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Limnonectes (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) from Arunachal Pradesh (India), and on the identity of some diminutive ranoid frogs

(Anura: Dicroglossidae, Occidozygidae)

Limnonectes (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) aus Arunachal Pradesh (Indien) und zur Identität einiger kleinwüchsiger ranoider Frösche

(Anura: Dicroglossidae, Occidozygidae)

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KURZFASSUNG

Zwei weibliche Exemplare eines kleinen, der Familie Dicroglossidae zugehörigen Frosches wurden in Arunachal Pradesh (Indien) gesammelt und aufgrund morphologischer Merkmale *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) zugeordnet. Dadurch wurde das Verbreitungsgebiet der Art vom südöstlichen Tibet zum östlichen Arnachal Pradesh erweitert. Die Taxonomie der Untergattungen *Taylorana*, *Liurana* und *Ingerana* und die Zuordnung der chinesischen Arten, die in diese Untergattungen eingeschlossen wurden, wird diskutiert und die Synonomie von *Liurana* mit *Taylorana* bestätigt. Hingegen ist *Ingerana* eine eigenständige Gattung, Mitglied der Familie Occidozygidae.

ABSTRACT

Two female specimens of a small Dicroglossidae frog were collected from Arunachal Pradesh (India) and allocated to *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) on morphological evidence. This extends the species' known distribution from south-eastern Tibet to eastern Arunachal Pradesh. The taxonomy of the subgenera *Taylorana*, *Liurana* and *Ingerana*, and the allocation of the Chinese species included into these subgenera are discussed. Synonymy of *Liurana* with *Taylorana* is confirmed wheras *Ingerana* is a distinct genus, member of the family Occidozygidae.

KEYWORDS

Amphibia: Anura: Dicroglossidae, Occidozygidae, *Taylorana*, *Liurana*, *Ingerana*, *Limnonectes* (*Taylorana*) *medogensis*, distribution, taxonomy, systematics, India

INTRODUCTION

Northeast India is considered to be one of the biodiversity hotspots of the world (Mittermeier et al. 2004) and numerous new amphibian species were discovered in the recent years, including taxa of phylogenetical and biological interest (Bordoloi et al. 2007; Biju et al. 2010; Kamrei et al. 2012). This place, one of the first studied for Oriental amphibians, thus being the type locality of names described in the middle and end of the 19th century, is also at the crossing point of different biogeographical subregions. Here the Himalayan region meets the Transhimalayan mountain ranges. To the north it touches the Tibetan region and in the south it is continuous to the Malayan Peninsula. Thus, the northeast Indian fauna counts elements of Malayan, Tibetan, Himalayan, Chinese, Indochinese and Indian origins. This is a source of biodiversity richness but also taxonomic difficulty.

During fieldwork in Arunachal Pradesh (India) in 1997 and 2009, two small sized ranoid frogs were discovered. Here we present the taxonomic allocation of these specimens, give their description, photographs and a discussion of the generic allocation and extension of the taxon's known range.

MATERIALS AND METHODS

The female specimen ZSI A11549 was collected at Pange (altitude 2000-2500 m a.s.l.). This location is one of the significant areas of Lower Subansiri District of Arunachal Pradesh and lies about 20 km away from Hapoli, the district headquarter. The river Pange is a tributary of the river Subansiri. The forest at this location was dense and undisturbed. The specimen was collected in the forest floor near the river on July 26, 1997. The second specimen studied in this work, a female bearing mature oocytes, was collected from Basar (West Siang District of Arunachal Pradesh) from an altitude of ca. 950 m a.s.l. The frog was collected on April 15, 2009 at around 11.00 hr from the leaf litter-covered floor of a forest that had a moderate canopy cover. The degraded forest was adjacent to terraced cultivation. The specimen is deposited at the Biodiversity Museum of Help Earth, Guwahati, and bears the collection number BMHE A0081.

From each specimen, 25 measurements were taken. The female specimen ZSI A11549 is described in detail using the standards of Ohler (1996). The differences of the second specimen are noted. Comparisons are made to the available data in the literature. Comparative tables for measurements and characters are presented.

