is named in honor of Ernst Keller, who takes a keen in-

terest in the gecko fauna of the Philippines, a country that he has visited many times. By taking patronage of this unique gecko from Panay, Mr. Keller supports nature conservation in the area.

**Distribution:** At present, *G. ernstkelleri* is known only from the localities of the type series, an area close to the coast of the north-west peninsula of Panay Island, Philippines.

**Natural history:** Specimens were caught at the entrance of a limestone cave at low elevation. This cave is situated at the border of a degraded lowland rainforest growing on carbonatic soil. Most non-topotypic paratypes were found at the entrance of a limestone cave, not far away from the type locality but at a slightly higher elevation. Some of them were caught on trees in the surrounding forest, and two were caught on a rock just 20 m away from the coastline. Several times *Gekko ernstkelleri* was observed (by ADD and MG) at its type locality for some hours. First active individuals appeared before sunset, around 4.30 pm. But only after sunset active individuals could be observed regularly, during each visit. They were observed climbing in the vegetation surrounding the cave entrance, as well as on the roof, walls and rock crevices on the ground of the cave entrance itself. In some narrow rock crevices up to four individuals were observed together. Several egg clutches were seen at the cave roof, consisting of two eggs glued within crevices. These eggs were definitely those of *G. ernstkelleri*, because no other *Gekko* species was observed in the cave. At one of the egg clutches an adult female was observed, at two clutches two adults each (of unknown sex), obviously they guarded the eggs. Egg guarding behaviour is known for other members of the genus *Gekko* as well (*Gekko gecko*, *G. smithii*, see for example RÖSLER 2005b). The eggs are sepia coloured, having a length of 15.5-16 mm and a width of 12.3-12.5 mm. PNM 9081 contains two well-developed eggs.

## Discussion

Based on their phenotypic similarity of external morphology, *Gekko ernstkelleri*, *G. kikuchii*, *G. mindorensis*, and *G. monarchus* can be grouped together. Probably, *G. palawanensis* belongs in this group as well (TAYLOR 1925). Characters shared by the species in this putative group that distinguish them from other congeners include body length, relatively large dorsal tubercles, and high numbers of preanofemoral pores. Other shared characteristics include brownish ground colour, and the paired, dark-brown blotches arranged both-sides of the vertebral line.

Within the *G. monarchus* Group, *G. mindorensis* is probably the sister taxon of *G. ernstkelleri*. However, in our sample each species possesses unique character states that do not overlap with the other species. *Gekko ernstkelleri* differs from *G. mindorensis* by a higher number of interorbitals, ventrals, fourth finger and fourth toe subdigital lamellae, and by fewer rows of dorsal tubercles, more preanofemoral pores, and tubercles in caudal whorls 1 and 5. Another difference is the absence of tubercles on the fore limbs, and the few dorsal tail tubercles on the anterior caudal whorls, arranged in one row, in *G. ernstkelleri* (Tab. 5). The higher number of tubercles in the first caudal whorl of *G. mindorensis* is the result of their arrangement in three rows. Six tail tubercles are arranged in one row. In our sample of males of *G. mindorensis* from Panay (PNM 8528, ZSM 50/2005) the preanofemoral pores are separated in the cloacal region by one, and in the male from Cebu (ZSM 1025/2001) by two smooth scales, while these smooth scales do not exist in the males of *G. ernstkelleri*. The distinctive white head and nuchal spots of *G. ernstkelleri* are hardly discernible in *G. mindorensis* (Fig. 13). The *G. mindorensis* from Cebu differs from the Panay specimens by the absence of tubercles on upper fore limbs and its dorsal colour pattern of vertebraally interrupted bands (GAULKE 2003:fig. 8). Even

	KU 300196	KU 300197	KU 300198	KU 300199	PNM 9152	KU 300200
	paratype	paratype	paratype	paratype	paratype	paratype
SPL	14/14	12/12	13/13	12/13	15/13	15/15
SCO	11/10	10/10	11/10	11/11	12/10	12/12
IFL	11/11	11/11	11/11	10/10	13/12	11/11
N	3/3	3/3	3/3	3/3	3/3	3/3
IN	1	1	1	1	1	1
IO	46	43	43	43	43	43
SC	4	4	4	4	5	4
PM	2	2	2	2	2	2
GP	6	6	6	7	7	6
DTR	12	11	13	13	12	13
GSDT	11	11	11	11	11	11
V	41	38	41	38	41	44
LF1	18	14	16	15	15	14
LF4	18	16	16	17	17	18
LT1	16	15	16	15	15	16
LT4	18	17	18	18	18	17
PP	–	–	42	–	–	–
PAT	2	–	2	–	2	2
DT1	4	4	4	5		4
DT5	2	2	2	1		0
SR3	10	11	10	9	–	12
SR5	8	10	10	10	–	12

Tab. 4. Scale counts of non-topotypical paratypes of *Gekko ernstkelleri* sp. n. For abbreviations see Material and methods, right/left counts indicated by back slash (/); right side, if only one count given.

though *G. ernstkelleri* and *G. mindorensis* can be easily distinguished from each other by scalation and colour characters, a secondary taxonomic problem arises because of the recent discussion on the validity of *G. mindorensis*.

