

The Far East Species of the Genus *Rybinskiella* (Coleoptera,
Leiodidae, Cholevinae), with Discussions on their
Taxonomic Position and Natural History

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Abstract Two species belonging to the genus *Rybinskiella* REITTER from the Far East are dealt with. *Rybinskiella levushkini* IABLOKOFF-KHNZORIAN is redescribed and *Rybinskiella peninsularis* sp. nov. from South Korea is described as new. Their taxonomic position and natural history are discussed.

Introduction

So far as we are aware, the cholevine genus *Rybinskiella* REITTER includes eleven species in three subgenera from the Palearctic Region at the present. From the Far East including the Korean Peninsula, additional specimens of *Rybinskiella levushkini* IABLOKOFF-KHNZORIAN and a new species are obtained as below.

Rybinskiella levushkini was described only in Russia as the only member of the newly established subgenus *Eurybinskiella* IABLOKOFF-KHNZORIAN, 1970, on the basis of two males and three females collected by S. I. LYOVUSHKIN from Belyi Dvoretz Cave (Primorskyi Kray, Russia) on August 16, 1966. In his “Revision der Gattung *Rybinskiella*,” FRANK (1988) cited the original description of this species as a German translation with original drawings. Although he did not add any new morphological features to it, his speculation was that the species actually belongs to the genus *Catops*.

Besides, its type locality was incorrectly considered by him to be Armenia, not Primorskyi Kray, Russia.

In October of 1991, the first author received a small collection of beetles for taxonomic study from Dr. S. LYOVUSHKIN, who carried out a biospeleological exploration of several caves in Primorskyi Kray, Russia, in 1966–1967 at his post-graduate age. LYOVUSHKIN's material from Belyi Dvoretz Cave contained three specimens of *R. levushkini* together with some other beetles. Later, the first author visited this cave with a Russian-Japanese group of biologists in 1992 and collected by himself two additional specimens of the species. A damaged female seemingly belonging to the same species was also obtained by a pitfall trap on Mt. Litovka in the southern part of Primorskyi Kray. On the other hand, a single specimen of a new *Rybinskiella* species was found by the third author on Mt. Togyu-san of the Sobaeg Mountains in the southern part of the Korean Peninsula in the cause of his study on the Korean cholevine fauna (cf. NISHIKAWA & CHO, 2000).

As the authors were informed by one another about the occurrence of the *Rybinskiella* species in the Russian Far East and South Korea, the present cooperative study has fortunately been realized. In the present paper, we are going to redescribe the poorly known species, *R. levushkini*, and to describe the new species under the name *Rybinskiella peninsularis*. Besides, discussions will be made on their taxonomic position and natural history.

The abbreviations used in this paper are as follows: HL – length of head measured from the apical margin of clypeus to the hind margin of tempora; HW – greatest width of head; PA – width of pronotal apex; PW – greatest width of pronotum; PB – width of pronotal base; PLt – maximum length of pronotum; PLm – length of pronotum, measured along mid-line; EL – length of elytra; EW – greatest width of elytra; L – maximum length measured from the apical margin of mandibles to the apices of elytra; Ls – total of HL+PLt+EL; M – arithmetic mean; IBPV – Institute of Biology and Pedology, the Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia; NHMHU – Natural History Museum, Hannam University, Daejeon, Korea.

Descriptions

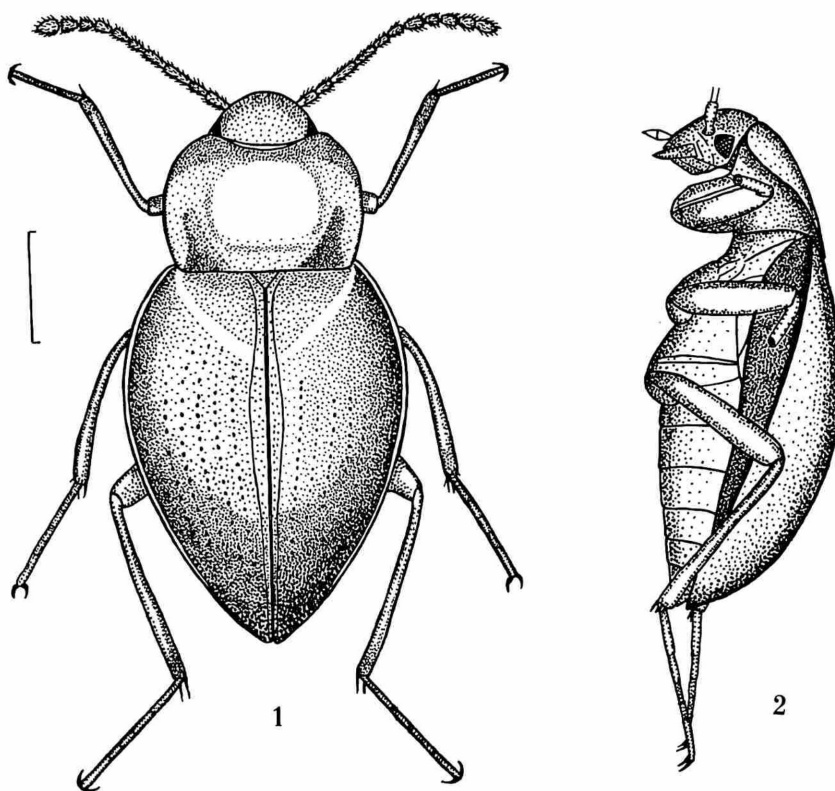
Rybinskiella (Eurybinskiella) levushkini IABLOKOFF-KHNZORIAN, 1970

(Figs. 1–16)

Rybinskiella (Eurybinskiella) levushkini IABLOKOFF-KHNZORIAN, 1970, Zool. Sb., Erevan, **15**, pp. 51–54, figs. 2 a–z; type locality: Belyi Dvoretz Cave, Primorskyi Kray, Russia; type depository: Institute of Zoology, Armenian Academy of Sciences, Erevan. — NEWTON, 1998, Phylog. Evol. Subterranean Endogean Cholevidae, Torino, p. 109. — PERREAU, 2000, Mém. SEF, Paris, **4**, p. 146.

