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A New Species of Cave-dwelling *Cyrtodactylus* (Squamata: Gekkonidae) from Thailand

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ABSTRACT.–A new species of the gekkonid lizard genus *Cyrtodactylus* Gray, 1827 is described on the basis of material collected in limestone caves at Khao Wong, Rayong Province, Thailand. It is characterized by a slender body, elongate tail and digits, small number (12) of rows of dorsal tubercles, and enlarged patch of precloacal scales bearing only two precloacal pores. The new species is the second tropical Asian *Cyrtodactylus* believed to be largely associated with cave environments and is the twelfth species of the genus thus far recorded from Thailand.

KEY WORDS: *Cyrtodactylus sumonthai*, sp. nov.; Gekkonidae; description; cave-dwelling

INTRODUCTION

The bent toed geckos of the genus *Cyrtodactylus* Gray, 1827 are represented by 65 currently recognized species (Rösler, 2000, 2001; Das and Lim, 2000; Kluge, 2001; Wells, 2002; Bauer, 2002) and are thus among the most diverse of all gekkonid groups. Underwood (1954) resurrected the genus for a large assemblage of Eastern Hemisphere padless geckos of widely differing form. Subsequent revisions (Szczerbak and Golubev, 1977, 1984, 1986; Kluge, 1983; Ulber and Gericke, 1988) have removed the majority of Palearctic species, as well as those from the Mascarene Islands and parts of the tropical Pacific, to other genera. A radiation of bent–toed geckos from Peninsular India and Sri Lanka, *Geckoella*, has also been recognized as generically distinct (Kluge, 1991, 1993, 2001), but has been accorded only subgeneric rank by other authors (Ulber and Gericke, 1988; Rösler, 2000). As presently construed, *Cyrtodactylus* (including *Geckoella*) is distributed across the whole of tropical Asia from India eastwards to the Philippines, the Indoaustralian Archipelago, northern Australia, New Guinea, and the Solomon Islands.

Smith (1916a) recorded four *Cyrtodactylus* (as *Gymnodactylus*) from Thailand: *C. marmoratus*, *C. pulchellus*, *C. peguensis*, and *C. oldhami*, based almost exclusively on material from Peninsular Thailand. The same author (Smith, 1935) subsequently omitted the first two species, but added *C. intermedius*, *C. angularis*, and *C. brevipalmatus* to the fauna of the country. Suvatti (1950) accepted all seven

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species as components of the Thai fauna, whereas Taylor and Elbel (1958) followed Smith (1935) in excluding *C. marmoratus* and *C. pulchellus,* but added *C. consobrinoides* in their list of the Thai herpetofauna. Taylor (1963), in his definitive work on Thai lizards, subsequently deleted *C. consobrinoides*, the original record having been based on an error in identification. He further added his newly described (Taylor, 1962) *C. quadrivirgatus* to the species list and again included *C. marmoratus* as a member of the fauna on the basis of material from extreme southern peninsular Thailand. Dring (1979) has since evaluated earlier records of *C. marmoratus* and referred all those from the Malay Peninsula, including those from peninsular Thailand, to *C. quadrivirgatus*. Ulber and Grossmann (1991) and Ulber (1993) described three additional *Cyrtodactylus* from Thailand: *C. papilionoides*, *C. interdigitalis*, and *C. jarujini*. These additions, as well as the confirmation of the validity of records of *C. pulchellus*, brought the total number of Thai species recorded by Das (1997) to ten. In the most recent enumeration, Chan-Ard et al. (1999) noted eleven species, including all of those recognized by Das (1997) (*C. angularis*, *C. brevipalmatus*, *C. interdigitalis*, *C. intermedius*, *C. jarujini*, *C. oldhami, C. papilionoides*, *C. peguensis* [represented by two subspecies], *C. pulchellus*, and *C. quadrivirgatus*), as well as *C. variegatus*, a species previously recorded only from Myanmar. The occurrence of a twelfth species of *Cyrtodactylus* in Thailand was inadvertently signaled by Thooliwan (2001) who, in a popular article, provided a photograph (identified only as a gecko) of what was clearly a hitherto unknown member of the genus. We here describe this distinctive species on the basis of material collected from limestone caves in Rayong Province in southeastern Thailand.