*Gekko kikuchii*, described by OSHIMA (1912) from Botel Tobago Island (Kotosho) shows a close phenotypic similarity with *G. mindorensis* (HENKEL & SCHMIDT 2003:Fig. 111). Therefore, *G. mindorensis* was suggested as a possible synonym of *G. kikuchii* (BAUER 1994, KLUGE 2001, FERNER et al. 2001), but to date, no formal revision has been presented. The geographical widely separated distribution ranges of both taxa favors the theory of two different species

(confirmed by pers. comm. of A. BAUER to M. GAULKE in 2005). In his original description, TAYLOR (1919) compares *G. mindorensis* with *G. monarchus* and with *G. kikuchii*. According to the description, *G. monarchus* differs among others in size, more ventrals, and fewer preanofemoral pores, while *G. kikuchii* differs by shorter extremities, fewer preanofemoral pores and absent rudimentary webbing in the females of *G. mindorensis*. However, some of these characters seem not reliable. BROWN & ALCALA (1978) give 48-60 preanofemoral pores for males of *G. mindorensis*. Furthermore, the extent of webbing between the toes does usually not vary between the sexes (MG & HR pers. obs.).

*Gekko mindorensis* is not known from the

PNM 9153 paratype	KU 300201 paratype	PNM 9154 paratype	KU 300202 paratype	KU 300203 paratype	PNM 9155 paratype
15/15	13/13	13/14	13/13	15/15	13/13
10/10	11/10	10/10	10/10	12/11	11/11
11/11	11/11	11/10	10/10	11/11	11/11
3/3	3/3	3/3	3/3	3/3	3/3
1	1	1	1	1	1
43	43	43	41	42	43
5	4	4	4	5	4
2	2	2	2	2	2
6	7	7	8	6	7
13	12	13	14	12	13
11	11	10	11	11	11
42	43	40	43	42	39
15	15	18	14	14	14
16	17	17	15	19	17
15	15	16	15	15	15
18	19	17	18	19	17
–	36	–	39	37	–
2	2	2	2	2	–
				4	4
				2	2
–	–	–	–	10	11
–	–	–	–	11	10

northern islands of the Philippines (Luzon, Batanes Islands, see GAULKE 2003), which are situated between the known distribution areas of *G. kikuchii* and *G. mindorensis*. Even if a future revision shows that both species are conspecific, *G. ernstkelleri* can still be distinguished from *G. kikuchii* by the absence of tubercles on the fore limbs and in the tail scalation. In *G. ernstkelleri* tubercles are absent in the middle caudal whorls, while at least six tubercles are present in the middle caudal whorls of *G. kikuchii* (see LU et al. 1999:98).

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	<i>G. ernstkelleri</i> sp. n.	<i>G. mindorensis</i>	<i>G. mindorensis</i>
		Panay	Cebu
n	18	3	1
SPL	11-16	11-14	12/15
SCO	10-12	9-10	—
IFL	8-13	9-10	10/10
N	3-4	3	3/3
IN	1-2	1	1
IO	39-46	26-32	—
SC	2-5	0-4	—
PM	2	2	2
GP	5-8	4-7	6
DTR	11-15	19-23	19
GSDT	10-12	11	11
V	38-48	38-43	38
tubercles on fore limbs	no	yes	yes*
tubercles on hind limbs	yes	yes	yes
LF1	14-18	12-16	—
LF4	15-19	11-14	—
LT1	15-17	10-12	15/15
LT4	17-19	12-16	14/13
PP	36-42	57-62	53
PAT	2	1-3	1/1
DT1	2-4	16-17	—
DT5	0-2	6	—
SR3	13-15 (n=6)	13-14	—
SR5	12-13 (n=6)	12	—

Tab. 5. Variation of scale counts of *Gekko ernstkelleri* sp. n. and *Gekko mindorensis*. For abbreviations see Material und methods, right/left counts indicated by back slash (/). \* Tubercles on lower fore limb only.

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Authors' addresses: HERBERT RÖSLER, Staatliche Naturhistorische Sammlungen Dresden, Museum für Tierkunde, Forschungsstelle A. B. Meyer Bau, Königsbrücker Landstraße 159, D-01109 Dresden, Germany, corresponding address: F.-Freiligrath-Straße 51, D-06502 Thale am Harz, Germany; CAMERON D. SILER, RAFA M. BROWN, Natural History Museum and Biodiversity Research Center, Department of Ecology and Evolutionary Biology, University of Kansas, Dycher Hall, 1345 Jayhawk Blvd, Lawrence, KS 66045-7561, U.S.A., E-Mail (CDS): camsiler@ku.edu, (RMB): rafe@ku.edu; ARNOLD D. DEMEGILLO, Department for Agriculture, Municipality of Pandan, 5712 Pandan, Antique, Philippines, E-Mail: ardemegillo2000@yahoo.com; MAREN GAULKE, GeoBio Center, Ludwig-Maximilians-University (LMU), Richard-Wagner-Straße 10, D-80333 Munich, Germany, E-Mail: mgaulke@web.de.