



Cyrtodactylus erythrops (Squamata: Gekkonidae), a new cave-dwelling gecko from Mae Hong Son Province, Thailand

AARON M. BAUER^{1,8}, KIRATI KUNYA², MONTRI SUMONTHA³, PIYAWAN NIYOMWAN⁴,
NONN PANITVONG⁵, OLIVIER S.G. PAUWELS⁶, LAWAN CHANHOME⁷ & TUNYAKORN KUNYA²

¹Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova, Pennsylvania 19085, USA

²Nakhonratchasima Zoo, 111 M.1, Ratchasima-Pak Tongchai Rd., Chaimongkol, Muang Nakhonratchasima 30000, THAILAND

³Ranong Marine Fisheries Station, 157 M. 1, Saphan-Pla Road, Paknam, Muang Ranong 85000, THAILAND

⁴National Park, Wildlife and Plant Conservation Department, 61 Phaholyothin Rd., Ladyao Jatujak, Bangkok 10900, THAILAND

⁵College of Environment, Kasetsart University, 50 Phaholyothin Rd. Chatuchak, Bangkok 10900, THAILAND

⁶Département des Vertébrés Récents, Institut Royal des Sciences naturelles de Belgique, 29 Rue Vautier, B-1000 Brussels, BELGIUM

⁷Queen Saovabha Memorial Institute, Thai Red Cross Society, 1871 Rama IV Road, Bangkok 10330, THAILAND

⁸Corresponding author. E-mail: aaron.bauer@villanova.edu

Abstract

A new cave-dwelling species of *Cyrtodactylus* Gray is described from Mae Hong Son Province in northern Thailand. The new species, *C. erythrops* **sp. nov.**, is characterized by its moderate size (snout-vent length to at least 78 mm), relatively large, closely-spaced, flattened tubercles in 18–20 irregular rows at midbody, low number of ventral scales across midbody (28), absence of precloacal groove, presence of precloacal and femoral pores separated by a diastema, broad subcaudal plates, and dorsal pattern of dark spots and blotches. It is the fifth species of cave-dwelling *Cyrtodactylus* recorded from Thailand and its discovery adds to the mounting evidence that this genus exhibits unprecedented levels of localized endemism throughout tropical Southeast Asia.

Key words: Thailand, Mae Hong Son Province, Reptilia, Gekkonidae, *Cyrtodactylus erythrops* **sp. nov.**, taxonomy, cave-dwelling

Introduction

The tropical Asian and Australopapuan genus *Cyrtodactylus* Gray is one of the most species rich gekkonid lizard groups. Its approximately 100 described species are distributed across tropical Asia from India and Sri Lanka to the Philippines, northeastern Australia, New Guinea, and the Solomon Islands (Rösler 2000; Kluge 2001; Bauer 2002, 2003; Bauer *et al.* 2002, 2003; Günther & Rösler 2003). New species of *Cyrtodactylus* continue to be discovered throughout the range of the genus (e.g., Sri Lanka, Batuwita & Bahir 2005; Indonesia, Hayden *et al.* 2008; Linkem *et al.* 2008; New Guinea and the Solomons, Rösler 2001; Günther & Rösler 2003; Kraus & Allison 2006; Oliver *et al.* 2008; Rösler *et al.* 2007; Kraus 2007, 2008), but the greatest rate of discovery has been in Southeast Asia.

Since 2005 21 new species, most with highly restricted distributions, have been described in Peninsular Malaysia and its offshore islands (Grismer 2005, 2006; Grismer & Leong 2005; Youmans & Grismer 2006; Grismer & Ahmad 2008; Grismer *et al.* 2008; Rösler & Glaw 2008) and Vietnam (Nguyen *et al.* 2006; Heidrich *et al.* 2007; Hoang *et al.* 2007; Orlov *et al.* 2007; Ngo & Bauer 2008; Ngo 2008; Ngo *et al.* 2008; Nazarov *et al.* 2008; Rösler *et al.* 2008) alone. Other relatively recent discoveries include a new *Cyrtodactylus* from Laos (David *et al.* 2004), nine from Myanmar (Bauer 2002, 2003), and four from Thailand (Bauer *et al.* 2002, 2003; Pauwels *et al.* 2004).

