

New data on Enidae (Gastropoda, Pulmonata) of Nepal

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Pupinidius tukuchensis sp. nov., *Laevozebrinus nepalensis myagdiensis* subsp. nov., and *L. mustangensis* sp. nov. are described by conchological and anatomical features. New data on the distribution and habitat of *Nepaliena ceratina* (Benson, 1849), *Laevozebrinus nepalensis nepalensis* Schileyko et Frank, 1994, and *Mirus* (?) *nilagiricus* (Pfeiffer, 1846) are presented.

Новые данные о видах семейства Enidae фауны Непала

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Pupinidius tukuchensis sp. nov., *Laevozebrinus nepalensis myagdiensis* subsp. nov. и *L. mustangensis* sp. nov. описаны по конхологическим и анатомическим признакам. Для трех видов [*Nepaliena ceratina* (Benson, 1849), *Laevozebrinus nepalensis nepalensis* Schileyko et Frank, 1994 и *Mirus* (?) *nilagiricus* (Pfeiffer, 1846)] приведены новые подробные данные о распространении и характере местообитаний.

About 20 species of Enidae are known from Indian part of Himalayas [Gude, 1914], while only two species have been described from Nepalesian Himalayas [Schileyko, Frank, 1994]. This is connected with the fact that the malacofauna of Nepal is still poorly known. During two collecting trips to Nepal of one of the authors (A. K.) in 1995 and 1996, new data on the distribution of previously known species were obtained, and two new species and one new subspecies were found. One of them, *Pupinidius tukuchensis* sp. nov., is the first representative of the genus from southern slope of Himalayas. The others — *Laevozebrinus nepalensis myagdiensis* subsp. nov. and *L. mustangensis* sp. nov. — are the second and the third members of the genus from Nepal. *Mirus* (?) *nilagiricus* (L. Pfeiffer, 1846) is described by only conchological features, so its generic position is not quite clear.

Family Enidae Woodward, 1903

Subfamily Pseudonapaeinae
Schileyko, 1978

Genus *Pupinidius* Moellendorff, 1901

Moellendorff, 1901: 341 (*Buliminus* subgen.; type species *Buliminus pupinidius* Moellendorff, 1901; o.d.); Wiegmann, 1901: 254; Schileyko, 1978: 345.

Pupinidius tukuchensis
Kuznetsov et Schileyko, sp. nov.

(Figs. 1, 2)

LOCUS TYPICUS — Western Nepal, Dhau-lagiri zone, Mustang District, Annapurna National Park, Pholong-Dara Ridge, right side of Kali-Gandaki Valley, 200-700 m NE of Khobang village, 1-5 m over "Khobang —

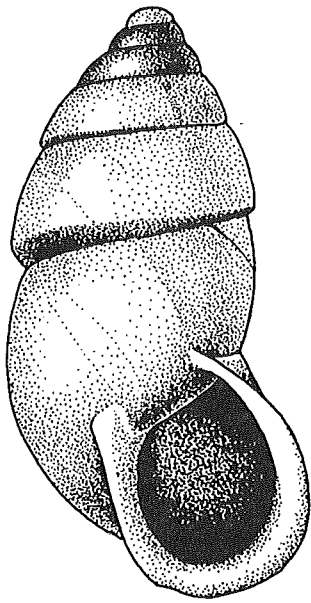


FIG. 1. *Pupinidius tukuchensis* sp. nov. Holotype.

РИС. 1. *Pupinidius tukuchensis* sp. nov. Голотип.

Tukuche" track, on dry rocks, 2600 m, coll. A.G. Kuznetsov, 1st and 7th of May 1996.

MATERIAL. Holotype (No. Lc-22965) and 25 paratypes from the type locality (Lc-22968) are deposited in the Zoological Museum of Moscow State University (ZMMU), more than 200 paratypes from the type locality in private collection of A.G.Kuznetsov (PCK), 5 paratypes from the type locality in private collection of B. Hausdorf (Hamburg, Germany, PCH);

Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park:

— right side of Kali-Gandaki Valley, NE end of

Tukuche village, upper half of SE slope of mountain, NW of Gonpa-Sampa temple, along dry rocks among *Astragalus* roots, 2650-2700 m, 40 paratypes (ZMMU Lc-22969), 91 paratypes (PCK), coll. A.G. Kuznetsov, 7.05.1996;

— right side of Kali-Gandaki Valley 1 km NE of Tukuche village, 5-10 m over track on dry rocks, 2580 m, 16 paratypes (PCK), coll.A.G.Kuznetsov, 28.09.1997.

DESCRIPTION. Shell ovate-conical to conical-cylindrical, rather solid, glossy, composed of 6.5-7.5 flattened whorls. Last whorl slightly ascending in front. Embryonic whorls (about 2 in number) greyish-corneous or light-fulvous, with radial wrinkles and indistinct spiral striae. Three subsequent whorls whitish-corneous, with more or less developed radial streaks; they have carinated periphery, often hang over last whorl. They form conical apical part. Two or three last whorls greyish-white, sometimes with small grey dots. Body whorl somewhat inflated. Surface of postembryonic whorls silky, with fine irregular radial wrinkles and wavy spiral striation, more distinct on shell base. Aperture ovate to subcircular, only slightly oblique, brownish-orange inside, with white margins. Places of aperture attachment close to each other, connected by variously developed parietal callus; sometimes small parietal tubercle present. Margins moderately thickened, rather expanded and reflexed. Palatal and basal margins evenly arched. Columellar margin subvertical. Umbilicus slit-like.

DIMENSIONS: height of shell 15.7-21.8, large diameter 8.4-11.5, height of aperture 6.8-10.0, width of aperture 5.5-7.2 mm; holotype 19.9, 10.0, 9.0, 7.1 mm, respectively.

REPRODUCTIVE ANATOMY (14 specimens from four localities). Vas deferens entering

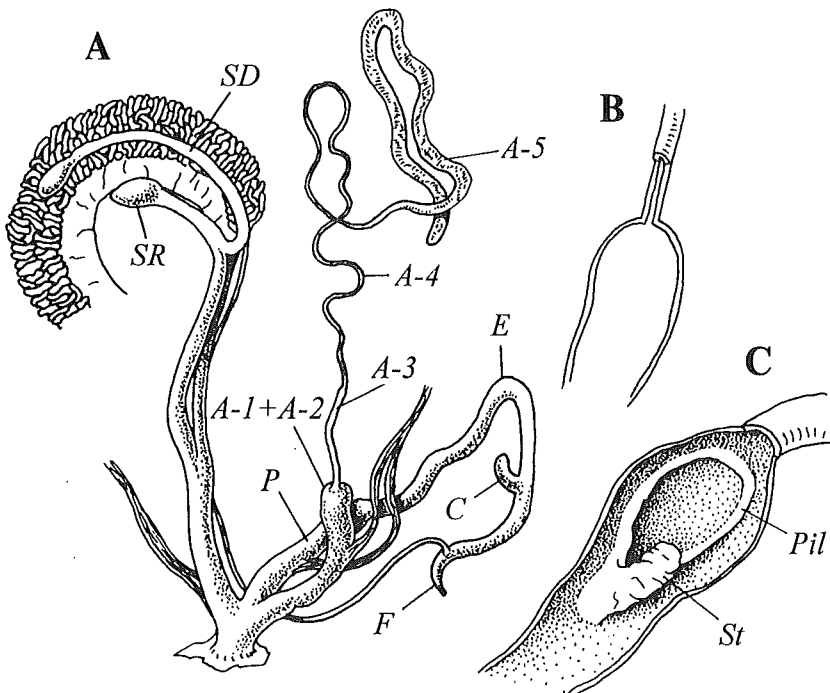


FIG. 2. *Pupinidius tukuchensis* sp. nov. Paratype from type locality. A — reproductive apparatus; B — longitudinal section of basal portion of penial appendix; C — open penis. A-1-A-5 — divisions of penial appendix; C — caecum; E — epiphallus; F — flagellum; P — penis; Pil — pilaster; SD — spermathecal diverticle; SR — spermathecal reservoir; St — stimulator.

РИС. 2. *Pupinidius tukuchensis* sp. nov. Паратип из типового местонахождения. А — половой аппарат; В — продольный разрез базальной части пениального аппендикса; С — вскрытый пенис. А-1-А-5 — отделы пениального аппендикса; С — цекум; Е — эпифаллус; F — флагеллум; P — пенис; Pil — пилистр; SD — дивертикул семеприемника; SR — резервуар семеприемника; St — стимулятор.

epiphallus at some angle, at some distance from tip, remaining comparatively long, conical flagellum. Epiphallus variable in length, with well-developed caecum above its middle. Penis of moderate length; internally with loop-like pilaster; lower portion of pilaster with tongue-like process (stimulator); inner surface of penis with numerous irregular longitudinal folds. Penial appendix characterized by poorly defined A-2 and absence of any inner structure in corresponding place; A-3 and A-5 unusually long. Penial retractor arising from diaphragm by one bundle which soon is forked: penial branch attached to middle part of penis, appendical branch — to A-1 above its middle. Upper part of vagina (free oviduct) somewhat longer than lower part. Spermathecal neck long; spermatheca and spermathecal diverticle equally expanded at their tips, so shaft and diverticle hardly distinguishable. One of these ducts longer than other.

REMARK. *Pupinidius tukuchensis* sp. nov. differs from *P. anocampatus* (Moellendorff, 1901) in larger size, more cylindrical shape of the shell, inflated body whorl, more oblique axis of aperture, and wider umbilical slit. From *P. nanpingensis* (Moellendorff, 1901) the new species differs mainly in greyish-white colour. Anatomically *P. tukuchensis* sp. nov. differs from type species of the genus, *P. pupinidius* (Moellendorff, 1901), in shorter neck of spermatheca and in presence of tongue-like stimulator located on loop-like pilaster in the penis.

HABITAT. *Pupinidius tukuchensis* sp. nov. is abundant in the zone of juniper forests at 2600–3500 m above the sea level. It occurs on open dry rocky slopes with xerophilous vegetation, on steep rocks, and among stones and *Astragalus* roots, where it is associated with: *Pupilla eurina* (Benson, 1864); *P. triplicata* (Studer, 1820); *Gastrocopta huttoniana* (Benson, 1849); *Truncatellina* sp.; *Vallonia ladacensis* (Nevill, 1878); *V.* sp.; *Pyramidula humilis* (Benson in Hutton, 1838); *Laevozebrinus nepalensis nepalensis* Schileyko et Frank, 1994; *Euconulus fulvus* (O.F. Müller, 1774); *Macrochlamys sequax* (Benson, 1859); *M. sequis* Godwin-Austen, 1907; *Hawaia* sp.; *Landouria* sp.

DISTRIBUTION. Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park, upper part of Kali-Gandaki Valley.

DERIVATIO NOMINIS. The species is named after the type locality — “Khobang — Tukuche” track.

[Диагноз. Раковина от овально-конической до коническо-цилиндрической, довольно прочная, блестящая, состоящая из 6,5–7,5 уплощенных оборотов. Последний оборот слегка приподнят перед устьем. Эмбриональные обороты (около 2) серовато-роговые или светло-коричневые, с радиальной морщинистостью и слабой спиральной струйчатостью. Три первых пост-

эмбриональных оборота беловато-роговые с радиальными пестринами и угловатой нависающей периферией. В совокупности они образуют коническую вершину. Два-три последующих оборота серовато-белые, с мелкими серыми точками. Последний оборот несколько вздут. Поверхность постэмбриональных оборотов шелковистая, с тонкими, неправильно расположенными линиями нарастания и радиальными морщинками, а также волнистой спиральной струйчатостью. Устье от овального до полукруглого, слегка скошенное, коричневатое-оранжевое внутри, с белыми краями. Места прикрепления устья сближены и соединены развитой в различной степени париетальной мозолью, иногда несущей париетальный бугорок. Край устья умеренно утолщенные, расширенные и отвернутые. Париетальный и базальный края равномерно выгнутые. Колумеллярный край почти вертикальный. Пупок открытый, шелевидный.]

Genus *Nepaliena* Schileyko et Frank, 1994

Schileyko, Frank, 1994: 128 (type species — *Bulimus ceratinus* Benson, 1849; o.d.).

Nepaliena ceratina (Benson, 1849).

Benson in Reeve, 1849, pl. 77, fig. 569. — L. Pfeiffer, 1856: 153 [*Bulimus* (*Ena*)]. — Nevill, 1878: 134 [*Bulimus* (*Petraeus*) *coelebs* var.]. — Gude, 1914: 230 [*Ena* (*Mirus*)]. — Solem, 1966: 21 [*Coccoderma*]. — Schileyko, Frank, 1994: 128, fig. 1 (I–III).

