## *Rhacophorus burmanus* (ANDERSSON, 1939) – the valid nomen for *Rhacophorus taronensis* SMITH, 1940 and *Rhacophorus gongshanensis* YANG & SU, 1984

When working on the synonymy of *Rhacophorus dennysi* BLANFORD, 1881, the nomen *Polypedates* (*Rhacophorus*) *dennysii burmana* ANDERSSON, 1939 called my attention because its type locality is largely out of the range known for the species. After checking the original description it was clear that the allocation was wrong and that it should be close to the frogs called *Rhacophorus gongshanensis*, recently changed to *Rhacophorus taronensis*. Subsequently I could study the type specimen from Naturhistoriska Rijkmuseet (NHRM), Stockholm, Sweden.

ANDERSSON (1939) described *burmana* as a "forma" *Polypedates* (*Rhacophorus*) *dennysii* [sic!], nevertheless presenting it as new subspecies. The type-locality is "Kambawti", a little village near to the Chinese border, the surroundings of which were covered at the time of collection by "dense bamboo-jungles and primeval forests". The species nomen is based on a single specimen, holotype by monotypy, an adult male. The description and measurements given by ANDERSSON are detailed and correspond to the observations I made on the holotype. I nevertheless reproduce here a description of the holotype in the same format as those given fore recently described and redescribed species of *Rhacophorus* (OHLER & DELORME 2006; OHLER & DUBOIS 2006; BORDOLOI et al. 2007). Abbreviations are detailed in a footnote at the end of the overnext page.

Redescription of holotype: NHRM 1858, adult male (Fig. 1).

Type locality: Kauliang [Kambawti, Kambaiti] (25°24'N, 98°09'E; altitude 2130 m), Kachin State, Myanmar.

(A) Size and general aspect. (1) Specimen of rather large size (SVL 67.1 mm), body rather slender. Good preservation.

(B) Head. (2) Head moderate, slightly longer (HL 21.2 mm) than wide (HW 20.7 mm; MN 17.4 mm; MFE 12.8 mm; MBE 7.8 mm), flat. (3) Snout pointed, protruding; its length (SL 10.79 mm) longer than horizontal diameter of eye (EL 7.50 mm). (4) Canthus rostralis sharp; loreal region concave, obtuse in cross section. (5) Interorbital space flat, larger (IUE 7.63 mm) than upper eyelid (UEW 6.18 mm) and internarial distance (IN 6.18 mm); distance between front of eyes (IFE 11.6 mm) about two thirds of distance between back of eyes (IBE 18.7 mm). (6) Nostrils oval, without flap of skin; closer to eye (EN 4.61 mm) than to tip of snout (NS 5.53 mm). (7) Pupil indistinct. (8) Tympanum (TYD 4.61 mm), distinct, oval, oblique; tympanum-eye distance (TYE 1.45 mm) one third its diameter. (9) Pineal ocellus absent. (10) Vomerine ridge present, bearing numerous small teeth (n = 10), between choanae, perpendicular to body axis, closer to choanae than to each other, as long as distance between them. (11) Tongue large, oval, emarginate; median lingual process absent. Tooth-like projection on maxilla absent.

(C) Forelimbs. (12) Arm short, rather strong, fore-arm (FLL 15.7 mm) shorter than hand (HAL 20.7 mm), not enlarged. (13) Finger I short, thin; finger II rather short, rather thin; fingers III and IV long and rather thin (TFL 12.6 mm). (14) Relative length, shortest to longest: I <II < IV <III. (15) Tips of fingers I to IV rounded, enlarged; circumferential ('circum-ventral' in OHLER & DELORME 2006) grooves present on fingers I to IV, very wide compared to finger width (paI 2.27 mm, waI 1.30 mm; paII 3.95 mm, waII 1.81 mm; paIII 4.21 mm, waIII 1.94 mm; paIV 4.15 mm, waIV 1.94 mm). (16) Fingers with webbing: I 1–1$^1/_4$ II 1–2$^1/_2$ III 1–1 IV. (17) Subarticular tubercles present, single, distinct, rounded, all present. (18) Prepollex oval, prominent; numerous indistinct small tubercles on palm.