Rybinskiella levushkini: FRANK, 1988, Ent. basil., **12**, pp. 268, 275, figs. 1, 5 A–H.

Male and female. Length 4.30–5.80 mm, width 2.50–2.90 mm. Body wholly dark reddish brown; antennae, palpi, propleura, elytral epipleura, tibiae and tarsi light



Figs. 1-2. *Rybinskiella* (*Eurybinskiella*) *levushkini* IABLOKOFF-KHNZORIAN, 1970, from Belyi Dvoretz Cave, Primorskyi Kray, Russia. — 1, Habitus, female (specimen 3 in Table 1); 2, same, in lateral view. Scale: 1.0 mm. (Del. G. Sh. LAFER.)

brown; dorsum clothed with dark reddish brown adpressed pubescence (short hairs), which are light golden brown under lateral light; head almost dull, pronotum more or less shiny, and elytra nearly dull with opalescent lustre.

Head (Fig. 3) as in *Catops*. Clypeus with transversely truncate apex. Frontoclypeal suture indistinct. Vertex moderately convex. Upper surface of head with moderately large and deep round foveae forming arched rows at vertex in some places, with hairs directed anteriad on clypeus and posteriad on frons and vertex; interspaces among the foveae shagreened, less than the diameter of each fovea. Eyes reduced, small, weakly prominent. Genae before eyes comparatively broad and high, with weak vertical impression, separated from upper side of head by fine carina. Labrum transverse, trapezoidal, with emarginate front margin and rounded front angles. Mandibles simple at inner margins. Maxillae membranous and pubescent at the apex of their outer lobe. Maxillary palpi rather long and thick, with terminal segment conical, widest at base, though narrower than the apex of penultimate one, which is dilated apicad, ob-

Table 1. Standard measurements of body parts in *Rybinskiella levushkini* (mm).

N	Sex	HL	HW	PA	PW	PB	PLt	PLm	EW	EL	L	Ls
1	m	0.58	1.04	0.95	1.80	1.60	1.20	1.15	2.50	3.30	4.50	5.08
2	f	0.65	1.10	1.10	2.10	1.90	1.31	1.25	2.90	3.70	5.80	5.66
3	f	0.60	1.05	1.00	1.82	1.55	1.25	1.20	2.60	3.30	4.30	5.15
4	m	0.60	1.08	1.00	1.90	1.70	1.30	1.15	2.60	3.50	5.20	5.40
5	m	0.55	1.05	1.00	1.90	1.70	1.25	1.20	2.60	3.40	5.00	5.20
6	f	—	—	—	—	—	—	—	2.80	3.90	—	—

Remarks. Locality of specimens 1–3 are Belyi Dvoretz Cave, Primorskyi Kray, Russia, in 1966–1967, 4–5 are from the same locality in 1992, and 6 is from Mt. Litovka. Value L depends on the mounting of each specimen: the head is directed forwards in specimens 2, 4 and 5 and it is deflexed in specimens 1 and 3. (Abbreviations are shown in the final part of the introduction.)

long, as long as the former. Labial palpi very small and slender. Submentum transverse, trapezoidal, narrowed forwards, with round apex. Antennae (Table 2, Fig. 5) relatively long (length 2.3–2.4 mm), slender, reaching basal third of elytra, pubescent throughout, dilated into a weak club beginning from segments V–VI, inserted at upper front corner of gena before each eye. Segment II almost cylindrical, about twice as long as wide, segment III weakly narrowed towards base, the longest, three times as long as wide and as long as segment XI or longer, segments IV–V nearly equal in length but the latter is weakly thicker, segment VI a little shorter and somewhat thicker than segment V, segments VII–X narrowed towards each base, segments VII and segments IX–X nearly equal in each size, segment VIII a little shorter and narrower than the neighboring segments, segment XI shortly fusiform with apex pointed.

Pronotum (Figs. 3–4) transverse, distinctly wider than head, widest at about basal third, feebly narrowed towards base, nearly flattened in transverse direction, weakly convex in longitudinal direction, PW/PLt 1.46–1.52 (M 1.51), PW/PLm 1.52–1.68 (M 1.60), PW/HW 1.73–1.91 (M 1.79), PW/PB 1.11–1.17 (M 1.13); front margin as wide as head, strongly marginate, weakly emarginate; front angles very obtuse, widely rounded, gently produced and deflexed; sides arcuate, narrowly bordered; basal margin narrowly bordered, straight, noticeably wider than front margin, PB/PA 1.55–1.73 (M 1.67); hind angles obtuse, angulate or weakly rounded at the tips; disc nearly flattened in basal half and with a weak impression at each lateral side (impressions triangularly

Figs. 3–16. *Rybinskiella* (*Eurybinskiella*) *levushkini* IABLOKOFF-KHNZORIAN, 1970. — 3, Head and pronotum, female (specimen 2 in Table 1); 4, pronotum, male; 5, right antenna (by preparation in Canada balsam), male; 6, right protarsus, male; 7, right mesotarsus, male; 8, male genitalia, lateral view; 9, apical part of aedeagus, dorsal view; 10, apical part of aedeagus, other specimen; 11, same, lateral view; 12, same, ventral view; 13, visible seventh abdominal tergite, female, dorsal view; 14, visible seventh abdominal sternite, female, ventral view; 15, eighth abdominal segment, female, dorsal view; 16, ninth abdominal segment and female genitalia, dorsal view. Scales: 0.5 mm (a for Figs. 13–16 and the remainings for the nearest respective figures). (Del. G. Sh. LAFER.)