LOCUS TYPICUS — India, Uttar-Pradesh State, Kumaun Himalayas, Almora.

DISTRIBUTION AND MATERIAL. Besides the type locality in Northern India, the species is known from Nepal: Central Nepal, vicinity of Kathmandu, 7 specimens (ZMMU), leg. Ch. Frank, 10–20.06.1986; Western Nepal, Dhaulagiri zone, Myagdi District, Annapurna National Park:

- right side of Kali-Gandaki Valley, 100–300 m NNW of Suke-Bagar village, 1–5 m over “Tatopani — Dana” track, in cracks of mossy rocks, 1430 m, 22 specimens (PCK), 25 specimens (ZMMU), coll. A.G. Kuznetsov, 13–14.05.1996;
- right side of Kali-Gandaki Valley, southern end of Dana, along track, under stones of old wall, 1500 m, 3 specimens (ZMMU), coll. A.G. Kuznetsov, 6.05.1996
- left side of Kali-Gandaki Valley, SW end of Do-Khola village, 1180 m, 5 specimens (PCK), coll. A.G. Kuznetsov, 6.10.1997.

HABITAT. *N. ceratina* is uncommon species of upper level of deciduous forest zone. It lives at altitude of 1430–1500 m above the sea level. Micropopulations occur in cracks of mossy shadowed rocks and under stones of ancient walls, where it is associated with *Cyclophorus* (*Litostylus*) *pyrotrema* Benson, 1854; *Laevozebrinus nepalensis myagdiensis* subsp. nov.; *Allopeas mauritianus prestoni* (Sykes, 1898); *Macrochlamys longicauda* Godwin-Austen, 1883; *M. subjecta* (Benson, 1852); *Bensonies convexus* (Reeve, 1852); *Cryptaustenia ovata* (H. Blanford, 1871); *C.* cf. *globosa*

(Godwin-Austen, 1876); *C. sp.*; *Landouria huttoni* (L. Pfeiffer, 1842); *Endothyrella* ex. gr. *affinis* Gude, 1897.

Genus *Laevozebrinus*
Lindholm, 1925

Lindholm, 1925: 28 [*Zebrina (Subzebrinus)*, sect.; type species — *Buliminus urgutensis* Kobelt, 1902; o.d.].
— Schileyko, 1978: 845 (pro gen.).

Laevozebrinus nepalensis nepalensis
Schileyko et Frank, 1994

Schileyko, Frank, 1994: 130, fig. 2 (I-VI).

LOCUS TYPICUS. Central Nepal, neighbourhood of Kathmandu, holotype and 7 paratypes (ZMMU).

DISTRIBUTION AND MATERIAL. Besides the type locality in Central Nepal, the species is widely distributed in Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park:

— Pholong-Dara Ridge, right side of Kali-Gandaki Valley, 200-700 m NE of Khobang village, 1-5 m over "Khobang — Tukuche" track, on dry steep slope among stones and grass roots, 2600 m, 52 specimens (PCK), 10 specimens (ZMMU), coll. A.G. Kuznetsov, 7.11.05.1996.

— right side of Kali-Gandaki Valley, NE end of Tukuche village, upper half of SE slope of mountain NW of Gonpa-Sampa temple, along dry rocks among grass roots, 2650-2700 m, 10 specimens (ZMMU), 30 specimens (PCK); coll. A.G. Kuznetsov, 7.05.1996;

— right side of Kali-Gandaki Valley, middle part of southern slope of mountain, at NE end of Marpha village near Buddhist shrine among stones and grass roots, 2750 m, 10 specimens (ZMMU), 13 specimens (PCK), coll. A.G. Kuznetsov, 8.05.1996;

— W of Tukuche village, at right side of Yamkim-Khola Valley (right tributary of the Kali-Gandaki River), on dry slope under stones, 2600 m, 10 specimens (ZMMU), 5 specimens (PCK), coll. A.G. Kuznetsov, 7.05.1996;

— right side of Kali-Gandaki Valley, opposite Chhariogaon village (=Chhariogaon) 1-2 m over "Marpha — Tukuche" track, on dry slope under stones, 2670 m, 10 specimens (ZMMU), 5 specimens (PCK), coll. A.G. Kuznetsov, 11.05.1996;

— left side of Kali-Gandaki Valley 2 km SSW of Jomsom (100 m SW of Samle village), on northern slope of mountain along track between Holy Lake and Kuchhaptrnga monastery, among stones and grass roots, 2850-2900 m, 3 specimens (PCK), coll. A.G. Kuznetsov, 9.05.1996;

— 50-100 m E of Dhumpha village, on dry slope around juniper bushes, among stones and grass, 2850-2900 m, 31 specimens (PCK), coll. A.G. Kuznetsov, 9.05.1996;

HABITAT. The species is common in zones of pine and juniper forests at altitude of 2600-2900 m above the sea level. It occurs on moderately dry slopes with bushes, among stones and grass roots, where it associated with land snails complex of *Pupinidius siniayevi* sp. nov. (see above).

Laevozebrinus nepalensis myagdiensis
Kuznetsov et Schileyko, subsp. nov.

(Figs. 3, 4)

LOCUS TYPICUS — Western Nepal, Dhaulagiri zone, Myagdi District, Annapurna National Park, right side of Kali-Gandaki Valley 100-300 m NNW of Suke-Bagar village, 1-5 m over "Tatopani — Dana" track, 1430 m, coll. A.G. Kuznetsov, 13-14.05.1996;

MATERIAL. Holotype (ZMMU Lc-29976) and 5 paratypes (ZMMU LC-29975), 30 paratypes (PCK), 3 paratypes (PCH) from type locality;

Western Nepal, Dhaulagiri zone, Myagdi District, Annapurna National Park:

— right side of Kali-Gandaki Valley 150-200 m N of Tital (=Tital) village, 1 m over "Dana — Ghasa" track, 1550 m, 2 paratypes (PCK), coll. A.G. Kuznetsov, 13.05.1996;

— right side of Kali-Gandaki Valley, southern end of Dana, along track under stones of old wall, 1500 m, 7 paratypes (PCK), coll. A.G. Kuznetsov, 6.05.1996.

DESCRIPTION. The taxon differs from the nominotypical subspecies in more slender shell consisting of more numerous whorls (up to 8), more conical outline of spire, and comparatively less high and more rounded aperture.

DIMENSIONS: height of shell 8.5-11.7, large diameter 3.8-4.8, height of aperture 3.1-4.0, width of aperture 2.3-3.2 mm; holotype: 11.2, 4.2, 3.7, 2.9 mm respectively.

REPRODUCTIVE ANATOMY (1 and only preserved specimen from type locality). Vas deferens entering epiphallus at nearly right angle. Flagellum comparatively long, conical. Epiphallus rather long, with large caecum occupying middle part of epiphallus. Penis of slender distal and bulbous proximal portions; later containing fleshy verge with very long and wide lateral orifice. A-1 of penial appendix unusually long, slender and twisted, remaining portions of appendix without any peculiarities. Penial retractor arising from diaphragm as single bundle and soon divided into appendical arm, attached to A-1 above its middle part, and penial branch, inserted to boundary between distal and proximal portions of penis. Vagina very short. Spermathecal stalk simple, rather short; reservoir lying on lower surface of spermoviduct.

Anatomically the new subspecies differs from the nominotypical in longer A-1 and A-3, shorter vagina, and structure of penial verge: this organ corresponds to principal lobe of *L. nepalensis nepalensis* verge, whereas smaller additional lobe(s) absent.

HABITAT. The range of the new subspecies is geographically and ecologically separated from that of nominotypical one. *L. nepalensis myagdiensis* is uncommon in the lower part of Kali-Gandaki Valley, at 1430-1550 m above the sea level, in comparatively more wet con-

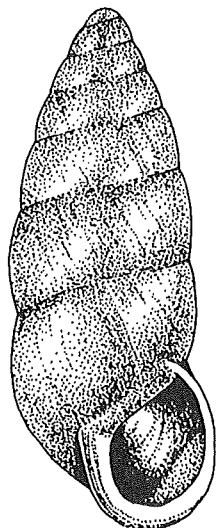


FIG. 3. *Laeozobrinus nepalensis myagdiensis* subsp. nov. Holotype.
РИС. 3. *Laeozobrinus nepalensis myagdiensis* subsp. nov. Голотип.

ditions in dense bushes of the upper level of deciduous forest zone, in crevices of rocks, covered by moss, where it lives together with species of *Nepaliena ceratina* complex (see above).

DISTRIBUTION. Western Nepal, Dhaulagiri zone, Myagdi District, Annapurna National Park, Kali-Gandaki Valley.

DERIVATIO NOMINIS. The subspecies is named after the area (District Myagdi).

[Диагноз. Новый подвид отличается от номинативного более стройной раковиной, состоящей из большего числа оборотов (до 8), более коническими контурами завитка, а также сравнительно меньшей высотой и более округлыми очертаниями устья.]

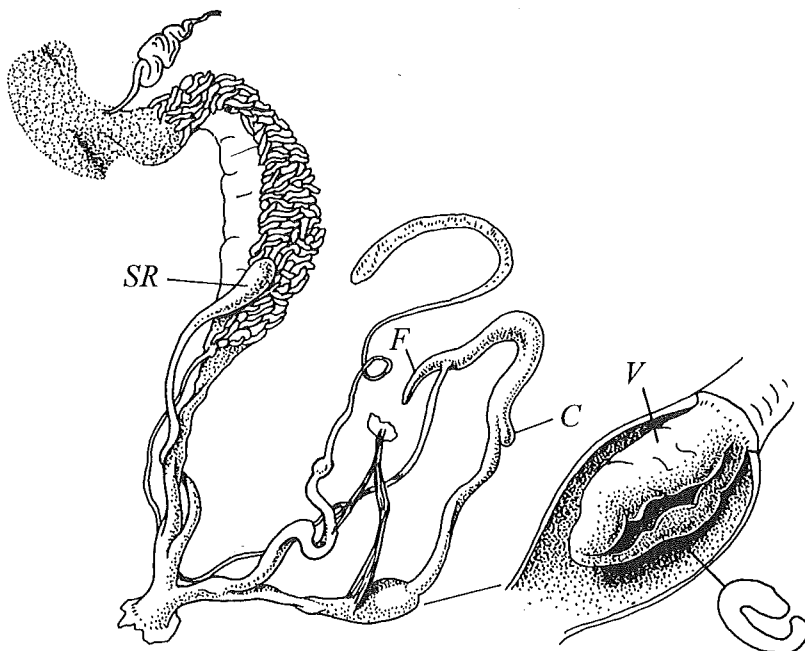


FIG. 4. *Laeozobrinus nepalensis myagdiensis* subsp. nov. Paratype from type locality. Reproductive apparatus and open penis. V — penial verge. Other abbreviations as in Fig. 2.

РИС. 4. *Laeozobrinus nepalensis myagdiensis* subsp. nov. Паратип из типового местонахождения. Половой аппарат и вскрытый пенис. V — папилла пениса. Другие обозначения как на рис. 2.

***Laeozobrinus mustangensis*
Kuznetsov et Schileyko, sp. nov.**

(Figs. 5, 6)

LOCUS TYPICUS — Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park, left side of Kali-Gandaki Valley 400-600 m SE of Koketani village (=Kokhethanti), in small ravine, 2600-2630 m, coll. A.G. Kuznetsov, 11.05.1996.+30.10.1997.

MATERIAL. Holotype (ZMMU Lc-22982); 3 paratypes (ZMMU Lc-22983), 9 paratypes (PCK) and 2 paratypes (PCH) from the type locality;

Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park, right side of Kali-Gandaki Valley:

— SSW end of Ghasa village (= Gansa), on main street opposite "Eagle Nest" guest house, under stones of old wall, 1950 m, 1 paratype (PCK), coll. A.G. Kuznetsov, 6.05.1996;

— left side of Kali-Gandaki Valley 100 m ESE of Lharkyo village along "Koketani-Titigaon" track, 2750 m, 1 paratype (PCK), coll.A.G.Kuznetsov, 1.10.1997;

— left side of Yamkim-Khola Valley 1 km over Tukuche village, along upper track on western slope, 2700 m, 21 paratypes (PCK), coll.A.G.Kuznetsov, 29.09.1997.

