

Contribution to the knowledge of the Palaearctic species of the genus *Diplous* Motschulsky, 1850 (Coleoptera: Carabidae)

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Descriptions or redescriptions as well as comparative morphometric data are presented for several Asiatic species of the genus *Diplous*: *D. petrogorbatschevi* sp. n. (Tibet), *D. sciakyi* sp. n. (Sichuan), *D. yunnanus* Jedlička, 1932 (Yunnan), *D. sterbai* Jedlička, 1932 (Gansu), *D. szetschuanus* Jedlička, 1932 (Sichuan), *D. gansuensis* Jedlička, 1932 (Gansu), *D. sibiricus* (Motschulsky, 1844) (China, E Siberia, Mongolia, Japan), *D. jedlickai* sp. n. (Sichuan). The following new synonymy is established: *D. sibiricus caligatus* Bates, 1873 = *D. tesari* Jedlička, 1951; *D. szetschuanus* Jedlička, 1932 = *D. yunnanus* ab. *flavipes* Jedlička, 1932. A key to the Palaearctic species is given, larva of *D. depressus* (Gebler, 1829) is described, and some ecological data are presented.

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Introduction

The genus *Diplous* Motschulsky, 1850 is known to comprise several species from Asia (Table 2) and 4 species from North America (Bousquet & Laroche, 1993). Since our previous paper with descriptions of Chinese species and a key to the majority of Palaearctic species was published (Zamotajlov & Sciaky, 1996), new important material of this group was accumulated and examined. Because of their great importance, I found it reasonable to add the descriptions of the newly examined forms, present a new version of the key, update some distribution and ecological data, and summarize the current knowledge of the Palaearctic species. The sources of the studied material are as follows. By the kind offices of Dr. J. Jelínek, of the Národní Muzeum, Prague, who had authorised the loan, I had an opportunity to examine some types and other material from the collection of A. Jedlička. Since I was unable to find a description of "*D. wassulandi*", in spite of intensive search, I describe it below as a new species. The present paper comprises also the descriptions of new species from material kindly forwarded to me

by Dr. R. Sciaky, of Milan, Mr. D. Wrase, of Berlin, and Mr. P. Gorbachev, of Sochi, comparative morphometric data (Table 1) and remarks on other species. Description of the 3rd instar larva, based on the material from the State Pedagogical University, Moscow, and available ecological data are also given.

Abbreviations used: AZ = Coll. A. Zamotajlov, Krasnodar; DW = Coll. D. Wrase, Berlin; NMP = Národní Muzeum, Prague; OK = Coll. O. Kabakov, St.Petersburg; PG = Coll. P. Gorbachev, Sochi; RS = Coll. R. Sciaky, Milan; SM = Coll. S. Morita, Tokyo; SPUM = State Pedagogical University, Moscow; ZISP = Zoological Institute of the Russian Academy of Sciences, St.Petersburg; ZMUM = Zoological Museum of the Moscow State University, Moscow.

I. DESCRIPTIONS OF IMAGO

The *przewalskii*-group

Diplous przewalskii (Semenov, 1889)

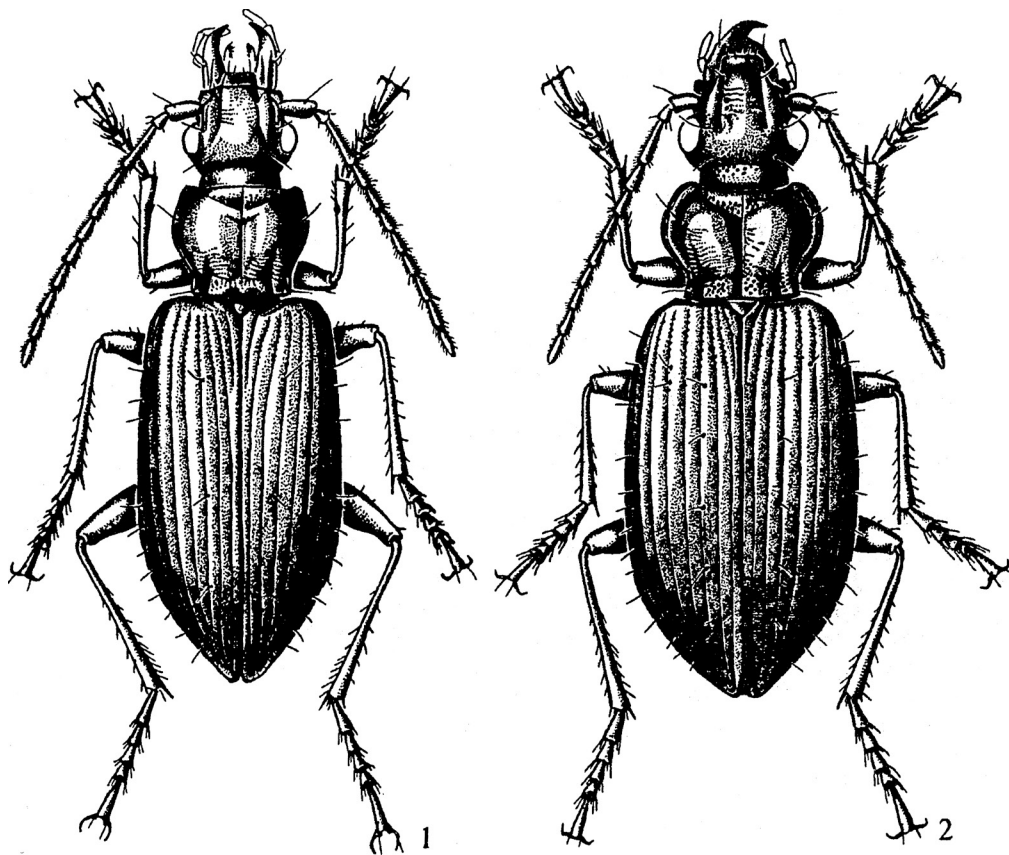
Platidius przewalskii Semenov, 1889: 356.