Specimens studied for comparison

Ingerana borealis (Annandale, 1912): ZSI 16932, holophoront, sex not investigated, Rotung (1300 ft = 400 m asl; 28°07'N, 95°12'E), South of Yembung, Arunachal Pradesh, India; MNHN 1994.6489-6492, 4 males, Deothang (1000 m asl; 26°53'N, 91°30'E), Samdrup Jongkhar District, Bhutan. *Ingerana tenasserimensis* (Sclater, 1892): ZSI 10429, symphoront, sex not investigated, Tenasserim expedition (near 12°04'N, 99°01'E), Myanmar; MNHN 1989.0718-0719, Banthat Mts. (7° 30'N, 99°40'E), Thailand. *Ingerana tasanae* (Smith, 1921): BMNH 1947.2.2.69-84, symphoronts, adult females, Chumpoon, Thailand; *Limnonectes hascheanus* (Stolizcka, 1870): ZSI 2696-2697, Penang, Malaysia; *Limnonectes limborgii* (Sclater, 1892): BMNH 1974.1360-1372, Thailand; KIZ 195, holophoront of *Platymantis liui* Yang, 1983, Menglun (550 m a.s.l.), Mengla County, Yunnan, China; MNHN 1997.5355-5358, 4 adult males, Ben En NP (19°35'N, 105°28'E), Thanh Hoa, Vietnam; ZSI 18299, 18300, 1 adult female, 1 young, Phang-Von-Phung, Thailand; ZSI 19932, adult male, Paukang, Myanmar; *Occidozyga lima* (Gravenhorst, 1829): MNHN 1999.6112-6132, Luang Prabang (19°53'N, 102°08'E), Laos. *Phrynoglossus baluensis* (Boulenger, 1896): BMNH 1947.2.4.38, holophoront, adult female, Kina Baloo, North Borneo; BMNH 1974.3376-3384, same locality. *Phrynoglossus celebensis* (Smith, 1927): BMNH 1947.2.4.94-99, symphoronts, 3 adult females, 1 adult male, 1 young, Djikoro, Mt. Bonthain, South Celebes; *Phrynoglossus diminutivus* (Taylor, 1922): BMNH 1928.1.11.17, holophoront, adult female, Zamboango, Philippines Islands; BMNH 1929.6.1.32, 1974.1030, 2 adult females, Jolo Island, Philippines; *Phrynoglossus laevis* (Günther, 1858): BMNH 1947.2.4.65, 1947.2.29.95, symphoronts, 2 adult females, Philippine Islands; *Phrynoglossus martensii* Peters, 1867: ZMB 5645, holophoront, young female, Bangkok (13°34'N, 100° 13'E), Thailand; MNHN 1997.5359-5369, 9 males, 2 females, Ben En National Park (19°35'N, 105°28'E), Thanh Hoa Province, Vietnam.

Measurement abbreviations

Body: SVL – Snout-vent length.

Head: EL – Eye length. EN – Distance from anterior corner of eye to nostril. HL – Head length (from posterior corner of mandible to tip of snout). HW – Head width, at the angle of jaws. IBE – Distance between posterior corner of eyes. IFE – Distance between anterior corner of eyes. IN – Internarial distance. IUE – Minimum distance between upper eyelids. MBE – Distance from posterior corner of mandible to posterior corner of eye. MFE – Distance from posterior corner of mandible to anterior corner of eye. MN – Distance from posterior corner of mandible to nostril. NS –

Distance from nostril to tip of snout. SL – Distance from anterior corner of eye to tip of snout. TYD – Maximum tympanum diameter. TYE – Distance between tympanum and posterior corner of eye. UEW – Maximum width of upper eyelid.

Forelimb: FLL – Forelimb length (from elbow to base of outer palmar tubercle). HAL – Hand length (from base of outer palmar tubercle to tip of third finger). TFL – Third finger length (from base of first subarticular tubercle).