DESCRIPTION. Shell ovate-conical, rather thin, somewhat translucent, of 6.5-7 slightly convex whorls. Last whorl slightly ascending in front. Colour greyish-corneous, with white radial streaks, which are brighter on three lower whorls. Embryonic whorls (2 in number) dark-corneous or brown, with vague granulation and crowded spiral striae. Sculpture of postnuclear whorls of fine irregular growth lines and white rough radial wrinkles, becoming more numerous toward aperture; besides, indistinct spiral striae present. Aperture

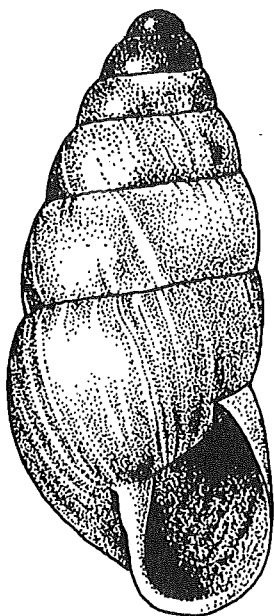


FIG. 5. *Laevozebrinus mustangensis* sp. nov. Holotype.

РИС. 5. *Laevozebrinus mustangensis* sp. nov. Голотип.

elongated-ovate, slightly oblique. Margins whitish, slightly thickened. Palatal and basal margins evenly arched and moderately expanded. Columellar margin subvertical and dilated above. Parietal callus thin to very thin. Umbilicus dot-like.

DIMENSIONS: height of shell 10.9-12.6, large diameter 4.8-5.6, height of aperture 4.0-

4.9, width of aperture 2.8-3.4 mm; holotype 11.3, 5.0, 4.2, 3.0 mm, respectively.

REPRODUCTIVE ANATOMY (4 specimens from left side of Yamkim-Khola Valley, 1 km over Tukuche village). Vas deferens entering epiphallus at some angle. Flagellum conic, tapering, comparatively long. Epiphallus about two times longer than penis, with moderately developed caecum shifted to flagellum. Penis with slender distal and more inflated proximal portions. Penial verge (stimulator) of irregular shape, elongated, somewhat clavate, lying between two high pilasters with corrugated ridges. A-1 of penial appendix 1.5 times longer than penis. A-2 and A-3 poorly defined. A-4 about 1.5 times longer than A-1 and approximately equal to A-5. Two penial retractors arising from diaphragm separately. One of them attached to A-1 above its middle, another inserted to boundary between distal and proximal portions of penis. Vagina short. Spermathecal neck long. Spermathecal diverticle two times longer than spermathecal reservoir plus its stalk. Spermathecal reservoir subglobular, its stalk thin.

TAXONOMIC POSITION. *Laevozebrinus mustangensis* sp. nov. differs from *L. nepalensis* s. lat. in having a thinner shell, covered with white radial wrinkles, rounded apex, and comparatively longer aperture with less thickened margins.

HABITAT. It is a very rare species of zones of *Rhododendron* and *Juniperus* forests, occurring in soil among trees roots and under stones of

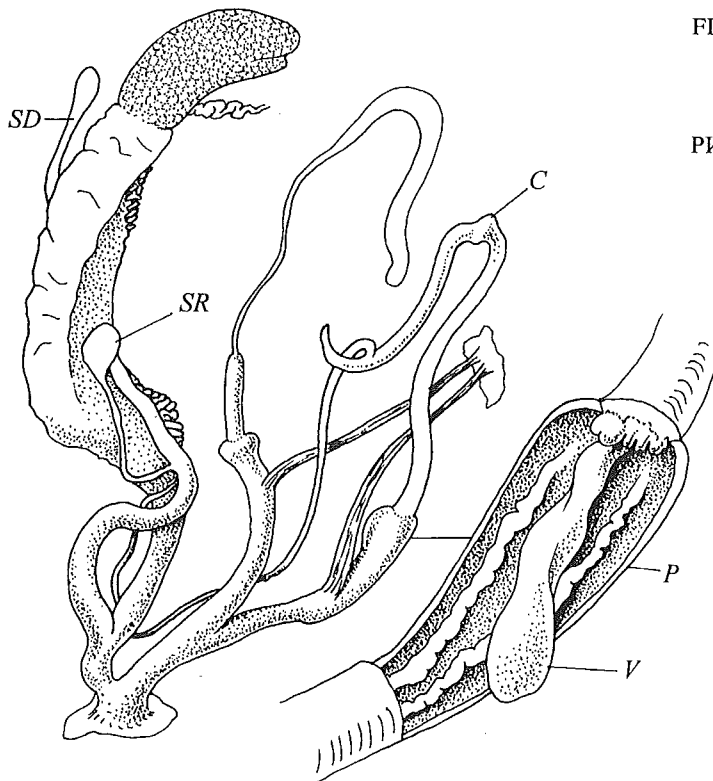


FIG. 6. *Laevozebrinus mustangensis* sp. nov. Reproductive apparatus and open penis. Abbreviations as in Figs. 2 and 4.

РИС. 6. *Laevozebrinus mustangensis* sp. nov. Половой аппарат и вскрытый пенис. Обозначения как на рис. 2 и 4.

old walls. The following species were collected together with *Laevozebrinus mustangensis*: *Sinoennea* (S.) sp., *Macrochlamys lata* (?) Godwin-Austen, 1888, *M. longicauda* Godwin-Austen, 1883, *M. subjecta* (Benson, 1852), *M.* sp., *Bensonies convexus* (Reeve, 1852), *Oxytesta blanfordi* (Theobald, 1859), *O. orobia* (Benson, 1848), *Euaustenia monticola* (L. Pfeiffer, 1848), *Syama p. prona* (Nevill, 1878), *Kaliella* (K.) *barrakporensis* (L. Pfeiffer, 1852), *K. (K.) nana* (Hutton, 1838), *Bradybaena r. radiculicola* (Benson, 1848), *Landouria* sp.

DISTRIBUTION. Western Nepal, Dhaulagiri zone, Mustang District, Annapurna National Park, upper part of Kali-Gandaki Valley.

DERIVATIO NOMINIS. The name "*mustangensis*" is given after the range of the species.

[Диагноз. Раковина овально-коническая, довольно тонкостенная, слабо просвечивающая, состоящая из 6,5-7 слабо выпуклых оборотов. Последний оборот перед устьем слегка приподнят. Окраска сероватороговая, с белыми радиальными пестринами, ярче выраженными на трех последних оборотах. Эмбриональные обороты (2) от темно-роговых до коричневых, покрыты слабо выраженной зернистостью и густой спиральной струйчатостью. Скульптура постэмбриональных оборотов состоит из тонких неправильных линий нарастания и грубых белых радиальных морщинок, более многочисленных перед устьем. Кроме того, присутствует вялая спиральная струйчатость. Устье удлинненно-овальное, слегка скошенное, с белесыми, слабо утолщенными краями. Палатальный и базальный края равномерно выгнутые и умеренно отвернутые. Колумеллярный край почти отвесный, сверху расширенный. Паритальный каллус от тонкого до очень тонкого. Пупок проколловидный.]

Genus *Mirus* Albers, 1850

Albers, 1850: 184 (*Bulimus* subgen.; type species *Bulimus cantori* Philippi, 1844; monotypy).

Mirus(?) *nilagiricus* (L. Pfeiffer, 1846)

(Fig. 7)

Pfeiffer L., 1846: 41 (*Bulimus*). — Adams H., Adams A., 1855: 160 [*Bulimulus* (*Ena*)]. — Nevill, 1878: 135 [*Buliminus* (*Petraeus*)]. — L. Pfeiffer, Clessin, 1881: 291 [*Bulimina* (*Ena*)]. — Kobelt, 1902: 950, pl. 133, fig. 5 [*Buliminus* (*Subzebrinus*)]. — Gude, 1914: 231 [*Ena* (*Mirus*)].

LOCUS TYPICUS - "From the Neelgherries, East Indies" (Nilgiri Hills, Madras State, India).

DISTRIBUTION AND MATERIAL: Besides the type locality, the species is distributed in Anaimulai Hills; NE India, Assam State, Dafla and Khasi Hills; Burma, Shan States, Pulney Hills; Eastern Nepal, Sagarmatha zone, Solukhumbu district, 500 m E of Khari-Khola village, right side of Khari-Khola ravine, lower part of southern slope of the mount, on steep rocks in dense bushes among grass roots, 2200 m, 1 specimen (PCK), coll. A.G. Kuznetsov, 16.05.1995.

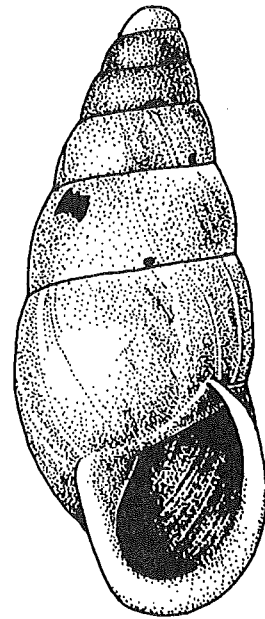


FIG. 7. *Mirus* (?) *nilagiricus* (Pfeiffer, 1846). E Nepal, Solukhumbu district, Khari-Khola village.

РИС. 7. *Mirus* (?) *nilagiricus* (Pfeiffer, 1846). Восточный Непал, округ Солухумбу, деревня Хари-Хола.

DESCRIPTION. Shell ovate-conical, thin, lustreless, of 7.5-8 moderately convex whorls; last whorl slightly ascending in front. Spire conical, with nearly straight outline and rounded apex. Body whorl somewhat compressed below. Colour brownish-corneous, with radial whitish streaks. Surface of embryonic whorls (two in number) eroded in a single specimen at our disposal. Postembryonic whorls with fine irregular radial wrinkles and crowded spiral striae, which are more rough on basal part. Aperture ovate, slightly oblique, brownish inside, with white, broadly reflexed and expanded margins. Parietal callus thin. Basal and palatal margins evenly arched. Columellar margin subvertical, triangularly dilated above. Umbilicus minutely open.

DIMENSIONS: height of shell 13.4, large diameter 5.8, height of aperture 5.4, width of aperture 4.2 mm.

REMARK. In original description Pfeiffer indicated the shell height being 28.5 mm and width 8 mm; Gude (1914: 231) gave the minimal height 15 mm and believed that Pfeiffer's indication is erroneous: it should be 18.5 mm. Besides, it should be mentioned that Nepal is very far from the type locality. So there is a definite doubt if the specimens from Himalayas and Burma belong to the same species as those collected in the type locality in South India.

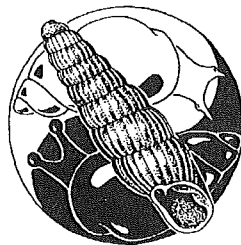
HABITAT. The only dry shell was collected on steep rocks in dense bushes among grass roots together with the following species: *Alycaeus* (A.) *burti* Godwin-Austen, 1874, *Chama-*

lycaeus (C.) *summus* (Godwin-Austen, 1914), *Ch. (Dicharax) notatus* (Godwin-Austen, 1876), *Diplommatina* (D.) *oviformis* Fulton, 1901, *D. (D.) pachyphilus* Benson, 1857, *D. (D.) sperata* W. Blanford, 1862, *D. (Sinica) canarica* Beddome, 1875, *Carychium minusculum* Gredler,

1887, *Glessula* sp., *Sinoennea* (S.) *stenopylis* (Benson, 1860), *Kaliella* (K.) *nongsteinensis* Godwin-Austen, 1883, *Macrochlamys sathilaensis* Godwin-Austen, 1907, *Oxytesta cycloplax* (Benson, 1852), *Sitala rimicola* (Benson, 1859), *Landouria aborensis* Godwin-Austen, 1918.

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Land snails of the genus *Landouria* Godwin-Austen, 1918 and some other Bradybaenidae of Nepal (Gastropoda, Pulmonata)

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ABSTRACT. Six species of the genus *Landouria* Godwin-Austen, 1918 from Nepal and one species from Sri Lanka are described conchologically and anatomically. Two Nepalesian species are new. The genus *Landouria* is assigned to the family Bradybaenidae (Aegistinae), and its range is tentatively limited by northern India, Nepal, northern Burma and Sri Lanka. Conchological descriptions of two species of Bradybaenidae from Nepal are also given.

ZMMU — Zoological Museum of Moscow State University;

PCK — Private coll. of Andrey G. Kuznetsov (Moscow).

H — height of shell;

LD — large diameter;

HA — height of aperture;

WA — width of aperture;

WU — width of umbilicus.

Genus *Landouria* Godwin-Austen, 1918

Godwin-Austen, 1918: 604; Zilch, 1959-1960: 612; Richardson, 1985: 174.

Type species: *Helix huttoni* L. Pfeiffer, 1842; OD.