Many of these new forms are associated with karstic or limestone cave formations, which act as isolated habitat “islands” and appear to have promoted speciation within *Cyrtodactylus*. In Vietnam, pairs of limestone restricted species occur in sympatry at both Phong Nha-Ke Bang National Park (Ziegler *et al.* 2002; Heidrich *et al.* 2007) and Ba Den Mountain (Nguyen *et al.* 2006). Three of the recently described Thai species, *C. chanhomeae* Bauer *et al.*, *C. sumonthai* Bauer *et al.*, and *C. thirakhupti* Pauwels *et al.* are restricted to cave environments and their immediate surroundings. A fourth Thai species, *C. tigroides* Bauer *et al.* is associated with limestone, although it has not been found active inside caves. We here describe yet another species associated with cave habitats, in this case from Mae Hong Son Province in far northwestern Thailand.

Materials and methods

The following measurements were taken with a digital caliper following the methods of Bauer *et al.* (2002, 2003): CrusL: crus length; EarL: ear length; EyeEar: eye to ear distance; ForeaL: forearm length; HeadD: head depth; HeadL: head length; HeadW: head width; Internar: internarial distance; Interorb: interorbital distance (across narrowest point of frontal bone); OrbD: orbital diameter; SnEye: snout to eye distance; SVL: snout-vent length; TailL: tail length; TrunkL: trunk length. Values are reported to the nearest 0.1 mm, but mensural ratios calculated from raw measurements to the nearest 0.01 mm. Measurements and scale counts based on left side of animals unless otherwise noted. Scale counts and external observations of morphology were made using a Nikon SMZ1000 stereo dissecting microscope.

Comparisons were made with museum material in the collections of the California Academy of Sciences, San Francisco (CAS), Chulalongkorn University Museum of Zoology, Herpetological Section, Bangkok (CUMZ R), Institut Royal des Sciences Naturelles de Belgique, Brussels (IRSNB), Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ), and United States National Museum, Washington, D.C. (USNM), as well as published species descriptions (see references in Introduction) and broader faunal and taxonomic treatments of Southeast Asian *Cyrtodactylus* (e.g., Smith 1935; Taylor 1963; Hikida 1990; Ulber & Grossmann 1991; Ulber 1993; Darevsky & Szczerbak 1997; Das 1997; Manthey & Grossmann 1997; Chan-Ard *et al.* 1999; Das & Lim 2000; Malkmus *et al.* 2002).

Cyrtodactylus erythrops sp. nov.

Figures 1–3.

Holotype. Thai Natural History Museum (THNHM) 15377 (field number MS 150), adult male; Thailand, Mae Hong Son Province, Pangmapha district, Tham Lod, 19°37'05"N 98°11'01"E, 640 m a.s.l., collected by Eakarit Punamphon, April 2005.

Additional Specimen. Juvenile (photographed but not collected); same data as holotype (see **Coloration** below).

Etymology. The specific epithet is derived from the Greek *erythros* [= red] and *ops* [= eye] and refers to the reddish life coloration of the iris of this species. Tuk kai ta daeng (Thai), Red-eyed bent toed gecko (English), *Cyrtodactyle aux yeux rouges* (French), Rotaugen-Bogenfingergecko (German), Rood ogige kromvingergekko (Dutch).

Diagnosis. *Cyrtodactylus erythrops* can be distinguished from all congeners on the basis of the following combination of characters: body slender, limbs and digits long, dorsal scalation with 18–20 rows of large, flattened, smooth to weakly-keeled or weakly conical tubercles, some in contact with one another, 28 ventral scales across belly between weakly developed ventrolateral folds, no precloacal groove, precloacal pores in a continuous series of 9, separated from a broken series of 9–10 femoral pores on each thigh by 2–3 poreless scales, femoral scales enlarged, dorsal pattern consisting of roughly transversely-oriented rows of pale-rimmed, dark brown blotches, posteriorly forming irregular crossbands, and a series of blotches forming a broken nuchal loop.



