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A new species of *Hemiphyllodactylus* Bleeker, 1860 (Squamata: Gekkonidae) from northwestern Thailand

L. LEE GRISMER[1,2], PERRY L. WOOD, JR.[3] & MICHAEL COTA[4,5]

[1]*Department of Biology, La Sierra University, Riverside, California, USA. E-mail: lgrismer@lasierra.edu*
[2]*Institute for Environment and Development, (LESTARI), Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Darul Ehsan, Malaysia*
[3]*Department of Biology, Brigham Young University, 150 East Bulldog Boulevard, Provo, Utah 84602 USA. E-mail: pwood@byu.edu*
[4]*Natural History Museum, National Science Museum, Thailand, Technopolis, Khlong 5, Khlong Luang, Pathum Thani 12120 Thailand. E-mail: herpetologe@gmail.com*
[5]*Faculty of Science and Technology, Suan Sundandha Rajabhat University, 1 U-thong Nok Rd, Dusit, Bangkok 10300*

Abstract

A new species of gekkonid, *Hemiphyllodactylus chiangmaiensis* **sp. nov.**, from northwestern Thailand is separated from all other species of *Hemiphyllodactylus* by a set of features including: a maximum SVL of 41.2 mm; 8–12 chin scales extending transversely from unions of second and third infralabials and posterior margin of mental; lamellar formula on hand 3–3–3–3 or 3–4–3–3; lamellar formula on foot 3–3–3–3 or 3–4–4–4; continuous precloacal and femoral pores; a unique dorsal color pattern; and caecum and oviducts pigmented. These characters place this species in the speciose *H. typus* group. *Hemiphyllodactylus chiangmaiensis* **sp. nov.** fills a biogeographical hiatus in the distribution of this genus across northern Indochina.

Key words: Gekkonidae, *Hemiphyllodactylus, Hemiphyllodactylus chiangmaiensis* **sp. nov.**, Thailand, Chiang Mai, new species

Introduction

The gekkonid genus *Hemiphyllodactylus* Bleeker, 1860 currently composes 22 confirmed species (Grismer *et al.* 2013) that collectively extend from the Mascarene Islands in the western Indian Ocean, eastward through southern Asia and Indochina. From here the genus ranges southward through the Philippines and Sundaland, through the Indo-Australian Archipelago, and continues into much of Oceania to as far eastward as Hawaii. Many of these species are geographically restricted upland or insular populations ranging throughout mainland Asia or are restricted to islands in western Indonesia and the Philippines. Grismer *et al.* (2013) demonstrated that *Hemiphyllodactylus* was far more diverse than the most recent taxonomic revision based solely on morphology (see Zug 2010) indicated. Ten of the 22 species they identified were done so on the basis of genetic and or preliminary morphological evidence and their descriptions were deferred to subsequent, more in depth morphological analyses. One of these species from Chiang Mai, Chiang Mai Province in northwestern Thailand (Fig. 1), was originally identified as *H. yunnanensis* (Zug 2010) but is actually the sister species to a lineage containing *H. longlingensis* Zhou & Liu and an unnamed species from Mandalay Division, Myanmar (Grismer *et al.* 2013: *Hemiphyllodactylus* sp. nov. 8 in Figure 2). We were able to examine nine specimens from Chiang Mai and present here morphological data supporting the molecular phylogenetic analysis that initially indicated this population was a distinct species. It is described below.

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Comparisons. The taxonomy of Zug (2010) is used in the comparisons below for *H. titiwangsaensis* Zug*, H. typus* Bleeker and *H. yunannensis* (Boulenger) except for *H. zugi* Nguyen, Lehmann, Le, Duong, Bonkowski & Ziegler which has been removed from the latter species (Nguyen *et al.* 2013). *Hemiphyllodactylus chiangmaiensis* **sp. nov.** differs from *H. ganoklonis* Zug in having a maximum known SVL of 41.2 mm versus 34.2 mm and from *H. margarethae* Brongersma, *H. titiwangsaensis*, *H. typus*, and *H. yunnanensis* by having a maximum SVL less than 46.1 mm–49.3 mm. It differs from *H. aurantiacus* Beddome, *H. ganoklonis,* and *H. insularis* Taylor in having enlarged as opposed to small postmentals. *Hemiphyllodactylus chiangmaiensis* **sp. nov.** has three or four circumnasal scales that separates it from *H. tehtarik* which has five and is further separated by having 6–10 as opposed to 12 ventral scales. *Hemiphyllodactylus chiangmaiensis* **sp. nov.** has a lamellar hand formula of 3–3–3–3 or 3–4–3–3 which separates it from *H. aurantiacus* (2–2–2–2), *H. ganoklonis* (3–4–4–3), *H. margarethae* (4–4–4–4), *H. titiwangsaensis* and *H. typus* (3–4–4–4). From *H. titiwangsaensis* and *H. typus, H. chiangmaiensis* **sp. nov.** differs in having three or four transversely expanded subdigital lamellae beneath digit 1 on the hand as opposed to 5–8. It can be separated further from *H. harterti* (Werner) in having 17–25 continuous femoral and precloacal pores as opposed to 42–45. The caecum and gonadal tracts of *H. chiangmaiensis* **sp. nov.** are pigmented, further differentiating it from *H. harterti, H. insularis,* some *H. margarethae, H. tehtarik, H. titiwangsaensis,* and *H. yunnanensis. Hemiphyllodactylus chiangmaiensis* **sp. nov.** differs from *H. zugi* in having a smaller maximum SVL (41.2 versus 46.6 mm); 6–10 versus 15 or 16 ventral scales; having a 3–3–3–3 or 3–3–4–3 versus a 3–4–4–4 lamellar formula on the hand; having as opposed to lacking dark dorsal transverse blotches on the body; and a pigmented caecum and gonads. From *H. larutensis* Boulenger, *H. chiangmaiensis* is separated on the basis of having a maximin SVL of 41.2 versus 52.2 mm; 17–25 continuous femoral and precloacal pores as op[p[osed to 27–36; one as opposed to two or three cloacal spurs on each side; having a banded to blotched dorsal pattern as opposed to a unicolor dorsal pattern; and a pigmented caecum and gonads as opposed to these structures being unpigmented. Four morphometric ratios, HeadL/SVL, HeadW/SVL, HeadW/HeadL, and EyeD/HeadL of other species of *Hemiphyllodactylus* differ discretely from the corresponding ratios in *H. chiangmaiensis* **sp. nov.** (Table 1).

Discussion

All well-studied continental populations of *Hemiphyllodactylus* are generally upland species with restricted distributions (Grismer *et al.* 2013). Thus, the presence of an endemic *Hemiphyllodactylus* in the uplands of northern Thailand is not surprising given that this area has a number of other endemic species as well as geographic variants that may themselves represent distinct lineages (see Chan-ard 2003; Chan-ard *et al.* 2011; Cox *et al.* 1998*;* Das 2010; Manthey & Grossmann 1997; Matsui *et al.* 1998; Nabhitabhata *et al.* 2000; Nutphund 2001 Taylor 1962, 1963, 1965). Many of these, such as *H. chiangmaiensis* **sp. nov.**, occupy niches in montane regions that are filled by related taxa elsewhere and fill a biogeographical gap across northern Indochina (Wood & Grismer in prep.).

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