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A new limestone-dwelling leaf-toed gecko (Gekkonidae: *Dixonius*) from Khao Sam Roi Yot massif, peninsular Thailand

MONTRI SUMONTHA[1], NIRUT CHOMNGAM[2], EAKARIT PHANAMPHON[3], PARINYA PAWANGKHANANT[4], CHUTINTON VIRIYAPANON[5], WANLADA THANAPRAYOTSAK[6] & OLIVIER S. G. PAUWELS[7,8]

[1]*Ranong Marine Fisheries Station, 157 Saphanpla Rd., Paknam, Muang, Ranong 85000, Thailand. E-mail: montri.sumontha@gmail.com*
[2]*54 M.2 Tha Pha, Ban Pong, Ratchaburi 70110, Thailand*
[3]*300 Ratchasima Rd., Dusit, Bangkok 10300, Thailand*
[4]*Bansomdejchaopraya Rajabhat University, 1061 Soi 15, Itsaraphab Rd., Hiran Ruchi, Thon Buri, Bangkok 10600, Thailand*
[5]*Office of Natural Resources and Environmental Policy and Planning, Rama 6 Road, Samsen Nai, Khet Phaya Thai, Bangkok, 10400, Thailand*
[6]*Department of Fisheries, Kasetklang, Jatulak, Bangkok 10900, Thailand*
[7]*Département des Vertébrés Récents, Institut Royal des Sciences naturelles de Belgique, Rue Vautier 29, B-1000 Brussels, Belgium. E-mail: osgpauwels@yahoo.fr*
[8]*Corresponding author*

Abstract

We describe *Dixonius kaweesaki* **sp. nov.** from Khao Daeng, a limestone mountain in Khao Sam Roi Yot massif, Prachuap Khiri Khan Province, peninsular Thailand. It is diagnosed from all other species by a combination of maximal SVL of 41.6 mm; 12 or 13 longitudinal rows of dorsal tubercles; 24 longitudinal rows of ventrals across the abdomen; a continuous series of 9–11 precloacal pores in males, no pores in females; and two bold dark stripes from the snout to the base of the tail separated by a contrasting light vertebral stripe. It is the eighth species in the genus *Dixonius*. Lastly, we discuss the type locality of *Phyllodactylus paviei*, currently regarded as a junior subjective synonym of *Dixonius siamensis*.

Key words: Thai-Malay Peninsula, Khao Sam Roi Yot, *Dixonius kaweesaki* sp. nov.

Introduction

The genus *Dixonius* Bauer, Good & Branch, 1997 was erected to accommodate two Southeast Asian species formerly attributed to *Phyllodactylus*, *D. melanostictus* (Taylor) and *D. siamensis* (Boulenger). Ota *et al*. (2001) showed that the latter was in fact a species complex, and since then, five additional species have been described: *Dixonius aaronbaueri* Ngo & Ziegler, 2009, *D. hangseesom* Bauer, Sumontha, Grossmann, Pauwels & Vogel, 2004, *D. minhlei* Ziegler, Botov, Nguyen, Bauer, Brennan, Ngo & Nguyen, 2016, *D. taoi* Botov, Phung, Nguyen, Bauer, Brennan & Ziegler, 2015 and *D. vietnamensis* Das, 2004.

In pursuing our long-term systematic and zoogeographic review of the reptiles of the Thai-Malay Peninsula (see our most recent reports on the gecko fauna by Grismer *et al*. 2014; Pauwels *et al*. 2016a-b; Sumontha *et al.* 2015), we encountered a highly distinctive population of *Dixonius* in a limestone habitat near Khao Sam Roi Yot ("Mountain of Three Hundred Peaks") in Prachuap Khiri Khan Province. We assign it to the genus *Dixonius* based on its possession of a single pair of enlarged terminal scansors, tuberculate and keeled dorsal scalation, first supralabial in contact with the nostril, enlarged chinshields and lateral gulars, precloacal pores, a median row of transversely enlarged subcaudal scales, and the absence of terminal scansorial pad on tail (Bauer *et al*. 1997). However, its color pattern, strikingly different from those of the seven currently known species, readily allowed us to identify it as a taxonomic novelty. We describe it here as a new species, based on its unique combination of morphological and chromatical characters.

