

Two New Species of Amphibians in Tibet

Yong-zhao Huang

(Northwest Plateau Institute of Biology, Academia Sinica)

Liang Fei

(Chengdu Institute of Biology, Academia Sinica)

In May and June of 1977, based on the initial survey of the amphibians of Tibet in 1973, the Northwest Institute of Biology, Academia Sinica, once again, went to Yadong, Chuona, Motuo in the south part of Tibet for an important survey. We also made short visits to Rikaze, Langxian, Linzi, Bomi, Mangkang, and other places. We found two new species. Type specimens are kept separately in the Northwest Plateau Institute of Biology, Academia Sinica, and the Chengdu Institute of Biology, Academia Sinica.

New species: *Megophrys pachyproctus* Huang, sp. nov.

Type species: Holotype ♂ (No. 770650), Allotype ♀ (No. 770652) and Paratype 1 ♂ (No. 770651), all collected on July 28, 1977 in Gelin, Motuo County, Tibet at an elevation of 1530m by Huang Yongzhao.

Diagnostic Characters: This new species is very similar to *Megophrys minor* Stejneger. The main differences are: the new species bears a vomerine ridge, lower part is swollen and bears thin teeth; the posterior end of the body of the male protrudes a slight bit and has an arc-shaped swelling. However, *M. minor* does not bear vomerine teeth, the posterior body of male does not have an arc-shaped swelling. Compared with *M. omeimontis*, body shape of adult new species is distinctly smaller.



Figure 1. *Megophrys pachyproctus* #770650 ♂

M. pachyproctus

Gelin, Motuo, Tibet

Character	Holotype specimen 770650	2 ♂♂	1 ♀	Character	Holotype specimen 770650	2 ♂♂	1 ♀
Body length	35.3	35.3–36.2 35.8	35.8	Forearm and hand length	17.9	17.9–18.4 18.2 50.8%	18.7 52.2%
Head length	12.5	12.5–13 12.8 35.8%	12.5 34.6%	Forearm width	2.7	2.5–2.7 2.6 7.3%	2.4 6.7%
Head width	12.4	12.4– 12.8 12.6 35.2%	12.9 36%	Hand length	9.9	9.9–10.1 10 27.9%	10.4 29.1
Snout length	4.8	4.7–4.8 4.75 13.4%	4.5 12.6%	Sotal length of leg	55.5	55.5–60 57.8 161.5%	60 167.6%
Internasal space	4	4 11.2%	3.9 10.9%	Tibia length	17.1	17.1–17.8 17.5 48.9%	17.8 49.3%
Interorbital space	4	4 11.2%	4.3 12%	Tibia width	4.8	4.3–4.8 4.6 12.8%	4.2 11.7%
Eyelid width	3.5	3.5–3.8 3.7 10.3%	3.2 8.9%	Tarsus and foot length	25.6	25.6–27 26.3 73.5%	27.5 26.8%
Diameter of eye	4.9	4.8–4.9 4.85 13.7%	4.7 13.1%	Foot length	16.8	16.8–17 16.9 47.2%	17.4 48.4%
Tympanum	1.7	1.7 4.7%	1.7 4.7%				

Note: Measurements are in mm, percentages are the comparison of each part with body length.

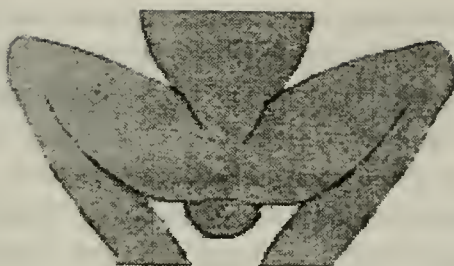


Figure 2. *Megophrys pachyproctus* showing anal region

Description of morphology: Body length of male 35.3–36 mm; head flattened, length and width nearly equal; snout tip bluntly rounded, shield like, distinctly protruding over lower lip, dorsal part of snout region concave; canthus rostralis very distinct, loreal region vertical and cheek surface concave; nostrils not easily seen in dorsal view, they are in the middle of snout and eyes; internasal space equal with interorbital space but a little larger than upper eyelid width; pupils vertical; tympanum oval, far away from eyes, about same distance as diameter of tympanum; two slanting vomerine ridges, posterior end swollen, bearing teeth, right and left not in contact; posterior end of tongue rounded, weakly notched.