(D) Hindlimbs. (19) Shanks five times longer (TL 30.6 mm) than wide (TW 6.8 mm), shorter than thigh (FL 32.7 mm) and as long as distance from base of internal metatarsal tubercle to tip of toe IV (FOL 29.6 mm). (20) Toes long, thin, toe IV (FTL 16.1 mm) longer than third of distance from base of tarsus to tip of toe IV (TFOL 43.7 mm). (21) Relative length of toes, shortest to longest: I < II < III < V < IV. (22) Tips of toes rounded, enlarged, circumferential ('cir-

Fig. 1: Three aspects of the holotype of *Polypedates* (*Rhacophorus*) *dennysii burmana* ANDERSSON, 1939. Adult male, SVL 67.1 mm, from Kauliang [Kambawti, Kambaiti], Kachin State, Myanmar (NHRM 1858).

cum-ventral' in OHLER & DELORME 2006) grooves on toes I to V, rather wide (ppI 1.81 mm, pwI 1.23 mm; ppII 2.72 mm, pwII 1.62 mm; ppIII 2.72 mm, pwIII 1.69 mm; ppIV 3.24 mm, pwIV 1.56 mm; ppV 3.11 mm, pwV 1.75 mm). (23) Webbing large: I 0–1 II 0–1$^{1}/_{2}$ III 0–2 IV 1$^{1}/_{2}$–0 V (WTF 7.37 mm; WFF 8.55 mm; WI 7.11 mm; WII 7.24

mm; MTTF 17.1 mm; MTFF 19.1 mm; TFTF 9.1 mm; FFTF 9.8 mm). (24) Dermal ridge along toe V from tip of toe along toe, continuing on tarsus to heel, poorly developed, but distinct as a white line. (25) Subarticular tubercles present, single, distinct, rounded, all present. (26) Inner metatarsal tubercle short, distinct, its length (IMT 2.89 mm) 2.5 times in length of toe I (ITL 8.03 mm). (27) Tarsal fold absent. (28) Outer metatarsal tubercle and tarsal tubercle absent; few indistinct supernumerary tubercles on base of toes II to IV.

(E) Skin. (29) Dorsal and lateral parts of head and body: snout, between the eyes, dorsum and upper part of flanks smooth with horny spinules; side of head smooth with few horny spinules near tympanum; lower part of flank smooth gradually changing to poorly distinct glandular warts. (30) Latero-dorsal folds absent; "Fejervaryan" line absent; lateral line system absent; supratympanic fold present, prominent, thin, from eye to above arm insertion; cephalic ridges absent; co-ossified skin absent. (31) Dorsal parts of limbs: smooth with horny spinules; no such spinules on tarsus. (32) Ventral parts of head, body and limbs: throat and chest smooth; belly and thigh covered with treefrog belly skin. (33) Macroglands: absent.

(F) Coloration in alcohol. (34) Dorsal and lateral parts of head and body: dorsal parts of head and body and upper part of flank bluish brown with white spinules; canthus and supratympanic fold yellowish; lower part of flank brown with distinct large, rounded, white spots; loreal region and tympanic region bluish brown; tympanum brown with indistinct bluish spot; a distinct white line above vent. (35) Dorsal parts of limbs: bluish brown with white spinules separated by distinct white line on hand, fore-limb, foot and tarsus; posterior part of thigh brown with distinct, large, rounded, white spots. (36) Ventral parts of head, body and limbs: throat, margin of throat and chest creamy white; belly and thigh creamy white with an orange shade; webbing creamy white with orange tinge.

(G) Male secondary sexual characters. (37) Nuptial spines present on prepollex and finger I; indistinct, creamy white forming a unique pad. (38) Vocal sacs present, indistinct on throat; slit-like, posterior openings. (39) Other male secondary sexual characters: absent.

The nomen was in the synonymy of *Rhacophorus dennysi* BLANFORD, 1881 in the Amphibians of the World online database (FROST 2007) without providing authority for this synonymy. None of the authors working on *Rhacophorus* in the last 60 years mentioned this nomen. The synonymy seems to be based on giving faith to the decision of the original author in considering it close to *Rhacophorus dennysi*. Study of original description and of the holotype give evidence that *burmana* is in fact a nomen available for the species called