FIGURE 1. Adult male holotype of *Cyrtodactylus erythropus* **sp. nov.** (THNHM 15377) from Tham Lod, Pangmapha district, Mae Hong Son Province, Thailand. Scale bar equals 20 mm.

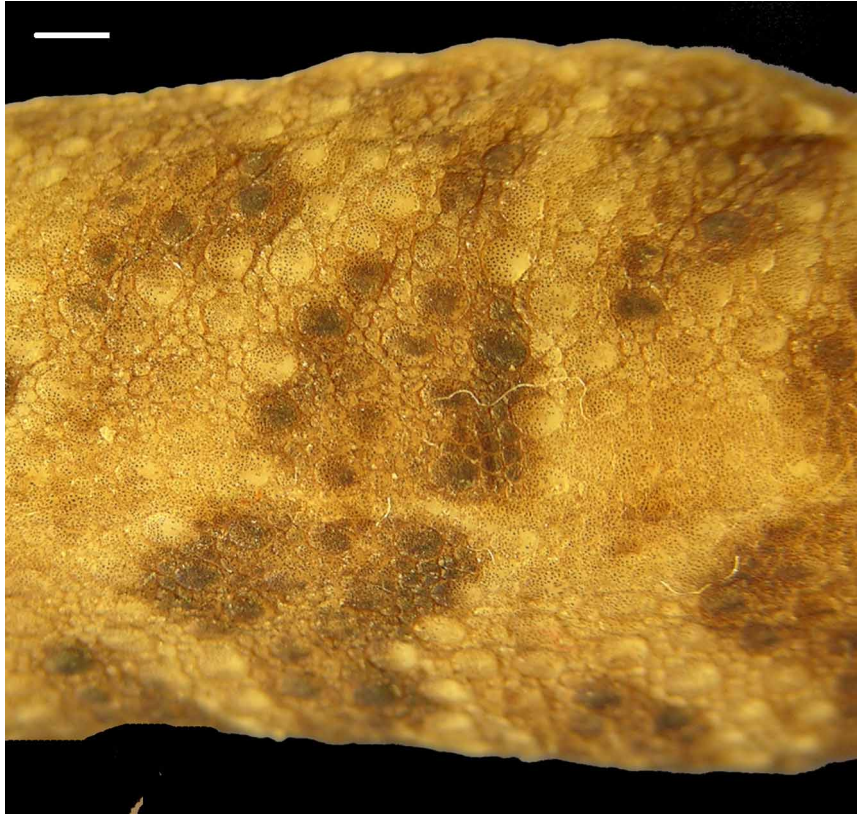


FIGURE 2. Dorsal pholidosis of *Cyrtodactylus erythropus* sp. nov. (THNHM 15377) showing closely packed, flattened dorsal tubercles in irregular rows. Anterior to left, scale bar = 2 mm.