Shell somewhat depressed, rather thin, not glossy, of about 5 moderately convex whorls. Last whorl slightly descending in front, evenly rounded or obtusely angulated at periphery. Color corneous to dark reddish-brown. Embryonic whorls with checkerwise elongated granules ("scars"), radial and spiral striae, postnuclear sculpture of dense and fine radial wrinklelets and scars, often with short scales. Aperture rounded, oblique, with a little reflexed, thin margins. Umbilicus open, moderately broad, profound, quite perspective.

Talon, a short ovate thickening of hermaphroditic duct at base of albumen gland, not embedded in gland tissue. Vas deferens entering epiphallus at some angle. Flagellum short, stout, more or less ovate, with series of distinct tubercles on its surface. Internally flagellum with axial canal from which secondary smaller canals branched off; these secondary canals end in superficial tubercles. Epiphallus rather thick, moderately long. Penis distinctly subdivided into two portions: upper short, subglobose, containing minute tubular verge with thin, somewhat corrugated walls and very spacious canal; lower (distal) portion internally with longitudinal sinuous folds. Vagina long, thin-walled, with fine anastomosing longitudinal folds. Spermathecal stalk enormously swollen at base, its rest

The genus *Landouria* has been described by Godwin-Austen [1918] with the type species *Helix huttoni* L. Pfeiffer, 1842 from Himalayas of northern India. Besides the type species, the author included four more species in the genus: *L. aborensis* Godwin-Austen, 1918; *L. damsangensis* Godwin-Austen, 1918; *L. hengdanensis* Godwin-Austen, 1918; *L. radleyi* (Jousseau, 1894), and restricted the range of the genus by northern India, Sikkim, Assam and Ceylon. Zilch [1960], following Godwin-Austen, indicated the range of the genus as "Vorderindien, Ceylon". Later [1966] he referred six more species from Indonesia to *Landouria*. Richardson [1985] recognized 11 species (and 13 names seeming to be synonyms) distributed in Himalayas, Ceylon, Indonesia and the Philippines. Thus, at present the genus *Landouria* consists of as many as 27 nominal species, rather heterogeneous conchologically and distributed throughout a huge territory.

During collection trips to Nepal and Ceylon (Sri Lanka) one of the authors (A. K.) has obtained a number of snails belonging to the genus *Landouria* and, probably, *Bradybaena*. Information on anatomy of the species of this genus is still restricted by data of Godwin-Austen [1918] and Rensch [1931]. We will discuss the taxonomic position and the volume of the genus after description of species at our disposal.

ABBREVIATIONS

ANSP — Academy of Natural Sciences, Philadelphia;

part very thin, ending by small reservoir; latter reaching albumen gland.

Landouria huttoni (L. Pfeiffer, 1842)

(Figs. 1 A, 3)

Pfeiffer, 1842: 82 (*Helix*). Tryon, 1888: 54, pl. 11, fig. 56 [*Helix* (*Plectotropis*)]. Pilsbry, 1895: 209 [*Eulota* (*Plectotropis*)]. Gude, 1914: 211 (*Plectotropis*). Godwin-Austen, 1918: 605-607, fig. 2 A, A', 3 A, B, C.

Locus typicus. "Himalaya near Simla, Mahasu".

Types: unknown.

Material. Western Nepal, Gandaki zone, Annapurna National Park, Kaski district:

— left side of Bhurungdi-Khola valley, 0.5 km NW of Birethanti village, on steep rocky slope near waterfall, in dense bushes among dead leaves, 1100 m, 2 spm (PCK), 3 spm (ZMMU), coll. A.G. Kuznetsov, 2.05.1996;

— N part of Tirkhedhunga village, in small ravine near waterfall, under bushes and stones, 1570 m, 2 spm (PCK), coll. A.G. Kuznetsov, 2.05.1996;

Western Nepal, Dhaulagiri zone, Annapurna National Park, Myagdi district:

— right side of Kali-Gandaki valley, SE end of Jhartare village, along "Dana-Tatopani" track, among stones of old wall, 1270 m, 1 spm (PCK), coll. A.G. Kuznetsov, 13.05.1996;

— right side of Kali-Gandaki valley, southern end of Dana village, along track, among stones of old wall, 1500 m, 3 spm (PCK), coll. A.G. Kuznetsov, 6.05.1996;

— left side of Kali-Gandaki valley, 200-300 m from Kopchepani village to Talbagar village, on rocky slope under stones, 1800 m, 1 spm (PCK), coll. A.G. Kuznetsov, 12.05.1996.

Description. Shell of medium size, depressed-orbiculate, composed of 5-5.5 slightly convex whorls, separated by impressed suture. Spire low conic, with convex outlines and somewhat obtuse apex. Last whorl initially with angulated periphery, almost rounded and scarcely descending in front. Color corneous, with irregular paler radial streaks. One and a half embryonic whorls covered with radial wrinklets, crowded scars, and very faint spiral liration. Sculpture of postembryonic whorls composed of rather rough scars, arranged along thin and wavy growth lines. Scars on base and inside umbilicus becoming more crowded, with short tri-

angular periostracal scales. Besides, vague spiral striae are visible on base. Aperture subcircular, oblique, fawn inside, with moderately reflexed lower palatal margin and more reflexed basal and columellar ones. Peristome scarcely thickened. Umbilicus perspective, wide, its width 4.0-4.2 times less than shell width.

Dimensions (Nepalesian specimens): H 6.3-7.0, LD 9.8-11.0, HA 3.3-3.8, WA 4.6-5.1, WU 2.4-2.7 mm.

Reproductive anatomy: unknown.

Habitat. The species is common in moderately dry places in old walls and on slopes under bushes, among stones and debris, at 1100-1800 m above sea level.

Distribution. INDIA: Himachal-Pradesh State (Simla, Landour); Uttar-Pradesh State (Kumaun Himal, Mussoorie); Darjeeling; Assam State (Dafla Hills, Shevroy Hills); Nagaland State (Naga Hills); Kashmir (?);

NEPAL: Western Nepal, Gandaki zone, Kaski district, lower part of Bhurungdi-Khola valley; Dhaulagiri zone, Myagdi district, lower part of Kali-Gandaki valley (Fig. 3);

BURMA: Mandalay (Poupa Mts., near Ava); Shan (upper part of Salween valley);

CHINA: Yunnan (Ponsee).

Remark. Conchologically the species of the genus *Landouria* are very similar to one another and anatomical data are very poor. So, we are not sure if *L. huttoni* is really distributed from Kashmir to Yunnan, throughout almost entire southern slopes of Himalayas. The ranges of other species are more restricted.

Landouria savadiensis (Nevill, 1877)

(Figs. 1 B, 2 A, 3)

Nevill, 1877: 20 [*Helix* (*Plectotropis*) *huttoni* var.]; Tryon, 1888: 54 [*Helix* (*Plectotropis*)]; Gude, 1914: 211 (*Plectotropis huttoni* var.).

Locus typicus. "Upper Burma: Sawady".

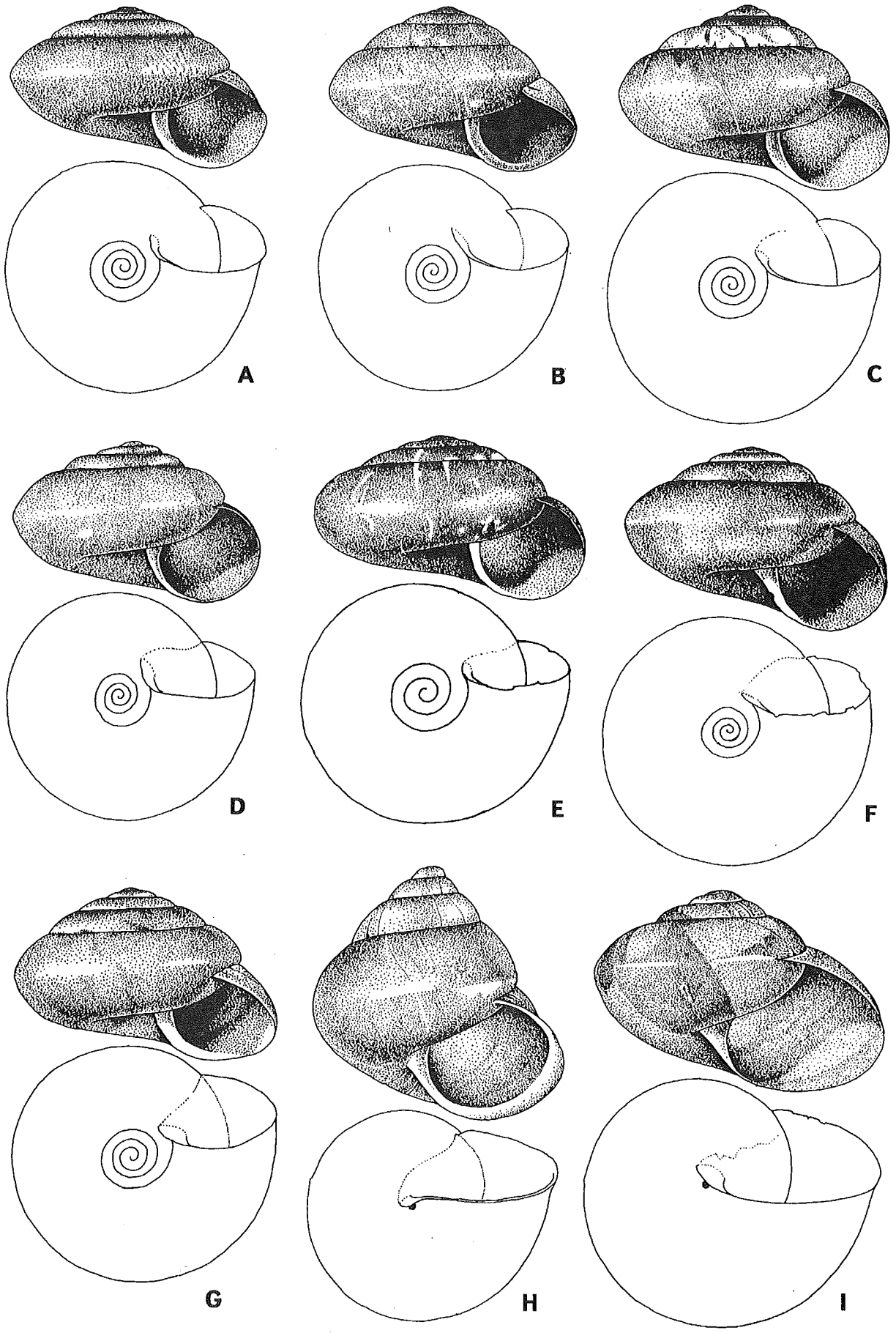
Types: stored in the Indian Museum, Calcutta [Nevill, 1877].

Material. Central Nepal, Kathmandu valley:

— 1.3 km NW of Balaju village, Nagarjun Royal

FIG. 1. Shells of Bradybaenidae. A — *L. huttoni* (L. Pfeiffer, 1842): Eastern Nepal, Kopchepani village (PCK); B — *L. savadiensis* (Nevill, 1877): Central Nepal, Kathmandu valley, NE-facing slope of Jhamacok Mt. (PCK); C — *L. aborensis* Godwin-Austen, 1918: Central Nepal, Jiri village (PCK); D — *L. dhaulagirica* sp. nov., holotype: Western Nepal, Khobang village; E — *L. rhododendronis* sp. nov., holotype: Western Nepal, Ghorapani village; F — *L. coeni* (Preston, 1914): Eastern Nepal, Phuiyan village (PCK); G — *L. radleyi* (Jousseume, 1894): Sri Lanka, Nuwara-Eliya (ANSP); H — *Bradybaena radiciala* (Benson, 1848): Western Nepal, Koketani village (PCK); I — *B. (?) thakkholensis* sp. nov., holotype: Western Nepal, Ghasa village.

РИС. 1. Раковины Bradybaenidae. А — *Landouria huttoni* (L. Pfeiffer, 1842): Восточный Непал, с. Копчепани (PCK); В — *L. savadiensis* (Nevill, 1877): Центральный Непал, долина Катманду, с-в склон горы Джамачок (PCK); С — *L. aborensis* Godwin-Austen, 1918: Центральный Непал, с. Джири (PCK); D — *L. dhaulagirica* sp. nov., голотип: Западный Непал, с. Кхобанг; E — *L. rhododendronis* sp. nov., голотип: Западный Непал, с. Горапани; F — *L. coeni* (Preston, 1914): Восточный Непал, с. Пхуйян (PCK); G — *L. radleyi* (Jousseume, 1894): Шри-Ланка, г. Нувара-Элия (ANSP); H — *Bradybaena radiciala* (Benson, 1848): Западный Непал, с. Кокетани (PCK); I — *B. (?) thakkholensis* sp. nov., голотип: Западный Непал, с. Гхаса.