Diplous przewalskii: Kühnelt, 1941: 158 (part.); Zamotajlov & Kryzhanovskij, 1990: 13; Zamotajlov & Sciaky, 1996: 38.

Table 1. Variability of morphometric characters and setation in several *Diplous* species and subspecies

Species and locality	N	Total length, mm	WH, mm	LP, mm	WP, mm	LE, mm	WE, mm	WP/WH	WP/LP	WE/WP	LE/WE	Setae on E13	Setae on marginal series
<i>D. przewalskii</i> (Chalaxung)	2	8.1-8.9	1.6-1.7	1.5-1.6	2.0-2.1	5.7-5.8	3.0-3.2	1.17-1.19	1.31-1.40	1.53-1.54	1.67-1.69	3-4	0 10
<i>D. przewalskii</i> (Qingshuihe)	5	9.3-10.4	1.7-2.0	1.6-1.7	2.1-2.4	5.7-6.4	3.2-3.5	1.13-1.22	1.24-1.37	1.48-1.64	1.78-1.83	3	0 9-10 (3-4+6)
<i>D. petrogorbatschevi</i> (Djosola)	4	8.4-9.3	1.7-1.9	1.4-1.6	1.9-2.1	4.9-5.3	2.9-3.2	1.12-1.16	1.21-1.29	1.53-1.59	1.76-1.95	3	0 11-12 (3+8-9)
<i>D. petrogorbatschevi</i> (Naggu)	2	10.2-10.7	2.0	1.7	2.2-2.4	6.3-6.6	3.6-3.7	1.12-1.20	1.30-1.42	1.54-1.61	1.76-1.82	3	0 13 (4.5+8.9)
<i>D. scitakyi</i> (Litang, type series)	2	11.5-12.2	2.2-2.3	2.0-2.2	2.7-2.8	6.9-7.6	4.0-4.3	1.19-1.24	1.26-1.35	1.48-1.56	1.73-1.76	3	0 10-13
<i>D. yunnanus</i> ("Yunnan", type series)	3	10.7-12.1	2.2-2.3	2.0-2.2	2.7-2.9	6.7-7.7	4.3-4.5	1.26-1.28	1.31-1.43	1.52-1.60	1.52-1.73	4-6	1-2 14-16
<i>D. sterbai</i> (Hweisi, holotype)	1	12.5	2.2	2.2	2.8	7.5	4.6	1.26	1.26	1.64	1.64	3-5	1 17-18
<i>D. szetschuanus</i> ("Tatsienlu", including type series)	6	10.6-11.6	2.1-2.2	2.0-2.1	2.6-2.8	6.6-7.5	4.1-4.6	1.18-1.26	1.25-1.33	1.59-1.67	1.57-1.67	3-6	0 16-25
<i>D. gansuensis</i> (Hweisi, type series)	3	11.3-11.7	2.0-2.2	2.0	2.5-2.7	6.8-7.3	4.1-4.3	1.20-1.26	1.26-1.35	1.62-1.66	1.63-1.69	3-4	0 13-16
<i>D. sibiricus sibiricus</i> (diverse localities, including type series)	21	10.0-12.6	1.9-2.1	1.8-2.3	2.4-2.7	6.4-8.3	3.3-4.4	1.19-1.30	1.14-1.34	1.38-1.69	1.70-1.97	3	0 8-13
<i>D. sibiricus caligatus</i> (Japan, diverse localities)	7	11.4-13.2	2.1-2.4	2.2-2.4	2.4-2.8	7.1-8.3	4.1-4.6	1.16-1.29	1.16-1.25	1.46-1.67	1.73-1.98	3-4	0 7-14
<i>D. sibiricus atratus</i> (Japan, diverse localities)	3	11.1-12.9	1.8-2.4	2.0-2.2	2.4-2.8	6.6-7.9	3.7-4.5	1.15-1.33	1.20-1.26	1.54-1.59	1.75-1.89	3	0 7-14
<i>D. jedlickai</i> ("Sankiangkou", holotype)	1	12.5	2.3	2.1	2.8	7.2	4.4	1.19	1.34	1.60	1.64	3	0 12
<i>D. sp.</i> (Tsurphu)	1	11.9	2.1	2.1	2.6	7.2	4.2	1.22	1.26	1.64	1.69	3	0 17-18

Abbreviations: N – number of specimens examined; WH – width of head; LP – length of pronotum; WP – width of pronotum; LE – length of elytra; WE – width of elytra; E13 – elytral interspace 3; E15 – elytral interspace 5.