MATERIALS AND METHODS

The following measurements were taken with Brown and Sharpe Digit-cal Plus digital calipers (to the nearest 0.01 mm): snout-vent length (SVL; from tip of snout to vent), trunk length (TrunkL; distance from axilla to groin measured from posterior edge of forelimb insertion to anterior edge of hindlimb insertion), crus length (CrusL; from base of heel to knee); tail length (TailL; from vent to tip of tail), tail width (TailW; measured at widest point of tail); head length (HeadL; distance between retroarticular process of jaw and snout-tip), head width (HeadW; maximum width of head), head height (HeadH; maximum height of head, from occiput to underside of jaws), ear length (EarL; longest dimension of ear); forearm length (ForeaL; from base of palm to elbow); orbital diameter (OrbD; greatest diameter of orbit), nares to eye distance (NarEye; distance between anteriormost point of eye and nostril), snout to eye distance (SnEye; distance between anteriormost point of eye and tip of snout), eye to ear distance (EyeEar; distance from anterior edge of ear opening to posterior corner of eye), internarial distance (Internar; distance between nares), and interorbital distance (Interorb; shortest distance between left and right supraciliary scale rows).

Scale counts and external observations of morphology were made using a Nikon SMZ-10 dissecting microscope. Radiographic observations were made using a Picker X-ray Corporation enclosed radiographic unit.

Comparisons were made with museum material in the collections of the California Academy of Sciences (CAS), United States National Museum (USNM), and the Museum of Comparative Zoology (MCZ), as well as original published descriptions and descriptions provided in broader faunal and taxonomic treatments (e.g., Smith, 1935; Taylor, 1963; Szczerbak and Golubev, 1986; Hikida, 1990; Ulber, 1993; Darevsky and Szczerbak, 1997; Das, 1997; Das and Lim, 2000; Bauer 2002).

SYSTEMATICS

(Reptilia: Squamata: Gekkonidae)
Cyrtodactylus sumonthai sp. nov.
(Figs. 1–3)

Holotype.–Institut Royal des Sciences Naturelles de Belgique (IRSNB) 2624, adult male; Thailand, Rayong Province, Khao Wong, Tham Khang Khao (16°42′N, 104°06′E); collected by Montri Sumontha, 3 February 2002 (12h00–17h00).

Paratypes.–Chulalongkorn University Museum of Zoology (CUMZ) R 2002.2.5.1, adult female; Thailand, Rayong Province, Khao Wong. IRSNB 2625, adult female; Thailand, Rayong Province, Khao Wong. IRSNB 2626, juvenile; Thailand, Rayong Province, Khao Wong, Tham Tao. CAS 223819, adult male; Thailand, Rayong Province, Khao Wong; collector and date for all specimens as for holotype.

Etymology.–The specific epithet is a partonym honoring Mr. Montri Sumontha of the Ranong Marine Fisheries Station, who collected the type series of the new species.

Definition.–A relatively small *Cyrtodactylus*, snout-vent length to at least 71 mm; body slender, limbs and digits long, slender; two pairs of enlarged postmental scales, members of each pair in broad contact with one another; dorsal scalation with 12 rows of keeled tubercles; 33–36 ventral scales between base of ventrolateral folds; no precloacal groove, precloacal scales greatly enlarged, two minute precloacal pores in adult male holotype (one in subadult male paratype, absent in females), no femoral pores or enlarged femoral scales. Six broad basal lamellae and 12 narrow distal lamellae beneath 4th toe of pes. Median subcaudal scales enlarged to form broad transverse plates. Dorsal pattern of alternating light (whitish to yellowish) and dark (brownish) bands, one dark band across nape, two across trunk, one across sacrum. Lighter bands containing brown markings within them.

Description (based on holotype, IRSNB 2624).–Adult male with hemipenes (5.25 mm) partially everted. Snout-vent length 70.66 mm. Head relatively long (HeadL/SVL ratio 0.28), wide (HeadW/HeadL ratio 0.62), not markedly depressed (HeadH/HL ratio 0.38), distinct from slender neck. Lores and interorbital region

