proximate incubation period of some reptile eggs from northeastern Thailand. *Herpetologica* 31: 360–364.

PRESNELL, J. K. & M. P. SCHREIBMAN. 1997. Humason's Animal Tissue Techniques. The Johns Hopkins University Press, Baltimore. xix + 572 pp.

SMITH, M. A. 1935. The Fauna of British India. Reptilia and Amphibia. Vol. II. Sauria. Taylor & Francis Ltd. London. xiii + 440 pp., 1 pl., 2 maps.

TIKADER, B. K. & R. C. SHARMA. 1992. Handbook Indian Lizards. Zoological Survey of India, Calcutta. xv + 249 pp. + 42 pl.

UETZ, P. (ED.). 2012. The Reptile Database, http://www.reptile-database.org, accessed 20 November 2012.

WORLDWEATHERONLINE. 2012. www.worldweatherline.com/v2/weather-averages.aspx. Accessed 22 November 2012.

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Appendix

The following specimens of *L. bowringii* from Nakhon Ratchasima Province, Thailand comprise the basis for this study: FMNH 181847, 181856, 181864, 181865, 181886, 181917, 181925, 181936, 181944, 181945, 181948, 181965, 181968, 181970, 181972, 181976, 181983, 181986, 181993, 181996, 182016, 182043, 182049, 182052, 182054, 182056, 182059, 182066, 182069, 182072, 182075, 182077, 182088, 182095–182097, 182102, 182116, 182118–182120, 182124–182126, 182132, 182134, 182139, 182144, 182149, 182151, 182155, 182170, 182173, 182176, 182178–182180, 182183, 182184, 182188, 182190, 182202, 182205, 182207, 182208, 182218, 182225, 182234, 182235, 182237–182239, 182241, 182242, 182246, 182250, 182256, 182258, 182267, 182286, 182287, 182294, 182304, 182313, 182318, 182322, 182329, 182331, 182333, 182340.

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The status of the dorsal snake scale lophate microdermatoglyphic pattern

The first studies on the snake scale microstructure were presented by Leydig (1868, 1873). No other work on the subject appeared before that of Picado (1931), who announced the major importance of this character in snake systematics, confirmed by the works of Holtzinger-Tenever (1935) and Pockrandt (1937), also done with light microscopy. The first study of snake scale microstructure by electron microscope (T.E.M.) was done by Hoge & Souza Santos (1953). The term "microdermatoglyphics" was used for the first time by Dowling *et al*. (1972) who used a Scanning Electron Microscope (S.E.M.), and defined for the first time by Price (1981: 5) as "all features of snake scale surface sculpturing too small to be seen with the naked eye but which are resolvable under the scanning electron microscope". The first attempts to define the nomenclature of the microdermatoglyphic patterns were by Price (1981, 1982).

The terminology adopted by the (rare) authors currently working on the study of the dorsal snake scale microdermatoglyphics is still mainly based on that coined by Price (1982) who was himself inspired by the palynological nomenclature of Kremp (1965). Price's (1982) work, in which he enumerated and defined most of the major patterns and the pattern subtypes he had observed, was a very abbreviated version of his unpublished Ph.D. thesis defended in 1981. The pictures accompanying the pattern definitions by Price (1982) were very stereotyped. In order to really grasp the variation that Price understood for each pattern, it is actually necessary to examine all pictures presented in both works of 1981 and 1982 for each pattern, but this variation was however not expressed in the very laconic definitions of his 1982 work. A redefinition of all the patterns, presenting the variation within each one, seems necessary for future studies, as well for systematic works as for the study of the relation between the microstructure and the ecology of a given taxon.

A very important aspect of dorsal scale microstructure, not dealt with in Price (1981, 1982),

but only later by Price & Kelly (1989), is the variation of the microstructure along the surface of the scale itself, following an antero-posterior axis. Price (1981, 1982) did not specify at which place on the scale the photographs were taken, and, as he himself noted (Price, 1989: 90), the existence of a transition between a basal and an apical pattern through a "microdermatoglyphic transition zone" (MTZ) was discovered by him only after his 1981 and 1982 works. Thus, the eleven patterns defined by Price in 1982 might not have been all based on the observation of the posterior part of the scales. Nevertheless, these eleven patterns are sufficient to classify most of the snake apical patterns known to date, except the scolecophidian patterns, since Price never observed them, and those of sea snakes, some of which were examined by Price for his Ph.D., but not mentioned in his 1982 work.

