

A new *Dendrolasma* (Opiliones, Nemastomatidae) from Thailand

Peter J. Schwendinger

Institute of Zoology, University of Innsbruck,
Technikerstr. 25, A-6020 Innsbruck, Austria

and

Jürgen Gruber

Naturhistorisches Museum Wien,
3. Zoologische Abteilung,
Burggring 7, A-1014 Wien, Austria

Summary

A new opilionid, *Dendrolasma angka* n. sp. (♀), the first representative of the family Nemastomatidae demonstrably found in tropical Asia, is described from the cloud forest of Doi Inthanon (2565 m), northern Thailand. The new species is closely related to *D. parvulum* (Suzuki) from Japan, both distinctly different from American congeners. Zoogeographical aspects are discussed.

Introduction

When searching for soil-dwelling spiders in the mountains of northern Thailand, a tiny opilionid was discovered which caused attention because of its peculiar ornamentation. Among other bizarre-looking forms, mostly of Laniatores, which are typically found in tropical forests, it stands out as a relative of the opilionid fauna of temperate regions and thus provides a zoogeographically highly interesting record. It is so far the only tropical species of the family Nemastomatidae, hitherto known to be holarctic in distribution. The record of *Nemastoma emigratum* Roewer from Madras, southern India, had been doubted by the author of the species himself. It is, most probably, based on a confusion of localities (cf. Roewer, 1959).

Though unexpected, the finding of a nemastomatid in Thailand was not a complete surprise, for high altitude areas of the Southeast Asian tropics are known to house various species with close affinities to flora and fauna of temperate latitudes (Whitmore & Burnham, 1985: 251, 258). Further interesting discoveries from these localities can be expected.

Abbreviations: MHNG = Muséum d'Histoire naturelle, Genève; NHMW = Naturhistorisches Museum, Wien.

Dendrolasma angka n. sp. (Figs. 1–12)

Material examined

Thailand, Chiang Mai Province, Doi Inthanon National Park, 2530 m: ♀ holotype, 28 November 1990, MHNG; 2 juv. paratypes, 28 November, 19 December 1990, MHNG, NHMW; Schwendinger leg.

Etymology

The species is named after Doi Angka, the old name of Doi Inthanon.

Diagnosis

Dendrolasma angka n. sp. closely resembles *D. parvulum* (Suzuki) but differs in: dorsum with light median band, stronger processes and a preponderant small-celled lattice of higher anvil-shaped tubercles; long basal (subocular) pair of tubercles on higher hood process; circumocular keels fused dorsally; spines on posterior margin of scute and on basal leg segments conical rather than club-shaped; legs annulated, femora with dorso-apical pair of processes; palpal femora without clavate hairs (cf. Suzuki, 1974: figs. 1, 2).

Female

Colour and pattern: Body generally brown, irregularly mottled with light dots, caused by pale bases of anvil-shaped tubercles, and dark spots. Dorsum with light median band, reaching back to scute area IV. In scute areas III and IV the median band widens and is divided by two indistinct longitudinal dark zones. Small dark brown spots in lateral parts and pale median zone of carapace, larger ones in lateral scute areas I–IV; 5 such spots in a transverse row on area V (Fig. 1). Eye ring dark brown; genital operculum, hood and carapace processes light brown. Legs annulated with pale rings, most pronounced on femora (I 3, II 7, III 3, IV 5 rings), less distinct on other leg segments. Metatarsi and tarsi of leg II dark brown.

Cephalothorax and abdomen (Figs. 1–3): Dorsum with carapace, metapeltidium and scutum parvum separated by membranous folds; free tergites not visible from above. Surface covered with intricate, predominantly small-celled lattice of tiny interconnected anvil-shaped tubercles (cf. Shear & Gruber, 1983: figs. 15, 16), often only separated by distance of their own width. Few large cells present, mostly in lateral parts as dark spots with finely punctate surface. A pair of enlarged median tubercles on posterior margin of carapace, on metapeltidium (both indistinct) and on scute area II (distinct); two median pairs on area III and a median and two lateral pairs on area IV (all distinct). Posterior scute margin in area V with a fence-like row of 6 long digitiform tubercles, interconnected by small anvil-shaped tubercles. Free tergites on ventral side with keels of anvil-shaped tubercles, followed by one or several rows of small wart-like tubercles, interspersed by a few longer, club-shaped ones.