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Material and methods

Voucher specimens were fixed in 90% ethanol and subsequently transferred into 70% ethanol for permanent storage. The sex of individuals photographed in the field was determined based on the presence or absence of hemipenial swellings. Measurements and meristic counts follow Bauer *et al*. (2004) and Sumontha *et al*. (2015). Paired meristic characters are given left/right. Numbers of supralabial and infralabial scales are counted from the largest scale immediately posterior to the dorsal inflection of the posterior portion of the upper jaw to the rostral and mental scales, respectively. The number of longitudinal rows of body tubercles was counted transversely across the center of the dorsum. The number of longitudinal rows of ventral scales was counted transversely across the center of the abdomen between the lowest rows of dorsal tubercles. The numbers of subdigital lamellae beneath the toes were counted from the base of the first phalanx to the claw.

The following measurements were taken with a digital caliper to the nearest 0.1 mm: AG: axilla to groin length, taken from the posterior margin of the forelimb at its insertion point on the body to the anterior margin of the hind limb at its insertion point on the body; EarL: ear length, the greatest horizontal distance of the ear opening; ForeaL: forearm length, taken on the dorsal surface from the posterior margin of the elbow while flexed 90° to the inflection of the flexed wrist; HeadH: head height, the maximum depth of head from the occiput to the throat; HeadL: head length, from the posterior margin of the retroarticular process of the lower jaw to the tip of the snout; HeadW: head width, measured at the angle of the jaws; Internar: internarial distance, measured between the nares across the rostrum; Interorb: interorbital distance, measured between the anterior edges of the orbits; MentalL: length of the mental; MentalW: width of the mental; NosOrb: nostril to orbit distance, from the posterior margin of the external nares to the anterior margin of the orbit; OrbD: orbit diameter, the greatest horizontal diameter of the orbit; OrbEar: orbit to ear distance, from the anterior edge of the ear opening to the posterior edge of the orbit; RostralH: maximum height of the rostral; RostralW: maximum width of the rostral; SnOrb: snout to eye distance, from the tip of the snout to the anteriormost margin of the orbit; SVL: snout-vent length, taken from the tip of snout to the vent; TailL: tail length, taken from the vent to the tip of the tail, original or regenerated; TailW: tail width, taken at the base of the tail immediately posterior to the postcloacal swelling; TibiaL: tibia length, taken on the ventral surface from the posterior surface of the knee while flexed 90° to the base of heel. Meristic characters abbreviations: DorTubR: longitudinal rows of dorsal tubercles; FemPo: femoral pores; IL: infralabial scales; InterorbSc: interorbital scales, counted across the narrowest point of the frontal bone; PreclPo: precloacal pores; SL: supralabial scales; SubLT4: number of subdigital lamellae beneath 4th toe; Ven: ventral scales.

Comparisons to other species were made using original descriptions of all recognized *Dixonius* species and their synonyms (see References) and museum preserved specimens (see Appendix).

Museum and other acronyms: CUMZ-R: Chulalongkorn University Museum of Zoology, Reptile Collection, Bangkok; IRSNB: Institut Royal des Sciences naturelles de Belgique, Brussels; MNHN: Muséum national d'Histoire naturelle, Paris; MS: Montri Sumontha's field number series; PSUZC, Prince of Songkhla University Zoological Collection, Songkhla; THNHM: Thailand Natural History Museum, National Science Museum, Technopolis, Pathum Thani; and ZMKU Rep: Zoological Museum of Kasetsart University, Reptile Collection, Bangkok.

Systematics

***Dixonius kaweesaki* sp. nov.**
(Figs 1–6)

Holotype. THNHM 25607 (field no. MS 566); adult male from Khao Daeng, Kui Buri District, Prachuap Khiri Khan Province, peninsular Thailand; collected by K. Keeratikiat on 20 June 2014.

Paratypes. PSUZC 718 (field no. MS 568), adult male; PSUZC 719 (field no. MS 567), adult female; ZMKU Rep-000319 (field no. MS 570), subadult female; all same locality, collecting date and collector as holotype.

Diagnosis. *Dixonius kaweesaki* **sp. nov.** can be distinguished from all other congeneric species by its combination of a maximal SVL of 41.6 mm; 12 or 13 longitudinal rows of dorsal tubercles; 24 longitudinal rows of ventrals across the abdomen; a continuous series of 9-11 precloacal pores in males, no pores in females; and two bold dark stripes from the snout to the base of the tail separated by a contrasting light vertebral stripe.