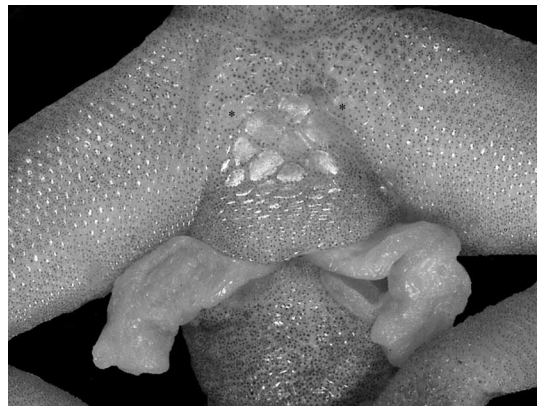

FIGURE 1. Cloacal region of adult male holotype of *Cyrtodactylus sumonthai*, sp. nov. (IRSNB 2624) from Khao Wong, Rayong Province, Thailand. Note the enlarged precloacal scales and the two minute precloacal pores (indicated by asterisks). Photo by E. Daeschler and A. M. Bauer, Albert M. Greenfield Digital Imaging Center for Collections.

weakly inflated, canthus rostralis not especially prominent. Snout elongate (SnEye/HeadL ratio 0.43), pointed; much longer than eye diameter (OrbD/SnEye ratio 0.57); scales on snout and forehead small, rounded, granular, homogeneous; scales on snout larger than those on occipital region. Eye large (OrbD/HeadL ratio 0.24); pupil vertical with crenelated margins; supraciliaries short, bearing tiny conical spines posteriorly. Ear opening rounded, relatively large (EarL/HeadL ratio 0.07); eye to ear distance greater than diameter of eyes (EyeEar/OrbD ratio 1.12). Rostral approximately 3/4 deep (1.83 mm) as wide (2.53 mm), incompletely divided dorsally by an inverted "Y" shaped rostral groove; two enlarged supranasals separated by a single, roughly pentagonal internasal; rostral in contact with supralabial I, supranasals, and internasal; nostrils round, each surrounded by supranasal, rostral, first supralabial, and two enlarged postnasals; three rows of small scales separate orbit from supralabials. Mental triangular, slightly wider (2.50 mm) than deep (2.33 mm); two pairs of enlarged postmentals, anteriormost approximately 6 times larger than posterior, posterior approximately 4 times larger than adjacent throat scales; each anterior postmental bordered anteromedially by mental, posteromedially by other anterior

FIGURE 2. Living specimen of adult male *Cyrtodactylus sumonthai*, sp. nov. (IRSNB 2624, holotype) from Tham Khang Khao, Khao Wong, Rayong Province, Thailand. Note the slender habitus, elongate tail and digits and banded color pattern. Photo by Lawan Chanhome.

postmental, anterolaterally by first infralabial, posterolaterally by an enlarged lateral chin-shield, and posteriorly by second postmental; posterior postmentals each bordered posteriorly by series of 3–4 granules. Supralabials to midorbital position 9; supralabials to angle of jaws 12; infralabials 10; interorbital scale rows across narrowest point of frontal bone 15.

Body slender, elongate (TrunkL/SVL ratio 0.40) with very weakly developed, non-denticulate ventrolateral folds. Dorsal scales weakly heterogeneous, conical; regularly distributed tubercles (4–5 times size of adjacent scales) extending from supra-auricular region on to back; each tubercle bearing several low ridges, the most prominent forming a keel on the anterior-facing surface, extending approximately 2/3 along the tubercle; tubercles in approximately 12 rows at midbody, absent from flanks. Ventral scales larger than dorsal, smooth, hexagonal and subimbricate; somewhat larger midventrally, particularly on chest and much larger in precloacal region; midbody scale rows across belly to base of ventrolateral folds 36; gular region with relatively homogeneous, smooth scales. Two minute precloacal pores, each borne in an enlarged scale; pore-bearing scales separated by three comparably large, poreless scales, each 3–8 times size of adjacent ventrals (Fig. 1). No femoral pores or enlarged femoral scales; no precloacal groove. Scales on palm and sole smooth, rounded; scalation on dorsal aspects of limbs similar to body dorsum, with enlarged, conical tubercles interspersed among smaller scales.

Fore and hindlimbs moderately long, slender (ForeaL/SVL ratio 0.17; CrusL/SVL ratio 0.19); digits long, slender, strongly inflected at interphalangeal joints, all bearing robust, slightly recurved claws; basal subdigital lamellae broad, rectangular, without scansorial surfaces (4–6–6–6–6 manus; 4–6–6–6–5 pes); narrow lamellae distal to digital inflection and not including ventral claw sheath: 8–8–11–10–10 (manus), 8–10–12–12–12 (pes); interdigital webbing absent. Relative length of digits (manus; measurements in mm in parentheses): IV (6.47) > III (5.94) > II (5.36) > V (5.03) > I (3.61); (pes): IV (6.98) > III (6.90) > V (6.87) > II (6.06) > I (4.30).