Hindlimb: FL – Femur length (from vent to knee). FOL – Foot length (from base of inner metatarsal tubercle to tip of fourth toe). FTL – Fourth toe length (from base of first subarticular tubercle). IMT – Length of inner metatarsal tubercle. ITL – Inner toe length. TL – Tibia length. TW – Maximum tibia width.

Institutional abbreviations

BMHE – Biodiversity Museum of Help Earth, Guwahati, India. CIB – Chengdu Institute of Biology, Chengdu, China. ZSI - The Zoological Survey of India, Kolkata, India.

TAXONOMY

Taylorana medogensis (Fei, Ye & Huang, 1997)

Description of an adult female specimen ZSI A11549 (Fig. 1)

Size and general aspect: Specimen of moderate size (SVL 20.5 mm), body moderately stout.

Head: Head moderate in size (HL 6.4 mm), shorter than wide (HW 7.6 mm; MN 5.2 mm; MFE 4.8 mm; MBE 2.3 mm). Snout rounded, as long (SL 3.0 mm) as horizontal diameter of eye (EL 3.0 mm). Canthus rostralis rounded, loreal region concave. Interorbital space flat (IUE 1.7 mm) larger than upper eyelid (UEW 1.5 mm), but narrower than internasal distance (IN 2.3 mm); distance between front of the eyes (IFE 3.6 mm) two thirds of distance between back of the eyes (IBE 5.5 mm). Nostrils rounded without flap of skin laterally, closer to eye (EN 1.4 mm) than to tip of snout (NS 1.7 mm). Pupils oval, horizontal. Tympanum distinct, rounded, its diameter (TYD 1.6 mm) about half of horizontal diameter of eye, its distance from eye (TYE 0.2 mm) less than half its diameter. Pineal ocellus absent. Vomerine ridge present, prominent, bearing few small teeth with an angle of 45° relative to body axis. Tongue moderate in size, notched; lingual papilla absent. Tooth-like projections on maxilla absent. Supra tympanic fold is distinct from behind eye to above shoulder.

Forelimbs: Arm short, rather thin; fore arm (FLL 4.2 mm) longer than hand (HAL 3.4 mm), not enlarged. Finger I and II thin, short; III and IV long (TFL 2.15 mm). Relative length of fingers I < II < IV < III. Tips of fingers rounded, slightly enlarged, no discs present on fingers I-IV. Dermal fringe on inside of fingers absent; webbing absent. Subarticular tubercles not observed. Prepollex and palmar tubercles indistinct; supernumerary tubercles absent.

Hindlimbs: Leg five times longer (TL 10.5 mm) than wide (TW 1.9 mm), barely shorter than thigh (FL 10.6 mm), about as long as from base of internal metatarsal tubercle to tip of toe IV (FOL 10.5 mm). Toes long, toe IV (FTL 6.3 mm). Relative length of toes I < II < V < III < IV. Tips of toes rounded, distinctly enlarged, with grooves. Webbing rudimentary. Dermal fringe of toe V absent. Subarticular tubercles poorly distinct. Inner metatarsal tubercle distinct, oval, its length (IMT 0.8 mm) about the length of toe I (ITL 0.9 mm). Tarsal fold absent. Outer metatarsal tubercle present, poorly distinct.

Skin: Dorsal and lateral parts of head and body: snout granular, between eyes smooth; anterior and posterior part of back shagreened; flank granular. Latero-dorsal folds absent, lateral line absent. Dorsal parts of limbs: forelimb, thigh, leg and tarsus smooth. Ventral parts of head, body and limbs: throat, chest and belly smooth aspect, but with dense flat tubercles on lateral parts; thigh finely granular. Macro glands absent.

Fig. 1: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), ZSI A11549, adult female, SVL 21.0 mm. Dorsal, ventral and lateral view.

Abb. 1: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), ZSI A11549, adultes Weibchen, Kopf-Rumpflänge 21.0 mm. Dorsal-, Ventral- und Lateralansicht.

Coloration (in formalin preserved specimen).- (36) Dorsal and lateral parts of the head and body: dorsal parts of head and dorsum: flank upper part light brown with spot, lower part creamy white; loreal region light brown with black edge; tympanic region brown with black color of supra tympanic fold; tympanum cream bordered. Dark mark at the cloacal region.