FIGURE 1. Preserved adult male holotype of *Dixonius kaweesaki* **sp. nov.** in dorsolateral view. Photo. by M. Sumontha.

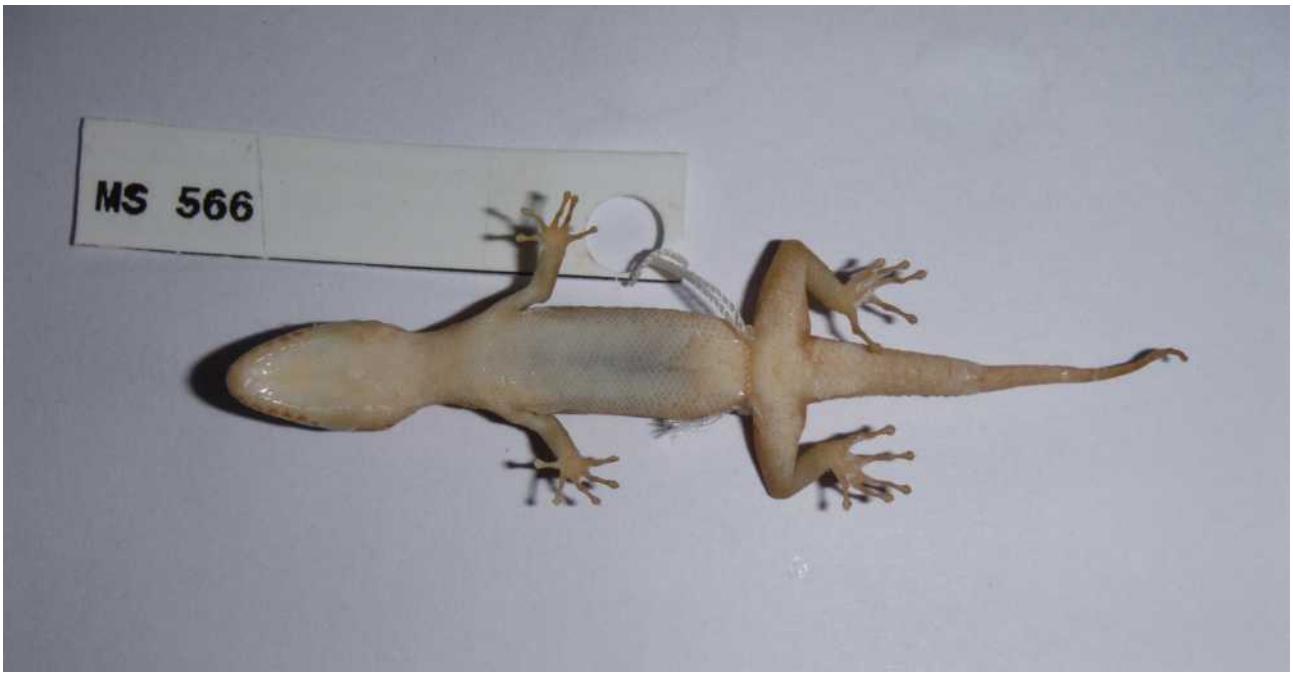

FIGURE 2. Preserved adult male holotype of *Dixonius kaweesaki* **sp. nov.** in ventral view. Photo. by M. Sumontha.

Description of holotype. Adult male. SVL 41.6 mm. Head relatively long (HeadL/SVL ratio 0.31), wide (HeadW/HeadL ratio 0.62), not markedly depressed (HeadH/HeadL ratio 0.44), distinct from slender neck. Lores and interorbital region weakly inflated, canthus rostralis relatively prominent. Snout moderately short (SnOrb/HeadL ratio 0.35), rounded, longer than orbit diameter (OrbD/SnOrb ratio 0.84); scales on snout and forehead small, hexagonal to rounded, flattened, with smooth or slightly rugose surface, some conical; scales on snout larger than those on occipital region. Eye moderately large (OrbD/HeadL ratio 0.29); pupil vertical with crenelated margins; supraciliaries short, without spines. Ear opening oval, obliquely oriented, moderate (EarL/HeadL ratio 0.05); orbit to ear distance subequal to orbit diameter. Rostral about twice wider than high, two enlarged supranasals in broad contact; rostral in contact with supralabial I on each side, nostrils and both supranasals; nostrils round, each surrounded by supranasal, rostral, supralabial I and two postnasals. Mental triangular, as wide as deep; two pairs of enlarged postmentals, anteriormost approximately three times larger than posterior; each anterior postmental bordered anteriorly by mental, medially by other anterior postmental, anterolaterally by 1st and