FIGURE 3. Living specimen of juvenile *Cyrtodactylus sumonthai*, sp. nov. (IRSNB 2626, paratype) from Tham Tao, Khao Wong, Rayong Province, Thailand. Note the conspicuous differences between the juvenile and adult color patterns. The specimen was approximately two weeks old when photographed, but was not preserved until it died at approximately seven weeks of age. Photo by Lawan Chanhome.

Mostly original (terminal 40.76 mm regenerated) tail long, slender, gently tapering to tip; longer than snout-vent length (TailL/SVL ratio 1.29); original portion of tail distinctly segmented; each segment 8–9 scale rows in extent; dorsal caudal scales flat, oval, smooth, homogeneous, except for basal segments where two parasagittal rows of enlarged, keeled tubercles continue from the body dorsum to the fourth postpygal segment; ventral scales smooth, greatly enlarged, extending the entire width of the tail venter; two such transverse plates per tail segment. Regenerated portion of tail with more-or-less uniform, flattened, subimbricate scales; without tubercles. Series of 3 small, smooth, conical postcloacal spurs on each side of tailbase.

Osteology (based on IRSNB 2624 and CUMZ R 2002.2.5.1). Parietal bones paired; stapes imperforate. Premaxillary teeth loci 11, approximately 45 tooth loci on each maxillary bone, 51 on each dentary. Phalangeal formulae 2–3–4–5–3 for manus and 2–3–4–5–4 for pes. Presacral vertebrae 26, including 3 anterior cervical (without ribs), 2 lumbar (one in paratype), and 2 sacral vertebrae; 5 pygal and 14.5 post pygal caudal vertebrae to point of regeneration (31.5 post-pygal vertebrae in CUMZ R 2002.2.5.1). Male holotype with one pair of crescentic cloacal bones present, flared both medially and laterally; lateral end of left bone with an small, nodular, accessory ossification (cloacal bones lacking in female paratype). Endolymphatic sacs not enlarged extracranially.

Coloration (in preservative). Base color a pale yellowish white. Banded with pale brown markings, each outlined by a darker brown border that is more prominent anteriorly than posteriorly. One dark band across shoulder, two across trunk, and one across sacrum. Pale interspaces with diffuse, paired brown markings. Dorsal pattern faded on flanks. Alternating light and dark pattern of dorsum continues on to tail, becoming more diffuse caudally. A prominent brown collar from posterior border of orbits across nape. Dorsum of head pale brown with scattered, slightly darker, diffuse markings. Loreal region suffused with darker pigment; darkest pigmentation across inferior border of orbit and near corner of mouth. A light line extends from posterior border of orbit to anterior border of ear. Labial scales white with scattered, often dense brown punctations. Limbs pale brown, weakly marked by darker, irregular markings, especially distally by a

TABLE 1. Mensural data for the type series of *Cyrtodactylus sumonthai*, sp. nov. Abbreviations as in Materials and Methods, all measurements in mm.

	IRSNB 2624 holotype	**CUMZ R 2002.2.5.1 paratype**	**IRSNB 2625 paratype**	**CAS 223819 paratype**	**IRSNB 2626 paratype**
Sex	male	female	female	male	juvenile
SVL	70.66	70.40	67.41	61.53	35.05
ForeaL	12.00	11.76	11.47	11.28	5.60
CrusL	13.86	14.50	13.75	13.36	7.32
TailL	91.40	91.21	93.95	89.90	43.47
TailW	6.07	5.33	5.63	5.90	2.80
TrunkL	28.04	30.53	26.81	23.98	13.97
HeadL	19.96	19.83	19.40	19.47	11.59
HeadW	12.43	12.58	12.73	11.82	6.86
HeadH	7.58	8.44	8.45	7.33	4.28
OrbD	4.85	4.58	4.96	5.04	3.25
EyeEar	5.46	4.87	5.27	4.94	2.69
SnEye	8.57	8.89	8.08	7.95	4.60
NarEye	6.43	6.35	6.05	6.28	3.17
Interorb	6.80	6.78	6.23	6.19	3.03
EarL	1.40	1.50	1.58	1.42	1.14
Internar	2.09	2.40	2.23	2.17	1.47

series of dark transverse bars that extend onto the edges of the ventral surfaces. Venter cream tinged by the light brown speckling of individual scales, densest laterally.