Figs 1-2. *Diplous*, general view. 1, *D. scialcyi* sp. n.; 2, *D. yunnanus* Jedlička.

Material. *China, Qinghai:* 1 ♂, 1 ♀ (DW), Chalaxung, 30.VI.1992 (D. Wrase); 2 ♂, 2 ♀ (RS), 1 ♀ (DW), Qingshuihe, 4200 m, 1.-5.VII.1992 (J. Kaláb).

Remarks. Both examined specimens from Chalaxung agree almost completely with the series from the valley of Dzhagyn (ZISP), particularly in the structure of male and female genitalia, though they differ in the composition of marginal series, comprising 10 setae not arranged into clear-cut groups (in population from Dzhagyn, 9 marginal setae, forming more or less distinct basal (2 setae) and apical (7 setae) groups). Female possesses 4 discal pores on the right elytron, while all other examined specimens have 3 pores. Specimens from Qingshuihe possess 3 discal pores on elytra and 9-10 marginal setae, usually arranged in basal (3-4 setae) and apical (6 setae) groups, rarely marginal series comprises 10 setae not forming distinct groups. Morphometric data see in the Table 1.

***Diplous petrogorbatschevi* sp. n.**
(Figs 5, 15-18, 40)

Holotype. ♂ (PG), *China, Tibet*, Djosola Mt., 24.VI. 1995 (P. Gorbachev).

Paratypes. *China, Tibet:* 2 ♂, 1 ♀ (PG), as holotype; 2 ♀ (RS), Nagqu Distr., 4800 m, 23.VI.1995 (E. Tarasov).

Description. Body black; head and pronotum black, shiny; elytra black, somewhat mat; mandibles and antennae dark brown; palpi and legs reddish-brown. Head ovate, 0.83-0.89 times as wide as pronotum; eyes large, convex; temples faintly tumid, subequal in length to eye diameter; neck-constriction fairly deep. Frontal furrows rugose; neck-constriction rather coarsely punctate; 2 setiferous pores present on each side, one in anterior third eye level, and another somewhat closer to posterior margin of eye than to neck-constriction. Tooth of mentum bifid, rather short and narrow (Fig. 5). Pronotum

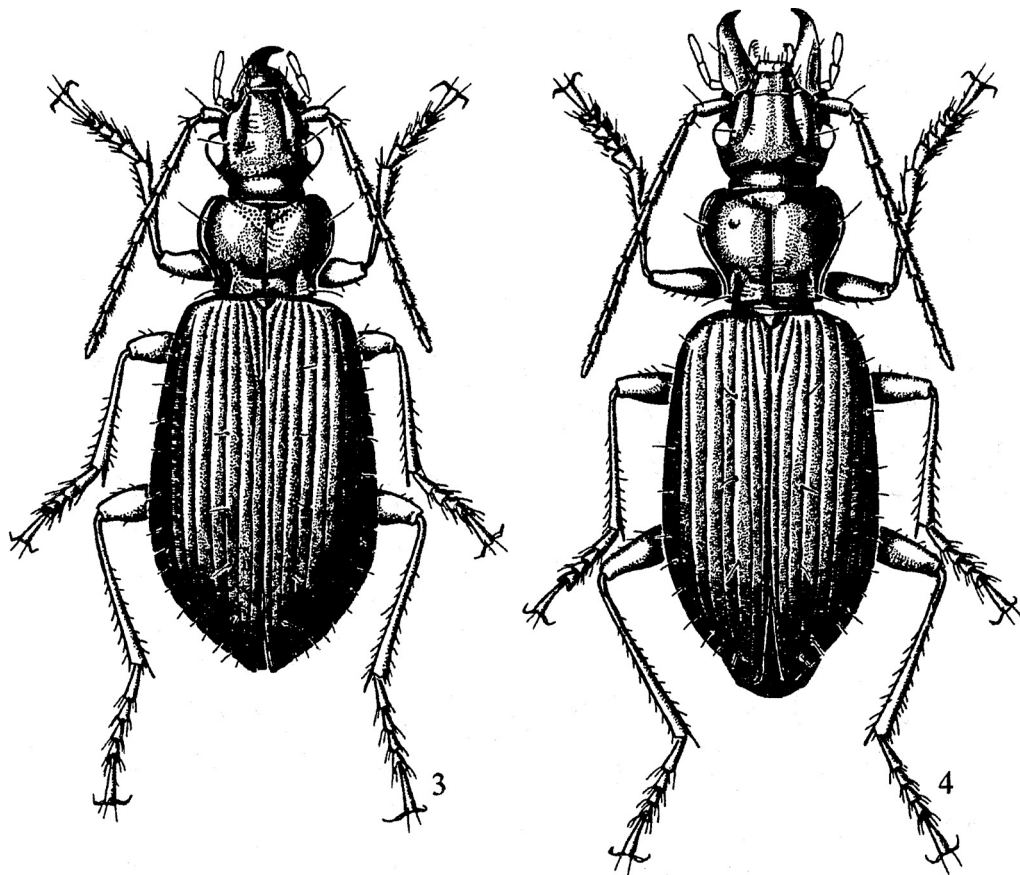
Table 2. Distribution and habitats of the Palaeartic *Diplous* species and subspecies