2nd infralabials; the pair collectively bordered posteromedially by a row of four throat scales. Supralabials to midorbital position 8/7; enlarged supralabials to angle of jaws 10/10. Infralabials 8/8. Interorbital scales 6. Body slender, elongate (AG/SVL ratio 0.42), without ventrolateral folds. Dorsal scales heterogeneous, small, irregular, flattened to conical scales distributed among large, strongly keeled subimbricate tubercles arranged in 12 or 13 more-or-less regular longitudinal rows at midbody; flanks covered with irregular smooth scales. Ventral scales smooth, imbricate; free margins rounded; increasing in size from throat to chest to abdomen, somewhat smaller in precloacal region; midbody scale rows across belly to lowest rows of tubercles, 24; gular region with relatively homogeneous, granular scales. Eleven precloacal pores in a continuous series; pore-bearing scales not enlarged relative to adjacent scale rows; scales in row immediately posterior to pore-bearing row 2 to 3 times size of other scales of cloacal region. No femoral pores or enlarged femoral scales.

FIGURE 3. Preserved type series of *Dixonius kaweesaki* **sp. nov.** Photo. by M. Sumontha.

Fore- and hind limbs short, slender (ForeaL/SVL ratio 0.13; TibiaL/SVL ratio 0.18). Digits slender, dilated distally, all bearing robust, slightly recurved claws. Basal subdigital lamellae narrow, without scansorial surfaces (6-9-11-11-10 manus, 7-13-16-15-14 pes); setae-bearing lamellae restricted to enlarged, distal, ‘‘leaf-like’’ scansors. Scales on palm and sole small, smooth, rounded to oval. Interdigital webbing absent. Relative length of digits: III>IV>II>V>I (manus), IV>III>V>II>I (pes). Total length of tail 29.2 mm, last 17.3 mm regenerated. Tail slender, tapering to tip, shorter than snout-vent length (TailL/SVL ratio 0.70); whorls of keeled scales on dorsum of basal portion of tail, lateral and distal scales lacking well-developed keels; ventral tail scales enlarged into transverse plates both in the original and regenerated portions, although much shorter in the regenerated part.

Coloration in life. Dorsal surface of head gray. Behind the nostril a black canthal stripe runs through the eye, joins the upper part of the flanks and extends along the body to the first fifth of the tail where it progressively fades out posteriorly. These two black stripes are bordered on their upper side by a contrasting whitish vertebral stripe which runs all along the dorsum from the nape to the beginning of the tail. On their lower sides, the two black

stripes progressively turn into grey, then light gray and eventually become uniformly whitish as the belly and the throat. The upper surface of limbs, hands and feet is uniformly light gray. The vertebral whitish stripe is prolonged anteriorly by two thin stripes running through the temporal area above the postorbital black stripe and above the eye where the supraciliaries are whitish. Supralabials are grey with thin white vertical bars. The dorsal surface of the original part of the tail is light orange, with regularly arranged darker and lighter thin bands. In preservative the colors fade out, and are replaced by nuances of light brown and beige (compare live individuals of Figures 4–6 with the preserved holotype on Figure 1).

FIGURE 4. Live adult male *Dixonius kaweesaki* **sp. nov.** *in situ* (individual not collected). Photo. by M. Sumontha.

Variation. The morphometric and meristic characters of the type series are provided in Table 1. Morphological and coloration characters of the paratypes agree in most respects with the holotype. Two of the paratypes, both females, have an original and complete tail, with a TailL/SVL ratio of 1.55 (PSUZC 719) and 1.36 (ZMKU Rep-000319), respectively. Precloacal pores are absent in females. Subdigital lamellae of paratype PSUZC 718 6-8-10-10-8 (manus) and 7-12-16-15-13 (pes), of paratype PSUZC 719 7-8-10-10-7 (manus) and 7-12-16-15-13 (pes). Colors in life are bolder and more contrasted in young individuals than in adults (compare Fig. 6 with Figs 4 and 5).