Color in life much bolder (Fig. 2), with a yellowish tinge to the scales surrounding the eyes and to the lighter portions of the tail dorsum and a pinkish suffusion along the lower flanks. Dark markings within lighter bands well defined. Iris golden brown.

Variation.–Comparative mensural data for the holotype and paratypes are presented in Table 1. The paratypes similar to holotype in most respects except as noted. CUMZ R 2002.2.5.1: Adult female, mostly original tail with only tip regenerated. Similar in most aspects of scalation, except as follows: 33 scale rows across venter; no precloacal pores present; precloacal scales enlarged, but much smaller than in holotype; cloacal spurs very small, barely larger than adjacent scales of lateral tail base. Coloration similar to holotype but with heavier pigmentation of chin, throat and thigh venter. Snout and labial regions more uniformly dark brown than in holotype. In life with distinctly yellowish snout, supraciliaries, and tail bands. IRSNB 2625: Adult female, tail original. 34 scale rows across venter; no precloacal pores; precloacal scales enlarged, but much smaller than in holotype; cloacal spurs small, consisting of 3 conical scales on left side, 2 on right. Base color much darker than holotype, pattern of dark markings on head strongly pronounced. CAS 223819: Subadult (?) male, tail original. 11 infralabial scales; 34 scale rows across venter. Precloacal scales enlarged as in holotype, but with only left precloacal pore present. Coloration similar to IRSNB 2625, but with right thigh almost patternless and tail venter dark brown with

scattered white spots, mostly on lateral margins of transverse plates. IRSNB 2626: Juvenile, in poor state of preservation, with post mortem insect damage to throat and skin loss on throat, chest and base of extremities. No evidence of precloacal pores or hemipenial swellings; ventrolateral folds indistinct. Color pattern consisting of simple alternating light and dark banding, without dark blotches in the lighter bands or distinctly darker borders on darker bands; tail venter with dark pigmentation except for lateral margins of transverse plates, which are pigment-free, forming a pair of dashed white lines along underside of tail. In life with yellowish snout and tail bands; paler body bands grayish-brown rather than white; a pinkish suffusion on flanks (Fig. 3).

The type series provides evidence for a pronounced ontogenetic change in color pattern. In addition, it appears that *Cyrtodactylus sumonthai* is capable of at least some physiological color change, chiefly involving blanching, as is common among many geckos.