Forearm narrow; finger tips rounded; no web between fingers; fingers long and narrow, digital formula: 3,4,2,1, first and second fingers nearly equal in length; no subarticular tubercles; inner metacarpal tubercles flattened but not very distinct. Hindlimb long, tibio-tarsal articulation reaches anterior to eye, right and left heels slightly overlapping, tibia length does not reach half of body length; toe tips rounded; no lateral fringes on toes, no web between toes; toes long and narrow, third slightly longer than fifth toe; no subarticular tubercles; at the base of the first toe is a swollen-like tubercle; inner metatarsal tubercles flattened, no outer metatarsal tubercles.

Skin rough, dorsal body and four limbs all bear small light red warts both in rows and sparse, warts on middle of posterior dorsal occipital region “X”-shaped; longitudinal skin ridge from posterior supratympanic fold to hip with light red warts on it; skin folds at upper eyelid with many distinct folds; supratympanic fold obtusely angled, the part inclined to shoulder is thicker, warts also appear on folds; posterior end of the body of male protrudes slightly and appears as an arc-shaped swelling, then inclines to ventral body and reaches anal region. Dissected view: formed by a mass of adipose tissue under protruding skin, posterior of female does not have arc-shaped swelling. A few small round warts appear on lateral body and dorsal part of four limbs, femur and tibia are typical; a pair of light colored white glands appear on lateral chest; a pair of posterior femur glands present.

In life, dorsal body brownish yellow or dark brown; triangular dark marking edged with lighter color appear between the eyes; color along warts darker; upper lip edge bears light alternating with dark longitudinal stripes, one below eyes larger; color below supratympanic fold darker; 2–4 dark transverse stripes on forearms, and 4–5 on either side of femur and tibia; grayish brown or black-brown around vent, dorsally it is edged

with grayish white narrow stripe; pelvis, both anterior and posterior femur and anterior part of ventral femur are all orange-red colored; finger and toe tips light red; tarsal, metatarsal and ventral toes grayish brown or black-brown; many grayish black spots scattered on lateral body and whole ventral body, a grayish black short longitudinal stripe in the middle of throat region is distinct; small milky white spots along lower lip edge. Color marking on dorsal and ventral body in female are lighter than in male.

Secondary sex characters: first finger of male bears gray nuptial pad, with dense nuptial spines on it; internal single subgular vocal sac exists, opening of vocal sac small and interrupted; posterior body has swelling which protrudes a little bit and arc-like; no lineae musculinae.

Ecology: On a rainy night of July 28, 1977, in the forest about 1500m above sea level, following the call that was a continuous “gazhi—gazhi—gazhi—……”, two male *Megophrys* were collected in the bushes and branches of shrubs; a female was collected beside road which was not far away from a flowing ditch.

New species *Rana conaensis* Fei et Huang, sp. nov.

Rana liebigii Herpetology Research Section, Sichuan Institute of Biology, 1977, Acta Zoologica Sinica, 23(1):56–57. (specimen from Chuona)

Type specimen: Holotype ♂ (No. 770531, collected on June 30, 1977 in Mama, Chuona County, Tibet at the elevation 2900m, by Huang Yongzhao), allotype ♀ (No. 770532, collected at the same time and same place with holotype), paratype (22♂♂, 8 ♀♀, 26 juveniles, ova and tadpoles, collected on June 24–30, 1977 in Mama, Chuona County, Tibet, at the elevation of 2900–3400m, Northwest Institute of Biology. 2 ♂♂, 1 ♀, 3 juveniles and tadpoles, collected on August 7 in Mama, Chuona County, Tibet at the elevation of 2900m, Chengdu Institute of Biology¹)

