

**THE AGAMID LIZARD *Ptyctolaemus phuwanensis*
MANTHEY AND NABHITABHATA, 1991
FROM THAILAND AND LAOS REPRESENTS A NEW GENUS**

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New material of *Ptyctolaemus phuwanensis* is described. This rock-dwelling agamid from Thailand and Laos differs from all other draconines including *Ptyctolaemus gularis* (the type species of the genus) by having femoral pores, and from all other agamids by having the combination of femoral pores and haired skin sense organs. The taxon is described here as a new genus.

Key Words: Agamidae, Draconinae, *Ptyctolaemus*, Thailand, Laos, femoral pores, new genus.

INTRODUCTION

In 1991, an unusual new species of agamid lizard from northeastern Thailand was described as *Ptyctolaemus phuwanensis* (see Manthey and Nabhitabhata, 1991). The new taxon was assigned to the otherwise monotypic genus *Ptyctolaemus* Peters, 1864 because it shared the character of three parallel folds on each side of the throat with *P. gularis*, the type species of the genus known from Assam and Tibet. However, Manthey and Nabhitabhata (1991) realized that their placement of *P. phuwanensis* into the genus *Ptyctolaemus* was preliminary, owing to a number of significant morphological differences between it and *P. gularis*.

In a phylogenetic study of the Agamidae using data on mitochondrial DNA, Honda et al. (2000a) positioned *P. phuwanensis* as the sister group to *Draco* and within the monophyletic group V (after Moody, 1980), which corresponds to the subfamily Draconinae (*sensu* Macey et al., 2000). In a more detailed phylogenetic study of the Draconinae also using data on mitochondrial DNA, Honda et al. (2000b) posi-

tioned *P. phuwanensis* again within the draconine clade, but as the sister group to all other draconine genera included in the analysis. We concluded from these studies that *P. phuwanensis* is a group V (Moody, 1980), draconine (*sensu* Macey et al., 2000) agamid, but that it probably represents a unique lineage within the subfamily. Data on mitochondrial DNA of the rare *P. gularis* were not included in these studies, and so its relationship to *P. phuwanensis* was not determined.

In this study we examined specimens of both species of *Ptyctolaemus*, including new material of *P. phuwanensis* from Laos, and found significant morphological differences between *P. phuwanensis* and *P. gularis* (Figs. 1 – 2). The presence of femoral pores distinguished *P. phuwanensis* from all other draconines, and the combination of having femoral pores and haired skin sense organs distinguished *P. phuwanensis* from all other agamid lizards. *Ptyctolaemus phuwanensis* is allocated here to a new genus.

MATERIAL AND METHODS

In June 1998, *Ptyctolaemus phuwanensis* was observed by one of us (BLS) in the field in Laos. Specimens were collected by hand at night and shortly preserved in 10% buffered formalin. These were deposited at Field Museum, Chicago (FMNH 255493 – 95) in August 1998, and were transferred to 70% ethanol upon arrival there.

We also examined material, including type specimens, of *P. phuwanensis* and *P. gularis* in the hold-

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Fig. 1. Holotype (ZMB 5004) of *Ptyctolaemus gularis*.
Photograph by N. Orlov.

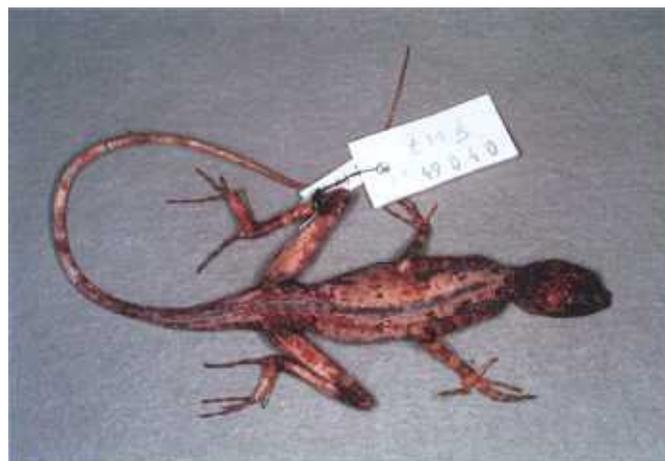


Fig. 2. Holotype (ZMB 49040) of *Ptyctolaemus phuwanensis*.
Photograph by N. Orlov.

ings of Zoologisches Museum Berlin (ZMB); these are listed below.

Skeletal characteristics were assessed using x-ray photography at Field Museum. No skull preparation was made owing to the limited material.

***Mantheyus* genus nov.**

Type species. *Ptyctolaemus phuwanensis* Manthey and Nabhitabhata, 1991; designated here.

