

## **A new species of *Ptychozoon* Kuhl and Van Hasselt, 1822 hitherto confused with *P. trinotaterra* Brown, 1999 from Vietnam, Asia.**

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**RAYMOND T. HOSER**

**LSID urn:lsid:zoobank.org:author:F9D74EB5-CFB5-49A0-8C7C-9F993B8504AE**

**488 Park Road, Park Orchards, Victoria, 3134, Australia.**

**Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: snakeman (at) snakeman.com.au**

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### **ABSTRACT**

The last major review of *Ptychozoon* Kuhl and Van Hasselt, 1822 *sensu lato* was that of Hoser (2018) in which ten new species were formally named.

An ongoing audit of the south-east Asian herpetofauna flagged an eastern population of putative *P. trinotaterra* Brown, 1999 from east of the Mekong Valley in Vietnam as being morphologically divergent from the type form from west of the Mekong Valley, with a type location of Sakaerat, Amphoe Pak Thong Chai, Nakhon Ratchasima Province, Thailand.

Differences in form and the fact that the barrier between the two relevant populations is of known antiquity warranted the eastern population being named a new species.

It is therefore named herein as *Ptychozoon nathanscanesi* sp. nov. in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

**Keywords:** Taxonomy; reptilia; Gekkota; gecko; *Ptychozoon*; nomenclature; Asia; Vietnam; new species; *nathanscanesi*.

### **INTRODUCTION**

South-east Asia has long been recognised as a region of high biodiversity. However in recent years, it has become increasingly apparent that previous estimates of biodiversity in herpetofauna have been far lower than the reality.

The last major review of geckoes in the genus *Ptychozoon* Kuhl and Van Hasselt, 1822 *sensu lato* was that of Hoser (2018) in which ten new species were formally named.

An ongoing audit of the south-east Asian herpetofauna form obviously unnamed species, flagged an eastern population of putative *P. trinotaterra* Brown, 1999 from east of the Mekong Valley in Vietnam as being morphologically divergent from the type form from west of the Mekong Valley, with a type location of Sakaerat, Amphoe Pak Thong Chai, Nakhon Ratchasima Province, Thailand.

Differences in form and the fact that the barrier between the two relevant populations is of known antiquity warranted the eastern population being named a new species.

It is therefore named herein as *Ptychozoon nathanscanesi* sp. nov. in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999).

### **MATERIALS, METHODS AND RESULT**

Before finalizing the decision to formally name the Vietnam population of putative *P. trinotaterra* as a new species a series of checks were done.

This included the literature relevant to *P. trinotaterra*, including the papers of Brown (1999) that originally described the species, but based on specimens from east and west of the central Mekong Valley, as well as Hartmann *et al.* (2014), Hoser (2018),

Kunya *et al.* (2011), Lalremsanga *et al.* (2023) and sources cited therein.

Specimens from either side of the Mekong Valley were inspected to confirm consistent differences between the populations.

There was no available name for the Vietnamese animals at the species level.

Furthermore, it was noted that the molecular evidence provided by Lalremsanga *et al.* (2023) relevant to their newly named taxon "*Gekko mizoramensis*" also indicated two species within what was regarded as putative *P. trinotaterra*.

In combination, the morphological divergence, across a barrier of known antiquity combined with DNA evidence of Lalremsanga *et al.* (2023), confirming the antiquity of the split, in combination made the case for naming the eastern population of putative *P. trinotaterra* as a new species compelling.

Therefore it is formally named in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride *et al.* 1999) as a new species *Ptychozoon nathanscanesi* sp. nov. below.

### **PTYCHOZOON NATHANSCANESI SP. NOV.**

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**Holotype:** A preserved adult male specimen at the Royal Ontario Museum, Toronto, Canada, specimen number ROM 31912 collected from the south slope of Yok Don Mountain, Yok Don National Park, adjacent to the Dak Ken River, Vietnam, Latitude 12.054 N., Longitude 10.8042 E.

This facility allows access to its holdings.

The holotype was photographed in life and is depicted in Fig 2 in Brown (1999), where he lists it as a paratype of his taxon *P.*

*trinotaterra*.

**Paratypes:** Two preserved specimens at the Royal Ontario Museum, Toronto, Canada, specimen numbers ROM 31910 and ROM 31911 collected from Gia Lai Province, 2 km north of Tram Lap, adjacent to the Azum River, Gia Lai Province, Vietnam.

**Diagnosis:** *Ptychozoon nathanscanesi* sp. nov. is readily separated from the morphologically similar *P. trinotaterra* Brown, 1999 by having 3-4 chevron-like markings on the dorsum formed by thick dark blackish lines that are well defined and unbroken (versus extremely thin and usually broken in *P. trinotaterra*), the dark-blackish chevron-like markings extending as dark peppering on either side of the dorsum (versus absent in *P. trinotaterra*). At the distal end of the original tail, two of the dark rings on the tail are virtually black and well-defined, versus at most ill-defined dark in *P. trinotaterra*.