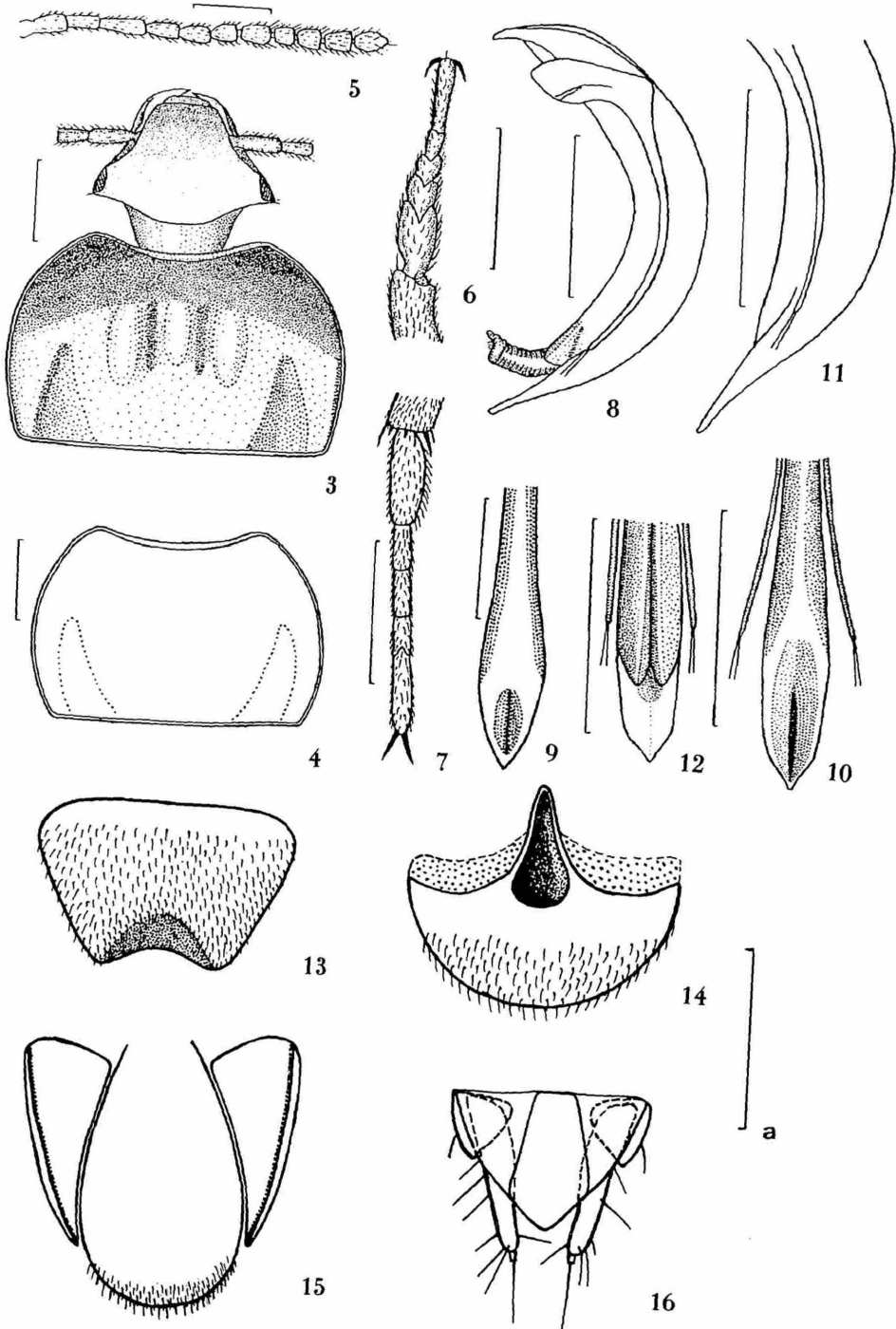


Table 2. Ratios of length and width of antennal segments in *Rybinskiella levushkini* (mm×1/4).

Sex	l/w	1	2	3	4	5	6	7	8	9	10	11
m	l	1.00	0.76	1.20	0.90	0.80	0.70	0.80	0.60	0.65	0.70	1.00
	w	0.45	0.36	0.39	0.39	0.39	0.44	0.58	0.48	0.52	0.50	0.50
f	l	1.10	0.80	1.20	0.80	0.80	0.70	0.70	0.60	0.70	0.80	1.20
	w	0.40	0.30	0.40	—	—	0.60	0.70	0.60	0.70	0.70	0.60

Remarks. Measured from a male prepared by Canada balsam, and from a dried specimen in a female.

enlarged towards base), feebly convex in middle, in one female divided by weak longitudinal impressions into three weakly visible ribs as shown in Fig. 3; broad lateral areas of disc outside of basal impressions weakly convex and faintly reflexed; surface of pronotum punctate-granulate and weakly shagreened with short adpressed hairs directed posteriad throughout, somewhat shiny. Scutellum triangular, large.

Elytra ovate and not coalescent, moderately convex with scutellar area flattened, widest at basal third, markedly tapered apicad, with apices conjointly acuminate; EL/EW 1.27–1.35 (M 1.30), EL/PLt 2.64–2.82 (M 2.72), EW/PW 1.37–1.43 (M 1.39); frontal margin covered by pronotal base almost transverse, shoulders obtuse, distinct; lateral margins narrowly marginate, at maximal width somewhat arcuate; each elytron with deep sutural stria and with traces of other eight striae, with transverse wavy rows of elongate punctures (the intervals between punctures in rows less than transverse diameter of each puncture, the distance between rows about 1.5–2.0 times as long as the longitudinal diameter of each puncture), densely shagreened in their interspaces, with short homogenous adpressed hairs; epipleura very broad, disappearing at the level of the apex of sternite VI; ventral surface of each elytron with traces of nine striae replaced by rows of fine granules but the six outer rows are distinctly striate in apical third. Hind wings strongly reduced, their rudiments reaching the level of the apex of sternite III.