Forest, Rani-Ban ridge, foot of NE slope of Jamacok Mt., 20-50 m over Phulbari gate, in oak forest along calcareous rocks, among dead leaves, 1450-1480 m, 3 spm (PCK), 4 spm (ZMMU), coll. A.G. Kuznetsov, 28.04.1995;

— 1.3 km NW of Balaju village, Nagarjun Royal Forest, Rani-Ban ridge, middle part of NE slope of Jamacok Mt., in oak forest along calcareous rocks, among dead leaves, 1500-1650 m, 3 spm (PCK), coll. A.G. Kuznetsov, 28.04.1995+28.04.1996;

— Shivapur Water Shed National Park, Tare-Bhir ridge, 1 km E of Thanaphedi village, S-facing slope, 10 m below Nagi-Gompa monastery, under bushes, in dry grass, 1900 m, 1 spm (PCK), coll. A.G. Kuznetsov, 2.05.1995.

Description. Shell conic-orbiculate, of 5.5-5.75 slightly convex, slowly increasing whorls, separated by impressed suture. Spire conic, with convex outline and pointed apex. Last whorl scarcely descending in front, with angulated periphery; angulation clearly expressed just behind aperture. Color dark-corneous, with irregular paler radial streaks. Two embryonic whorls covered with delicate radial wrinkles, crowded scars and faint spiral striae. Postembryonic whorls with crowded scars attenuated along wavy growth lines all over upper surface, and with distinct spiral striae on base. Periostracal triangular scales often present on upper surface. Aperture roundly lunate, oblique, grayish-fawn inside, with moderately reflexed lower palatal margin and more reflexed basal and columellar ones. Peristome clearly thickened. Umbilicus perspective, wide, 3.5-3.8 times narrower than shell width.

Dimensions (Nepalesian specimens): H 6.0-7.0, LD 8.8-10.2, HA 3.2-3.6, WA 4.0-4.9, WU 2.3-2.9 mm.

Reproductive anatomy: (3 specimens from middle part of NE slope of Jamacok Mt., 1500-1650 m, 28.04.1995, 28.04.1996).

Flagellum comparatively short, bulky, with extremely short basal portion; lumen of flagellum narrow, secondary canals more numerous and markedly longer than in *L. huttoni*. Flagellum + epiphallus forming two curvatures, resulting in S-shaped appearance. Penial retractor inserted to middle of "S". Chamber of penial verge small, containing minute verge with distinctly corrugated walls. Internal surface of chamber nearly smooth, basal part of penis internally with corrugated longitudinal folds. Vagina slightly shorter than penis.

Remark. It is indicated in the original description that *L. savadiensis* differs from *L. huttoni* in "more raised spire, stouter texture and less opened umbilicus" [Nevill, 1877]. After studying the Nepalesian material we can add that *L. savadiensis* has more closely coiled and less inflated whorls, clearly angulated behind aperture; pointed apex; more embryonic whorls (2 vs. 1.5 in *L. huttoni*); more crowded scars, which often bear periostracal scales on upper surface; and more prominent spiral sculpture on the base.

Habitat. The species is common in the zone of oak forests, in dense bush along rocks, among

stones and dead leaves at 1450-1900 m above sea level.

Distribution. BURMA (Sawady); NEPAL: Central Nepal, western and northern parts of Kathmandu valley (Fig. 3).

Landouria aborensis
Godwin-Austen, 1918
(Figs. 1 C, 2 B, 3)

Godwin-Austen, 1918: 611, fig. 2 C, D.

Locus typicus. "Kobo, Abor Hills".

Types: stored in the Indian Museum, Calcutta [Godwin-Austen, 1918].

Material. Central Nepal, Kathmandu valley:

— 1.5 km ESE of Godawari village, left side of Sungure-Khola valley, low quarter of NNW-facing slope of Phulcoki Mt., in oak forest, among dead leaves, 1750-1800 m, 1 spm (PCK), coll. A.G. Kuznetsov, 30.04.1995;

— 3.75 km SE of Godawari village, upper quarter of NE-facing slope of Phulcoki Mt., in oak forest, among dead leaves, 2350 m, 1 spm (PCK), coll. A.G. Kuznetsov, 30.04.1995.

Central Nepal, Janakpur zone:

— Dolakha district, left side of Jiri-Khola valley, 0.5 km NE of Jiri (= Manedanda) village, in small ravine near waterfall, among gravel and grass, 1960 m, 2 spm (PCK), coll. A.G. Kuznetsov, 22.05.1995;

— Ramechhap district, left side of Khimti-Khola valley, 100-200 m SW of Shivalaya village, along foot of NW-facing slope, in dense bushes, among dead leaves, 1770 m, 1 spm (PCK), 1 specimen (ZMMU), coll. A.G. Kuznetsov, 22.05.1995;

Eastern Nepal, Sagarmatha zone, Solukhumbu district, 0.5 km E of Khari-Khola village, right side of Khari-Khola ravine, on steep rocks, in dense bushes, among dead leaves, 2200 m, 4 spm (PCK), coll. A.G. Kuznetsov, 16.05.1996.

Description. Shell globosely-conoid, with 5-5.5 moderately convex whorls, separated by linear suture. Spire conic, with weakly convex outline and somewhat pointed apex. Last whorl not descending in front, with periphery initially clearly angulated and almost rounded behind aperture. Color corneous, with irregular paler radial streaks. Two embryonic whorls covered with radial wrinklets only. Sculpture of later whorls composed of faint irregular scars and wavy radial lines; there are also spiral striae on base. Aperture roundly lunate, oblique, grayish-horny inside, with slightly expanded basal and columellar margins and thin, sharp edges. Umbilicus wide, perspective. Its width 4.1-4.2 times less than shell width.

Dimensions (of Nepalesian specimens): H 5.1-6.3, LD 8.1-9.4, HA 3.0-3.5, WA 3.4-4.4, WU 1.8-2.2 mm.

Reproductive anatomy (2 spm from Jiri-Khola valley, 1960 m, 22.05.1995; 1 specimen from Khimti-Khola valley, 1770 m, 22.05.1995).

Flagellum comparatively long, consisting of two

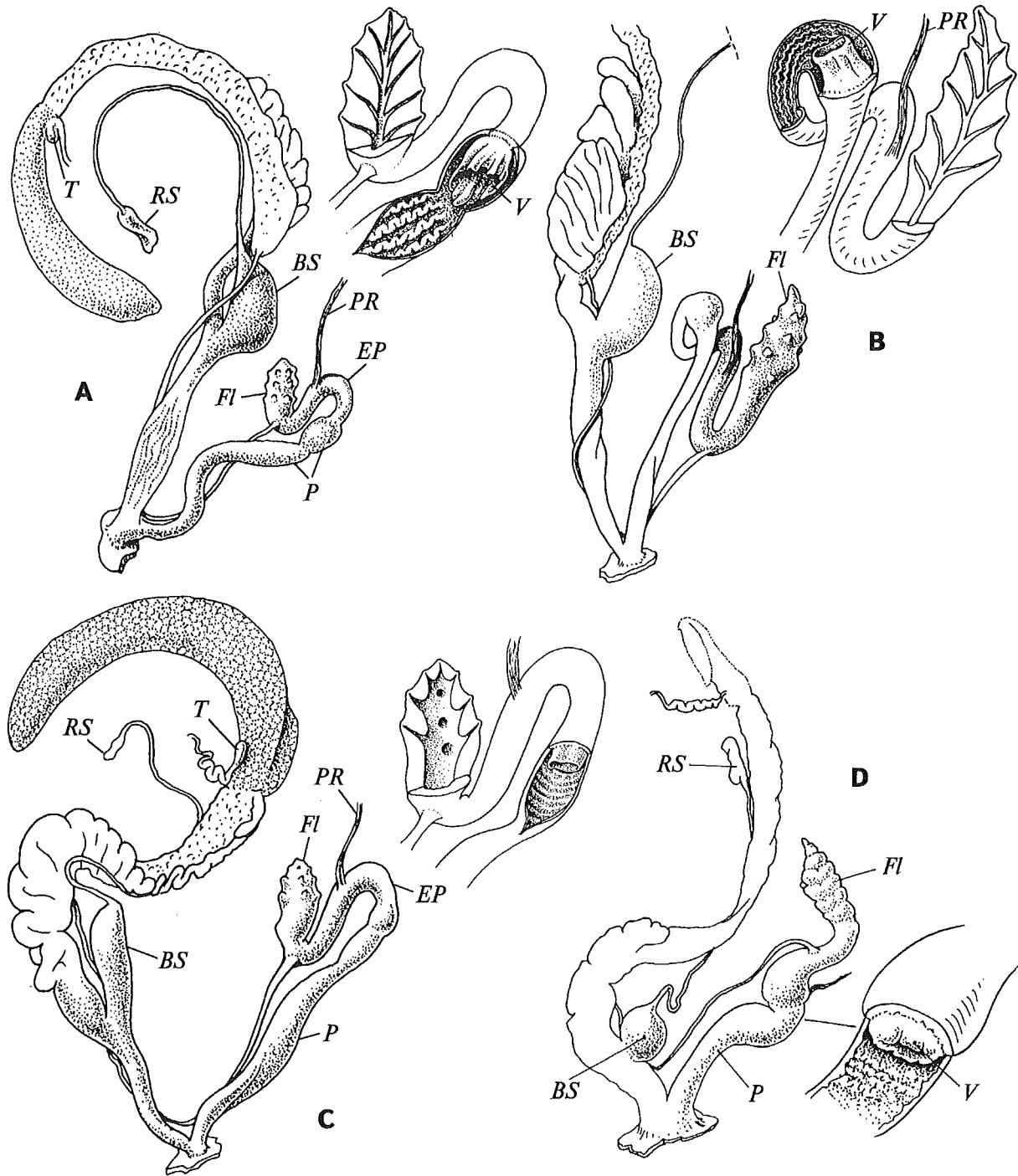


FIG. 2. Reproductive apparatus and interior of penis. A — *Landouria savadiensis* (Nevill, 1877). B — *Landouria aborensis* Godwin-Austen, 1918. C — *Landouria dhaulagirica* sp. nov. Holotype. D — *Landouria rhododendronis* sp. nov. Holotype. BS — basal portion of spermathecal stalk; EP — epiphallus; FI — flagellum; P — penis; PR — penial retractor; RS — reservoir of spermatheca; T — talon; V — verge.

РИС. 2. Половой аппарат и вскрытый пенис. А — *Landouria savadiensis* (Nevill, 1877). В — *Landouria aborensis* Godwin-Austen, 1918. С — *Landouria dhaulagirica* sp. nov. Голотип. D — *Landouria rhododendronis* sp. nov. Голотип. BS — базальная часть протока семеприемника; EP — эпифаллус; FI — флагеллум; P — пенис; PR — ретрактор пениса; RS — резервуар семеприемника; T — талон; V — папилла пениса.

well-defined parts. Apical part bearing a number of large conic tubercles, basal part rather long, without tubercles. Lumen of flagellum narrow, somewhat sinuous, with long and narrow secondary canals. Flagellum + epiphallus forming three curvations. Penial retractor attached between 1st and 2nd curvations. Chamber of penial verge somewhat swollen, containing small verge with nearly smooth walls. Inner surface of chamber almost smooth, those of cylindrical part of penis with regularly corrugated, thin, longitudinal folds. Vagina slightly shorter than penis.

Remark. *L. aborensis* differs from *L. huttoni* in the following characters: pointed apex; embryonic whorls two in number, covered with radial wrinkles only; irregular weak scars on upper surface of postnuclear whorls; clearly visible spiral striae on the base.

Habitat. The species inhabits the zone of oak forests, living in moderately wet places in dense bushes among stones and dead leaves, at 1750-2350 m above sea level.

Distribution. INDIA: NE Assam State (Abor Hills, Kobo); NEPAL: Central Nepal, SE part of Kathmandu valley; Eastern Nepal, Janakpur and Sagarmatha zones (Fig. 3).

Landouria dhaulagirica

Schileyko et Kuznetsov, sp. nov.

(Fig. 1 D, 2 C, 3)

Locus typicus. Western Nepal, Dhaulagiri zone, Mustang district, Pholong-Dara ridge, right side of Kali-Gandaki valley, 200-700 m NE of Khobang village, 1-5 m over "Khobang-Tukuche" track, on dry rocks in dense *Juniperus* bushes, under stones, 2600 m.