(37) Dorsal and lateral parts of limbs: forelimbs, thigh, leg and foot brown with poorly distinct darker markings; posterior

Table 1: Measurements of holotype and paratype of *Liurana medogensis* (Fei, Ye & Huang, 1997) and of specimens from Northeast India allocated to this species. Abbreviations as in the text. M – Male, F – Female.

Tab. 1: Längenmeßwerte des Holotypus und des Paratypus von *Liurana medogensis* (Fei, Ye & Huang, 1997) und von Exemplaren aus Nordostindien, die dieser Art zugeordnet wurden. Abkürzungen wie im Text. M – Männchen, F – Weibchen.

	Holotype CIB 73II0080 M adult	Paratype CIB 770736 M adult	ZSI A11549 F adult	BMHE A0081 F adult
SVL	17.5	14.3	20.5	21.0
HW	6.7	6.3	7.6	7.9
HL	6.8	5.8	6.4	6.5
MN	-	-	5.2	5.8
MFE	-	-	4.8	4.7
MBE	-	-	2.3	2.8
SL	2.7	2.5	3.0	6.1
EL	2.5	1.9	3.0	2.7
IUE	2.0	1.8	1.7	2.0
UEW	1.7	1.5	1.5	1.6
IN	2.1	2.0	2.3	2.8
IFE	-	-	3.6	3.6
IBE	-	-	5.5	5.7
NS	-	-	1.7	2.0
EN	-	-	1.4	1.4
TYD	2.0	2.0	1.6	2.2
TYE	-	-	0.2	0.7
FLL	-	-	4.2	12.4
HAL	4.5	3.9	3.4	5.4
TFL	-	-	2.2	2.4
TL	9.6	8.6	10.5	11.0
FOL	10.0	8.2	10.5	11.2
ITL	-	-	0.9	1.5
FTL	-	-	6.3	6.1
IMT	-	-	0.8	1.0

part of thigh brown with large whitish spots.

Ventral parts of head, body and limbs: throat, chest and anterior part of belly whitish with fine brown lines; posterior part of belly whitish.

Female sexual characters: Oviduct zigzag. Ovary with large whitish oocytes.

Variation.- The female specimen BMHE A0081 from Basar (Fig. 2) has very similar morphology and measurements (Table 1). The main differences are in skin structure. The dorsum is of more granular aspect. Limbs are granular and not smooth as in the described specimen. Chest and centre of belly are smooth in the Basar specimen and not granular.

Comparison.- The specimens were allocated to *Liurana medogensis* because of the morphological similarity: small size, foot and hand without webbing, toe tips enlarged with pads, finger I much smaller than finger II, belly smooth in centre. Dorsal and ventral coloration corresponds to the pattern present in the types with minor variation. The specimens are distinct from *Liurana xizangensis* (Hu, 1977) by the toe tips that are distinctly enlarged in the NE Indian specimens but as large as finger tips in *L. xizangensis* and relative length of fingers I and II. The belly is described as smooth in *L. medogensis* types but the specimens newly collected from Arunachal Pradesh, India, shows flat tubercles on the side of the belly. The ventral color pattern of specimen ZSI A11549 is similar to Fig. 1 of Fei & Ye (1997) with the large reticulation, but in the specimen of Basar the belly is almost uniformly white and only the sides show dark pattern.

Generic allocation (Table 2)

Fei et al. (1997) described a small ranoid frog based on two male specimens from Medog (Tibet, China) as *Liurana medogensis*; the holotype was collected on

Fig. 2: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), BMHE A0081, adult female, SVL 20.5 mm. Live photograph.

Abb. 2: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), BMHE A0081, adultes Weibchen, Kopf-Rumpflänge 20.5 mm. Lebendabbildung.