Eye tubercle above anterior margin of carapace projecting into horizontal hood process which bears one median, unpaired and 5 lateral, paired digitiform tubercles; the median, 3 distal and basal (subocular) ones long and extending well beyond interconnecting bridges, finely granulate distally. Basal pair of tubercles posteriorly connected to circumocular keels, which unite above the eyes to form an irregular median keel that divides again in front. Anterior margin of carapace with long blunt process on each side of eye tubercle. Front margin of carapace below hood with transverse keel. Laminae suprachelicerales with reduced lateral tubercles and a distinct conical median one.

Ventral side covered with small warts bearing setae, most densely on leg coxae. Warts on anterior border of coxa I elongated. Pro- (except coxa I) and retroventral margin of leg coxae with a row of anvil-shaped tubercles.

Coxae and trochanters with dorso-distal row of anvil-shaped tubercles and lateral digitiform processes: retrolateral on coxa II and trochanters I, II, prolateral on coxa and trochanter IV, and pro- and retrolateral on coxa I and trochanter III (Figs. 1, 3). Genital operculum broad and short, without sclerotised anterior lip and not delimited from anterior abdominal sternite (Fig. 8).

Legs: Femora slightly curved and (except on leg II) spindle-shaped, widest distally. Femora to tibiae sculptured with granules and distadly inclined, blunt denticles, in between short scattered setae (Fig. 4). Pale rings on femora and tibiae slightly swollen. Dorso-distal end of femora with a pair of lateral processes (indistinct on Fe II), on patellae represented only by a retrodorsal lobe (Fig. 5); tibiae terminating in small dorsal heels. Metatarsi and tarsi without annulations, densely covered with microtrichia and interspersed longer setae. Tarsal segments I–IV (symmetrical): 4 (2+2), 6 (4+2), 6 (2+2+2), 6 (2+2+2).

Pedipalpi (Fig. 7): Trochanters with two ventro-distal warts bearing setae. Clavate hairs absent from femora, present on medio-ventral side of patellae and on entire surface of tibiae and tarsi.

Chelicerae (Fig. 6): Proventral face of second segment furnished with two procurved rows of 6 and 3 short setae at base of immovable finger.

Genital morphology (Fig. 9): Ovipositor similar to that of *D. parvulum*, receptacula seminis developed as simple ovoid sacs.

Measurements: Total length (including hood and posterior tubercles) 3.8 mm, scute 2.5 mm long,

abdomen 2.0 mm wide. Leg and palp measurements (in mm):

	Tr	Fe	Pa	Ti	Mt	Ta	Total
Palp	0.34	0.70	0.47	0.56	—	0.36	2.43
Leg I	0.4	1.3	0.5	1.1	0.5	0.5	4.3
Leg II	0.4	2.9	0.8	2.8	1.7	1.2	9.8
Leg III	0.4	1.4	0.8	1.2	0.5	0.6	4.9
Leg IV	0.4	2.0	0.7	2.1	0.7	0.7	6.6