Distribution and natural history. *Dixonius kaweesaki* **sp. nov.** is currently known only from its type locality Khao Daeng in Kui Buri District (Figure 7). The limestone reliefs on which it was found are an extension of the Khao Sam Roi Yot massif, itself a subrange of the Tenasserim Hills. We suspect that the species occurs at other localities within the massif, probably on all limestone hills of the Khao Sam Roi Yot National Park. The species is locally common, nocturnal, and lives in dry microhabitat on limestone boulders (Figure 8), from 5 m to 300 m a.s.l. It was found to be most active between 0100 and 0400 hrs, especially after rainfall. We observed it in syntopy with *Cnemaspis siamensis* (Smith), *Cyrtodactylus samroiyot* Pauwels & Sumontha, 2014, *Dixonius siamensis*, *Gehyra fehlmanni* (Taylor), *G. lacerata* (Taylor) and *G. mutilata* (Wiegmann), *Gekko gecko* (Linnaeus) (Gekkonidae), *Ahaetulla nasuta* Bonnaterre, *Dendrelaphis subocularis* (Boulenger), *Lycodon capucinus* (Boie) (Colubridae),

Indotyphlops braminus (Daudin) (Typhlopidae) and *Trimeresurus* sp. (Viperidae). Additional geographically close populations of *Dixonius siamensis* are documented north and south of the type locality of *Dixonius kaweesaki* **sp. nov.**, in Phetchaburi and Prachuap Khiri Khan provinces (Chan-ard *et al*. 1999; Pauwels and Chan-ard 2006; Pauwels *et al*. 2009; Figure 10; Appendix).

TABLE 1. Meristic and morphometric (in mm) data for the type series of *Dixonius kaweesaki* **sp. nov.** Paired meristic characters are given left/right.

	THNHM 25607, holotype	PSUZC 718, paratype	PSUZC 719, paratype	ZMKU Rep-000319
Sex	Male	Male	Female	Female
SVL	41.6	39.3	39.8	31.3
HeadL	13.0	12.1	12.3	9.0
HeadW	8.0	7.0	8.0	6.5
HeadH	5.7	5.6	5.3	4.2
OrbD	3.8	3.5	3.5	2.6
OrbEar	3.7	3.3	3.4	2.8
SnOrb	4.5	4.5	4.6	3.8
NosOrb	3.9	3.2	3.3	3.1
Interorb	3.9	4.1	4.2	3.3
EarL	0.6	0.4	0.5	0.4
Internar	1.5	1.2	1.0	0.9
RostralH	1.1	1.1	1.3	0.7
RostralW	2.0	1.8	1.9	1.2
MentalL	2.4	1.9	1.9	1.1
MentalW	2.4	1.9	2.2	1.1
AG	17.6	16.6	18.7	12.9
ForeaL	5.6	5.0	5.2	4.8
TibiaL	7.2	6.6	7.7	5.9
TailL	29.2 (last 17.3 regenerated)	>8.0 (original, incomplete)	61.5 (original, complete)	42.5 (original, complete)
TailW	4.6	4.2	4.5	3.1
SL	10/10	10/10	11/10	10/10
IL	8/8	8/7	8/7	6/7
InterorbSc	6	7	7	6
DorTubR	12	12	13	12
Ven	24	24	24	24
PreclPo	11	9	0	0
FemPo	0	0	0	0
SubLT4	15	15	15	15

Etymology. The specific epithet honors the Thai naturalist Kaweesak (Toi) Keeratikiat from Bangkok, in recognition to his help in our herpetological field surveys, and who collected the type series. We suggest the following common names: *Djing-djok din Sam Roi Yot* (Thai), Sam Roi Yot leaf-toed gecko (English), *Dixonius de Sam Roï Yot* (French), *Samroiyot Blattfingergecko* (German).