Diagnostic Characters: The new species is similar to *Rana liebigii* Guenther. Body size of new species is small, the largest body length of adult frog is not greater than 70mm, no dorsolateral fold; skin on both sides of anal region forms a slight “^”-shaped air-filled sac, very distinct; internal arm of male frog does not bear cone-shaped black spines. Body size of *Rana liebigii* large, the greatest body length of an adult frog is more than 100mm; dorsolateral fold exists; skin on anal region does not bear air-filled sac; inner arm of male bears cone-shaped black spines.

Description of morphology: Average body length is 58mm in males, 55mm in females; head width slightly larger than head length, snout tip bluntly rounded, protruding

¹ * In 1977, two ♂♂, one ♀, three juveniles collected by Mr. Wenxuan Chao of Fishery Institute of Biology, Academia Sinica in Mama, Chuona County on August 7, 1974, were regarded as *Rana liebigii*. Now after obtaining more of the same species, we think they should be this new species, *Rana conaensis*.

over mandible; canthus rostralis not distinct, loreal region inclines outward; nostrils slightly closer to eyes, internasal space larger than interorbital space or upper eyelid width; pupils rounded; tympanum hidden; vomerine teeth in two short rows, slanting from choanae to mid-line, rows closer together posteriorly; large tongue, deeply notched at posterior end.

Forearm and hand length do not reach half of body length; finger tips ball-like, formula 3,4,1,2, first and second fingers nearly equal in length, slight lateral fringes on fingers; subarticular tubercles near tips of fingers distinct; three metacarpal tubercles, inner metacarpal tubercles big and oval shape, outer metacarpal tubercles small, narrow and long, hindlimb thick and strong, tibio-tarsal articulation extends anterior to eyes or nostrils, right and left heels overlap; tibia length larger than half of body length, tibia and foot almost same length; comparisons between toes and fingers, third and fifth toe almost same length; completely webbed between toes, first and fifth toe have very distinct lateral fringes, fringes over half the length of the web; subarticular tubercles distinct; inner metatarsal tubercles long oval shape, no outer metatarsal tubercles; no tarsal fold.

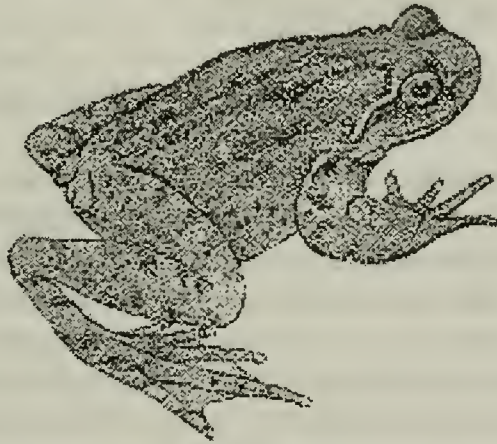


Figure 3. *Rana conaensis* ♂ No. 770531

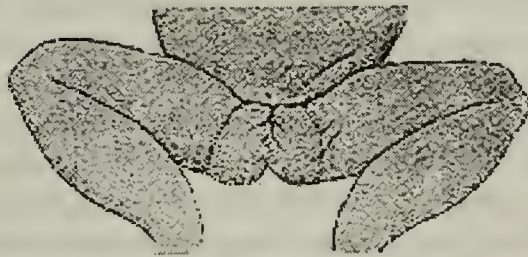


Figure 4. *Rana conaensis* showing anal region

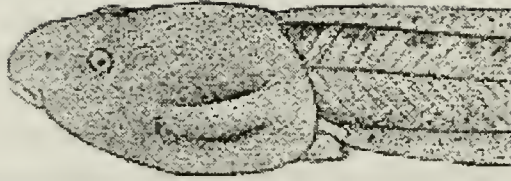


Figure 5. Tadpole of *Rana conaensis* showing air-filled sac.