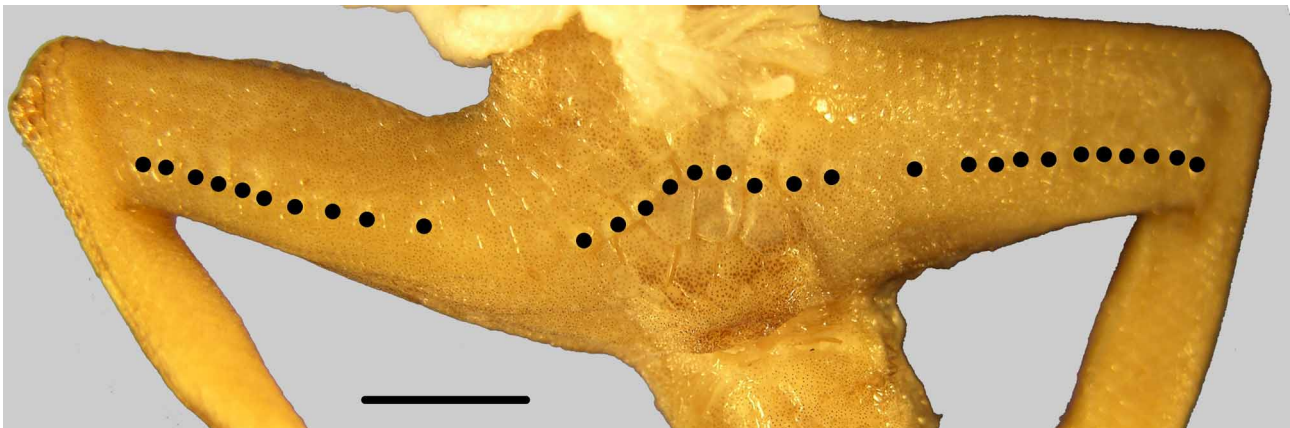


FIGURE 3. Ventral view of groin and thighs of holotype of *Cyrtodactylus erythropus* sp. nov. illustrating the discontinuous series of precloacal and femoral pores (positions indicated by black dots) and series of enlarged femoral scales. Scale bar = 5 mm.

Description. Adult male (Figure 1). Measurements (in mm): SVL 78.4, TailL (tail broken, see below) 7.3 TrunkL 31.3, ForealL 13.8, CrusL 16.6, HeadL 22.4, HeadW 14.91, HeadD 9.8, SnEye 8.9, OrbD 6.4, EyeEar 6.8, EarL 2.3, Internar 2.6, Interorb 3.4). Specimen dehydrated and somewhat brittle. Head relatively long (HeadL/SVL = 0.29), wide (HeadW/HeadL = 0.67), not markedly depressed (HeadH/HeadL = 0.44), markedly distinct from very slender neck. Loreal region concave anteriorly, weakly inflated posteriorly, canthus rostralis relatively prominent. Snout elongate (SnEye/HeadL = 0.40), rounded; longer than eye diameter (OrbD/SnEye = 0.72); scales on snout and forehead small, rounded, granular, homogeneous; scales on snout smooth, flat, pentagonal to hexagonal, 4–8 times larger than minute, smooth, flattened to very

weakly domed, juxtaposed scales on occipital region. Eye large (OrbD/HeadL = 0.29); pupil vertical with crenelated margins; superciliaries short, with rounded outer margins except for a few scales at posterodorsal border of orbit, which bear tiny conical spines. Ear opening vertically elliptical, large (EarL/HeadL = 0.10); eye to ear distance subequal to diameter of eyes (EyeEar/OrbD = 1.07). Rostral much wider (3.4 mm) than deep (2.2 mm), incompletely divided (~40%) dorsally. Two enlarged supranasals separated by a single smaller internasal. Rostral in contact with supralabials I, nostrils, supranasals and internasal. Nostrils rounded, each surrounded by supranasal, rostral, first supralabial and four postnasals. A concave narial valve occupies the posterior 75% of the nostril. At least 3–4 rows of small scales separate orbit from supralabials. Mental triangular, wider (3.5 mm) than deep (2.0 mm). A single pair of enlarged median postmentals, each postmental bordered anteromedially by mental, anterolaterally by first infralabial, and posterolaterally by an enlarged lateral chinshield (= second postmental) approximately 50% of its size. Together the median postmentals border a row of five chin scales, each approximately twice the size of all more posterior chin and gular scales. Supralabials to midorbital position 7 (left)/6 (right); enlarged supralabials to angle of jaws 8 (left)/7 (right). Enlarged infralabials 6 (left)/7 (right) to inflection of jaw, 9 (bilateral) to corner of rictus. Interorbital scale rows across narrowest point of frontal bone 18.