Ventral surface of prothorax almost entirely occupied medially by large procoxae, which begin practically from its anterior margin and hardly reach the hind one. Procoxal cavities closed behind and inside; a low and narrow intercoxal process present though invisible. Propleura convex in front and impressed behind (in this impression knees of mid and hind legs are placed). Mesosternum somewhat long, marginate along front margin, more or less arch-shaped in front and evenly lowering posteriad. Mesepimeron reaching mesocoxal cavities, which are connected to each other in middle. Metasternum comparatively short in middle (shorter than mesosternum) and longer at sides, strongly convex in transverse direction and lowering posteriad, with small protrusion between metacoxae. Metepisternum oblong, very slender, pointed posteriad. Metepimeron faintly visible outside and behind of metepisternum. Abdomen composed of seven visible segments though the first sternite is almost fully reduced, so that the last visible sternite is sternite VII (=sternum VIII in RŮŽIČKA, 1994). Abdom-

inal sternites densely punctate and shagreened, with gentle adpressed hairs.

Legs medium-sized. Procoxae subconical, prominent, conjoined at their distal tips; mesocoxae large, more or less oval, obliquely placed, conjoined at the middle to each other; metacoxae transverse, flat, short and broad, conjoined to each other at the middle and reaching metepimera on the outside. Pro- and mesocoxae with open trochantins. Trochanters small. Femora slender, depressed; pro- and mesofemora reaching lateral margins of pronotum and elytra, respectively; metafemora protrudent a little beyond elytral margins; tibiae slender, as long as femora, mesotibiae weakly curved outwards, spurs very short. Tarsi slender, a little shorter than tibiae; in male segments I–III of protarsi dilated distinctly (segment III weaker) and furnished with adhesive appendages beneath (Fig. 6), in mesotarsi the first segment 1.5 times as wide as segment II, furnished with adhesive appendages beneath (Fig. 7). Claws simple, slender.

Aedeagus (Figs. 8–12) lanceolate at the apical part, weakly dilated in preapical portion, pointed at the apex, with oval impression and longitudinal medial furrow near apex in dorsal surface; ligulae costal, narrowly and separately rounded at each apex. Parameres narrow, hardly reaching the apices of ligulae, noticeably shorter than apex of penis, with two setae at apex.

Female genitalia (Figs. 13–16):—Visible segment VII: tergite subtrapezoidal, narrowed posteriorly, with apex widely emarginate; last visible sternite with apex widely rounded; spiculum ventral elongated triangular, longitudinally impressed; the impression dilated and deepened posteriorly with its hind margin arcuate. Segment VIII: tergite subovoidal, dilated towards apex, pubescent along apical margin; hemisternites elongated triangular. Segment IX: tergite widely subtriangular, membranous, with middle sclerite feebly sclerotized; hemisternites small, triangular, with one seta; coxites (styli in RŮŽIČKA, 1994) long and subcylindrical, feebly curved and feebly narrowed towards rounded apex, with three setae before apex and three or four setae on outer surface; styli minute, cylindrical, with one long seta at each apex.

Specimens examined. 1♂, 2♀♀, Belyi Dvoretz Cave (ca. 440 m in alt.) at the foot of Mt. Konstantinopol' (Partizanskyi Range), 40 km NE of Partizansk Town, southern part of Primorskyi Kray, Russia, VIII–1966~IX–1967 [apparently, 18–IX–1966], S. I. LYOVUSHKIN leg.; 2♂♂, same locality, 13–VIII–1992, G. Sh. LAFER leg.; 1♀ (elytra and abdomen), Mt. Litovka, 1,110 m alt. (a glade near the upper limit of forests), Livadiyskyi Range, 28 km westwards of Partizansk (=Sutchan) Town, Primorskyi Kray, Russia, 14~26–VI–1994, V. N. MAKARKIN & S. K. KHOLIN leg. (trap). Deposited in the IBPV.

Distribution. Russia (Partizanskyi and Livadiyskyi Ranges of the Sikhote-Alin Mountains, Primorskyi Kray).

Biological notes. The main habitat of *R. levushkini* in the Sikhote-Alins is the limestone cave Belyi Dvoretz (length 120 m, capacity 1,600 m³) which is located at the foot of Mt. Konstantinopol', only a short way above a river bed. Ten specimens including the type series were collected before in this cave. The first author collected one

beetle on the ceiling of a tight crawl and the other on a wall in the main hall. Together with *R. levushkini* were obtained in the cave 1 female of *Agonum (Platinidius) nazarovi* LAFER (Carabidae), 2 males and 1 female of *Pteroloma sibiricum* SZÉKESSY (Agyrtidae), and 12 exs. of *Gnypeta* sp. (Staphylinidae). Previously published records of animals from this cave are: *Fuxi nyujwa* PERKOVSKY, 1989 (Leioididae), *Galloisiana kurentzovi* PRAVDIN et STOROZHENKO, 1977 (Notoptera, Grylloblattidae), and *Pacificampa birsteini* CHEVRIZOV, 1986 (Diptera). On Mt. Litovka a single specimen was collected by soil traps in a small glade in a forest of *Picea ajanensis*, *Abies nephrolepis* and *Betula lanata* and also with thickets of *Lonicera edulis* and *Pinus pumila* at the outskirts.

Apparently *R. levushkini* lives mainly in caves and in deep fissures of rocks or in heaps of rock debris, and only sporadically comes out onto the surface. Weakly reduced eyes and dark colour of body show that the species has troglophilous (not troglobiontic) habit of life.