Material. Holotype (Lc-22977) is deposited in ZMMU, 4 paratypes from the type locality are in PCK;

Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district:

— Pholong-Dara ridge, right side of Kali-Gandaki valley, 1 km SW of Larjung village, along "Larjung-Sokung" track on SE-facing slope, around *Juniperus* bushes, among dead leaves, 2590 m, 5 paratypes (PCK), coll. A.G. Kuznetsov, 30.09.1997;

— left side of Kali-Gandaki valley, 400-600 m SE of Koketani (= Kokhethanti) village, in small ravine in *Rhododendron* forest, among dead leaves, 2600-2630 m, 5 paratypes (PCK), coll. A.G. Kuznetsov, 11.05.1996;

— right side of Kali-Gandaki valley, 2 km NNW of Kalopani village (opposite to Koketani village), right side of mouth of small ravine, under stones, 2550 m, 2 paratypes (PCK), coll. A.G. Kuznetsov, 29.09.1997;

— right side of Kali-Gandaki valley, 50-300 m WSW of Kalopani village, right side of Seto-Khola ravine, in *Rhododendron-Pinus* forest, under stones, 2550-2650 m, 4 paratypes (PCK), coll. A.G. Kuznetsov, 1.10.1997.

Description. Shell depressed-orbiculate, of 5-5.5 rather convex whorls, separated by impressed suture. Spire low-conic, with slightly convex outline

and obtuse apex. Last whorl with initially angulated periphery, somewhat rounded and scarcely descending in front. Ground color brownish-horny. Two embryonic whorls with irregular radial wrinkles and very thin spiral liration. Sculpture of later whorls of rough, wavy growth lines, very weak scars, better visible on base, and spiral striae, covering entire upper surface. Tiny periostracal scales present on slopes of umbilicus. Aperture roundly lunate, oblique, light-corneous inside, with moderately reflexed basal and columellar margins and thickened peristome. Umbilicus perspective and wide, 4.0-4.8 times less than shell width.

Dimensions. H 5.0-6.3, LD 8.0-10.0, HA 3.1-3.6, WA 3.7-4.7, WU 1.8-2.5 mm; holotype: 6.0, 9.7, 3.2, 4.5, and 2.3 mm respectively.

Reproductive anatomy: (1 paratype from left side of Kali-Gandaki valley, 400-600 m SE of Koketani village, 2600-2630 m, 11.05.1996; 3 paratypes from right side of Kali-Gandaki valley, 1 km SW of Larjung village, 2590 m, 30.09.1997; 1 paratype from right side of Kali-Gandaki valley, opposite to Koketani village, 2550 m, 29.09.1997; 3 paratypes from Seto-Khola ravine, 2550-2650 m, 1.10.1997).

Flagellum comparatively short, with very short basal portion; lumen of flagellum enormously wide, secondary canals rather short. Flagellum + epiphallus forming two curves, resulting S-shaped appearance. Penial retractor attached to central part of "S". Chamber of penial verge very small, containing minute verge with smooth walls. Internally chamber with smoothed circular folds. Inner surface of basal cylindrical portion of penis with vague longitudinal folds. Vagina shorter than penis by about 2 times.

Remark. The new species differs from *L. huttoni* in color and sculpture of shell: shell brownish-horn; two embryonic whorls with irregular radial wrinkles and very thin spiral liration; spiral striae cover the entire upper surface of postembryonic whorls; scars very weak and better visible on the base.

Habitat. The species inhabits the zone of *Rhododendron* and *Juniperus* forests, living on moderately dry rocky slopes in dense bushes, under stones and among dead leaves, at 2550-2650 m above sea level

Distribution. NEPAL: Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district (Fig. 3).

Derivatio nominis. The species is named after the area of collection (Dhaulagiri zone):

[Диагноз.] Раковина прижато-кубаревидная, с 5-5,5 уплощенно-выпуклыми оборотами, разделенными вдавленным швом. Завиток низко конический со слегка куполовидными очертаниями и сложенной вершиной. Последний оборот к устью незначительно опущен, в начале с угловатой периферией, которая ближе к устью становится почти округлой. Окраска раковины коричневатого-роговая. Эмбриональных оборотов два, покрытых нерегулярно расположенными радиальными морщинками и тончайшей спиральной

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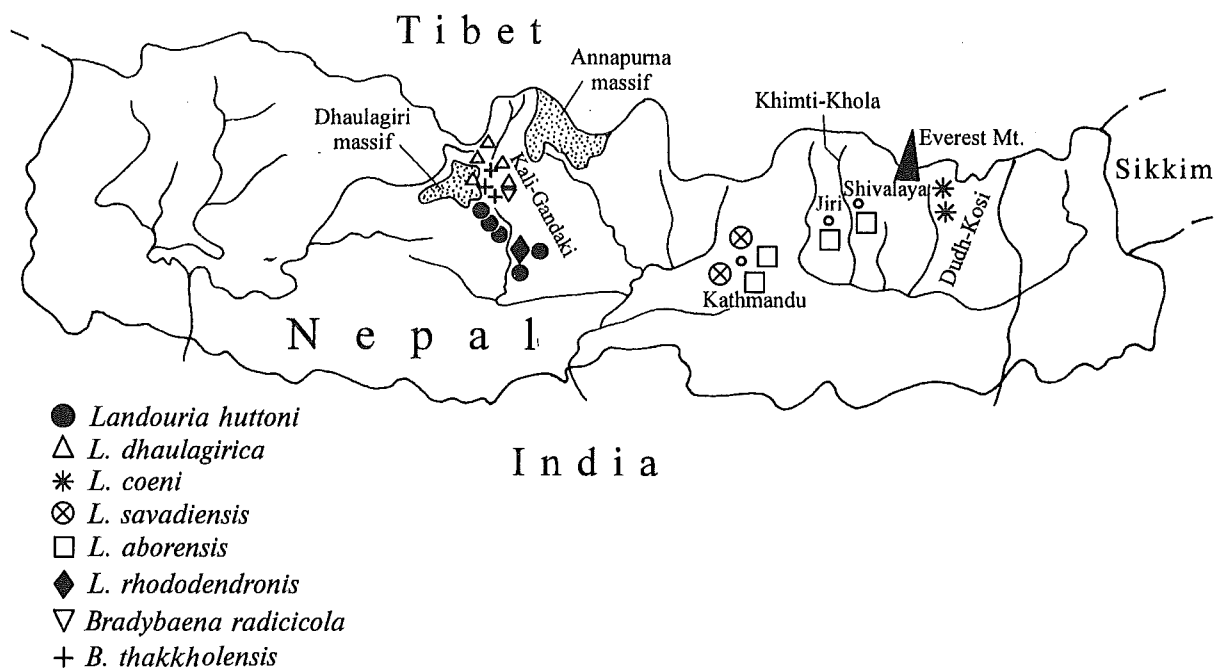


FIG. 3. Map of records of Bradybaenidae species in Nepal.

РИС. 3. Карта местонахождений видов Bradybaenidae в Непале.

струйчатостью. Скульптура дефинитивных оборотов в виде грубых, волнистых линий нарастания, слабо выраженных рубцов, лучше заметных на базальной поверхности, и отчетливой спиральной струйчатости, покрывающей всю поверхность раковины. На стенках внутри пупка рубцы несут крошечные треугольные периостракальные чешуйки. Устье полулунно-округлое, скошенное, светлороговое внутри; его края умеренно отвернуты, базальный и колумеллярный заметно утолщены. Пупок перспективный, широкий, в 4,0-4,8 раза уже большего диаметра.]

Landouria rhododendronis

Shileyko et Kuznetsov, sp. nov.

(Fig. 1 E, 2 D, 3)

Locus typicus. Western Nepal, Dhaulagiri zone, Annapurna National Park, Parbat district, 0.4-1 km W of Ghorapani (= Ghorepani) village, along crest of Poon-Hill ridge, in dense bushes of *Rhododendron*, under stones, 2950-3194 m.

Material. Holotype (Lc-23257) is deposited in ZMMU, 5 paratypes from the type locality are in PCK.

Description. Shell depressed-orbiculate, of 4.5-4.75 moderately convex whorls, separated by impressed suture. Spire depressedly dome-shaped. Last whorl initially slightly angulated, becoming evenly rounded towards aperture, scarcely descending in front. Ground color from corneous-brown

to reddish-brown. Embryonic whorls (1.75) roughly radially striated with traces of scars. Postembryonic whorls covered with irregular radial wrinklets, very weak spiral liration and scars, better impressed on base. Scars bearing tiny periostracal scales inside umbilicus. Aperture roundly lunate, oblique, whitish-brown inside, with moderately reflexed columellar margin. Aperture edges sharp. Umbilicus perspective, wide, 3.6-4.2 times less than shell width.

Dimensions. H 5.7-5.8, LD 8.9-9.4, HA 3.2-3.4, WA 3.7-4.0, WU 2.1-2.5 mm; holotype: 5.7, 9.0, 3.3, 3.7, and 2.5 mm, respectively.

Reproductive anatomy: (holotype and paratype from the type locality).

Flagellum with elongate apical part, bearing large tubercles, and short basal one. Flagellum + epiphallus comparatively short and massive, forming two curves, resulting in S-shaped appearance. Penial retractor attached to central part of "S". Chamber of penial verge inflated, containing minute verge with smooth walls. Inner walls of chamber velvety. Vagina shorter than penis by about 2 times.

Remark. *L. rhododendronis* sp. nov. differs from the most similar to it *L. dhaulagirica* sp. nov. in more depressed spire, rounded periphery, reddish-brown color, more rough radial sculpture and scars, and weaker spiral liration.

Habitat. The species inhabits the zone of *Rhododendron* forests, where found in dense bushes under stones, at 2950-3194 m above the sea level.

Distribution. The species is known only from the type locality (Fig. 3).

Derivatio nominis. The species is named after the habitat.

[**Диагноз.** Раковина прижато-кубаревидная, с 4,5-4,75 умеренно выпуклыми оборотами, разделенными вдавленным швом. Последний оборот вначале слегка угловатый, к устью незначительно опускается и становится равномерно закругленным. Окраска от рогово-коричневой до красновато-коричневой. Эмбриональных оборотов 1,75, грубо радиально исчерченных со слабо выраженными рубцами. Постэмбриональные обороты покрыты неправильной радиальной морщинистостью, очень вялой спиральной струйчатостью и рубцами, особенно хорошо заметными на основании. Внутри пупка рубцы несут крошечные треугольные периостракальные чешуйки. Устье полулунно-округлое, скошенное, беловато-коричневое внутри, с умеренно отвернутым колумеллярным краем. Края устья острые. Пупок перспективный и широкий, в 3,6-4,2 раза уже большего диаметра.]

Landouria coeni (Preston, 1914)

(Fig. 1 F, 3)

Preston, 1914: 19, text-fig. (*Aegista*); Gude, 1914: 222 (*Aegista*).

Locus typicus. India, Naga Hills.

Types: unknown.

Material. Eastern Nepal, Sagarmatha zone, Solukhumbu district:

— right side of Dudh-Kosi valley, S of Benkar village, S end of Zampute village, 1-5 m over track, in dense bushes under stones, 2700 m, 2 spm (PCK), coll. A.G. Kuznetsov, 12.05.1995;

— right side of Phuiyan-Khola valley, NW end of Phuiyan village, 3 m over "Surke-Phuiyan" track, in dense bushes among dead leaves, 2840 m, 1 spm (PCK), coll. A.G. Kuznetsov, 14.05.1995.

Description. Shell turbate-conic, of 5.5-6 closely coiled, convex whorls, separated by deeply impressed suture. Spire conic, markedly elevated, with convex outline and obtuse apex. Last whorl initially weakly angulate at periphery, later rounded, and descending in front. Color dark corneous-brown, apex somewhat darker. Embryonic whorls (2-2.3) covered with irregular rough radial wrinkles and scars. Postnuclear whorls with wavy growth lines, weak scars better visible on base around umbilicus and inside it. Spiral striae well developed on basal surface, also observed on upper surface of whorls. Aperture roundly-ovate, oblique, whitish-horny inside, with slightly reflexed basal margin and rather broadly expanded columellar one. Peristome scarcely thickened. Umbilicus perspective, moderately wide, its width 5.3 times less than shell width.

Dimensions (Nepalesian specimens): H 6.0-7.8, LD 8.2-10.1, HA 3.1-3.6, WA 4.0-4.8, WU 1.7-2.1 mm.

Reproductive anatomy: unknown.

Remark. *L. coeni* differs from *L. huttoni* in turbate-conic shape of shell; more numerous embryonic whorls; more numerous and closely coiled, convex postembryonic whorls; dark horny-brown color; higher spire; sculpture of both embryonic and postembryonic whorls; obtuse peripheral angulation; slightly reflexed apertural margins and narrower umbilicus.