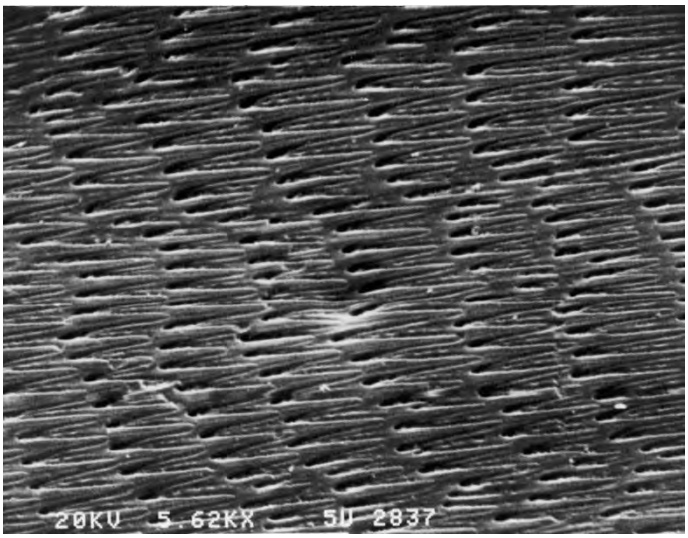

Figure 1. Echinate pattern, a member of the lamellate patterns group (here the central part of a mid-dorsal scale of an adult *Lycodon laoensis*, MNHN 1998.8549 from Chiang Mai, Chiang Mai Province, Thailand; for photography methodology, see Pauwels et al. 2000).

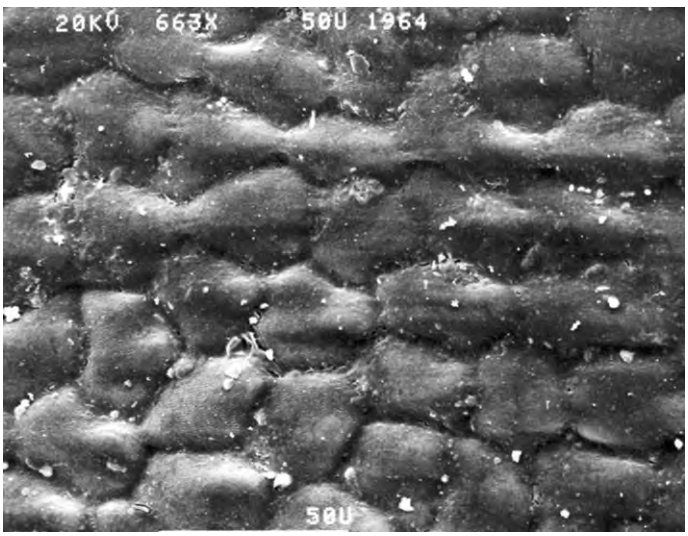

Figure 2. Tessellate pattern, a member of the tessellate patterns group (here the central part of a mid-dorsal scale of an adult *Trimeresurus albolabris*, MNHN 1998.0569 from Ban Salakern, Ban Lat District, Phetchaburi Province, Thailand).

In order to stabilize the nomenclature of the dorsal scale microdermatoglyphics, an ultimate reference should be chosen, as with type specimens for the definition of taxa in systematic zoology. The pictures presented by Price (1982) could logically serve as 'types' for each pattern. In the case that a pattern is not represented in that work, I would suggest to select it among the pictures presented in his Ph.D. thesis, in order to stay loyal to Price's conception of the patterns. Price himself (1990) noted that some authors (in particular Chiasson & Lowe 1989) wrongly interpretated his terminology, and appealed for "standardization and use of pre-existing terminology" (i.e., his own).

Many pattern subtypes were very briefly defined but unfortunately not illustrated by Price (1982): cristate striocristate, echinate echinulate, echinate subechinate, foveate foveoreticulate, lophate striolophate, papillate "secondarily microreticulate", and reticulate echinoreticulate. Among the major patterns, a single one was not illustrated by Price (1982), nor in all his subsequent works: the lophate pattern. It was vaguely defined as following: "having smooth longitudinal ridges" (Price, 1982: 296). The definition given for this pattern in his Ph.D., "with the outer surface