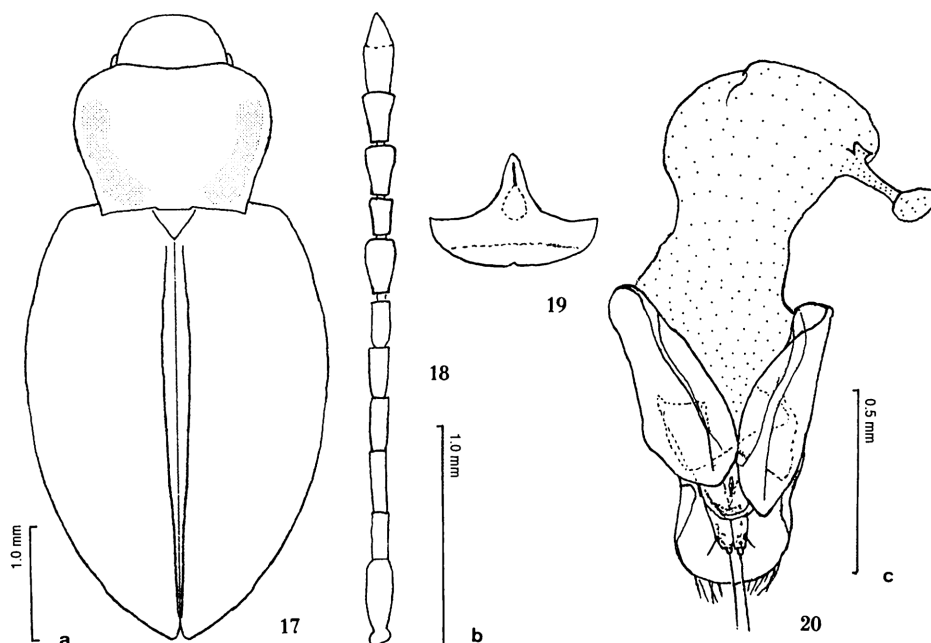
***Rybinskiella (Eurybinskiella) peninsularis* M. NISHIKAWA et Y. B. CHO, sp. nov.**

(Figs. 17–20)

Female. Length 5.65 mm (from the apical margin of mandibles to the apices of elytra), width 2.80 mm. Body convex, with weakly acuminate apex, almost clothed with long, yellowish brown adpressed pubescence on dorsal surface. Head, scutellum and pronotum blackish brown; elytra dark reddish brown with weak opalescent lustre; antennae and legs dark reddish brown. Ventral surface blackish brown.

Head gently convex, uniformly foveolate in dorsal surface, the fovea shallow, with microsculpture formed by minute punctures, microscopically punctate in lateral fields except for eyes, almost straight at front margin, widest at the level of occipital carina (HW/HL 1.26); labrum transverse, subtrapezoidal, slightly emarginate at front margin, with close punctations; maxillary palpi with last segment as long as the penultimate one; eyes reduced, moderately prominent; horizontal diameter of eye about 4/7 as long as the distance between antennal socket and occipital carina. Antennae long (Fig. 18), reaching about basal 1/4 of elytra, with segments II–VI cylindrical, VII–X turbinate, XI lancetform. Segmental measurements (length followed by width) in the holotype as follows: I, 0.30, 0.13; II, 0.20, 0.10; III, 0.33, 0.10; IV, 0.23, 0.10; V, 0.21, 0.11; VI, 0.19, 0.11; VII, 0.26, 0.15; VIII, 0.16, 0.13; IX, 0.24, 0.15; X, 0.24, 0.15; XI, 0.33, 0.15.

Pronotum transverse, subcampanulate, gently marginate except for that of front margin distinct, widest at the middle, with base distinctly narrower than elytral base, PW/HW 1.57, PW/PLt 1.30, PW/PLm 1.40, PW/PB 1.18, PB/PA 1.36; front margin distinctly emarginate; front angles rounded; sides sinuate; basal margin bisinuate, though almost straight at the middle; hind angles obtuse, pointed; disc weakly curvate in each lateral portion, almost flat in the middle, granulate-punctate, the punctures relatively large, glabrous among the punctures. Scutellum triangular, closely punctate.



Figs. 17–20. *Rybinskiella (Eurybinskiella) peninsularis* M. NISHIKAWA et Y. B. CHO, sp. nov., from near Paengnyon-sa Temple on Mt. Togyu-san, Chŏnllabuk-do, South Korea. — 17, Outline of body with pronotal depressions and sutural striae, female; 18, right antenna, same; 19, eighth abdominal sternite, same; 20, female genitalia, ventral view. Scales: a for Fig. 17, b for Figs. 18–19, and c for Fig. 20. (Del. M. NISHIKAWA.)

Hind wings full.

Elytra ovate, with weakly acuminate apices, convex, widest just before the middle, EW/PW 1.45, EL/PLt 2.60, EL/EW 1.38; sides strongly arcuate, convergent apicad, well marginate to apical 1/3; suture entire; disc with distinct sutural striae and a pair of traces of seven striae, granulate-punctate, the punctures close; microsculpture formed by transversely rugose punctures; epipleura broad, feebly depressed longitudinally at the middle, with punctations as on elytra. Pygidium punctulate, feebly emarginate at the apex with weakly sclerotized U-shaped area.

Ventral surface with prosternum punctate; mesosternum glabrous except for foveolate middle portion; metasternum setiferous, closely granulate-punctate; mesepisterna glabrous, foveolate near base; mesepimeron glabrous in basal portion. Abdominal sternites simple in shape, with transverse rugose punctations, though sternite VIII (Fig. 19) is of an anchor-like shape, microscopically punctate in apical portion, feebly notched at the middle of apical margin, with spiculum ventral triangular, nearly roundly depressed in the middle of basal portion.

Female genitalia (Fig. 20) with proctiger elliptical; coxites reaching before the apex of proctiger, with short cylindrical styli bearing a long apical setae at each apex;

ventro-medial sclerite between coxites elliptical, almost transparent except for strongly sclerotized short line longitudinally along the middle, with sensories situated at apical sides; spermatheca unsclerotized, tumid in apical portion, with a process near base.