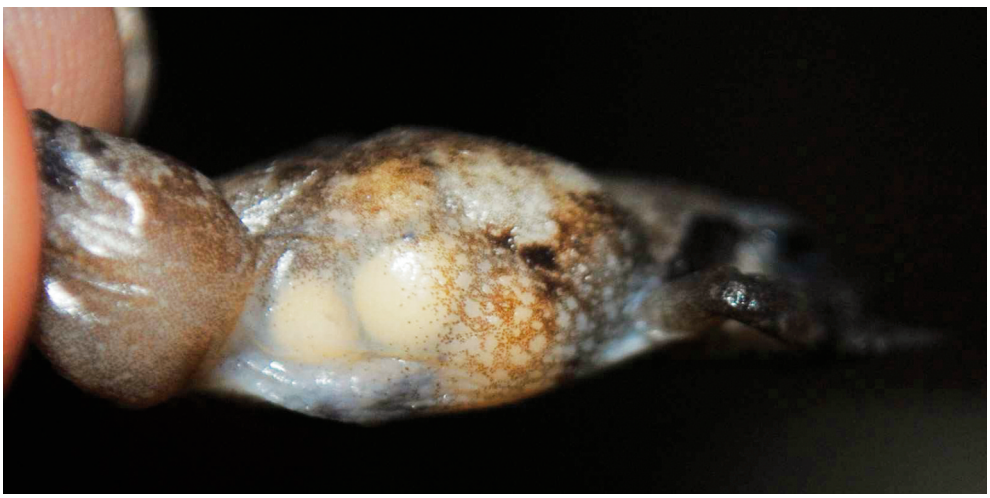

Fig. 3: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), BMHE A0081, adult female, SVL 20.5 mm. View of lateral body showing mature oocytes by transparency.

Abb. 3: *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997), BMHE A0081, adultes Weibchen, Kopf-Rumpflänge 20.5 mm. Seitenansicht: durch die transparente Körperwand sind die reifen Oozyten sichtbar.

21 July, 1973 and the paratype on 8 August, 1977. These specimens were allocated to the genus *Liurana* DUBOIS, 1987. DUBOIS (1987) included in this new subgenus *Cornufer xizangensis* HU, 1977 (type-species) and *Platymantis liui* YANG, 1983. None of these species has been integrated in the recent molecular studies, thus all taxonomic proposals (DUBOIS 2005; FROST et al. 2006; FEI et al. 2009) are devoid of new evidence. Until now, only morphological characters are available.

The small sized ranoid frogs included into *Liurana* by DUBOIS (1987) or in their original descriptions from southern China are allocated to *Ingerana* in the recent classifications (FROST et al. 2006; Frost online) or to *Liurana* (FEI et al. 2009), which is considered a distinct genus by these authors. *Liurana* was described as subgenus of *Ingerana* by DUBOIS (1987) on a combination of morphological characters. The subgenus *Liurana* was separated from the nominotypical subgenus by the enlarged size of toe pads and presence of grooves, as well as the extension of webbing and the presence of a lingual papilla. DUBOIS (2005) proposed *Liurana* as a synonym of *Taylorana* without indicating evidence. FROST et al. (2006) considered it synonym of *Ingerana* mainly on the basis of evidence from the original description and overlapping character states.

The decision of the status of the generic nomen depends on the allocation of the type-species. The identity of the other species may be different and their allocation distinct from the allocation of the type-species, but this will not influence the nomenclatural fate of the nomen.

The study of the newly collected specimens of *Liurana medogensis* provides more data on the morphology of the species. The species is now known from male and female specimens. The three oocytes that can be observed by transparency through left body wall of the adult female, are of large size (Fig. 3), which indicates, that development will go on without free larval stage and may depend entirely on yolk stored in the ova. This and the morphological characters of rudimentary webbing, small body size, and smooth dorsal skin without reticulate dermal structures, lead the authors to consider this species as a member of *Taylorana* (OHLER et al. 1999; SAILO et al. 2009; INGER & STUART 2011).