Diagnosis. Femoral pores distinguish *Mantheyus* from all other genera of draconine agamids. The combination of femoral pores and haired skin sense organs distinguishes *Mantheyus* from all other agamids.

Referred species. (1). *Ptyctolaemus phuwanensis* Manthey and Nabhitabhata, 1991.

Material examined. *Ptyctolaemus phuwanensis* ZMB 49040, holotype, male; ZMB 49041, paratype, male; Phu Wua Wildlife Sanctuary, Nong Khai Province, Nong Dern Subdistrict, Bung Khan District, Thailand, 18°15' N, 103°58' E, 200 – 380 m elevation, collected December 1990 by J. Nabhitabhata. ZMB 59043 – 45, juveniles, Phou Khao Khouay (as “Phu Khao Kouay”), District 201, near 18°17' N, 103°04' E, Laos, collected February 1998 by U. Manthey. FMNH 255493 female; FMNH 255494 – 95, males; Phou Khao Khouay National Biodiversity Conservation Area, Bolikhamxay Province, Thaphabat District, Laos, 18°17' N, 103°10' E, 300 m elevation, collected June 1998 by B. L. Stuart.

TABLE 1. Comparison of characters of *Mantheyus phuwanensis* (Manthey and Nabhitabhata, 1991) genus nov. and *Ptyctolaemus gularis* (Peters, 1864).

Character	<i>Mantheyus phuwanensis</i>	<i>Ptyctolaemus gularis</i>
Femoral pores	present	absent
Body and head compression	dorsoventrally	laterally
Haired skin sense organs	midline of scale, 6 – 20 per scale	periphery of scale, 3 – 10 per scale
Dorsal scales	granular or very small triangular	keeled, overlapping, heterogeneous
Ventral scales	smooth	keeled
Gular sac	small, triangular	absent
Transverse gular folds	distinct	absent
Longitudinal gular folds	slightly rounded with red, yellow and black pigment	linear with black pigment
Dorsal crest in males	present	absent
Midbody scale count	108 – 130	64 – 65
Scale rows from gular fold to vent	110 – 132	84 – 88

Comparative material examined. *Ptyctolaemus gularis* ZMB 5004, holotype; ZMB 31134 – 31135, Margherita, in Patkai Mountains, Upper Assam.

Supplemental description of *Mantheyus phuwanensis* (Manthey and Nabhitabhata, 1991). We supplement the original species description in Manthey and Nabhitabhata (1991) with the following: Presacral vertebrae 23; 18 with ribs. Sternum with paired fontanelles. Clavicle as simple bar. Phalangeal formulae of fingers and toes 2-3-4-5-3. Snout elongated; distance from rostrum to orbit approximately 40% of head length. Head length 1.5 – 1.6 times head width and approximately 23 – 25% of snout-vent length; head depth approximately 70 – 80% of maximum head width. Forelimb reaching anterior border of orbit when extended. Forelimb length approximately 60 – 65% of snout-vent length. Hind limb length approximately 68 – 74% of snout-vent length. Holotype with distinct dorsal crest of enlarged projected scales, extending from above shoulder region to middle of tail; all other specimens with less prominent dorsal crest. Male gular sacs triangular in lateral aspect (not rectangular as in original description). Supralabial scales 7 – 9; infralabial scales 7 – 9. Scales covering tympanum slightly larger than scales of temporal region. Midventral scales rectangular. Scale rows between gular fold and anus 110 – 132; mid-body scale rows 108 – 130. No preanal callose pads. Three to six femoral pores on each side; males with maximum 5/5, females with maximum 6/6. Each femoral pore entirely within a single scale; scales containing femoral pores slightly modified compared to adjacent scales. Six to 20 skin sense organs with hair-bearing receptors on midline of supralabial, mental, nasal, labial and most head scales. Hemipenis short, extending posteriorly to eighth caudal scale row, with plicate folded structure on outer lobe surface. Intact (nonautotomized) tail with 45 vertebrae; basal 7 – 8 caudal vertebrae with transverse processes. Tail autotomized between caudal vertebrae 10 and 11 in FMNH 255493, caudal vertebrae 13 and 14 in FMNH 255494, and caudal vertebrae 12 and 13 in FMNH 255495. Autotomized tail of FMNH 255493 with 22.2 mm of regenerated growth; FMNH 255494 with 48.6 mm of regenerated growth. Snout-vent length up to 88.8 and 84.2 mm in males and females, respectively.

Range. *Mantheyus phuwanensis* is known only from two localities separated by approximately 100 km: Phu Wua Wildlife Sanctuary, Nong Khai Province, Thailand (type locality) and in Laos at



Fig. 3. Distribution map of *Mantheyus phuwanensis* genus nov.