Comparisons to other species. Based on its color pattern, *Dixonius kaweesaki* **sp. nov.** can be readily distinguished from all other recognized *Dixonius* species. The absence of dorsal spots, ocellae and transversal bands readily diagnoses it from *D. hangseesom*, *D. minhlei*, *D. siamensis* (Figure 10; see also individuals from

Chaiyaphum, Chon Buri, Loei, Prachuap Khiri Khan, Sisaket and Udon Thani provinces illustrated by Manthey & Grossmann 1997, Chan-ard *et al*. 1999 and Taylor 1963), *D. taoi* and *D. vietnamensis*. The presence of a lateral wide dark stripe on the upper flanks distinguishes it from *D. aaronbaueri* (absence of stripes, bands or any pattern on dorsum), *D. hangseesom* (no dark dorsal stripe; see Figure 11), *D. melanostictus* (lateral wide dark stripe on the lower flanks, not on the upper flanks; see Figure 9 and individuals from Nakhon Ratchasima and Saraburi provinces illustrated by Taylor 1963 and Chan-ard *et al*. 1999), *D. minhlei* (no dark dorsal stripe), *D. siamensis* (no dark dorsal stripe), *D. taoi* (no dark dorsal stripe) and *D. vietnamensis* (no dark dorsal stripe). The presence of a vertebral stripe abruptly lighter than the upper flank background color is unique to *Dixonius kaweesaki* **sp. nov.** This latter contrast is most marked in young individuals where the vertebral stripe is white and the upper flank color is black. The drawings presented in the original description of *Phyllodactylus paviei* (Mocquard, 1904) from "Vatana (Siam)"and in a complement to the description of *Phyllodactylus burmanicus* Annandale, 1905a (Annandale 1905b) from "Tavoy", both currently regarded as junior subjective synonyms of *D. siamensis* (Bauer *et al*. 2004), show a blotched dorsal pattern without dark stripes; they also both lack a dark canthal stripe.

FIGURE 5. Live adult female *Dixonius kaweesaki* **sp. nov.** *in situ* (individual not collected). Note the partly regenerated tail. Photo. by M. Sumontha.

Besides its unique color pattern *Dixonius kaweesaki* **sp. nov.** can be also easily distinguished from all other *Dixonius* by its combination of meristic and morphometric characters. It indeed differs from *D. aaronbaueri* by its slightly larger size (maximum SVL 41.6 vs. 38.6 mm), its higher SL number (10 or 11 vs. 8 or 9), distinctly higher Ven number (24 vs. 18 or 19), slightly higher DorTubR number (12 or 13 vs. 11) and its sensibly higher number of precloacal pores in males (9–11 vs. 5). From *D. hangseesom* it differs by its higher SL number (10 or 11 vs. 8), distinctly lower Interorb number (6 or 7 vs. 10), its higher SubLT4 (15 vs. 13) and its higher number of precloacal pores in males (9–11 vs. 6–8). It can be separated from *D. melanostictus* by its smaller maximum SVL (41.6 vs. 50 mm), its higher SL number (10 or 11 vs. 9), its higher Ven number (24 vs. 22), and slightly higher DorTubR

number (12 or 13 vs. 10 or 11). From *D. minhlei* it differs by its slightly smaller size (maximum SVL 41.6 vs. 47.5 mm), its higher SL number (10 or 11 vs. 7–9), lower DorTubR number (12 or 13 vs. 14 or 15), higher Ven number (24 vs. 20–23), and its higher number of precloacal pores in males (9–11 vs. 7 or 8). From *D. siamensis* it differs by its much smaller size (maximum SVL 41.6 vs. 57 mm), higher SL number (10 or 11 vs. 7 or 8), and higher number of precloacal pores in males (9–11 vs. 6 or 7). It is distinguished from *D. taoi* by its higher SL number (10 or 11 vs. 7 or 8), higher Ven number (24 vs. 21–23), higher SubLT4 (15 vs. 12–14) and higher number of precloacal pores in males (9–11 vs. 5 or 6). From *D. vietnamensis* it differs by its higher SL number (10 or 11 vs. 7), higher Ven number (24 vs. 20), generally lower DorTubR number (12 or 13 vs. 13–17) and higher SubLT4 (15 vs. 13). *Phyllodactylus burmanicus* shows 6 SL, 6 IL, 8 or 9 SubLT4, 7 precloacal pores and a maximum known SVL of 35 mm (Annandale 1905a–b). *Phyllodactylus paviei* shows 8 SL, 6 precloacal pores and a maximum known SVL of 46 mm (Mocquard 1904).

FIGURE 6. Live subadult *Dixonius kaweesaki* **sp. nov.** *in situ* (individual not collected). Photo. by M. Sumontha.