Species and subspecies	Species-group	General distribution*	Altitude, m
<i>D. davidis</i>	<i>davidis</i>	China: W Sichuan	2900-4500
<i>D. depressus</i>	<i>depressus</i>	S Siberia, Russian Far East, Japan, Korea, NE China	0-1800
<i>D. gansuensis</i>	<i>sibiricus</i>	China: E Gansu	?
<i>D. grunmi bicolor</i>	<i>przewalskii</i>	China: E Qinghai	4500-4700
<i>D. grunmi grunmi</i>	<i>przewalskii</i>	China: E Qinghai	3200
<i>D. jedlickai</i>	<i>davidis</i>	China: W Sichuan	?
<i>D. julonshanensis</i>	<i>davidis</i>	China: N Yunnan	2500-3500
<i>D. giacomazzoii</i>	<i>davidis</i>	China: W Sichuan	4000
<i>D. nortoni</i>	<i>przewalskii</i>	N Himalayas: Mt. Everest vic.	5050
<i>D. petrogorbatschevi</i>	<i>przewalskii</i>	China: SE Tibet	4700
<i>D. przewalskii</i>	<i>przewalskii</i>	China: E Qinghai	4000-4870
<i>D. sciakyi</i>	<i>przewalskii</i>	China: W Sichuan	4700
<i>D. sibiricus atratus</i>	<i>sibiricus</i>	S Kurils: Iturup; Japan: Hokkaido, Honshu	0-1000
<i>D. sibiricus caligatus</i>	<i>sibiricus</i>	S Kurils: Iturup; Japan	10-1500
<i>D. sibiricus sibiricus</i>	<i>sibiricus</i>	E Siberia, Primorsk Terr., Mongolia, N China	0(?) -4200
<i>D. sibiricus yezeensis</i>	<i>sibiricus</i>	Japan: Hokkaido	0-1000
<i>D. sp.</i>	<i>davidis</i>	China: Tibet: Lkhasa env.	?
<i>D. sterbai</i>	<i>sibiricus</i>	China: E Gansu	?
<i>D. szetschuanus</i>	<i>sibiricus</i>	China: W Sichuan	?
<i>D. tonggulensis</i>	<i>przewalskii</i>	China: S Qinghai	5200-5400
<i>D. wrasei</i>	<i>przewalskii</i>	China: NW Sichuan	4200-4700
<i>D. yunnanus</i>	<i>sibiricus</i>	China: Yunnan	?

* Doubtful localities are omitted.

faintly cordate, almost flat, 1.21-1.42 times as wide as long, widest at apical third; front margin almost even; sides moderately angulately rounded in front, faintly sinuated near hind angles, moderately bordered; basal margin nearly plane; front angles rounded to somewhat angulate, distinctly projecting forwards; hind angles obtuse, pointed, faintly or not protruding laterally, indistinctly carinate; anterior transverse impression prominent, rather large and deep, finely and sparsely punctate; basal foveae fairly deep, rugose-punctate; disc smooth, only at sides rugose-punctate; median line sharp, obliterated at both extremities; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.76-1.95 times as long as wide and 1.53-1.61 times as wide as pronotum; shoulders rounded, but broad and distinct; humeral teeth inconspicuous; interspaces flat; striae outside stria 4 smoothed out, but conspicuous, without prominent punctation at base; interspace 3 with 3 setiferous pores adjoining stria 3; marginal series composed of 11-13 setae forming clear-cut

basal (3-5 setae) and apical (8-9 setae) groups; microreticulation forming isodiametric meshes. Pro- and mesotarsal segment 4 moderately emarginate, bilobed. Propisterna, mesepisterna, and mesosternum with coarse and sparse punctures; metepisterna with large, but shallow and smooth, sparse punctures; prosternum with large smooth punctures; metasternum sparsely punctate at sides only; sternites finely rugose in lateral areas; females with somewhat less prominent punctation. Aedeagus (Figs 15, 16) strongly bent at base; its apical lamella fairly curved dorsally (viewed laterally) and fairly twisted rightwards (viewed dorsally); apex rather broad, rounded. Armature of endophallus consisting of large, bilobed, moderately sclerotized proximal copulatory piece and small, tooth-like apical copulatory piece. Left paramere (Fig. 17) larger than right one (Fig. 18); their apical projections long and narrow, bearing 1-3 long apical setae and 4-9 short and fine subapical setae. Spermatheca (Fig. 40) with sclerotized oval ring ventrally about 0.35 mm in diameter. Total length 8.4-9.3 mm.



Figs 3-4. *Diplous*, general view. 3, *D. szetschuanus* Jedlička; 4, *D. jedlickai* sp. n.

Etymology. I named this species for my friend Piotr Gorbachev, of Sochi, who collected the type series.

Remarks. The new species resembles *D. tonggulensis* Zamot. & Sciaky in its habitus, though differs, first of all, in the obtuse hind angles of pronotum, composition of elytral marginal series, and structure of endophallic armature. Specimens from Nagqu Distr. have broader pronotum, larger marginal series with more numerous basal group (4-5 setae, while in those from Djosola Mt. only 3 setae), however both populations coincide in many respects.