Phou Khao Khouay National Biodiversity Conservation Area, Bolikhamxay Province (Fig. 3).

Etymology. The genus *Mantheyus* is named after Ulrich Manthey for his contributions to Southeast Asian herpetology, including the discovery and description with Jarujin Nabhitabhata of *P. phuwanensis*.

Habitat and behavior. The habitat of *M. phuwanensis* in Laos was semi-evergreen forest along the Houay Kay River, near That Xay Waterfall, at 300 m elevation. Houay Kay was 7 – 10 m wide with rock substrate and bank, and a swift current but with some side pools. *Mantheyus phuwanensis* was observed on rock ledges along the river, on a large boulder pile in a forest clearing, and in a small cave formed by a large boulder pile near the riverbank. The species was always observed on rock surfaces, except for one individual found at night perched on a 3 cm diameter twig inside the boulder-pile cave. Unlike other draconine agamids, which are easily approached at night, *M. phuwanensis* was disturbed by headtorch light. It was unclear whether the lizards were active at night, or asleep but easily awakened. When disturbed by day or night, *M. phuwanensis*



Fig. 4. Gular folds of *Ptyctolaemus gularis*.
Photograph by N. Orlov.

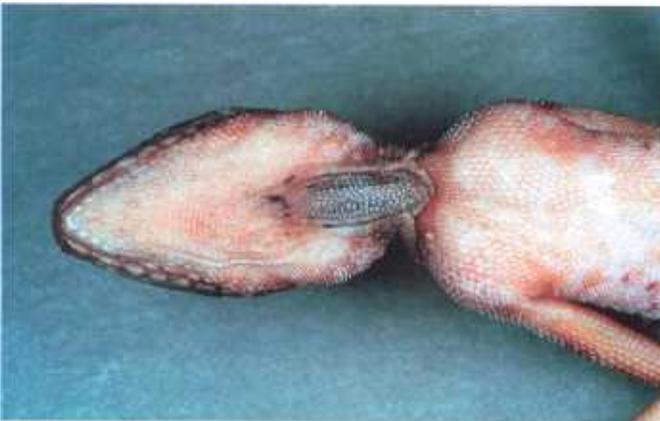


Fig. 5. Gular folds of *Mantheyus phuwuanensis* genus nov.
Photograph by N. Orlov.

ran quickly across the rock surfaces and escaped into crevices or small caves. As reported also by Manthey and Nabhitabhata (1991), these lizards sometimes ran upside-down on the ceilings of caves or undersides of rock ledges. When captured in the hand, *M. phuwuanensis* spread their ribs and became dorsoventrally flattened. This behavior is almost certainly an adaptation for fitting into rock crevices. People living near the Laos locality gave them the vernacular name “ka-pawm paa,” which means “cliff or rock face lizard” in the Lao language.

DISCUSSION

Manthey and Nabhitabhata (1991) were uncertain about the generic placement of *phuwuanensis* in their description. They wrote “[*P. phuwuanensis*] is preliminarily referred to the genus *Ptyctolaemus*,” but later in the same publication, “The differences of the species described here to *P. gularis* are great, but not great enough to refer it to a new genus.” In contrast, our examination concluded that the differences between *phuwuanensis* and *gularis* (Table 1) are so considerable that they do warrant generic separation.

According to Manthey and Nabhitabhata (1991), “...*Ptyctolaemus phuwuanensis* shows affinities to *P. gularis* only by the three parallel, U-shaped, longitudinal gular folds.” However, our examination concluded that even the gular folds differ in shape and color pattern between these two taxa (Figs. 4–5). *Mantheyus phuwuanensis* has slightly rounded longitudinal folds with yellow and red coloration and distinct black spots, and distinct transverse gular folds. *Ptyctolaemus gularis* has linear longitudinal folds containing solid black coloration, and no transverse gular folds.

Phylogenetic analyses using data on morphology (Moody, 1980) and mitochondrial DNA sequence variation (Honda et al., 2000a; Macey et al., 2000) have independently shown that the monophyletic subfamilies Draconinae and Agaminae (*sensu* Macey et al., 2000), or Groups V and VI (Moody, 1980), are derived lineages relative to all other agamid genera. Derived morphological characters shared by draconines and agamines include haired skin sense organs, a simple cleidodeltoid muscle, and an angled suture between the maxilla and palatine (Moody, 1980). Femoral pores have been lost in the amphibolurine (*sensu* Macey et al., 2000) genera *Chelosania*, *Moloch* (part of Group III; Moody, 1980), and *Hypsilurus* (Group IV; Moody, 1980), and all draconines and agamines. *Mantheyus*, however, is an exception; it is the only draconine, or Group V agamid, that retains the plesiomorphic character of femoral pores (Fig. 6). Thus, of the many characters that distinguish *Mantheyus* from *Ptyctolaemus*, we feel the presence of femoral pores provides the strongest support for recognizing *Mantheyus* as a distinct genus.