Discussion

Dixonius kaweesaki **sp. nov.** does not seem to be under any conservation threat in spite of its very limited geographical range, which may not extend beyond the limits of Khao Sam Roi Yot National Park. As far as we know, it is not exploited for traditional medicine nor collected for the pet trade. It is the second reptile species believed to be endemic to the Khao Sam Roi Yot massif, after *Cyrtodactylus samroiyot*. *Dixonius kaweesaki* **sp. nov.** is the 8th species in the genus *Dixonius*, and the third one believed to be endemic to Thailand, along with *D. hangseesom* and *D. melanostictus*.

We take this opportunity to report a wrong statement on *Dixonius siamensis* made by Ali *et al*. (2013). These authors noted ‘‘The Hemato polyvalent antivenom (HPA) produced against *C*[*alloselasma*]. *rhodostoma* and two

other haemotoxic Thai snakes, *Cryptelytrops albilabris* and *Dixonius siamensis*, has been demonstrated to abrogate the lethality of *H*[*ypnale*]. *hypnale* venom in rats, but has not yet been clinically trialled'', referring to Tan *et al*. (2011). *Dixonius siamensis* was certainly a *lapsus calami* for the viperid species *Daboia siamensis* (Smith) dealt with in Tan *et al*. (2011).

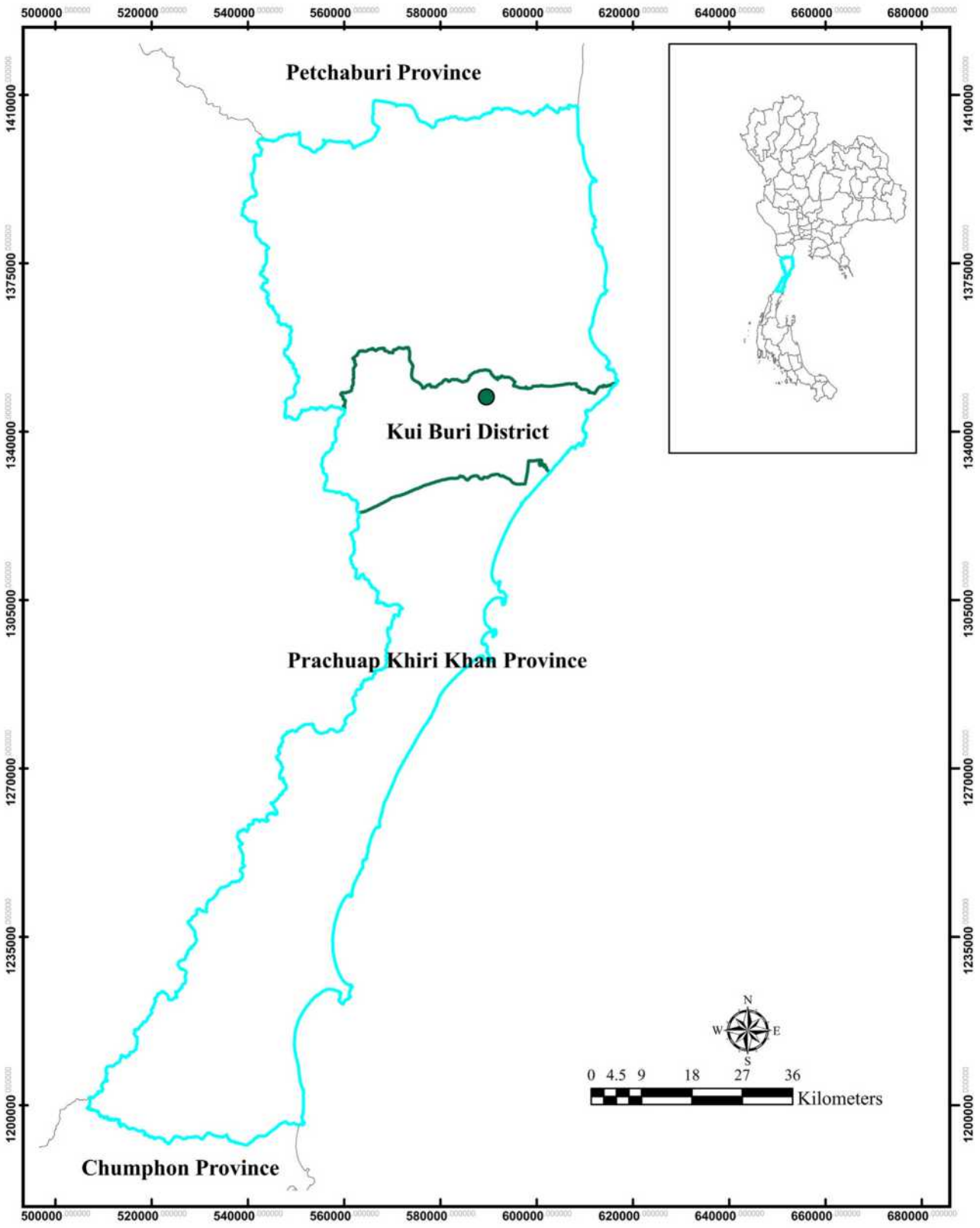

FIGURE 7. Map of Thailand showing the position of the type locality of *Dixonius kaweesaki* **sp. nov.** Map by C. Viriyapanon.

FIGURE 8. Microbiotope of *Dixonius kaweesaki* **sp. nov.** at the type locality. Photo. by M. Sumontha.

FIGURE 9. Live adult *Dixonius melanostictus* (tail original) photographed *in situ* in Muak Lek District, Saraburi Province, central Thailand. Photo. by O.S.G. Pauwels.

FIGURE 10. Live adult *Dixonius siamensis* (tail autotomized, partly regenerated) photographed *in situ* in Cha-am Forest Park, Cha-am District, Phetchaburi Province, western Thailand. Photo. by O.S.G. Pauwels.

FIGURE 11. Live adult *Dixonius hangseesom* (tail original) photographed *in situ* in Sai Yok District, Kanchanaburi Province, western Thailand. Photo. by M. Sumontha.