***Diplous wrasei* Zamotajlov & Sciaky, 1996**

Diplous wrasei Zamotajlov & Sciaky, 1996: 28.

Material. China, N Sichuan: 1 ♂, 1 ♀ (DW), Zhanga env., 4200-4700 m, 25-29.VII.1991, J. Kaláb.

Remarks. These two specimens agree completely with the type series.

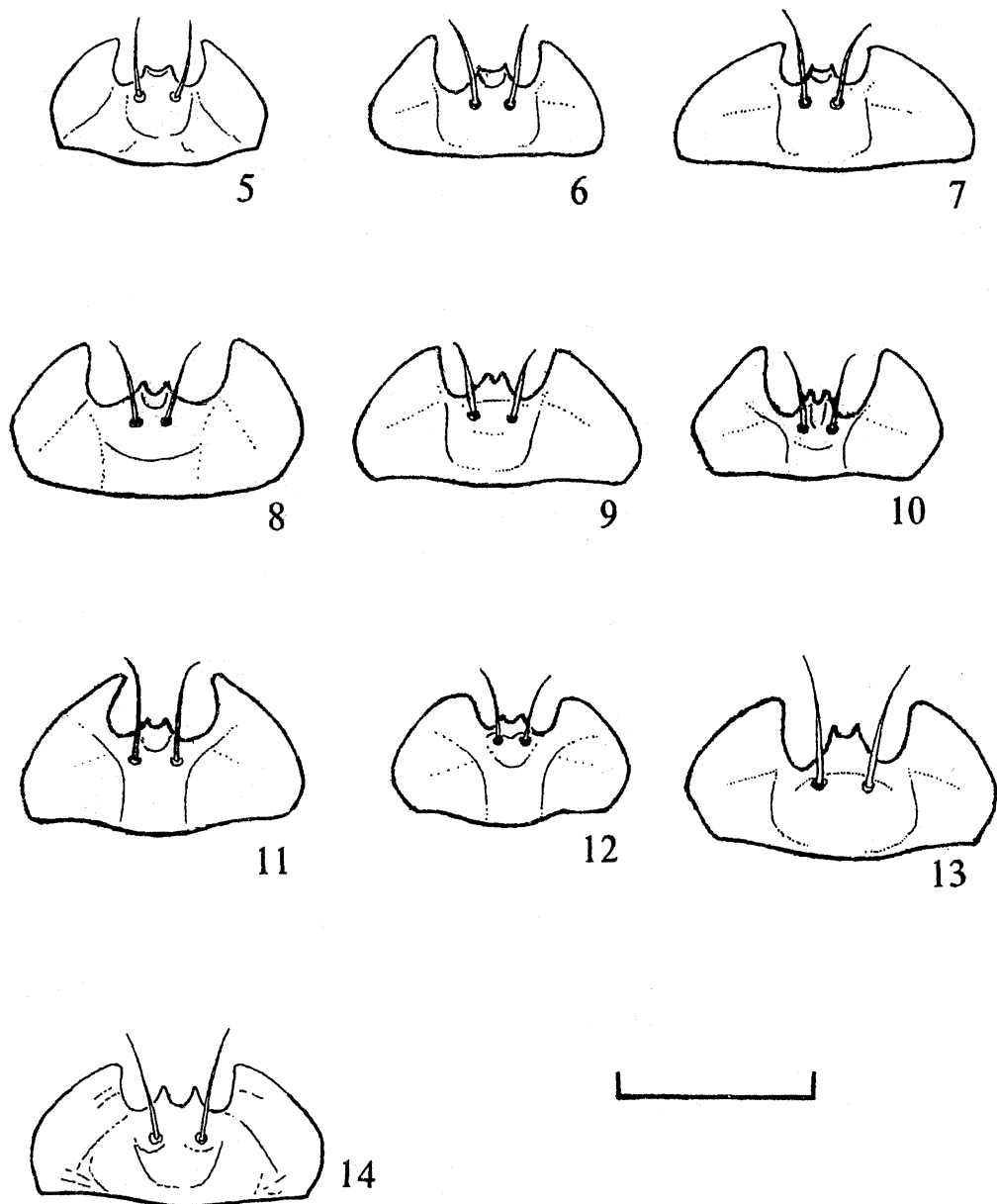
***Diplous sciakyi* sp. n.**

(Figs 1, 6-7, 19-22, 41)

Holotype. ♂ (DW), China, W Sichuan, Litang, 4700 m, 22.-24.VII.1994 (Beneš).

Paratype. ♀ (RS), as holotype.

Description. Body pitchy-black; head, pronotum, and elytra black, shiny; tips of palpi reddish; in female appendages reddish-brown. Head ovate, 0.81-0.84 times as wide as pronotum; eyes large, convex; temples tumid, somewhat shorter than eye diameter; neck-constriction fairly deep; frontal furrows divergent posteriorly. Surface smooth; frontal furrows rugose-punctate; neck-constriction punctate; 2 setiferous pores present on each side, one in anterior third eye level, and another almost equidistant between posterior margin of eye and neck-constriction.