Male

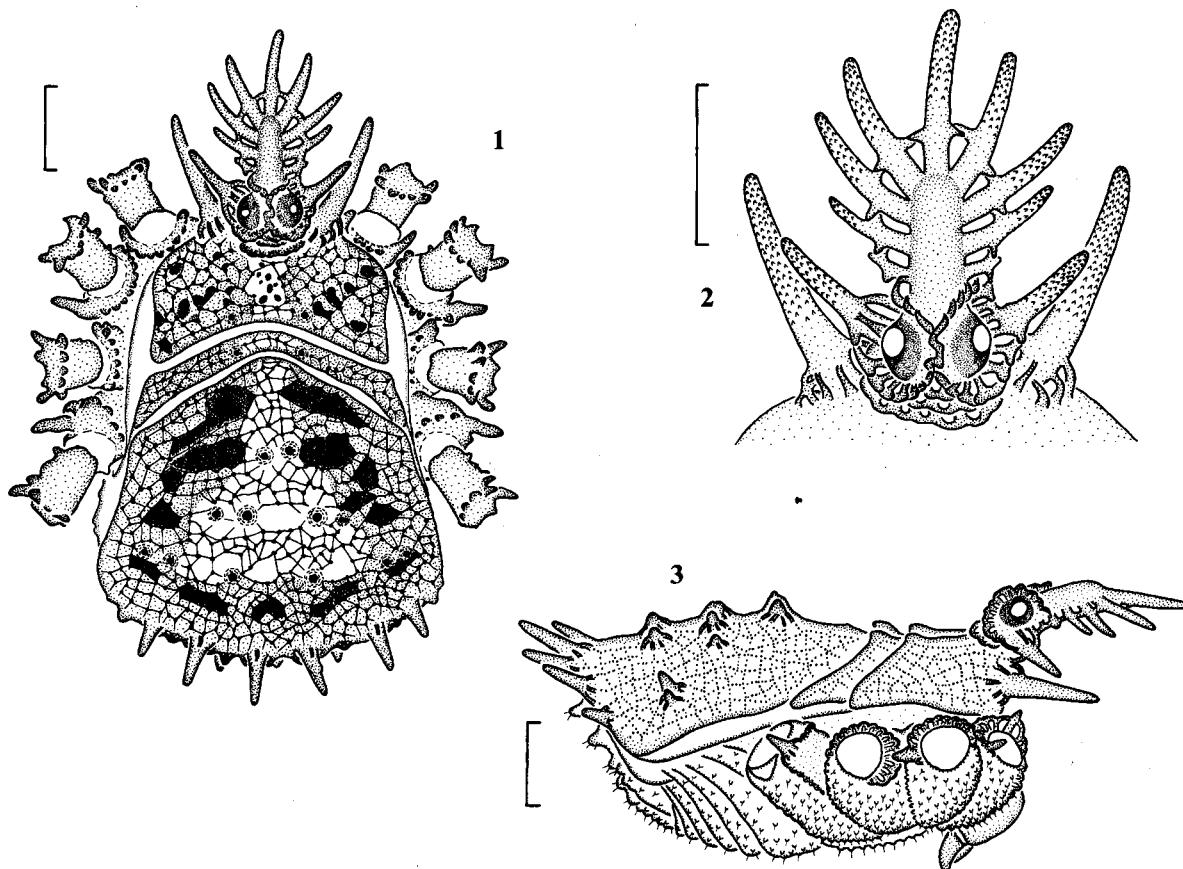
Unknown.

Juvenile stages

The two juveniles examined (body length/width 1.9/1.1 and 1.4/0.9 mm) represent two consecutive stages, the larger one probably pre-subadult. They resemble the pre-subadult type specimen of *D. parvulum* (cf. Suzuki, 1963: figs. 1, 2), but already show specific characters, i.e. distinct femoral processes and not yet fully developed subocular processes (Figs. 11, 12). Dorsum without light median band and without anvil-shaped tubercles, but with a fine granulation instead; enlarged tubercles wart-like. Legs without annulation, sculptured with fewer and smaller denticles (Fig. 10). Tarsal segmentation 2-2-3-3 in both specimens.

Natural history

Dendrolasma angka n. sp. was found by sifting and hand-sorting humus in the cloud forest near the summit of Doi Inthanon (2565 m), the highest mountain of Thailand. Though pitfall traps were placed in the same



Figs. 1–3: *Dendrolasma angka* n. sp., female holotype. 1 Cephalothorax and abdomen, dorsal view; 2 Hood, dorsal view; 3 Cephalothorax and abdomen, lateral view. Scale lines = 0.5 mm.

area for more than one year, no such animals were caught by this method. This indicates low population density or life in deep soil layers.