The type-species of *Liurana*, *Cornufer xizangensis*, was considered close to *L. medogensis* in the original description of the later (FEI et al. 1997). *Liurana xizangensis* can be distinguished by the pointed toe tip, the granular belly, the presence of tubercles on metatarsus and the similar length of fingers I and II. Considering the similarities with *L. medogensis*, *L. xizangensis* should be a member of the subgenus *Taylorana*. Thus, *Liurana* DUBOIS, 1987 is a synonym of *Taylorana* DUBOIS, 1987, the latter has priority over the former due to the 'first-reviser action' of DUBOIS (1999: 91).

The taxa *Platymantis liui* YANG, 1983 and *Liurana alpinus* HUANG & YE, 1997 should also be transferred to the genus-group *Taylorana*. Study of the holotype of *Platymantis liui* (OHLER unpublished data) showed that this species is morphologically close to the specimens of *Limnonectes* (*Taylorana*) *limborgii* (SCLATER, 1892) from northern Vietnam. The males of the type series from Yunnan measure 32.0-38.5 mm SVL, the only female measures 32.7 mm SVL (YANG 1983). This falls clearly within the range of the size given for *L. limborgii* by INGER & STUART (2010) for populations from central and northern Laos and northern Thailand. The size of the inner metatarsal tubercle is just half of the inner toe length in the holotype KIZ 195 according to Fig. 4 of YANG (1983) which also corresponds to the values given for *L. limborgii* in INGER & STUART (2010). Further molecular studies may elucidate the status of this name; here we propose it as *Limnonectes* (*Taylorana*) *liui*. *Liurana alpinus* is allocated to *Taylorana* by its smooth dorsal skin and the absence of webbing on feet.

The identity of *Micrixalus reticulatus* (ZHAO & LI, 1984) is distinct, as this species shares with the members of *Ingerana* the particular skin structure described as reticulated foldings. This skin structure is present in *Ingerana tasanae* (SMITH, 1921) and *I. tenasserimensis* (SCLATER, 1892). It is also present in *I. borealis* (ANNANDALE, 1912) (SAILO et al. 2009). Considering size, dorsal pattern and morphological characters, such as toe tips and webbing, *Micrixalus*

Table 2: Comparison of some morphological characters of *Limnonectes* (*Taylorana*) *alpinus* (Huang & Ye, 1997), *L.* (*T.*) *liui* (Yang, 1983), *L.* (*T.*) *medogenis* (Fei, Ye & Huang, 1997), *L.* (*T.*) *xizangensis* (Hu, 1977) and *Ingerana reticulata* (Zhao & Li, 1984). The information was taken from the original descriptions (Anonymous 1977; Yang 1983; Zhao & Li 1984; Huang & Ye 1997; Fei et al. 1997) and from Fei (1999). M – Male, F – Female.

Tab. 2: Vergleich morphologischer Merkmale von *Limnonectes* (*Taylorana*) *alpinus* (Huang & Ye, 1997), *L.* (*T.*) *liui* (Yang, 1983), *L.* (*T.*) *medogenis* (Fei, Ye & Huang, 1997), *L.* (*T.*) *xizangensis* (Hu, 1977) und *Ingerana reticulata* (Zhao & Li, 1984). Die Werte sind den Originalbeschreibungen (Anonymous 1977; Yang 1983; Zhao & Li 1984; Huang & Ye 1997; Fei et al. 1997) und Fei (1999) entnommen. M – Männchen, F – Weibchen. Die umfangreichen Angaben in englischer Sprache wurden nicht übersetzt.

Character	*alpinus*	*liui*	*medogensis*	*reticulata*	*xizangensis*
Size (mm)	M 16.6-20.2	M 32.0-38.5 W 32.7	M 17.5 W 21.0	M 18 W 21	M 21.3
Tympanum	Hidden	Large, distinct	Large, distinct	Hidden under skin	Large, distinct
Dorsum skin	Smooth with flat tubercles	Smooth with discontinuous folds	Smooth with folds	Reticulate skin ridges	Smooth, scattered with small tubercles
Belly skin	Smooth	Smooth	Smooth	Transverse s skin folds	Granular
Skin on thigh and tibia	Small tubercles on dorsal side	Tubercles in rows	Smooth	-	Smooth
Vomerine teeth	Absent	Present	Absent	Absent	Absent
Finger I to II	I shorter than II	I longer than II	I much shorter II	I longer than II	Almost same length
Toe tips	Not swollen	Small disks but no grooves	Slightly swollen	Slightly swollen	Not swollen
Tubercles on metatarsus	Absent	Absent	Absent	With small tubercles	Many small tubercles
Webbing	Absent	Small, distinct	Absent	Web to median subarticular tubercle	Absent
Belly coloration	Pale red, reticulation or markings	Pale yellow, no reticulation or markings	Light purple with distinctly marbled markings	Cream yellow with sparse dark dots	Pale yellow with black reticulated markings