Legs slender, with protibia feebly expanded towards apex, widest at the apex bearing two prominent spines only at its inner side; tarsi and femora simple; ratios of the lengths of pro-, meso- and metatarsi as follows: 0.28, 0.13, 0.10, 0.10, 0.35; 0.43, 0.23, 0.18, 0.15, 0.40; 0.55, 0.15, 0.18, 0.18, 0.43.

Male unknown.

Type specimen. Holotype: ♀, nr. Paengnyon-sa Temple on Mt. Togyu-san, ca. 950–980 m in alt., Seolch'on-myun, Chonllabuk-do, South Korea, 28~29-V-1999, Y. B. CHO leg. (trap). The holotype (left antennal segments VIII–XI and claws of left metatarsus are missing) is deposited in the NHMHU.

Distribution. South Korea (Sobaeg Mountains).

Comments. Though possessing obviously reduced eyes, the present new species has fully developed hind wings, which is peculiar in the genus *Rybinskiella*. It is distinguished from *R. levushkini*, other than the above differences, by the relatively long hairs of pronotum and elytra and the difference of relative ratios of body parts. However, the new species is rather similar in body form to *Rybinskiella murzini* RŮŽIČKA from Kazakhstan and *Dzungarites roubali* (LEBEDEV) from Dzungaria. When male specimens of this interesting new species are obtained by future investigations, its true affinity will become clearer by comparison of aedeagal characteristics.

Biological notes. Togyu-san (=Daeokyu-san, 1,614 m in alt.), the type locality, is sometimes called Buk Togyu-san. It rises at the southern part of the Sobaeg Mountains stretching from northeast to southwest in the central part of the Korean Peninsula, and is about 65 km distant to the southeast from Daejeon City. The mountain area containing limestone-prevailing valleys so-called Muju Gucheon-dong is protected by the Korean Government as the Togyu-san National Park.

The type specimen, a single female, was collected only near the Temple of Paengnyon-sa by a pitfall trap, which was set on a slope along a small valley with a brook. The small valley is mainly composed of loose rock debris surrounded by deciduous broadleaved trees, such as *Quercus serrata*, *Prunus lereilleana*, *Betula castata*, *Phellodendron amurense* and a few *Abies holophylla*, and *Sasa* sp. partly covering the floor (Fig. 21). This site is located near one of the main climbing routes from Paengnyon-sa to the summit of Mt. Togyu-san via Osuja-gul Cave, at an altitude of about 950–980 m. For several years, this route was closed to hikers for environmental recovery, so that a good natural condition has been preserved along it. In the spring of 2001, the second author visited this small valley including Osuja-gul Cave (ca. 1,200 m in alt.) for rediscovery of the new species, but it ended in failure.

Unfortunately, the actual microhabitat of *R. peninsularis* sp. nov. is still unknown, but the collecting site has many narrow spaces among rock and stone debris of taluses with moderately humid condition, which may furnish microhabitats for upper hypogean or cavernicolous species. It is possible that this new species dwells in such



Fig. 21. Habitat of *Rybinskiella* (*Eurybinskiella*) *peninsularis* M. NISHIKAWA et Y. B. CHO, sp. nov. Showing a talus slope with temperate forest near Paengnyon-sa Temple on Mt. Togyu-san, South Korea. (Photo by M. NISHIKAWA, 2-V-2001.)

spaces judging from its morphological appearance. On the other hand, it seems also possible that the new species may occupy a range not so much restricted geographically, since its hind wings are at least functional.

Discussions

1. A brief review on the subgenera of the genus *Rybinskiella* and the taxonomic position of the Far Eastern members.

The genus *Rybinskiella* was established by REITTER (1906, p. 243, described in 1907, p. 333) for *Choleva magnifica* RYBIŃSKY, 1902 (p. 11, pl. 2, fig. 5), from the northeastern part of the Carpathian Mountains in Central Europe. For the definition of this genus, some taxonomic studies were made by REITTER (1906, 1907, 1913), PIC (1908, 1914), PORTEVIN (1922), JEANNEL (1922, 1936), SZYMCAKOWSKI (1956, 1970, 1971), IABLOKOFF-KHNZORIAN (1970, 1975), FRANK (1988, 1994) and RŮŽIČKA (1994). According to current classification of the family Leiodidae (NEWTON, 1998), the genus *Rybinskiella* belongs to the subtribe Catopina of the tribe Cholevini in the subfamily Cholevinae. The genus is characterized by the following features: 1) fronto-clypeal suture indistinct; 2) the so-called basket of protibiae absent; 3) pronotum narrower than elytral base, with a weak depression in each latero-basal area; 4) elytra ovoid, with strongly acuminate apices; 5) epipleura markedly broad; 6) aedeagus spatulate with emarginate or bifurcate apex, or lanceolate in dorsal view. The genus has been recog-

nized as containing three subgenera, *Rybinskiella* s. str., *Sintania* and *Eurybinskiella*, which are briefly reviewed below for comparison with the Far Eastern members.

The subgenus *Rybinskiella* s. str. consists of a single species, *R. magnifica* (RYBIŃSKY), from the Carpathians. WINKLER (1924–1927, p. 291) and ROUBAL (1926, p. 10) regarded *R. magnifica* as a junior synonym of *R. daurica* (MOTSCHULSKY) (this view was followed by HATCH (1928, p. 207) and NEWTON (1998, p. 108), but we have doubt about their conspecific status like SZYMCZAKOWSKI (1956, p. 10, 1971, p. 232) and PERREAU (2000, p. 146). One of the reasons for this is the geographical distance between their type localities, the Carpathians and the Khamar-Dabans being more than 5,000 km distant from each other (Fig. 22). It is most improbable that such a narrowly specialized species should occur in two massifs incredibly remote from each other, as was rightly pointed out by JEANNEL (1936, p. 293). This subgenus is characterized by the following features: 1) pronotum small, subhexagonal, longer than width; 2) dorsal surface uniformly with adpressed short pubescence; 3) protarsi with a prominent spine at the inner corner of each apex, though the outer one is devoid of any prominent spines; 4) male protarsi and the first segment of mesotarsi hardly dilated; 5) aedeagus spatulate with slightly emarginate apex.