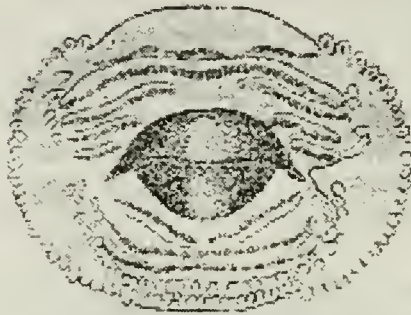


Figure 6. Mouth region of a tadpole of *Rana conaensis*

Skin smooth, small round warts or long warts sparse on dorsum and lateral body, dense on posterior body; no dorsolateral fold, only broken longitudinal rows of skin ridges on both sides of anterior dorsal body; granules scattered on warts or among skin ridges and on lateral head, dorsal part of four limbs, warts or granules all bear black spines or light spiny marks; horizontal skin groove between posterior corners of eyes; supratympanic fold distinct. Skin on anal region at posterior part of body in male loose, it forms a slight “^”-shaped sac from dorsum to anus to posterior base of thigh, very distinct, but not as distinct in females compared to that of males, absent in juveniles. Skin on ventral body smooth, two bunches of cone-shaped black spines on lateral chest of male, after black spines fall off, only two bunches of light fleshy tubercles remain; small spiny warts scattered on posterior part below tarsal and metatarsals.

In life, dorsal body of adult olive-brown, dark brown or grayish brown; black transverse stripe on anterior edge of transverse groove between eyes; three longitudinal rows of black-brown, small and big spots on dorsal body, generally linked to form three faint longitudinal stripes from posterior eyes along dorsal midline and both sides of body directly to posterior part of body; black-brown stripe starts on canthus rostralis through the eyes to the level below supratympanic fold; dark irregular stripes on both upper and lower lip edges; grayish brown spots on lateral body; dark transverse stripes on forelimbs mostly irregular; broken markings mostly appear on posterior thigh, some are not very clear. Ventral body grayish white or milky white, grayish brown or dark brown spots densely scattered on throat, chest and lateral belly, spots on posterior part of ventral

body and upper ventral thigh are few or none. Dorsal body of juveniles mostly olive-green, three longitudinal stripes on dorsal body very distinct; dorsal part of forelimbs olive-brown or grayish brown, transverse stripes on forelimbs very distinct; as size increases, green color on dorsal body will eventually decrease till reaching color of adult.

Secondary Sex Characters: Forelimb thick and strong, first and second fingers bear black cone-shaped nuptial spines, inner side of third finger also bears several nuptial spines in a few specimens, two bunches of black cone-shaped spiny warts on lateral side of chest; internal single subgular vocal sac exists, opening of vocal sac is a slit and interrupted; linea musculinae exists on lateral body.

Eggs: Diameter of eggs is 3–3.5mm, animal pole brownish gray, vegetable pole milky yellow; two layers of gelatinous membrane are outside of eggs, outer layer thick and very sticky.