reticulatus may be a synonym of *Ingerana borealis*. For the time, and waiting for new data, we consider this species as *Ingerana reticulata*.

Range and conservation

The type-locality of *Liurana medogensis* is Medog (1500 m a.s.l.; 29°22'N, 95°35'E), southeastern Tibet, China (Fig. 4). The place where the species was discovered in 2009, Basar (27°59'N, 94°40'E) is about 150 km southwest of Medog. The collecting place of 1997, Pange (27°32'N, 93°51'E) is more than 100 km west of Basar in the Himalayan slopes. Thus, the known range of the species was extended more than 250 km to the west. Considering the specific habitat requirements and their limited availability due to geomorphological constraints, the extension of the occurrence is remarkable. The habitat requirements are not yet clear, even though both specimens were collected in forest. It seems that the species is somehow tolerant to degraded forest. Arunachal Pradesh was still covered by forest to a large extent in the 1990s but deforestation continues and may destroy large parts of forest habitat.

From the reproductive mode, we can conclude that *L. medogensis* does not depend on water bodies for reproduction but probably needs high humidity during the period of embryonic development. *Limnonectes limborgii*, a species closely related, lays eggs in small holes in the ground under the undergrowth of forests (Ohler et al. 1999) where they develop. Males are calling by emitting single notes, repeated in very large intervals from 30 seconds to several minutes (Ohler et al. 1999), in these hidden places and difficult to find due to calling position and call structures. For *Limnonectes hascheanus* (Stolizcka, 1870)

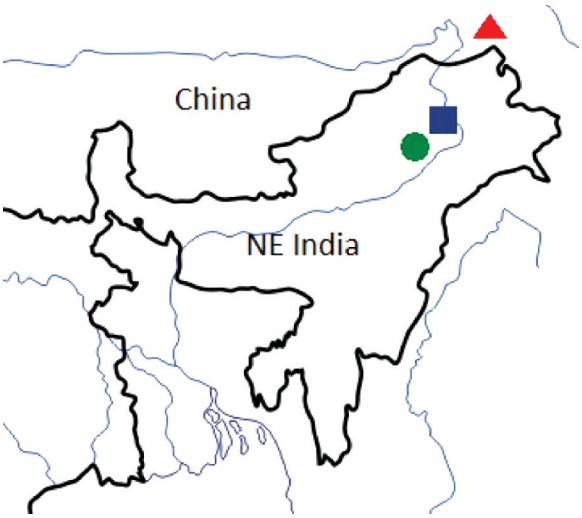

Fig. 4: Map of Northeast India and adjacent China showing type locality of *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) (red triangle) and localities in India (Basar - blue square; Pange - green circle).

Abb. 4: Karte von Nordostindien und angrenzenden Gebieten Chinas. Das rote Dreieck zeigt die Typuslokalität von *Limnonectes* (*Taylorana*) *medogensis* (Fei, Ye & Huang, 1997) in China; das blaue Quadrat symbolisiert Basar und der grüne Kreis Pange, beide Fundorte in Indien.

such nests have not been found and males call from positions hidden under leaf litter (Ohler pers. obs.). These observations are mentioned in order to stimulate researchers to do more explorations to find these species.

Even though more data are now available on range, habitat and life history, most aspects of the biology and ecology of *L. medogensis* is still unknown. This is clearly a species of interest for further studies, in particular, more information on distribution, reproductive biology and population sizes is needed for a thorough conservation assessment.

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