Figs 5-14. *Diplous* spp., mentum. 5, *D. petrogorbatschevi* sp. n., paratype; 6, *D. sciakyi* sp. n., ♂, holotype; 7, *D. sciakyi* sp. n., ♀, paratype; 8, *D. yunnanus* Jedlička, lectotype; 9, *D. sterbai* Jedlička, holotype; 10, *D. szetschuanus* Jedlička, "Cotype" of "*D. chinensis*"; 11, *D. szetschuanus* Jedlička, "Type" of "*D. chinensis*"; 12, *D. gansuensis* Jedlička, lectotype; 13, *D. sibiricus caligatus* Bates, Japan, Kanagawa Pr.; 14, *D. sp.*, Tibet, Tsurphu env. Scale: 1 mm.

Tooth of mentum bifid, rather short and moderately broad (Figs 6, 7). Pronotum cordate, faintly convex, 1.26-1.35 times as wide as long, widest at apical third; front margin almost even; sides widely rounded in front, fairly sinuated near hind angles, in male

rather widely, in female moderately bordered; basal margin nearly plane; front angles rounded, hardly projecting forwards; hind angles obtuse, pointed, faintly protruding laterally, indistinctly carinate; anterior transverse impression prominent, but rather

shallow, punctate; basal foveae deep, rugose-punctate; disc smooth; median line sharp, obliterated at base; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.73-1.76 times as long as wide and 1.48-1.56 times as wide as pronotum; shoulders distinct, somewhat angulate, though dull; humeral teeth inconspicuous; interspaces faintly convex; striae outside stria 4 less developed than striae 1-3, but prominent, with faint punctuation at base; interspace 3 with 3 setiferous pores adjoining stria 3; marginal series composed of 10-13 setae; microreticulation forming isodiametric meshes. Pro- and mesotarsal segment 4 moderately emarginate, bilobed. Punctuation of ventral side of thorax different in both sexes: proepisterna, metepisterna, and mesosternum densely punctate, mesepisterna finely punctate, prosternum and sides of metasternum sparsely punctate in male; mesosternum densely punctate, other thoracic parts rather sparsely punctate in female; sternites faintly rugose in lateral areas. Aedeagus (Figs 19, 20) strongly bent at comparatively short base; its apical lamella faintly curved dorsally (viewed laterally), sharply attenuating towards apex and fairly twisted rightwards (viewed dorsally); apex rather narrow, but rounded. Armature of endophallus consisting of single large and strongly sclerotized proximal copulatory piece being somewhat spirialized and with lobes almost completely overlapping; apical copulatory piece absent. Left paramere (Fig. 21) larger than right one (Fig. 22); their apical projections long and narrow, bearing 2 long and 1-2 short apical setae and 7-9 very short and fine subapical setae. Spermatheca (Fig. 41) with fine, irregularly elongate ring ventrally about 0.27 mm in diameter and small additional sclerotized bodies not arranged into plate. Total length 11.5-12.2 mm.

Etymology. I named this species for my friend and colleague Dr. Riccardo Sciaky of Milan, who has forwarded me important material for study.

Remarks. The above described species seems to resemble in the structure of proximal copulatory piece species of the *dauidis*- and *sibiricus*-groups. However in the general appearance, shape of aedeagus, and peculiarities of spermathecal sclerotization, it fits the main characters of the *przewalskii*-group. In external characters, *D. sciakyi* resembles most closely *D. wrasei* Zamot. & Sciaky, but is easily distinguishable in the structure of

the male genitalia. Judging from the shape of aedeagus and endophallic sclerotization, *D. tonggulensis* Zamot. & Sciaky should be considered its nearest relative within the *przewalskii*-group, their proximal copulatory pieces manifesting gradual transition from spirialized to bilobed type, or vice versa. Obviously, *D. sciakyi*, combining some characteristic features of different species-groups, occupies an important position in the phylogenesis of Chinese *Diplous*. However, we are inclined to place it in the *przewalskii*-group. It is noteworthy that *D. sciakyi* resembles in habitus also *D. giacomazzo* Zamot. & Sciaky of the *dauidis*-group, which also occurs in environs of Litang.