Tadpoles: In life, dorsal body olive-brown or dark brown, dorsal part of musculus caudalis bears 3–5 dark transverse stripes or spots, color of caudal fin slightly lighter, dark brown spots densely scattered on caudal fin. Ventral body light colored, liver and intestine can be seen. When hindlimb bud is 3.4–7mm long, total body length is about 65mm, snout rounded, eyes dorsolaterally on head; spiracle on left side of body slanting to posterior upper level, does not form a free tube; skin on posterior lateral body loose, forming a slight air-filled sac; anus slants open on right side below base of tail; musculus caudalis well developed, caudal fin low, posterior tip bluntly rounded; mouth on ventral side of snout, about 5mm wide, lip wide, no papillae in middle part of upper lip, two rows of papillae on both sides of upper lip, widely separated from each other, external row of papillae small and dense, internal row big and sparse, near labial teeth; some bear 3–5 additional papillae; labial tooth formula often II: 3-3 / II: 1-1, individual II: 4-4 / II: 1-1 or II: 3-3/III. In addition, color of small tadpoles in life with an average 23mm body length is brownish gray on dorsum; milky yellow on venter; milky yellow on musculus caudalis, also; caudal fin light with sparse gray tiny spots, two rows of papillae on corner of mouth and mandible, widely separate; labial teeth formula often II: 2-2 / II: 1-1, some I: 3-3 / II: 1-1 or II: 3-3 / II: 1-1. When tail length of tadpole in metamorphosis is 8–14mm, body length is 19–23.2mm, essentially having adult frog characteristics, warts or skin ridges on dorsal body starts to show, transverse stripes on forelimbs are more regular and clearer than adults.

Ecology: This species often rests in small streams, spring runs and nearby water puddles at an elevation of 2850–3400m, mostly hidden under rocks, fallen trees beside streams or under roots beside ditches, occasionally stays on rocks beside the bank or among bushes, when scared, jumps into water immediately and escapes, very hard to catch. Eggs either single or several linked together and stuck unevenly on fallen trees or under rocks in shallow water. Tadpoles move around either in the cracks of rocks or under stones in small slow moving streams, or among aquatic plants beside spring water or slow areas under the tree roots.

Rana conaensis

Mama, Chuona Tibet

Character	Holotype specimen 770531	20♂♂	9♀♀	Character	Holotype specimen 770531	20♂♂	9♀♀
Body length	57.6	43.5-69 58	46.1-68.4 55.2	Forearm and hand length	26.2	21.2-33.5 27.6 47.6%	21.7-27.6 24.3 44%
Head length	18.3	15-22 18.8 32.4%	15.2-21 17.8 32.2%	Forearm width	9.5	5.2-12.3 9.4 16.2%	4.3-6.5 5.4 9.8%
Head width	20.8	16-24 20.2 34.8%	16.6-23.7 19.5 35.3%	Hand width	15.9	13.3-20.5 17.2 29.7%	13.5-17.2 15.1 27.4%
Snout length	8.3	6.4-9.3 8.2 14.1%	6.9-9 7.8 14.1%	Total length of leg	102	75-132 103.6 178.6%	80-107 92.6 167.8%
Internasal space	6.4	4.7-7 6.1 10.5%	5-6.5 5.7 10.3%	Tibia length	31.5	24.5-40.7 32.2 55.5%	25.4-33.3 29.2 52.9%
Interorbital space	4	3.6-5 4.4 7.5%	3.5-4.2 3.9 7.1%	Tibia width	8.5	6.8-12.1 10.2 17.6%	7.4-10 8.6 15.6%
Eyelid width	4.7	3.3-5.4 4.7 8.1%	4-5.2 4.5 8.2%	Tarsal and foot length	46	34.4-58.3 46.2 79.7%	35.7-47 41.6 75.4%
Diameter of eye	6.3	5.2-7.5 6.3 10.9%	5.3-8 6.2 11.2%	Foot length	31	23.5-39.5 31.4 54.1%	24.4-31.7 28.1 50.9%

10 tadpoles of *Rana conaensi*

Mama, Chuona, Tibet

Total body length	59.3–70.4 64.4	Snout to spiracle	12–14 13 59.6%	Tail height	10–11.2 10.6 48.6%
Head and body length	20.4–23 21.8	Interorbital space	4.6–5.2 4.9 22.5%	Musculus caudalis width	5.6–6.8 6.3 28.9
Body height	10–11.2 10.6 48.6%	Mouth width	4.3–5.2 5 22.9%	Hindlimb	3.4–7 4.9 22.5%
Body width	13–14.5 13.4 61.5%	Tail length	38.5–48.2 42.6 195.4%		

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