Body slender, relatively short (TrunkL/SVL ratio 0.40) with extremely weakly developed, non-denticulate ventrolateral folds. Dorsum highly heterogeneous, with small, irregular, juxtaposed, domed to weakly conical, oblong scales intermixed with flattened, smooth to very weakly conical or weakly keeled, oval to rounded tubercles. Keels, where present, restricted to posterior 30–50% of tubercles. Tubercles extending from posterior margins of orbits and of frontal bone onto entire dorsum; 18–20 irregular rows at midbody, lateralmost rows reaching ventrolateral folds. Tubercles increasing in size from head (2–3 times size of adjacent granules) to midbody, largest in paravertebral rows (5–8 times size of adjacent scales), narrowly separated from one another or in direct contact, especially on posterior flanks (Figure 2). Ventral scales much larger than dorsals (exclusive of tubercles), smooth, with rounded or pointed free margins, imbricate, becoming larger posteriorly, midventrally, and in precloacal region. Midbody scale rows across belly to base of ventrolateral folds 28. Gular region with relatively homogeneous, smooth, domed, granular scales.

Precloacal region with four sequential transverse rows of enlarged scales, each 3 to 5 times size of adjacent ventral scales. A single series of nine precloacal pores. A diamond-shaped patch of eight very large scales between precloacal pore-bearing scales and granular scales on anterior cloacal lip. No precloacal groove. A continuous row of enlarged femoral scales, each about 1.5–2 times size of those in more anterior scale rows and > 4 times that of those on posteroventral surface of thigh, extending along length of femur almost to knee and continuous with the enlarged precloacal scales. Femoral pores separated from precloacal pores by a diastema of 2 (left) to 3 (right) poreless scales; 9 (right) to 10 (left) femoral pores, with medialmost pore on each thigh separated by one poreless scale from the more distal pores, which form a continuous series (Figure 3).

Scales on palm and sole smooth, flat, oval to pentagonal or hexagonal. Scallation on dorsal surfaces of hind limbs similar to body dorsum with enlarged, flattened, weakly-keeled tubercles interspersed among smaller scales. Scales of dorsal surface of forearms less strongly tuberculate, tubercles oval, feebly keeled. Upper arms without tubercles, scales somewhat variable in size and arranged in diagonal rows. Fore and hindlimbs moderately long, slender (ForeaL/SVL ratio 0.18; CrusL/SVL ratio 0.21). Digits long, slender, strongly inflected at interphalangeal joints, all bearing robust, slightly recurved claws. Basal subdigital lamellae broad, rectangular, without scansorial surfaces (3-5-5-5-6 left manus; 5-5-5-7-6 left pes); narrow lamellae distal to digital inflection and not including ventral claw sheath: 9-10-10-11-11 (left manus), 8-11-11-13-13 (left pes); interdigital webbing apparently absent (slight webbing could be obscured by skin shrinkage due to dehydration). Relative length of digits: III > IV > II > V > I (manus; digits II-V very similar in length); IV > V > III II > I (pes); distal phalanges of left pes partly separated from foot. Original tail broken near base in preserved specimen, but when captured the specimen had a TailL of 83 mm, with enlarged subcaudal plates. Series of 3 enlarged, raised, keeled cloacal spurs on each side of vent.



FIGURE 4. Dorsal view of the holotype of *Cyrtodactylus erythropus* sp. nov. in life illustrating the reddish iris and pale yellowish borders of the dark dorsal markings.



FIGURE 5. Dorsal view of a juvenile specimen (not collected) of *Cyrtodactylus erythropus* sp. nov. showing a less bold body patterning than the adult holotype but a strongly contrasting caudal pattern.

Coloration (in preservative). Dorsal ground color mottled straw to light brown, with roughly transverse rows of large, oval, dark brown spots or blotches with somewhat lighter centers; each spot surrounded by a thin whitish rim one scale wide or less. Spots over shoulders and limb insertions not in distinct rows, those between limb insertions in 4 distinct transverse rows, last three largely coalescent, forming irregular transverse bands. These bands narrowing on flanks, interband regions of flanks with irregular dark blotches. A pair of dark blotches over sacrum and another over tail base. Confluence of white margins of blotches on posterior portion of trunk forming a very thin vertebral stripe from level of adpressed elbows on to tail.