At the back of the head, the dark chevron-type markings are effectively joined or near joined and allow for a well defined interface between dark anterior and light posterior, the light in effect also having a well-defined triangular aspect at the centre of the back of the head, versus ill-defined and not obviously triangular-shaped in *P. trinotaterra*.

*P. nathanscanesi* sp. nov. lacks the single mid-vertebral row of flat dorsal tubercles seen in adult *P. trinotaterra*.

Both *P. nathanscanesi* sp. nov. and *P. trinotaterra* Brown, 1999 are separated from all other species of *Ptychozoon* Kuhl and Van Hasselt, 1822 by the unique combination of three (vs four) transverse bands in the axilla-groin region, 19-21 preanofemoral pore-bearing scales in a continuous series, 15-16 cutaneous denticulate lobes of the tail, lateral orientation of the caudal lobes, minimal reduction in total width of distal portions of the tail, absence of substantive lateral expansion of the straight-edged tail terminus beyond the nearest denticulate caudal lobe, minimal lobe fusion at the proximal border of the tail terminus, continuation of caudal tubercles distally on to the dorsal surface of tail terminus, and absence of a predigital notch in the preantibrachial cutaneous expansion (modified from Brown, 1999).

*P. nathanscanesi* sp. nov. (the holotype) is depicted in life on page 991 of Brown (1999) downloadable from <https://www.jstor.org/>

Images of *P. trinotaterra* Brown, 1999 in life can be downloaded from Kunya *et al.* (2011), on page 821 (3 images) and Hartmann *et al.* (2014) on page 13.

According to Hoser (2018), Lizards of the genus *Ptychozoon* Kuhl and Van Hasselt, 1822 as currently recognized are readily separated from all other living geckos by the following unique combination of characters: Digits strongly dilated, entirely webbed, with undivided lamellae below; all but the thumb and inner toe have a compressed curved distal phalanx with retractile claw, originating a little before the extremity of the digital expansion. Limbs and sides of head, body and tail with much developed membranous expansions acting as parachutes when lizards jump from elevated surfaces. Upper surfaces of the body are covered with juxtaposed granular scales and tubercles; lower surfaces have small, slightly imbricated scales; the parachute membrane is covered above with imbricated square scales arranged like the bricks of a wall to support it and are scaleless inferiorly. The genus *Alexteescolotes* Hoser, 2018 is separated from *Ptychozoon* by the absence of these support scales and it was until now included in the same genus. Caudal lobe angling is slight to strong. Pupil is vertical. Males with praeanal pores. Adults range from 60-110 mm maximal snout-vent length.

The genus *Alexteescolotes* Hoser, 2018 type species *Gecko rhacophorus* Boulenger, 1899, more recently known *Ptychozoon rhacophorus* (Boulenger, 1899) and species formerly included in the genus *Ptychozoon* Kuhl and Van Hasselt, 1822 and diagnosed as above, is readily separated from *Ptychozoon* by the absence of imbricate parachute support scales which are present in all species of *Ptychozoon* and *Cliveevattcalotes* Hoser,

2018 the species within *Cliveevattcalotes* Hoser, 2018 also until now being included in *Ptychozoon*. *Alexteescolotes* Hoser, 2018 is further separated from both other genera by the absence of an infra-auricular cutaneous expansion as seen in all other species. The genus *Cliveevattcalotes* Hoser, 2018 including the species until now known as *Ptychozoon lionotum* Annandale, 1905 and an allied form recently described as *Cliveevattcalotes steveteesi* Hoser, 2018 and type species for the genus, is separated from both *Ptychozoon* and *Alexteescolotes* Hoser, 2018 by the presence of a predigital notch in a preantibrachial expansion, versus none in all other species in both other genera.

**Distribution:** *Ptychozoon nathanscanesi* sp. nov. occurs in generally elevated areas east of the main Mekong River Valley in south and central Vietnam, generally away from the east coast.

*P. trinotaterra* Brown, 1999 occurs west of the main Mekong Valley in western Cambodia and eastern Thailand as well as presumably nearby parts of south-east Laos.

**Etymology:** *Ptychozoon nathanscanesi* sp. nov. is named in honour of Nathan Rodney Scanes of New South Wales, Australia, currently living at Ramornie in northern New South Wales, in recognition for his services to herpetology and aviculture in Australia spanning some decades, as well as his ongoing fight against taxonomic vandalism and copyright theft online, being an important part of his wildlife conservation effort.

**Conservation:** Few species of reptiles in south-east Asia can seriously be regarded as secure in the long term, noting the massive human overpopulation in the region. Delayed recognition of *P. nathanscanesi* sp. nov. could potentially result in the demise of the species in line with example/s cited in Hoser (2019a, 2019b). How well this taxon adapts to human disturbances over the long term is also effectively unknown, especially with regards to competing species and potential predators.

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**CONFLICTS OF INTEREST - NONE.**