The *sibiricus*-group

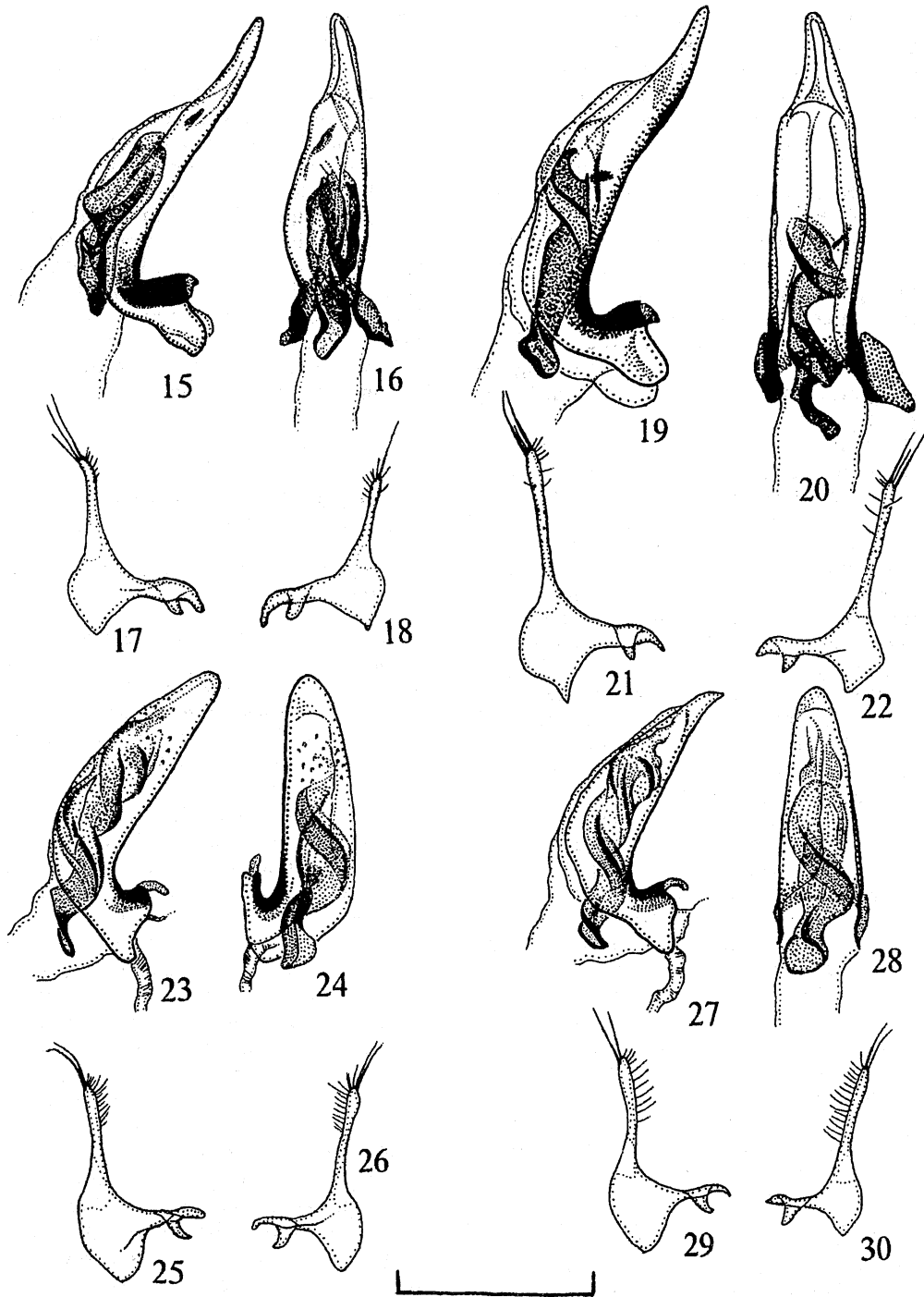
***Diplous yunnanus* Jedlička, 1932**

(Figs 2, 8, 23-26, 42)

Diplous yunnanus Jedlička, 1932a: 41; Zamotajlov & Sciaky, 1996: 39.

Material. 1 ♀ (NMP), labelled "China Merid., Provincia Yunnan"; "Type"; "*Diplous yunnanus* mihi, Type, det. Ing. Jedlička"; "Mus. Nat. Prage Inv. 24678" (designated here as lectotype). 1 ♂, 1 ♀ (NMP), labelled "China Merid., Provincia Yunnan"; "*yunnanus* Jedl. det. Ing. Jedlička" (paralectotypes).

Description. Body black; head, pronotum, and elytra completely black, shiny, in teneral specimens brown; legs black; antennae, except for antennomere 1, dark brown; tips of palpi reddish. Head ovate, 0.78-0.79 times as wide as pronotum, strongly constricted behind large, convex eyes; temples short, about 3 times shorter than eye diameter, oblique to faintly tumid; frontal furrows faintly divergent posteriorly, distinctly broadened backwards. Surface at frontal furrows, temples, and neck-constriction coarsely and densely punctate; vertex smooth; 2 setiferous pores present on each side, one at anterior third eye level, and another almost equidistant between posterior margin of eye and neck-constriction. Tooth of mentum bifid, rather short and narrow, with deep apical hollow (Fig. 8). Pronotum cordate, prominently transverse, very faintly convex, 1.31-1.43 times as wide as long, widest slightly before its middle; front margin faintly concave; sides somewhat angulately rounded in front and fairly sinuated before hind angles, rather widely bordered; basal margin nearly straight; front angles angulately rounded, prominent,



Figs 15-30. *Diplous* spp., ♂ genitalia. 15-18, *D. petrogorbatschevi* sp. n., holotype; 19-22, *D. sciakyi* sp. n., holotype; 23-26, *D. yunnanus* Jedlička, paralectotype; 27-30, *D. szetschuanus* Jedlička, paralectotype No. 24673. 15, 19, 23, 27, aedeagus, left lateral view; 16, 20, 24, 28, aedeagus, dorsal view; 17, 21, 25, 29, left paramere, left lateral view; 18, 22, 26, 30, right paramere, right lateral view. Scale: 1 mm.