Dorsum of head light brown, with distinct dark markings like those of body dorsum, forming a broken nuchal loop extending to the posterior margin of each eye and along the ventral margin of each orbit. A less well defined series of dark markings from posterodorsal margin of orbit across posterior parietal plate. Dark markings with indistinct margins on snout, loreal region, around margin of orbit and on frontal area. Labial scales with speckles of brown pigment, with less heavily pigmented borders. Anterior supralabials and ventral portion of mental and postmentals whitish. Supraorbital skin translucent with underlying scleral ossicles clearly visible. Limbs with irregular, ill-defined, alternating mid- to dark brown and straw bands. Venter cream to beige with darker pigmentation on anterior cloacal lip and enlarged patch of precloacal scales.

In life this species has red eyes and the dark dorsal markings of the head and body are edged by very pale yellowish borders (Fig. 4). A juvenile specimen (not collected) had a pinkish-gray dorsum with purplish-brown markings. Dorsal blotches in this specimen exhibit a greater degree of fusion and irregularity than in the holotype and the original tail exhibits bold alternating banding of very dark brown and opalescent white (Fig. 5).

Comparisons with Other Species. Although a number of species groups within *Cyrtodactylus* have been proposed on the basis of phenetic similarity (e.g., the *louisadensis* complex, Kraus 2008) or geographic proximity (e.g., the Sundaland group, Hayden *et al.* 2008), there exists no explicit phylogenetic hypothesis of relationships within the genus. Ongoing molecular phylogenetic work (Bauer *et al.*, unpublished) suggests that certain geographic clusters of taxa and morphologically similar species do correspond to monophyletic groups within *Cyrtodactylus*. However, fewer than 60% of the species have been sampled thusfar and it is not yet possible to unambiguously assign all species to particular clades. Thus, we here provide comparisons of *C. erythrops* **sp. nov.** with all of the *Cyrtodactylus* species described as of 31 December 2008 (exclusive of the distinctive South Asian *Geckoella*, sometimes considered as a subgenus of *Cyrtodactylus*). Although highly artificial, we have employed commonly used and easily scorable single differential characters for this purpose. Recent summaries of some of these, and other, features for large numbers of *Cyrtodactylus* species have been provided by Youmans & Grismer (2006), Grismer *et al.* (2007), Grismer & Ahmad (2008), Linkem *et al.* (2008), and Rösler & Glaw (2008).

The condition of precloacal and femoral pores in males has been widely employed to distinguish *Cyrtodactylus* species from one another (e.g., Smith 1935; Darevsky & Szczerbak 1997; Das & Lim 2000; Bauer 2002, 2003; Youmans & Grismer 2006). Although females of some species lack pores, these are present in other taxa (Bauer 2003). These features appear, however, to vary little between adult males within a species and we consider them to be reliable diagnostic characters. However, for those species known only from females or juveniles, we have used other features for diagnostic purposes. The presence of precloacal pores in males distinguishes *C. erythrops* from *C. eisenmani* Ngo; *C. gordongekkoi* (Das) (recently transferred from *Cnemaspis* by Biswas 2007), *C. jellesmae* (Boulenger), *C. laevigatus* Darevsky, *C. semenanjungensis* Grismer & Leong, *C. sermowaiensis* (de Rooij), *C. thirakhupti*, and *C. wallacei* Hayden *et al.* It may be distinguished from the following species by the presence of femoral pores: *C. adleri* Das, *C. angularis*, *C. annulatus* (Taylor), *C. ayeyarwadyensis* Bauer; *C. badenensis* Nguyen *et al.*; *C. brevidactylus* Bauer, *C. chauquangensis* Hoang *et al.*, *C. condorensis* (Smith), *C. consobrinoides* (Annandale), *C. cracens* Batuwita & Bahir; *C. cryptus* Heidrich *et al.*, *C. edwardtaylori* Batuwita & Bahir; *C. elok* Dring, *C. fraenatus* (Günther), *C. gansi* Bauer; *C. ingeri* Hikida, *C. intermedius*, *C. irianjayaensis* Rösler, *C. irregularis* (Smith), *C. khasiensis* (Jerdon), *C. lateralis* (Werner), *C. malayanus* (de Rooij), *C. matsuii* Hikida; *C. nigriocularis* Nguyen *et al.*; *C. oldhami* (Theobald), *C. pantiensis* Grismer *et al.*, *C. papuensis* (Brongersma), *C. paradoxus* (Darevsky & Szczerbak), *C. peguensis* (Boulenger), *C. pseudoquadriovirgatus* Rösler *et al.*, *C. quadriovirgatus* Taylor, *C. ramboda* Batuwita & Bahir; *C. soba* Batuwita & Bahir; *C. subsolanus* Batuwita & Bahir; *C. sumonthai*, *C. sworderi* (Smith), and *C. yoshii* Hikida, and from the following species by the presence of a diastema between the series of femoral pores and the precloacal pores: *C. batucolus* Grismer *et al.*, *C. epiroticus* Kraus, *C. feae* (Boulenger), *C. jarujini* Ulber, *C. klugei* Kraus, *C. louisadensis* (de Vis), *C. malcolmsmithi* (Constable), *C. phongnhakebangensis* Ziegler *et al.*, *C. robustus* Kraus, *C. seribuatensis* Youmans & Grismer; *C. serratus* Kraus, *C. tiomanensis* Das & Lim, and *C. variegatus* (Blyth).