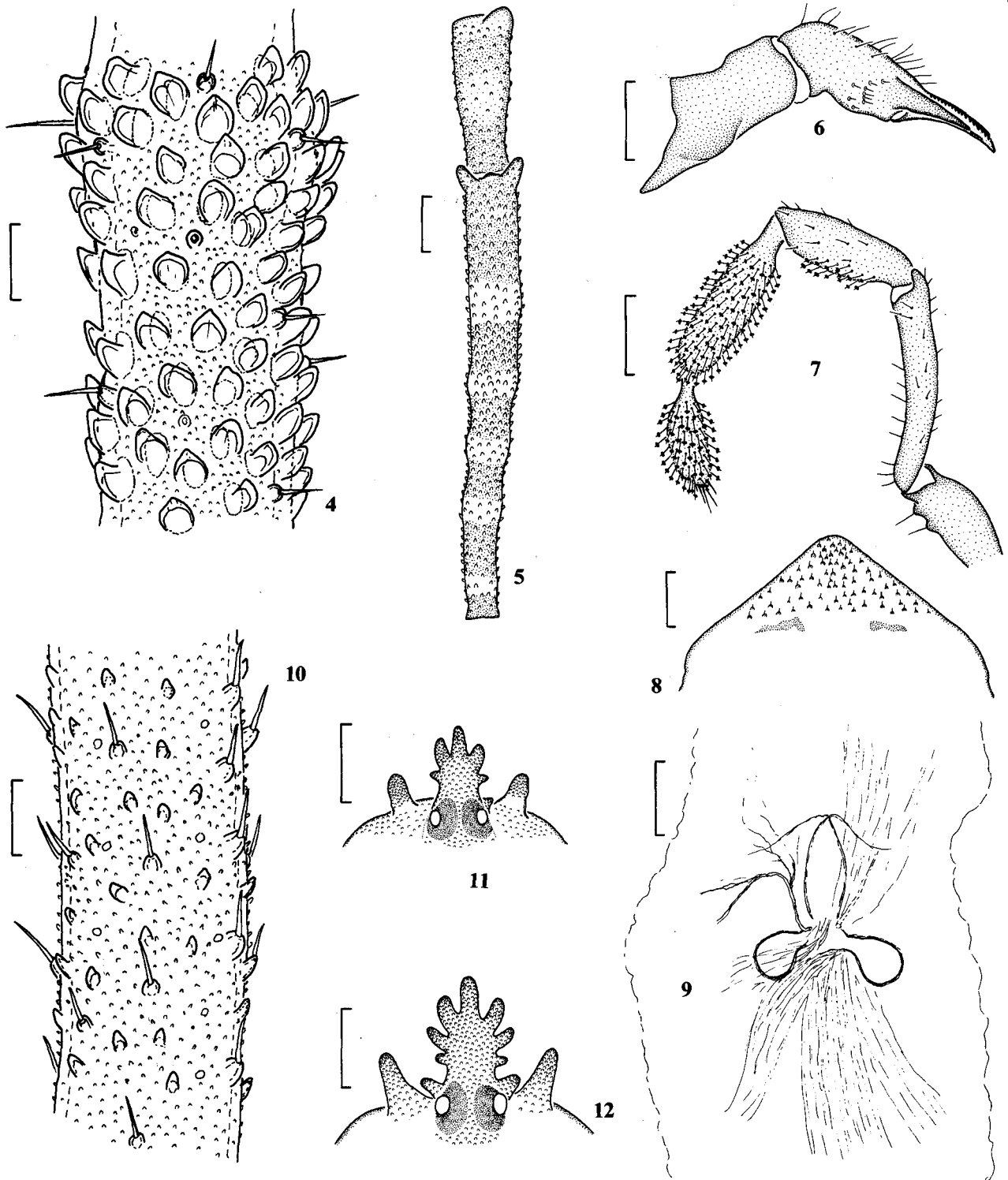
Other material examined

Dendrolasma parvulum: Japan, Shikoku, Ehime Pref., Mt Saragamine, 1175 m: 1 ♂, 1 ♀, 5 November 1974, Tsurusaki leg., NHMW 10046.

D. mirabile Banks: USA, Washington, Olympia: 1 ♀, 5–10 June 1944, Exline leg., NHMW 6089.

Discussion

Dendrolasma angka n. sp. is the closest known relative of *D. parvulum* from southern Japan. Both differ from the American representatives of the genus, i.e. *D. mirabile* and *D. dentipalpe* Shear & Gruber, which are only distantly related, by an isolated metapeltidium and by the microstructure on proximal leg segments consisting of relatively large and broad denticles. Phylogenetic evaluation of characters between the two Asiatic species is uncertain. According to the criteria formulated by Shear & Gruber



Figs. 4–12: *Dendrolasma angka* n. sp. 4–9 Female holotype. 4 Microsculpture of prolateral median part of femur II; 5 Femur and patella of right leg IV, dorsal view; 6 Left chelicera, prolateral view; 7 Right palp, prolateral view; 8 Genital operculum; 9 Receptacula seminis. 10–12 Juvenile paratypes. 10 Microsculpture of prolateral median part of femur II of later instar juvenile; 11 Hood of earlier instar; 12 Hood of later instar. Scale lines = 0.05 mm (Figs. 4, 9, 10; by Gruber) and 0.25 mm (all others; by Schwendinger).

(1983: 8), *D. angka* n. sp. may be regarded as primitive, owing to its higher hood. Apparently secondary modifications, e.g. enlarged subocular hood process, dorsally fused circumocular keels and reduced clavate hairs on palpal femora, however, indicate instead a derived state. The discovery of the unknown male of *D. angka* n. sp. is expected to provide additional evidence for a phylogenetic interpretation.