thrown into ridges" (Price, 1981: 145) refers to his Fig. 158, which represents the microstructure of *Candoia carinata* (Schneider, 1801) (Boidae). According to the above mentioned processes, I regard this picture as the primary reference for the lophate pattern. A thorough examination of this picture, however, does not reveal any difference between this pattern and that illustrated on the same page for *Acrantophis madagascariensis* (Duméril & Bibron, 1844) (Boidae) (loc. cit.: fig. 157) which Price qualified as "strioreticulate". Likewise, there is no difference between the pattern said to be "striolophate" for *Phyllorhynchus browni* Stejneger, 1890 and *P. decurtatus* (Cope, 1868) (Colubridae) by Price (1981: 16, 67-68, figs. 6–7) and the pattern "reticulate, subtype strioreticulate" illustrated for *Xenochrophis piscator* (Schneider, 1799) and *Virginia striatula* (Linnaeus, 1766) (Colubridae) in his 1982 publication. Price (1981: 47) stressed the similarities between the striolophate pattern of *P. decurtatus* and the "strioreticulate" pattern of *Gloydius himalayanus* (Günther, 1864) (Viperidae).

As to the "subechinolophate" pattern of *Helicops danieli* Amaral, 1938 (Colubridae) (Price, 1981: 124), it is best described as a plicate pattern, exactly like that illustrated in Price (1982), which is fully consistent with the fact that Price (1983: 294) identified the microstructure of the closely related species *Helicops angulatus* (Linnaeus, 1758) as being "plicate". A comparison of the pictures illustrating the microstructure of these two species moreover shows that they are absolutely identical. Price (1981: 42) stressed the similarity between the pattern of *H. danieli* and those of *Regina rigida* (Say, 1825) (loc. cit., fig. 45, "echinoreticulate") and *Liodytes alleni* (Garman, 1874) (loc. cit., fig. 46, "echinoplicate and punctate"; qualified as "plicate, secondarily punctate" by Price, 1982, as "plicate" by Price, 1983: 293, and as "plicate (punctate)" by Price & Kelly, 1989). Price did not mention the echinoplicate and subechinolophate patterns in his 1982 work.

I hence conclude that the lophate pattern is a composite and artificial pattern, that should be abandoned. A number of patterns (corrugate, foveolate, granulate, lamelliform, rugulate, striate) quoted and defined by Price in 1981 were not listed in his 1982 paper. On the other hand, a plethora of new terms naming apical morphotypes (patterns) was provided by Price & Kelly (1989) without definitions. Price's patterns were divided in two major groups by Pauwels *et al.* (2000) on the basis of the elementary units visible through S.E.M. at the surface of the scales: either very elongated units perpendicular to the antero-posterior axis of the scale (lamellate patterns group, see Fig. 1), or sub-polygonal, typical cell-shaped, units (tessellate patterns group, see Fig. 2). Now that the lophate pattern is definitely eliminated from the microdermatoglyphic jargon, the group of the lamellate patterns comprises the following major patterns: canaliculate, echinate, fimbriate, papillate, plicate and reticulate. The tessellate patterns group includes the cristate, foveate and verrucate patterns. The acrochordate pattern is represented only by the genus *Acrochordus* Hornstedt, 1787 (Acrochordidae). Further studies are necessary for the classification of the scolecophidian and the sea snake patterns.

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Literature Cited

CHIASSON, R. B. & C. H. LOWE. 1989. Ultrastructural scale patterns in *Nerodia* and *Thamnophis*. *Journal of Herpetology* 23: 109–118.

DOWLING, H. G., I. GILBOA, D. E. GENNARO & J. F. GENNARO. 1972. Microdermatoglyphics: a new tool for reptile taxonomy. *Herpetological Review* 4: 200.

HOGE, A. R. & P. SOUZA SANTOS. 1953. Submicroscopic structure of "stratum corneum" of snakes. *Science*, 118: 410–411.

HOLTZINGER-TENEVER, H. 1935. Über Strukturbilder des Natternhemdes bei Schlangen. Ein Hilfsmittel zur Systematik. *Verhandlungen der Deutschen Zoologischen Gesellschaft* 1935: 83–92.

KREMP, G. O. W. 1965. Morphological Encyclopedia of Palynology. University of Arizona Press, Tucson. xiii + 185 pp., 35 pls.

LEYDIG, F. 1868. Über Organe eines sechsten Sinnes. Zugleich als Beitrag zur Kenntniss des feineren Baues der Haut bei Amphibien und Reptilien.