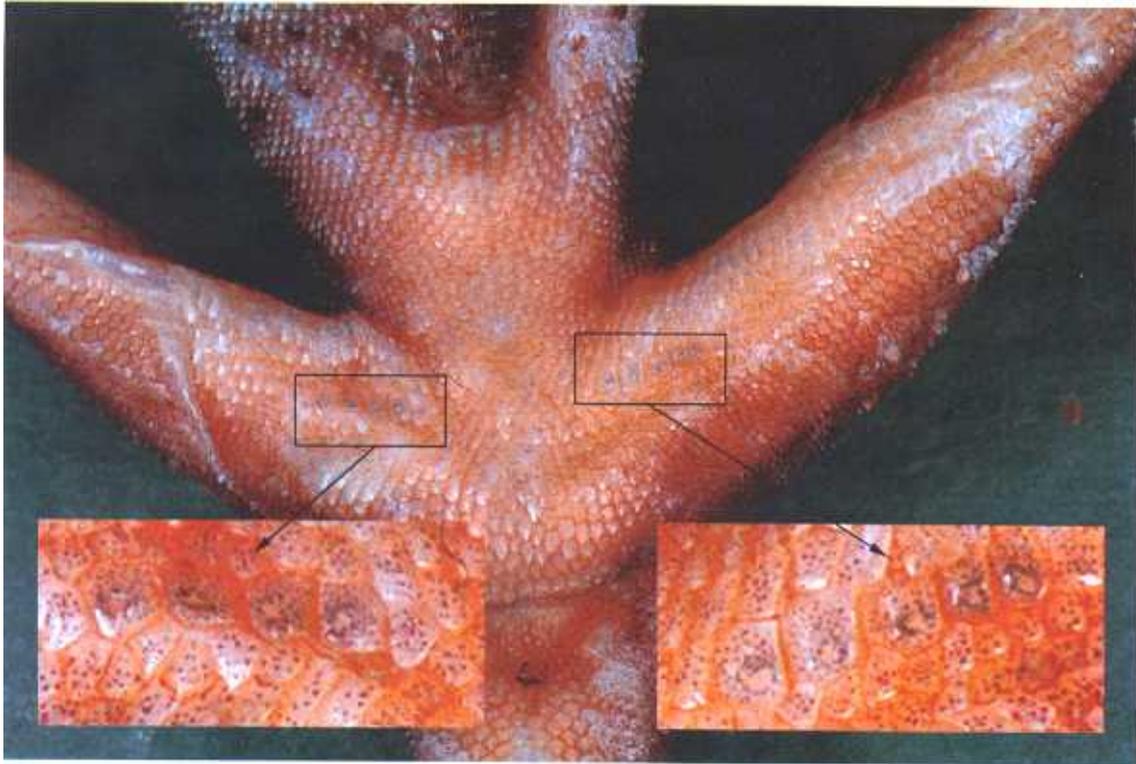


Fig. 6. Femoral pores of *Mantheyus phuwuanensis* genus nov. Photograph by N. Orlov.

As mentioned above, the derived subfamilies Draconinae and Agaminae have integument with skin sense organs containing hair-bearing receptors (Moody, 1980; Ananjeva et al., 1991; Ananjeva, 1997), except the draconine genus *Phoxophrys* (Inger, 1960). In *Mantheyus* and *Ptyctolaemus*, these organs are similar in morphology but differ in density and locations within cephalic scales. *Mantheyus* has 6–20 haired skin sense organs on the midline of most cephalic scales, whereas *Ptyctolaemus* has 3–10 haired skin sense organs on the periphery of these scales. The density observed in *Ptyctolaemus* is typical of agamines and other draconines that have haired skin sense organs on the periphery of scales. The scales of agamids other than draconines and agamines lack haired skin sense organs, but have lens-like apical pits (Scortecci, 1941; Ananjeva, 1997). Scortecci (1941) noted that femoral pores in agamids were always accompanied by these hairless, lens-like, apical pits, as femoral pores were not known in hair-bearing draconines or agamines prior to the discovery of *Mantheyus*. The report here of the presence of both femoral pores and haired skin sense organs in *Mantheyus* does not agree with Scortecci's conclu-

sion on the association of these two integumental characters. Further research is planned by one of us (NBA) on the development and distribution of integumental characters in the Agamidae.

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