Diagnosis.–*C. sumonthai* may be distinguished from all congeners on the basis of the following combination of characters: slender body, largely homogeneous body scalation, low number of rows (12) of small tubercles, elongate digits and tail, 2 precloacal pores and patch of greatly enlarged precloacal scales, absence of precloacal groove and femoral pores, and dorsal color pattern consisting of alternating light and dark bands. The condition of precloacal and femoral pores in males has traditionally been widely used to distinguish members of the genus *Cyrtodactylus* (e.g., Darevsky and Szczerbak, 1997). On this basis *C. sumonthai* may be distinguished from the following species by the absence of a precloacal groove: *C. annulatus* (Taylor, 1915), *C. cavernicolus* (Inger and King, 1961), *C. marmoratus* (Gray, 1831), *C. papuensis* (Brongersma, 1934), *C. philippinicus* (Steindachner, 1867), *C. pubisulcus* Inger, 1958, *C. pulchellus* Gray, 1827, *C. rubidus* (Blyth, 1860), *C. sadleiri* Wells and Wellington, 1984; from the following species by the absence of femoral pores and/or enlarged femoral scales: *C. abrae* Wells, 2002, *C. agusanensis* (Taylor, 1915), *C. angularis* (Smith, 1921), *C. baluensis* (Mocquard, 1890), *C. biordinis* Brown and McCoy, 1980, *C. brevipalmatus* (Smith, 1923), *C. condorensis* (Smith, 1920), *C. consobrinoides* (Annandale, 1905), *C. consobrinus* (Peters, 1871), *C. darmandvillei* (Weber, 1890), *C. derongo* Brown and Parker, 1973, *C. feae* (Boulenger, 1893), *C. fraenatus* (Günther, 1864), *C. fumosus* (Müller, 1895), *C. gubernatorius* (Annandale, 1913), *C. interdigitalis* Ulber, 1993, *C. intermedius* Smith, 1917, *C. irregularis* (Smith, 1921), *C. jarujini* Ulber, 1993, *C. lateralis* (Werner, 1896), *C. loriae* (Boulenger, 1898), *C. louisiadensis* (de Vis, 1892), *C. malcolmsmithi* (Constable, 1949), *C. mimikanus* (Boulenger, 1914), *C. novaeguineae* (Schlegel, 1844), *C. oldhami* (Theobald, 1876), *C. papilionoides* Ulber, 1993, *C. peguensis* (Boulenger, 1893), *C. quadrivirgatus* Taylor, 1962, *C. redimiculus* King, 1962; *C. slowinskii* Bauer, 2002; *C. sworderi* (Smith, 1925), *C. tiomanensis* Das and Lim, 2000, *C. tuberculatus* (Lucas and Frost, 1900), *C. variegatus* (Blyth, 1859), and *C. wetariensis* (Dunn, 1927); and from the following species by the presence of precloacal pores: *C. jellesmae* (Boulenger, 1897), *C. laevigatus* Darevsky, 1964, *C. paradoxus* (Darevsky and Szczerbak, 1997), *C. sermowaiensis* (de Rooij, 1915), and most members of the subgenus *Geckoella* (*C. collegalensis* [Beddome, 1870], *C. deccanensis* [Günther, 1864], *C. jeyporensis* [Beddome, 1877], *C. nebulosus* [Beddome, 1870], and *C. yakhuna* [Deraniyagala, 1945]). *Cyrtodactylus sumonthai* differs from *C.* (*G.*) *triedrus* (Günther, 1864) and *C. brevidactylus* Bauer, 2002 by its much more elongate tail and digits and by having only 2 cloacal pores (vs. 8 in *C. brevidactylus* and 3–4 in *C. triedrus*). All remaining congeners also have a greater number of precloacal pores (6 in *C. khasiensis* (Jerdon, 1870) and *C. adleri* Das, 1997; 7 in *C. matsuii* Hikida, 1990; 8 in *C. elok* Dring, 1979 and *C. ingeri* Hikida, 1990; 8–10 in *C. malayanus* (de Rooij, 1915); 8–12 in *C. yoshii* Hikida, 1990; and 7–16 in *C. irianjayaensis* Rösler, 2001).

In addition to differing with respect to precloacal and femoral pore characteristics, *C. sumonthai* differs markedly from all other Thai *Cyrtodactylus* in numerous other features. It may be differentiated from *C. brevipalmatus* and *C. interdigitalis* in the absence of basally webbed digits and a denticulate tail margin, from *C. quadrivirgatus* in possessing transversely enlarged subcaudal plates, from *C. peguensis* in having distinct ventrolateral folds, from *C. variegatus* in having a larger number of ventral scales between the ventrolateral folds (33–40 vs. 22), from *C. papilionoides* and *C. oldhami* in having an enlarged pair of second postmental scales, from *C. pulchellus* on the basis of its much smaller size (71 mm SVL vs. 165 mm SVL maximum), and from *C. angularis*, *C. intermedius*, and *C. jarujini* in having a reduced number of rows of dorsal tubercles (12 vs.16–24).

Each of these species also differs markedly in color pattern from the new species. Longitudinal stripes and/or small spots occur in the patterns of *C. oldhami*, *C. variegatus*, and *C. quadrivirgatus* and paired, dark dorsal spots or other markings typify *C. angularis*, *C. jarujini*, *C. papilionoides*, and *C. p. peguensis* (although these markings may fuse along the dorsal midline in the first three of these). In *C. brevipalmatus* the dorsum is mottled, and in *C. interdigitalis* it is banded, but very weakly contrasting. Bold bands are present in *C. intermedius* and *C. pulchellus*, but these species have larger numbers of body bands that are edged with white. In addition they lack the diffuse dark patterning within the pale bands seen in *C. sumonthai*. Bands also occur in *C. peguensis zebraicus*, but these are also more numerous and this form, like *C. p. peguensis*, also has a complex reticulated pattern on the head.