It should be stated here that the general discussion of characters, as well as subfamily diagnoses and keys, in Shear & Gruber (1983) were heavily biased in favour of the American species of Ortholasmatinae. The Asiatic representative was added as an after-thought. Especially penis morphology, generally characterised as: shaft slender to very slender; glans depressed; stylus very long and stout, with ventrally sclerotised and dorsally membranous cuticle; apex hook- or screw-shaped — relates only to the American species of *Dendrolasma* Banks and *Ortholasma* Banks. *D. parvulum*, with relatively stout penis shaft, compressed glans and short, slender, pointed stylus (possibly a more primitive combination of characters), is not covered by the characterisation given for the subfamily. Synonymisation and subsumption of *Cladolasma* Suzuki under *Dendrolasma*, versus *Ortholasma*, by Suzuki (1974) was based primarily on external features, e.g. one pair of lateral processes on anterior carapace margin. The distribution of these characters, however, does not correspond well with genitalic patterns. This throws some doubt on the phylogenetic scenario laid down by Shear & Gruber (1983) and makes a re-evaluation of the relationships within the Ortholasmatinae necessary, especially after the male of *D. angka* n. sp. and eventually other Asiatic species are known.

The disjunction of American and Asiatic Ortholasmatinae seems to be old. This is indicated by the discovery of a new species in Southeast Asia, not in the northeast as predicted by Shear & Gruber (1983). Moreover *D. parvulum* apparently occurs only in the mountains of the South Japanese island Shikoku and not further north like seemingly more recent amphi-beringian disjuncts such as

the triaenonychid *Paranonychus brunneus* (Banks) [Briggs, 1971; Shear & Gruber, 1983; Suzuki, 1976; Suzuki & Tsurusaki, 1983 (sub *Mutsumonychus fuscus*, northern Honshu)]. An Asiatic origin of *Dendrolasma*, as suggested by Shear & Gruber (1983), appears plausible. With great interest we can expect further discoveries of related forms in the mountain forests of China and other parts of continental Asia.

Acknowledgements

P. Schwendinger thanks the Biology Department of Chiang Mai University, especially Prof. Dr Panee Chiowanich, for facilitating research in Thailand. Support was granted by the Thai Ministry of University Affairs; Mr Thamarong Pragobun, Royal Forest Department (Bangkok), kindly allowed collecting in protected areas. Dr Konrad Thaler (Innsbruck) gave comments on the manuscript.

References

- BRIGGS, T. S. 1971: The harvestmen of the family Triaenonychidae in North America (Opiliones). *Occ. Pap. Calif. Acad. Sci.* **90**: 1–43.
- ROEWER, C. F. 1959: Die Araneae, Solifuga und Opiliones der Sammlung des Herrn Dr. K. Lindberg aus Griechenland, Creta, Anatolien, Iran und Indien. *Göteborgs K. Vetensk. Vitter. Samh. Handl.* (8 B) **8**(4): 1–47.
- SHEAR, W. & GRUBER, J. 1983: The opilionid subfamily Ortholasmatinae (Opiliones, Trogluloidea, Nemastomatidae). *Am. Mus. Novit.* **2757**: 1–65.
- SUZUKI, S. 1963: *Cladolasma parvula* gen. et sp. n. (Troglulidae: Opiliones) from Japan. *Annotes zool. jap.* **36**: 40–44.
- SUZUKI, S. 1974: Redescription of *Dendrolasma parvula* (Suzuki) from Japan (Arachnida, Opiliones, Dyspnoi). *J. Sci. Hiroshima Univ.* (Ser. B, Div. 1) **25**: 121–128.
- SUZUKI, S. 1976: Two triaenonychid harvestmen from the Northeast, Japan (Triaenonychidae, Opiliones, Arachnida). *J. Sci. Hiroshima Univ.* (Ser. B, Div. 1) **26**: 177–185.
- SUZUKI, S. & TSURUSAKI, N. 1983: Opilionid fauna of Hokkaido and its adjacent areas. *J. Fac. Sci. Hokkaido Univ.* (Ser. VI, Zool.) **23**: 195–242.
- WHITMORE, T. C. & BURNHAM, C. P. 1985: *Tropical rain forests of the Far East* (2nd edition). Clarendon Press, Oxford.