The subgenus *Sintania* PIC (1908, p. 59; type species: *Sintania himalayica* PIC, 1908, designated by JEANNEL (1922, p. 47)) contains *R. bodoana* REITTER from the Tianshans and other six species from the Northwest Himalayas: *R. brancuccii* FRANK, *R. heinzi* FRANK, *R. himalayica* (PIC), *R. kashmirensis* (PIC), *R. spinosa* FRANK and *R. wittmeri* FRANK. This subgenus is characterized by the following features: 1) pronotum transverse, with basal angles variably modified; 2) elytra usually bearing long erect hairs, which are uniform or sparsely intermixed with ordinary short adpressed ones; 3) male protarsi and the first segment of mesotarsi obviously dilated; 4) aedeagus variable in shape, lanceolate in *R. bodoana*, spatulate with bifurcate apex in *R. brancuccii* and *R. heinzi*, and emarginate at the apex in the remainings, where males are known; 5) parameres robust in *R. heinzi*, slender in the remainings. However, judging from the diverse features, above all in the shape of their aedeagus, careful reexamination is needed for clarifying taxonomic position of respective species (RŮŽIČKA, pers. comm.).

The subgenus *Eurybinskiella* was established by IABLOKOFF-KHNZORIAN (1970, p. 54; type species: *R. levushkini* IABLOKOFF-KHNZORIAN, 1970). According to the original description and the reexamination of the topotypical specimens of the type species made by the first author, this subgenus is distinguished from the preceding two by the following points: 1) pronotum transverse, though the basal angles are always simple; 2) dorsal surface uniformly with adpressed pubescence; 3) male protarsi and the first segment of mesotarsi obviously dilated; 4) aedeagus lanceolate, strongly arcuate in lateral view.

Rybinskiella peninsularis sp. nov., which has been known so far from a single female, should be tentatively included in this subgenus until males are available for study. The South Siberian species, *R. daurica* (MOTSCHULSKY), apparently belongs to

the subgenus *Eurybinskiella*, though reexamination of the type material is required as the original description is insufficient to illustrate its peculiarities. This species was re-discovered by BERLOV (1977) who recorded an additional specimen from the Snezhnaya River in the Khamar-Dabans, but the result of its close examination has not been published yet. Incidentally, the specimen is said to have been obtained by a baited trap set in the woods on a flood plain of a river in Sljudyanskyi District (BERLOV, *loc. cit.*). On the other hand, an undescribed species seems to be included in this subgenus. It was recently discovered from the East Sayans. Unfortunately, we were unable to examine any specimen of this species, but at least its pronotum is transverse and the elytral pubescence is adpressed (pers. comm. to the first author from A. ANISTSHENKO via O. BERLOV, Irkutsk). As regards the systematic position of *R. murzini* RŮŽIČKA from Mt. Tyshkan-Tau, Kazakhstan, PERREAU (2000) regarded it as a member of the subgenus *Sintania*.

2. Distributional Considerations.

As was mentioned in the subgeneric review, the actual distributional range of the *Rybinskiella* species has been revealed at present, sporadically extending to the Carpathians in the west, the Northwest Himalayas in the south, the East Sayans and the Khamar-Dabans in the north via the Tianshans, and to the Sikhote-Alins and the Sobaegs in the east (Fig. 22). The subgenus *Rybinskiella* s. str. is endemic to the Carpathians, and the subgenera *Sintania* and *Eurybinskiella* are distributed to the Northwest Himalayas and the Tianshans, and to the Khamar-Dabans, the Sikhote-Alins and the Sobaegs, respectively, though there still remain a few species whose subgeneric status has not been determined as yet.

They are enriched (54%) at the high altitudes of the Northwest Himalayas, which are considered to be the diversity center of the genus. The *Sintania* species mostly occur there, and show most diverse characteristics. MANI (1995) pointed out that the high altitude biota of the Northwest Himalayas are derived from the Turkmenian subregion, that is, their origin seems to be the Altai-Pamirs and the Central Tianshans. The disjunct distributional pattern is indicated in Fig. 22: *R. magnifica* isolated at the westernmost area can be recognized as a relict, which originated in Central Asia (IABLOKOFF-KHNZORIAN, 1968), and almost the same opinion was precedently proposed by SZYMCZAKOWSKI (1964). A generalized hypothesis given by MANI (1968) is that the fundamental element of the European fauna is of the Angaran origin. Though the only known completely alate species, *R. peninsularis* sp. nov., was discovered from the Sobaegs in the Korean Peninsula, it is highly possible that the same species or its close relatives will be found on other mountains of the same peninsula. The Changpai Mountains at its northern end are bounded by the Sikhote-Alins in the Russian Far East and the Transbaikalia, the latter of which harbour at least two congeners.

Probably, the Asian congeners are allopatric but seem to occur along the mountain systems, the so-called Great Transasian Mountain Way (cf. SHILENKOV, 1992). Such a distributional pattern fit in with the Euro-West-Asiatic type (cf. MANI, 1968),