Distribution and Natural History.–*Cyrtodactylus sumonthai* is known only from a single mountain, Khao Wong in Rayong Province, southeastern Thailand, which is riddled with limestone caves. The types come from Tham Tao (Turtle Cave) and Tham Khang Khao (Bat Cave). In addition, the collector of the types has observed the species in Tham Singto Noi (Little Lion Cave) and Tham Saamit (Saamit Cave), also on Khao Wong. Thooliwan (2001) provided a photograph of this species from another cave in the same mountain — Tham Rong Bon (Gambling Den Cave). *Cyrtodactylus sumonthai* climbs high on the walls of the caves and is relatively slow moving.

DISCUSSION

Among members of the subgenus *Cyrtodactylus*, precloacal pores are typically numerous. The presence of only two pores in *C. sumonthai* is thus noteworthy. Smith (1916b, 1935) reported that *C. oldhami* males may lack pores entirely, but more commonly they possess 1-4 precloacal pores. Darevsky and Szczerbak (1997) recently described *C. paradoxus* from Vietnam, which lacks precloacal pores all together. There is at present, however, no compelling evidence to suggest especially close affinities of *C. sumonthai* with either of these species. In the absence of an explicitly phylogenetic analysis of the genus, it would be premature to speculate about the genealogical affinities of *C. sumonthai*. However, it differs strikingly from all members of the Indian-Sri Lankan subgenus *Geckoella*, and from the much larger Australo-papuan taxa. Not surprisingly, the new species bears the greatest resemblance to the small, relatively slender-bodied members of the genus that make up the majority of the species ranging from Myanmar to Borneo.

Cyrtodactylus sumonthai is the second cave-dwelling member of the genus to be identified. The Niah Cave gecko, *C. cavernicolus,* of Sarawak was described more than forty years ago by Inger and King (1961). Harrisson (1961, 1966) and O'Shea (1985) discussed the biology of this species. It has been described as a true cave obligate, preferring larger caverns away from cave mouths. More recently, however, it has been observed outside of the cave environment on the limestone rocks of Melinau Gorge, Mulu National Park, Sarawak (Hikida, 1990) and the same (or a very similar) species

has also been observed at the threshold of Wonder Cave, also in Mulu National Park (Chapman, 1985). Das (2002) reports that *C. cavernicolus* retreats into the Niah Cave by day, but that it is commonly active at night on vegetation outside the cave.

Although many lizards utilize caves as resting and or thermal retreats, or opportunistically feed in or around caves (Mautz, 1982), relatively few species of true cave specialist lizards have been identified. Some so-called cave lizards are more appropriately regarded as substrate specialists. For example, the Cuban lizard *Anolis bartschi* makes use of a variety of limestone microhabitats, including cave walls, in the area where it occurs (Vergner and Polák, 1996; Rodríguez Schettino, 1999). Following the terminology of Chapman (1985), such animals are cave visitors — non-cavernicolous species that periodically enter caves. Geckos are perhaps preadapted for the occupation of caves, owing to their chiefly nocturnal habits. The Mexican species *Phyllodactylus lanei* (Mautz, 1982) and the West African *Hemidactylus fasciatus* (Edington, 1984) are both opportunistic users of cave environments, although both are chiefly surface active. Likewise *Hemidactylus maculatus* in India and *Cnemaspis nigridia* in Borneo are also cave visitors (I. Das, pers. comm.). Available evidence suggests that *Cyrtodactylus sumonthai*, like the xantusiid *Lepidophyma smithii* (Mautz and Lopez-Forment, 1978; Mautz, 1982) and perhaps *C. cavernicolus* (Harrisson, 1961, 1966), is capable of spending its entire life within the cave environment, although it remains possible that some populations may also eventually be found in neighboring surface limestone formations. As such it is best regarded as a troglophile or facultative cavernicole (sensu Chapman, 1985).

The discovery of *Cyrtodactylus sumonthai* brings the total number of Thai members of the genus to 12. It is likely that additional species will be found in other specialized habitat types throughout Thailand, but especially in the less herpetologically well-explored areas. Recent collecting activity in neighboring Myanmar has increased that country's species list from eight to 12 *Cyrtodactylus* and numerous undescribed species are known to exist elsewhere within the range of the genus (Bauer and Henle, 1994; Rainer Günther, pers. comm.).

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