Habitat. This is a rare species of upper level of deciduous subtropical forest zone, where it inhabits dense bushes, dwelling among stones and dead leaves, at 2700-2840 m above the sea level.

Distribution. INDIA: Nagaland State (Naga Hills); NEPAL: Eastern Nepal, Sagarmatha zone, Solukhumbu district (Fig. 3).

Landouria radleyi (Jousseume, 1894)

(Fig. 1 G)

Jousseume, 1894: 284, pl. 4, fig. 6 (*Hygromia*); Gude, 1914: 212 (*Plectotropis huttoni* var.).

Locus typicus. Ceylon: Nuwara-Eliya.

Types: unknown.

Material. "Ceylon" (Sri Lanka), ANSP No. 78310, 1 spm.

Sri Lanka, Central province, Nuwara-Eliya district:

— Nuwara-Eliya, left side of Nanu-Oya valley, Victoria Park, Rocky Garden, in dense bushes under dead leaves, 4 spm (ZMMU), coll. A.G. Kuznetsov, 18.01.1997;

— western end of Nuwara-Eliya, Great Western ridge, over end of Glenfall Road, at E-facing slope in dense bushes, among dead leaves, 6 spm (PCK), coll. A.G. Kuznetsov, 19.01.1997;

— 1 km NNW of Nuwara-Eliya, Piduru ridge, lower half of Pidurutalagala Mt., over Waterfield Drive, at right side of Waterfield Stream ravine, in tropical forest, in bamboo grove among dead leaves, 2100 m, 6 spm (ZMMU), coll. A.G. Kuznetsov, 20.01.1997;

— Horton Plains, slope of Totapala Mt., Totapalakanada, in tropical forest among dead leaves, 3 spm (PCK), coll. K. Perera, 7.01.1991;

— Uva province, Badulla district, 5 km NE of Bandarawela, left side of Badulu-Oya valley, Dowra village, 100 m NE of Dowra temple, in small ravine in tropical forest, around bushes in grass and dead leaves, 8 specimens (PCK), coll. A.G. Kuznetsov, 25.01.1997.

Description. Shell conic-orbiculate, of 5.5-5.75 flattened whorls, separated by impressed suture. Spire conic, with convex outline and obtuse apex. Last whorl with initially acutely angulated periphery, somewhat rounded and moderately descending in front. Ground color dark reddish-brown. Embryonic whorls (2.3) covered with irregular weak radial wrinkles and vague spiral liration. Sculpture of postembryonic whorls composed of wavy growth lines, weak scars, better visible on the base, and well developed spiral striae, observed throughout upper surface. Aperture roundly lunate, oblique, reddish-brown inside. Basal and columellar margins slightly expanded and rather thickened. Umbilicus wide, quite perspective, its width 3.7-4.5 times less than shell width.

Dimensions. H 5.2-6.8, LD 9.0-11.5, HA 3.1-4.1, WA 4.0-5.2, WU 2.2-3.0 mm.

Reproductive anatomy: unknown.

Remark. According to the original description, *L. radleyi* differs from *L. huttoni* in smaller size, more elevated spire and somewhat more closely coiled whorls. In our material we noticed the following distinctive characters: somewhat more closely coiled whorls; dark reddish-brown color; flattened upper surface of whorls; more acutely angulated periphery; more numerous embryonic whorls (2.3) lacking scars; weak scars on postembryonic whorls; spiral striae well developed throughout upper surface; aperture margins thicker and less expanded.

Habitat. This is uncommon species of the zone of *Rhododendron* forests, where it inhabits dense bushes, dwelling among dead leaves, at 1100-2200 m above the sea level.

Distribution. Central mountain part of Sri Lanka.

Genus *Bradybaena* Beck, 1837

Bradybaena radlicola (Benson, 1848)

(Fig. 1 H, 3)

Benson, 1848: 161 (*Helix*); Tryon, 1887: 210, pl. 48, fig. 85 [*Helicella (Dorcasia)*]; Pilsbry, 1905: 205 [*Eulota (Eulota)*]; Gude, 1914: 205, 206 (*Eulota*); Zilch, 1968: 185.

Locus typicus. Landour.

Types: stored in W.H. Benson's collection in the University Museum of Zoology, Cambridge [Gude, 1914].

Material. Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district:

— left side of Kali-Gandaki valley, 400-600 m SE of Keketani (= Kokhethanti) village, in small ravine in *Rhododendron* forest, among dead leaves, 2600-2630 m, 2 spm (PCK), coll. A.G. Kuznetsov, 11.05.1996;

— right side of Lete-Khola valley (right tributary of Kali-Gandaki river), 700 m over the estuary (1 km S of Lete village), on middle part of north slope of Mt., in *Rhododendron* forest, among dead leaves, 2650-2700 m, 2 spm (PCK), 2 spm (ZMMU), coll. A.G. Kuznetsov, 2.10.1997.

Description. Shell subglobose-conic, thin, semitranslucent, with 4.5 moderately convex whorls, separated by impressed suture. Spire conic with slightly convex outlines and rounded apex. Last whorl initially obtusely angulated just below the periphery, a little descending in front. Ground color yellowish-horn, sometimes with two brownish bands: one midway between suture and periphery, another on base. Banded form has three light zones: one along suture, second above peripheral angulation, and third around umbilicus. One and a half embryonic whorls covered with axially attenuated

crowded rhombic scars. Sculpture of postembryonic whorls composed of irregular and rough growth lines. Besides, there are malleation and faint spiral striation. Aperture ovate-circular, oblique, with moderately reflexed and gradually arcuate margins. Peristome thickened, with cream lip. Columella subvertical. Umbilicus slit-like, nearly concealed by reflexed columellar margin.

Dimensions. (Nepalesian specimens): H 11.0-11.4, LD 10.4-10.9, HA 5.2, WA 6.1-6.9, WU 0.8-0.9 mm.

Reproductive anatomy: unknown.

Remark. The shell of *B. radlicola*, in comparison with *B. elatior* (E. Martens, 1868), is smaller, thinner, with more reflexed margins and wider umbilicus.

Habitat. It is very rare species in Nepal, inhabiting *Rhododendron* forests zone at 2600-2700 m above the sea level.

Distribution. INDIA: Siwalik range of Himachal-Pradesh State (Landour, Simla), Uttar-Pradesh State (Mussoorie); Sikkim; NEPAL: Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district (Fig. 3).

Bradybaena (?) *thakkholensis*

Schileyko et Kuznetsov, sp. nov.

(Fig. 1 I, 3)

Locus typicus. Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district, right side of Kali-Gandaki valley, 200 m W of Ghasa [= Gansa] village, near waterfall, on slope, in dense bushes among dead leaves, 2050 m.

Material. Holotype (Lc-23256) is deposited in ZMMU; Paratypes: Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district, Pholong-Dara ridge:

— right side of Kali-Gandaki valley, 1 km SW of Larjung village, along "Larjung-Sokung" track, on SE-facing slope around *Juniperus* bushes, among dead leaves, 2590 m, 1 paratype (PCK), coll. A.G. Kuznetsov, 30.09.1997;

— right side of Yamkim-Khola valley, opposite to Tukuche village, over bridge, in *Pinus* forest under stones, 2600 m, 1 specimen (PCK), coll. A.G. Kuznetsov, 29.09.1997.

Description. Shell subglobose, thin, semitranslucent, with 3.75-4 moderately convex and rapidly increased whorls, separated by impressed suture. Spire low conic, apex widely rounded. Last whorl inflated, with obtusely angulated periphery down to aperture, scarcely descending in front. Color uniformly horny. Embryonic whorls (1.75) covered with radial striae and fine spiral liration. Sculpture of postembryonic whorls composed of radial irregular wrinklelets and spiral striation, very weak on upper surface and clearly impressed on base. Also irregular spaced malleation sometimes present on last whorl. Aperture widely ovate, moderately oblique, with simple margins; basal and lower part

of palatal margins somewhat reflexed. Columellar margin subvertical, arcuate, dilated, triangular, covering about one third of umbilicus. Umbilicus deep, narrow.

Dimensions. H 6.0-6.6, LD 8.5-8.9, HA 4.0, WA 5.0-5.2, WU 0.5-0.6 mm; holotype: 6.0, 8.5, 4.0, 5.0 and 0.5 mm, respectively.

Reproductive anatomy: unknown.

Remark. *B. (?) thakholensis* sp. nov. seems to be close to species of *B. similaris* (Férussac, 1822) group, from which it differs in smaller size, thinner shell, rapidly increasing and less numerous whorls. The last whorl is very inflated. Spiral striae are clearly impressed on the base only.

Habitat. This is an extremely rare species in the zone of *Pinus-Juniperus* forests, where it inhabits dense bushes of *Juniperus* at 2050-2600 m above the sea level.

Distribution. The new species is known from Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang district, Thak-Khola valley (the name of the part of Kali-Gandaki valley between Ghasa and Jomsom villages) (Fig. 3).

Derivatio nominis. The species is named after the area of collection (Thak-Khola valley).

[**Диагноз.** Раковина округлая, тонкая, полупрозрачная, с 3,75-4 умеренно выпуклыми и быстро нарастающими оборотами, разделенными вдавленным швом. Завиток низко конический, вершина широко закругленная. Последний оборот вздутый с притупленно угловатой периферией вплоть до самого устья, в конце незначительно опущен. Окраска однотонно роговая. Эмбриональные обороты (1,75) покрыты радиальной струйчатостью и тонкой спиральной исчерченностью. Скульптура постэмбриональных оборотов состоит из неправильно расположенной морщинистости и спиральной струйчатости, очень слабой на верхней поверхности оборотов и хорошо заметной на основании. Кроме того, на последнем обороте местами наблюдается маллеатная скульптура. Устье широко овальное, умеренно косое, с простыми краями; базальный и нижний палатальный края несколько отвернуты. Колумеллярный край почти отвесный, равномерно изогнутый, расширен в виде треугольного отворота, прекрывающего треть пупка. Пупок глубокий, узкий.]

DISCUSSION

The genus *Landouria* has been introduced as a member of Helicidae family. However, earlier, in 1894, Pilsbry had assigned the corresponding taxa (*huttoni* and var. *savadiensis*) to the section *Plectotropis* of the genus *Eulota*, i.e. in Bradybaenidae.

One can easily see the features of *Landouria* which clearly correspond to those of *Aegista* [cf. Schileyko, 1996b: 405, fig. 3]: tuberculate flagellum with internal canal giving off secondary canals, corresponding to external tubercles. Besides, *Aegista* possesses a minute verge with a broad lumen.

At the first glance, there is a profound distinction between *Aegista* and *Landouria*: the former genus has a stylophore and mucus glands, while the latter

has no female appendages. However, numerous examples of complete reduction of additional organs of both female and male genital divisions are known in many groups. For example, the majority of Achatinellidae have penial appendix, but in some genera the appendix is absent [Cooke, Kondo, 1960]; among Vertiginidae the subfamily Nesopu-pinae is characterized by the presence of penial appendix, whereas Vertigininae and Truncatellinae have no appendix. In Enidae, there is the subfamily Multidentulinae with three genera, which differ from one another by the presence/absence of penial appendix and/or spermathecal diverticle in all possible combinations; in some populations of *Brephulopsis bidens* (Krynicky, 1833) some parts of penial appendix are reduced [Schileyko, 1984]. In Hygromiidae the disappearance of a pair of four stylophores is known (*Nanaja cumulata* Schileyko, 1978 — *Archaica heptapotamica* (Lindholm, 1927); *Circassina circassica* (Mousson, 1863) is represented by four groups of populations, in which any combination of presence/absence of stylophores and mucus glands is observed [Schileyko, 1978]. In Helicidae one case (*Cylindrus obtusus* (Drapparnaud, 1805)) is known where one or both mucus glands are more or less reduced [Schileyko, 1996a; unpublished data]. Among Helicarionidae s. lat., one may find any combination of absence of accessory organ in both female (sarcobelum) and male (caecum and flagellum) divisions of reproductive apparatus [Schileyko, 1991].