Nova acta Academiae Caesareae Leopoldino-Carolinae Germanicae Naturae Curiosorum 34: 1–108.

LEYDIG, F. 1873. Ueber die äusseren Bedeckungen der Reptilien und Amphibien. *Archiv für mikroskopische Anatomie* 9: 753–794 + pl. 32.

PAUWELS, O. S. G., P. DAVID, P. F. A. MADERSON, W. DERECK & C. KUMPS. 2000. Dorsal scale microstructure of *Xenopeltis unicolor* (Serpentes, Xenopeltidae): description and position among the ophidian microdermatoglyphic patterns. *Dumerilia* 4(2): 99–111.

PICADO, T. C. 1931. Epidermal microornaments of the Crotalinae. *Bulletin of the Antivenin Institute of America* 4: 104–105.

POCKRANDT, D. 1937. Beiträge zur Histologie der Schlangenhaut. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere.* 62: 275–322.

PRICE, R. 1981. Analysis of the ecological and taxonomic correspondance of dorsal snake scale microdermatoglyphics. Unpublished Ph.D. dissertation, New York University. xx + 164 pp.

PRICE, R. M. 1982. Dorsal snake scale microdermatoglyphics: ecological indicator or taxonomic tool? *Journal of Herpetology* 16: 294–306.

PRICE, R. 1983. Microdermatoglyphics: the *Liodytes-Regina* problem. *Journal of Herpetology* 17: 292–294.

PRICE, R. 1989. A unified microdermatoglyphic analysis of the genus *Agkistrodon*. *The Snake* 21: 90–100.

PRICE, R. 1990. Microdermatoglyphics: an appeal for standardization of methodology with comments on recent studies of North American natricines. *Journal of Herpetology* 24: 324–325.

PRICE, R. & P. KELLY. 1989. Microdermatoglyphics: basal patterns and transition zones. *Journal of Herpetology* 23: 244–261.

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A new record of *Pseudoxenodon inornatus* (Boie In: Boie, 1827) from Gunung Gedeh National Park, West Java, Indonesia (Squamata: Pseudoxenodontidae)

The genus *Pseudoxenodon* (Family Pseudoxenodontidae) comprises six nominal species from east and south-east Asia (Uetz 2012): *Pseudoxenodon bambusicola* Vogt, 1922 (distribution: southern China and northern Vietnam; Bourret 1936; Orlov *et al.* 2000); *Pseudoxenodon baramensis* Smith, 1921 (distribution: Sarawak, East Malaysia [Borneo]; Smith 1921); *Pseudoxenodon inornatus* Boie in Boie, 1827 (distribution: Java; Manthey & Grossmann 1997); *Pseudoxenodon jacobsonii* van Lidth de Jeude, 1922 (distribution: Sumatra; David & Vogel 1996; sometimes considered a subspecies of *inornatus* but considered distinct here on account of its diagnosability and disjunct distribution); *Pseudoxenodon karlschmidti* Pope, 1928 (distribution: southern China and northern Vietnam; Smith 1943; Nguyen *et al.* 2009); *Pseudoxenodon macrops* (Blyth, 1855) (distribution: Nepal, eastern India, south-western China, Myanmar; Thailand, Peninsular Malaysia, Vietnam, Laos; Manthey & Grossmann 1997; Zhao & Adler 1993); and *Pseudoxenodon stejnegeri* Barbour, 1908 (distribution: southern China; Barbour 1908; Zhao & Adler 1993). One additional taxon, *P. buettikoferi*, has been described from Ka-

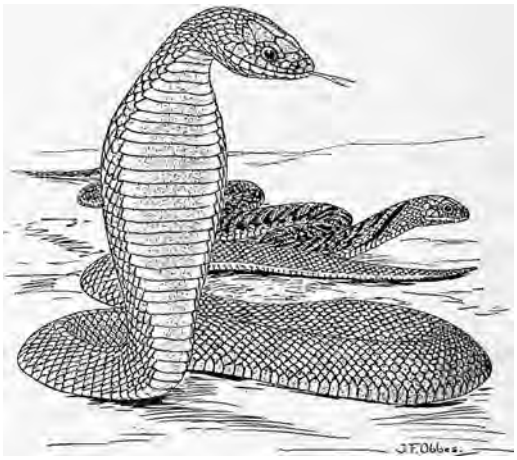

Figure 1. Line art showing a pair of *Pseudoxenodon inornatus* (reproduced from de Rooij 1917).