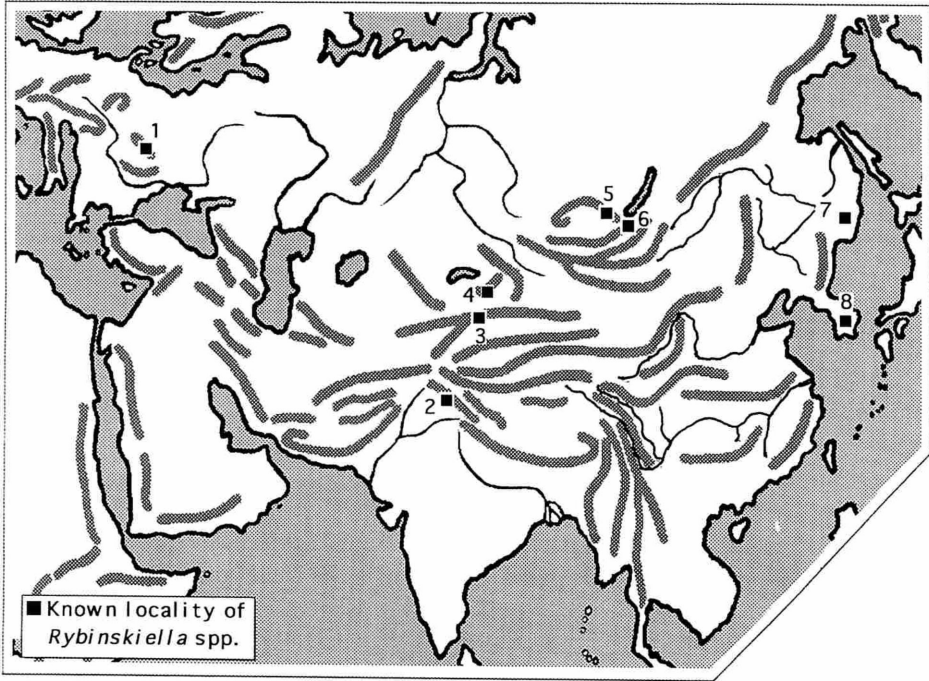


Fig. 22. Geographical distribution of *Rybinskiella* spp. — 1, *R. (s. str.) magnifica* (RYBIŃSKI), Carpathian Mts.; 2, *R. (Sintania) brancuccii* FRANK, *R. (S.) heinzi* FRANK, *R. (S.) himalayica* (PIC), *R. (S.) kashmirensis* (PIC), *R. (S.) spinosa* FRANK and *R. (S.) wittmeri* FRANK, Northwest Himalayas; 3, *R. (S.) bodoana* REITTER, Tianshan Mts.; 4, *R. (S.) murzini* RŮŽIČKA, Mt. Tyshkan-Tau; 5, *R. sp.*, East Sayan Mts.; 6, *R. (Eurybinskiella) daurica* (MOTSCHULSKY), Khamar-Daban Mts.; 7, *R. (E.) levushkini* IABLOKOFF-KHNZORIAN, Sikhote-Alin Mts.; 8, *R. (E.) peninsularis* M. NISHIKAWA et Y. B. CHO, sp. nov., Sobaeg Mts. (Modified from the original map with principal mountain and drainage systems by MANI (1968, fig. 45).)

and is generally recognized as the result of the Pleistocene climatic events, which was summarized by SHILENKOV (1992) in relation to the high altitude carabid fauna of the South Siberian Mountains. Judging from the synthetic knowledge based on previous zoogeographical hypotheses, the origin of the *Rybinskiella* species seems also to be sought in Central Asia including the westernmost corner of China.

On the other hand, the *Rybinskiella* species have generally been recognized as high mountain inhabitants as was repeatedly mentioned in this discussion; they usually occur between 1,700–1,850 m in altitude in the Carpathians (also above 2,030 m (RŮŽIČKA, pers. comm.) and above 2,000 m in the Rodnei Mountains, Rumania (CSIKI, 1951)), 2,350–3,600 m in the Northwest Himalayas and 2,300–3,600 m in the Tianshans including the Tersky Ala-Too (=Terskei Alatau) Mountains (cf. REITTER, 1913; FRANK, 1988, 1994; RŮŽIČKA, 1994). In contrast, *R. murzini* was found at an altitude of 1,500 m on Mt. Tyshkan-Tau, Kazakhstan, and *R. peninsularis* sp. nov. was obtained

from the lowest epigeal site (950–980 m in alt.), which is a talus slope with temperate forest (Fig. 21). *Rybinskiella levushkini* was also obtained from an epigeal habitat (1,110 m in alt.), though it seems to become a cave dweller at lower altitude (ca. 440 m in alt.). Anyway, the differences in their vertical distribution and habitat at each locality also support the influence of climatic changes upon the formation of their distribution.

Postscript

After the completion of the preparation of this paper, sufficient number of specimens including males of *Rybinskiella peninsularis* sp. nov. were taken from several caves lying in the Taebaeg Mountains of Gangwon-do, South Korea. The result of their study will be reported in a separate paper.

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要 約

German Sh. LAFER・西川正明・趙 永福：極東地方産 *Rybinskiella* 属（タマキノコムシ科チビシテムシ亜科）の種とそれらの分類学的位置および自然史に関する論議。—— ちょうど20年前に沿海州の洞窟を基準産地として記載されたが、実体のはっきりしなかった *Rybinskiella levushkini* IABLOKOFF-KHNZORIAN を、基準標本とおそらく同じ時期に採集された標本および、新たに基準産地および近隣の山岳地帯から得られた標本に基づいて再記載し、FRANK (1988) の本種に関する見解を訂正した。一方、韓国の低山地帯から本属の有翅の種が得られたので、*Rybinskiella peninsularis* sp. nov. と命名して記載した。有翅種の朝鮮半島からの発見は予想外のことであり、同属種のうちでは、洞窟を除き、もっとも低い標高から発見された種となる。続いて、既知亜属の特徴を概観し、*Eurybinskiella* 亜属を認めたくえで、雄が未知の *R. peninsularis* sp. nov. についても暫定的に同亜属に所属させた。あわせて同亜属と考えられるトランスバイカル

地方産の2種 (*R. daurica* (MOTSCHULSKY)と1未記載種)に関する最新の知見を付記した。また、極東地方産2種の産地の自然環境を記載のあとに記述し、それぞれの生息場所を特定あるいは推定した。最後に、カルパート山脈、北西ヒマラヤ山脈、天山山脈、中央アジアの山岳地帯、東サヤン山脈、ハマダバン山脈、そしてシホテアリン山脈と小白山脈に分布する本属種の分布様式と起原について考察した。

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