Abbreviations: EL - eye length; EN - distance from front of eye to nostril; FFTF - distance from maximum incurvation of web between fourth and fifth toe to tip of fourth toe; FL - femur length (from vent to knee); FLL - forelimb length (from elbow to base of outer tubercle); FOL - foot length (from base of inner metatarsal tubercle to tip of toe); FTL - fourth toe length (from base of first subarticular tubercle); HAL - hand length (from base of outer palmar tubercle to tip of toe); HL - head length (from back of mandible to tip of snout); HW - head width; IBE - distance between back of eyes; IFE - distance between front of eyes; IMT - length of inner metatarsal tubercle; IN - internasal space; ITL - inner toe length; IUE - minimum distance between upper eyelids; MBE - distance from back of mandible to back of eye; MFE - distance from back of mandible to front of eye; MN - distance from back of mandible to nostril; MTFF - distance from distal edge of metatarsal tubercle to maximum incurvation of web between fourth and fifth toe; MTTF - distance from distal edge of metatarsal tubercle to maximum incurvation of web between third and fourth toe; NS - distance from nostril to tip of snout; paI-paIV - width of pads of fingers I to IV; ppI-ppV - width of pads of toes I to V; pwI-pwV - width of toes I-V; SL - distance from front of eye to tip of snout; SN - distance from nostril to tip of snout; SVL - snout-vent length; TFL - third finger length (from base of first subarticular tubercle); TFOL - distance from base of tarsus to tip of forth toe; TFTF - distance from maximum incurvation of web between third and fourth toe to tip of fourth toe; TL - tibia length; TW - maximum width of shank; TYD - greatest tympanum diameter; TYE - distance from tympanum to back of eye; UEW - maximum width of inter upper eyelid; waI-waIV - width of fingers I to IV; WFF - webbing between fourth and fifth toe (from base of first subarticular tubercle); WI - webbing between third and fourth toe when folded along fourth toe (from base of first subarticular tubercle); WII - webbing between fourth and fifth toe when folded along fourth toe (from base of first subarticular tubercle); wpI-wpV - width of toes I to V; WTF - webbing between third and fourth toe (from base of first subarticular tubercle).

*Rhacophorus taronensis* SMITH, 1940 or *Rhacophorus gongshanensis* YANG & SU, 1984. These two nomina were recently studied and discussed by WILKINSON & RAO (2004) who gave evidence for them being synonyms.

The holotype of *Polypedates* (*Rhacophorus*) *dennysii burmana* corresponds in all major characters and measurements to the holotype of *Rana taronensis* SMITH, 1940, deposited in the Natural History Museum, London, United Kingdom (BMNH 1947.2.8.14, adult female), which I examined and which slightly differs from the descriptions given by SMITH (1940). Snout length is indicated as shorter than eye length, but in my measurements (EL 8.1 mm; SL 11.0 mm) as in the measurements given by WILKINSON & RAO (2004), the snout is longer than the eye. SMITH (1940) described the specimen as "fully webbed", but two phalanges of toe IV are free of web, as in the holotypes of *burmana* and *R. gongshanensis*. SMITH (1940) did not mention the presence of horny spinules on the dorsum of the type specimen, but those spinules are present, though more sparce than in the *burmana* holotype. This variation is presumably due to sexual dimorphism.

The type specimen of *burmana* also fits the data of *Rhacophorus gongshanensis* given by WILKINSON & RAO (2004) and the description given by YANG & SU (1984). It is slightly smaller in size than the male holotype of *R. gongshanensis*, but its size falls, as other comparable measurements, into the range given for a series of male specimens of the taxon from Myanmar (WILKINSON & RAO 2004). The tympanum measurements correspond to those given by these authors which are slightly different from the ratios indicated in the original descriptions. Webbing on foot lets two phalanges of the toe IV free of web in all three type specimens. All three type specimen have smooth skin with horny spinules on dorsal part of body. The main difference of the holotype of *burmana* is the absence of dark spots on back and dark sparkles on ventral parts.

The need to study and redescribe type specimens to allow proper allocation is confirmed by the discrepancies between the original description of *Rhacophorus taronensis* and the character states observed on the type of this species. It is not only a lengthy, repetitive exercise but a major tool for taxonomic work. These discrepancies might be partly due to different definition of characters and character states which cannot be verified as methodology used by a given author is not properly explained. Partly it may be due to observer differences. Redescription with properly defined methodology can limit such errors.

Taking into consideration similarity of the type specimens and intraspecific variation known to occur (WILKINSON & RAO 2004), the valid nomen of the taxon called in the past *Rhacophorus taronensis* or *Rhacophorus gongshanensis* is *Rhacophorus burmanus* (ANDERSSON, 1939) which is the first nomen available.

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