C. erythropros may be distinguished from the following species by the absence of a longitudinal or steeply angled precloacal sulcus or groove from *C. aurensis* Grismer, *C. cavernicolus* Inger & King, *C. macrotuberculatus* Grismer & Ahmad, *C. philippinicus* (Steindachner), *C. pubisulcus* Inger, *C. pulchellus* Gray, *C. rubidus* (Blyth), *C. spinosus* Linkem *et al.*, and *C. stresemanni* Rösler & Glaw, and by the absence of a recessed transverse precloacal groove in: *C. fumosus* (Müller), *C. marmoratus* (Kuhl), *C. saddleiri* Wells & Wellington, from *C. biordinis* Brown & McCoy by the presence of a single, *versus* double row of femoral pores, and from *C. chrysopylos* Bauer by the absence of an enlarged pore-bearing scale posterior to the precloacal pore row. An enlarged series of femoral scales separates the new species from *C. annandalei* Bauer, *C. buchardi* David *et al.*, *C. grimeri* Ngo, and *C. wakeorum* Bauer.

Cyrtodactylus erythropros may be distinguished from *C. aequalis* Bauer, *C. murua* Kraus & Allison, and *C. russelli* Bauer by its flattened (*versus* prominently conical or mucronate) dorsal tubercles, from *C. aaroni* Günther & Rösler, *C. agamensis* (Bleeker), *C. baluensis* (Mocquard), *C. caovansungi* Orlov *et al.*, *C. capreoloides* Rösler *et al.*, *C. consobrinus* (Peters), *C. darmandvillei* (Weber), *C. hontreensis* Ngo *et al.*, *C. huynhi* Ngo & Bauer, *C. interdigitalis* Ulber, *C. jarakensis* Grismer *et al.*, *C. takouensis* Ngo & Bauer, *C. tripartitus* Kraus, and *C. zugi* Oliver *et al.* by its much lower number of ventral scales (28 *versus* 36 or more), from *C. agusanensis* (Taylor), *C. brevipalmatus* (Smith), *C. derongo* Brown & Parker, *C. gubernatoris* (Annandale), *C. loriae* (Boulenger), *C. novaeguineae* (Schlegel), *C. papilionoides* Ulber & Grossmann, *C. wetariensis* (Dunn), and *C. ziegleri* Nazarov *et al.* by the presence of enlarged subcaudal plates in the original tail, and from *C. mimikanus* (Boulenger), *C. redimiculus* King, *C. salomonensis* Rösler *et al.*, and *C. tuberculatus* (Lucas & Frost) by its spotted/blotched (*versus* banded) dorsal pattern. This pattern difference also distinguishes *C. erythropros* from its Thai congeners *C. chanhomeae* Bauer *et al.* and *C. tigroides* Bauer *et al.* (note that the condition of the femoral scales in these taxa was incorrectly listed in the comparative table of Youmans & Grismer 2006; they do, in fact, share with *C. erythropros* enlarged femoral scales).