Lastly, we believe that the interpretation of the type locality of *Phyllodactylus paviei* by Das (2004: 629) is erroneous. Das (2004) matched Mocquard's ''Vatana'' with ''Chaeng Wattana, ca. 13°45'N, 100°31'E: a northern suburb of Bangkok, across the highway from the airport, Phra Nakhon Province, Thailand''. Mocquard's description of *P. paviei* appeared in the lizard chapter of a book dedicated to the study of the scientific results of the expedition of the French explorer Auguste Pavie in Indochina in 1879–1895. In the introduction of the book, a map, however locates ''Vatana'' just southeast of ''Srakeo'', and it thus certainly corresponds to Watthana Nakhon (13°43'49.13"N, 102°20'5.76"E; elev. 72 m asl), Watthana Nakhon District, in the eastern province of Sa Kaeo which borders Cambodia. The type locality reported by Das (2004) was an incorrect interpretation and was further repeated by Ngo & Ziegler (2009). Watthana Nakhon lies about 198 airline km E of Chaeng Watthana, and is located southeast of the type localities of both *D. melanostictus* and *D. siamensis*.

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APPENDIX. Thai comparative material examined.

Dixonius hangseesom: see CUMZ-R and IRSNB type material listed in Bauer *et al*. (2004). *Dixonius siamensis*: CUMZ-R 2003.59, near Sai Yok Waterfall, Sai Yok District, Kanchanaburi Prov.; IRSNB 15155, Ban Khao Kling, Kaeng Krachan District, Phetchaburi Prov.; IRSNB 16642, Chiang Mai City, Muang District, Chiang Mai Prov.; IRSNB 16643, Doi Saket, Doi Saket District, Chiang Mai Prov.; IRSNB 16645, foot of Khao Loun, Ban Nong Ipho, Ban Lat District, Phetchaburi Prov.; IRSNB 17015 (4 spec.), Hin Chang See, Ban Fang District, Kon Kaen Prov.; MNHN-RA 1998.0522, Ban Tham Rong, Ban Lat District, Phetchaburi Prov.; MNHN-RA 1998.0529, Doi Saket, Doi Saket District, Chiang Mai Prov.; MNHN-RA 1999.7606, Ban Salakern, Ban Lat District, Phetchaburi Prov.; MNHN-RA 1999.7627, Huay Kwang Jing, Tha Yang District, Phetchaburi Prov.; THNHM 1282, island in Kaeng Krachan Reservoir, Kaeng Krachan District, Phetchaburi Prov.; THNHM 1299–1305, Forestry Training Center, Cha-am, Cha-am District, Phetchaburi Prov.