Generally speaking, the main difference between Bradybaenidae and majority of Camaenidae (at least, as concerning Australian-Asian genera) is the presence of female accessory organs (stylophore and mucus glands) in the former group and their absence in the latter. We do not intend to discuss here the problem of interrelations between these two families, however we would like to emphasize the fact, that in many cases so-called Camaenidae in reality are just Bradybaenidae lacking stylophores and mucus glands. In particular, we suggest that some Japanese taxa of generic rank (*Satsuma* A. Adams, 1868, *Luchuhadra* Kuroda et Habe, 1949, *Coniglobus* Pilsbry, 1905, *Yakuchloritis* Habe, 1955, *Nipponochloritis* Habe, 1955) is nothing else than representatives of Aegistinae (Bradybaenidae) lacking stylophore and mucus glands. This suggestion is the more fair that in a number of true Bradybaenidae one can trace the process of reduction of female accessory organs, to their complete disappearance (i.g., *Neoagista* Azuma, 1955) [see Azuma, 1982]. Moreover, Azuma [op. cit.] has assigned *Neoagista* to the genus *Aegista* as a subgenus, in spite of absence of stylophore and mucus glands in the only species of the genus, *Aegista* (*Neoagista*) *trochula* (A. Adams, 1868). By the way, the species, which Azuma has identified as *Aegista* (*Plectotropis*) *omiensis* (Pilsbry, 1902), is conchologically very similar to *Landouria*, although it has a typical *Aegista*-like anatomy [Azuma, 1982: 289, fig. 446].

Another problem is the volume and range of *Landouria*. Based on descriptions and figures of Rensch [1931, figs. 34, 36], we should include in the genus, except the above-discussed species, at least three additional Indonesian species: *L. winteriana* (L. Pfeiffer, 1841), widely distributed throughout Indonesia, *L. rotatoria* (Busch in Philippi, 1842), also having a broad range, including also the Philippines, and *L. smiruensis* (Mousson, 1849). These three species are characterized by the presence of enormously swollen basal part of spermathecal stalk, a small reservoir, and a flagellum "das nach der Spitze zu mit parallelen Einkerbungen versehen ist" [Rensch, 1931: 90]. At the same time, we are not quite sure that a complete reduction of stylophores and mucus glands occurred in Aegistinae only once; it is quite possible that this phenomenon took place independently in western (Hindustan peninsula and Sri Lanka) and eastern (Indonesia, Philippines) parts of the range of Aegis-

tinae. This suggestion seems even more reasonable due to the fact that Rensch [op. cit.] wrote about "Einkerbungen", i.e. incisions on the surface of flagellum, rather than about tubercles.

Summing up, we assign the genus *Landouria* to Bradybaenidae (Aegistinae) and tentatively restrict the range of the genus by the territory of northern India, Nepal, northern Burma, and Sri Lanka. As concerning conchologically similar Indonesian and Philippinian species, we suggest that they may belong to some other genus of Aegistinae (perhaps they deserve a separation as a new genus).

In general, the genus *Landouria* is a south-Asian element in malacofauna of Nepal. As for *Bradybaena radicularis* and *B. (?) thakkholensis* sp. nov., they are much more similar to species from Burma and Indo-China than to Central Asian ones. So we suggest that known Nepalesian Bradybaenidae are of south and south-east Asian origin.

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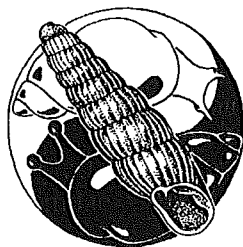
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Наземные моллюски рода *Landouria* Godwin-Austen, 1918 и другие Bradybaenidae Непала (Gastropoda, Pulmonata)

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Приведены описания раковин и половых аппаратов шести видов рода *Landouria* Godwin-Austen, 1918 из Непала и одного вида из Шри-Ланки. Описаны *L. dhaulagirica* sp. nov. и *L. rhododendronis* sp. nov. На основании совокупности конхологических, анатомических и географических данных род *Landouria* отнесен к семейству Bradybaenidae (Aegistinae), а его ареал пока ограничен северной Индией, Непалом, северной Бирмой и Шри-Ланкой. Кроме того, по конхологическим данным описаны еще два вида семейства Bradybaenidae из Непала.



Short communications

On the taxonomic position of the genus *Himalodiscus* Kuznetsov, 1996, with a description of a new species

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О систематическом положении рода *Himalodiscus* Kuznetsov, 1996, с описанием нового вида

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The monotypical genus *Himalodiscus* was originally described as belonging to Discinae (Endodontidae), based on conchological similarity [Kuznetsov, 1996]. During an expedition to Nepal, one of the authors (A.K.) has collected 8 specimens of a new species of the same genus; two of them were collected alive. Unfortunately, both were not completely developed (subadult), but nevertheless it was possible to dissect one specimen. The anatomical study brought unexpected results. The presence of sarcobelum, flagellum, and spirally coiled caecum indicates belonging of *Himalodiscus* to Ariophantidae and a rather close anatomical relation to *Macrochlamys*.

Family Ariophantidae

Genus *Himalodiscus* Kuznetsov, 1996

Kuznetsov, 1996: 163.

Type species — *Himalodiscus aculeatus* Kuznetsov, 1996 (o.d.).

Himalodiscus echinatus

Schileyko et Kuznetsov, sp. nov.

(Fig. 1)

Locus typicus — Western Nepal, Dhaulagiri zone, Annapurna National Park, Mustang District, right side of Lete-Khola Valley (right tributary of Kali-Gandaki River), 700 m over estuary (1 km S of Lete village), on middle part of north slope of

Mt., in *Rhododendron* forest among dead leaves, 2650-2700 m above sea level, coll. A.G. Kuznetsov, 2.10.1997.

Holotype (No. Lc-23258) deposited in the Zoological Museum of Moscow State University, 7 paratypes are in private collection of A.G. Kuznetsov.

Description. Shell low conic, somewhat lenticular, biconcave, thin, very fragile, translucent, of 4.25-4.5 whorls. First postembryonic whorls moderately convex, last slightly flattened above and below, with blunt angle at periphery, scarcely descending in front. Color dark corneous-brown. One and a half embryonic whorls with rough radial wrinklets and vague granulation. Subsequent whorls decorated with widely spaced radial rounded riblets, very fine radial periostracal lamellae in interspaces and spiral engraved lines. Axial lamellae bearing spines: two rows of long and curved spines just above and below periphery, and short and numerous hairs on upper and lower whorl surfaces. Aperture irregularly ovate, moderately oblique, with simple margins; columellar margin shortly reflexed. Umbilicus narrow, open, subcylindrical, 6.5-8.0 times less than shell width.

Dimensions (without spines): height of shell 2.7-3.1, large diameter 4.8-5.2, height of aperture 1.6-1.8, width of aperture 2.4-2.5, width of umbilicus 0.6-0.8 mm; holotype: 3.1, 5.2, 1.6, 2.5, and 0.7 mm respectively.

Reproductive anatomy (1 subadult paratype). Albumen gland very small. Vas deferens not adherent, entering flagellum/epiphallus junction at acute angle. Flagellum rather long, tapering, with semi-circular superficial folds. Epiphallus slightly shorter, furnished with two caeca: typically ariophantoid loosely spirally coiled (as, for example, in *Macrochlamys*), and short clavate, located at base of first caecum. Penis rather long, of irregular shape, with very thin and semitransparent walls, without visible inner structure (perhaps, a short verge present in adult specimens). Penial retractor attached to spiral caecum. Sarcobelum very large, its body covered with glandular layer; lower portion of sarcobelum

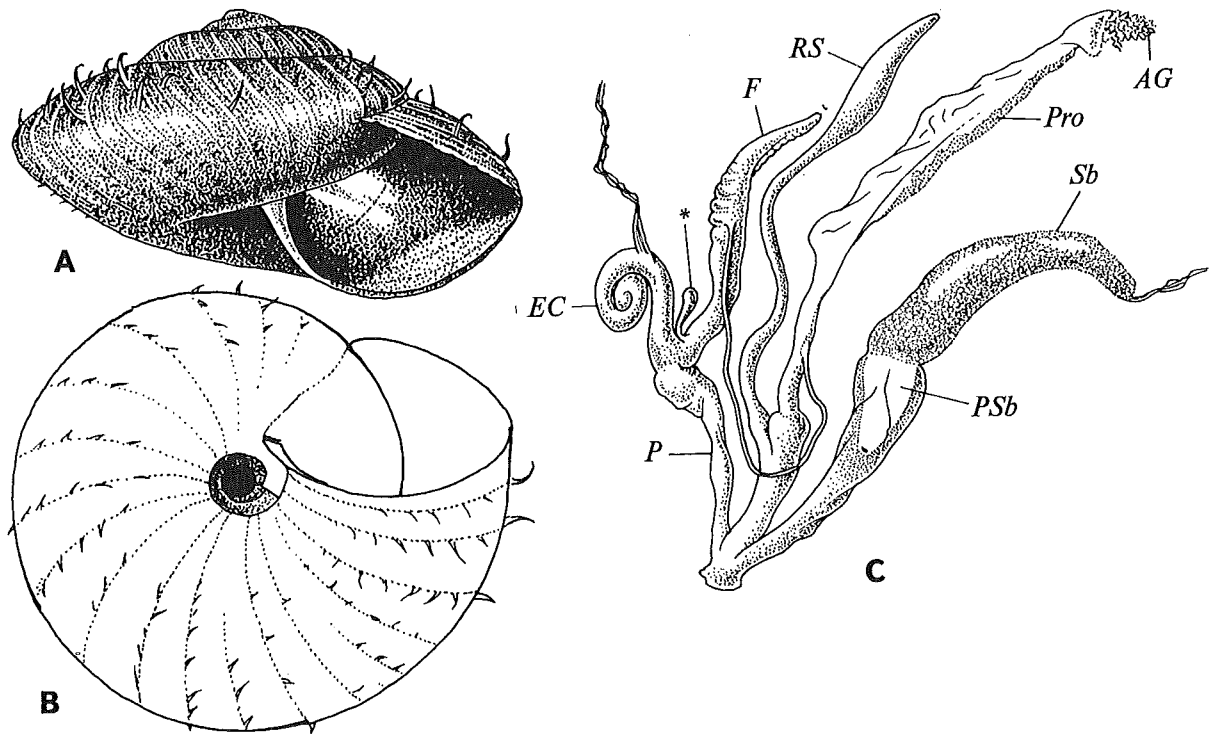


FIG. 1. *Himalodiscus echinatus* Schileyko et Kuznetsov sp. nov.: A. Holotype, apertural view; B. Holotype, basal view; C. Paratype. Reproductive apparatus. AG — albumen gland; EC — epiphallic caecum; F — flagellum; P — penis; Pro — prostate; PSb — papilla of sarcobelum; RS — reservoir of spermatheca; Sb — sarcobelum; * — additional caecum.

РИС. 1. *Himalodiscus echinatus* Schileyko et Kuznetsov sp. nov.: A. Голотип, вид раковины со стороны устья; B. Голотип, вид раковины снизу; C. Паратип. Половой аппарат. AG — белковая железа; EC — цекум эпифаллуса; F — флагеллум; P — пенис; Pro — простата; PSb — папилла саркобелума; RS — резервуар семеприемника; Sb — саркобелум; * — дополнительный цекум.

very thin-walled, containing large conic papilla. Retractor of sarcobelum attached apically.

Remark. *Himalodiscus echinatus* sp. nov. differs from *H. aculeatus* in more inflated last whorl; more obtusely angulated periphery; two rows of attenuated periostracal spines on the periphery; axial lamellae are less developed, bearing numerous tiny spines; narrower umbilicus.

Habitat. *H. echinatus* sp. nov. was found in *Rhododendron* forest zone, in dense bamboo thicket, in wet leaf mould, at 2650-2700 m above sea level. The following land snails were collected together with *H. echinatus* sp. nov.: *Hemiphaedusa m. martensiana* H. Nordsieck, 1973, *Macrochlamys nuda* (L. Pfeiffer, 1852), *Oxytesta blanfordi* (Theobald, 1859), *Syama p. prona* (Nevill, 1878), *Bradybaena radicularis* (Benson, 1848).

Distribution. The new species is known only from the type locality.

[**Диагноз.** Раковина средних размеров, низко-коническая, более или менее линзовидная, тонкая, очень хрупкая, с 4,25-4,5 оборотами. Первые дефинитивные обороты умеренно выпуклые, последний — слабо уп-

лощенный с обеих сторон, с притупленной угловатостью по периферии, к устью едва опущен. Окраска раковины темная рогово-коричневая. Эмбриональные обороты (1,5) покрыты грубой радиальной морщинистостью и неясной зернистостью. Скульптура постэмбриональных оборотов состоит из широко расставленных радиальных ребрышек, в промежутках между которыми располагаются очень тонкие перистракальные пластинки. Спиральная струйчатость слабая. Осевые пластинки несут выросты: два ряда длинных и кривых шипов чуть выше и ниже периферии, и короткие многочисленные волоски на верхней и нижней поверхностях оборотов. Устье неправильно овальное, умеренно скошенное, с острыми краями; колумеллярный край в верхней части отвернут. Пупок узкий, открытый, субцилиндрический, его ширина в 6,5-8,0 раз меньше ширины раковины.]

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