The new species is phenetically quite similar to *C. slowinskii* Bauer from Myanmar, but is considerably smaller (78 mm *versus* 108 mm maximum SVL) and has relatively larger and more closely-spaced dorsal tubercles, and a dorsal pattern consisting of more well-defined but irregularly distributed, oval markings (*versus* regularly distributed blotches of irregular shape). It also shares many similarities with members of the *C. irregularis* complex (*sensu* Nazarov *et al.* 2008), but can be differentiated from *C. irregularis*, *C. pseudoquadrivirgatus*, and *C. ziegleri* on the basis of the characters noted in the comparisons above, as well as its red eyes and specific dorsal patterning.

Cyrtodactylus abrae, described by Wells (2002), supposedly from the Iron Range of Queensland, Australia, has been demonstrated to be a *nomen nudum* (Couper *et al.* 2004).

Distribution and Natural History. *Cyrtodactylus erythropros* **sp. nov.** has been collected only from Mae Hong Son Province in the extreme northwest of Thailand (Figure 6). The type locality is less than 10 km from the border of Myanmar and lies in the West Thanon Thongchai Mountains, which are continuous with the Shan Plateau. It is thus likely that this species may occur in Shan State. Neither this vast region of Myanmar nor the adjoining areas of northern Thailand have been adequately surveyed for *Cyrtodactylus* and we suspect that many new species will eventually be discovered in the region.

Cyrtodactylus erythropros **sp. nov.** feeds by both day and night. Its natural diet appears to be composed principally of cave crickets, termites, and various insect larvae, whereas in captivity it takes both meal worms and termites. Breeding takes place in the winter season, at which time males emit advertisement vocalizations to females. The eggs, which are non-adhesive are oviposited in rock crevices within caves. The incubation period is approximately two months. THNHM 15377 was collected, along with two juveniles that were kept alive, just outside the entrance to Tham Lod cave.

We take this opportunity to make a correction to the type locality of another Thai cave gecko, *C. sumonthai*, from Tham Khang Khao, Khao Wong, Rayong. The incorrect latitude and longitude were inadvertently provided in the description of that species (Bauer *et al.* 2002). The corrected coordinates are 12°53'N, 101°49'E.



FIGURE 6. Map of Thailand showing Mae Hong Son Province in the extreme northwest of the country in black. The position of Tham Lod, the type locality of *Cyrtodactylus erythrops* **sp. nov.** is indicated by the small white circle.

Discussion

Cyrtodactylus erythrops is the seventeenth species of its genus to be recorded from Thailand. We are aware of many additional forms, from throughout the country, that await description. Many of these forms also occur in the extensive areas of limestone caves and outcrops that occur in many Thai provinces (Dunkley 1995). All of the most recently described Thai species: *C. thirakhupti*, *C. sumonthai*, *C. chanhomeae*, and *C. tigroides*, as well as many of their congeners from elsewhere in southeast Asia come from karstic areas (e.g., Ziegler *et al.* 2002; Hoang *et al.* 2007; Ngo 2008; Ngo *et al.* 2008; Nazarov *et al.* 2008).

Like other cave-associated *Cyrtodactylus*, *C. erythrops* exhibits no obvious morphological specializations and is clearly a troglophile, facultatively using cave environments (Chapman 1985), rather than a true cave obligate. Ongoing genetic studies will help to determine whether this and other limestone-living *Cyrtodactylus* constitute one or more monophyletic groups within the genus, and help to establish whether the amazing diversity of these geckos was generated over a long period or if it represents the results of a relatively recent radiation.

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