but not projecting forwards; hind angles obtuse, pointed, faintly protruding laterally, very finely, almost indistinctly carinate; anterior transverse impression deep and broad, coarsely and densely punctate; basal foveae rather shallow, coarsely and densely punctate; base and sides intensively rugose-punctate; disc faintly rugose to almost smooth; median line deep and sharp, reaching both extremities; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.52-1.73 times as long as wide and 1.52-1.60 times as wide as pronotum; shoulders broad, somewhat roundly angulate, without prominent humeral teeth; interspaces faintly convex, almost flat; all striae distinct, with fine and inconspicuous punctation at base, interspace 3 with 4-6, interspace 5 with 1-2 setiferous pores; marginal series composed of 14-16 setae; microreticulation forming isodiametric meshes. Pro- and mesotarsal segment 4 moderately emarginate at apex, bilobed. Episterna, pro-, mesosternum, and sides of metasternum with dense, medium-sized punctures; sternites faintly rugose in lateral areas. Aedeagus (Figs 23, 24) small, strongly bent at rather short base; ventral side nearly even (viewed laterally); apical lamella almost not attenuated towards apex, which is widely rounded (viewed dorsally). Armature of endophallus consisting of single large spiralized (with about 2 coils) proximal copulatory piece. Left paramere (Fig. 25) larger than right one (Fig. 26), their apical projections long and narrow, bearing both 2 long apical and 13-14 short apical or subapical setae. Spermatheca (Fig. 42) with sclerotized oval ring of regular shape ventrally. Total length 10.8-12.1 mm.

Remarks. The main features of the present species fit the *sibiricus*-group. However it differs from all continental forms of *D. sibiricus* Motschulsky, 1844 in the comparatively more robust body, presence of setiferous pores on elytral interspace 5, completely black legs, much smaller aedeagus with widely rounded apex, and fainter spiralized proximal copulatory piece. Together with *D. sterbai* Jedlička, 1932, which share with *D. yunnanus* many characters, it presents, apparently, a different from *D. sibiricus* species-swarm within the *sibiricus*-group. From *D. sterbai* it differs in many peculiar details, as given below.

***Diplous sterbai* Jedlička, 1932**

(Figs 9, 43)

Diplous sterbai Jedlička, 1932a: 40; Zamotajlov & Sciaky, 1996: 39.

Material. Holotype, ♀ (NMP), labelled "Kansu orient., Hweisi"; "Type"; "*Diplous Sterbai* mihi, Type, det. Ing. Jedlička"; "Mus. Nat. Pragae Inv. 24674".

Description. Body black; head, pronotum, and elytra black, shiny; femora black; tibiae and tarsi somewhat brownish; antennae, except for antennomere 1, and palpi dark brown. Head ovate, 0.79 times as wide as pronotum, sharply constricted behind large, convex eyes; temples very short, about 4 times shorter than eye diameter, oblique; frontal furrows faintly divergent posteriorly, rather coarsely and densely punctate; temples and neck-constriction covered with fine and sparse punctures; vertex smooth; 2 setiferous pores present on each side, one at about mid-eye level, and another somewhat equidistant between posterior margin of eye and neck-constriction. Tooth of mentum bifid, resembling that of *D. yunnanus*, however possessing more shallow and narrow apical hollow (Fig. 9). Pronotum cordate, rather narrow, faintly convex, 1.26 times as wide as long, widest slightly before middle; front margin almost even; sides widely rounded in front and fairly sinuated before hind angles, moderately bordered, marginal explanate border being widest somewhat in the middle and contracted both anteriorly and posteriorly; basal margin nearly straight; front angles rounded, indistinct, not projecting forwards; hind angles obtuse, pointed, fairly protruding laterally; anterior transverse impression distinct, but rather shallow, coarsely though rather sparsely punctate; basal foveae rather deep, of two indistinct impressions each, coarsely and sparsely punctate; base, lateral grooves, and sides of disc punctate; disc smooth; median line deep and broad, prominently broadened and deepened at base, nearly reaching both extremities; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.64 times as long as wide and 1.64 times as wide as pronotum; shoulders broad, somewhat roundly angulate, with small, but distinct humeral teeth; interspaces faintly convex, all striae distinct, with rather coarse and conspicuous punctation at base; interspace 3 with 3-5, interspace 5 with 1 setiferous pore;

marginal series composed of 17-18 setae; microreticulation forming isodiametric meshes. Pro- and mesotarsal segment 4 strongly emarginate at apex, bilobed. Pro- and mesosternum, sides of metasternum, and proepisterna with coarse and large punctures; mes- and metepisterna with smoothed and sparse punctures; lateral areas of sternite 1 rugose-punctate. Spermatheca (Fig. 43) with sclerotized oval ring of regular shape ventrally. Total length 12.5 mm.

Remarks. Even though male of the present species is unknown, we attribute it readily, according to its external characters and structure of female genitalia, to the *sibiricus*-group. In the chaetotaxy of elytra, regularly round shape of spermathecal ring, and some other features, it seems to be most closely related to *D. yunnanus*.

***Diplous szetschuanus* Jedlička, 1932**
(Figs 3, 10-11, 27-30, 44)

Diplous szetschuanus Jedlička, 1932b: 107.

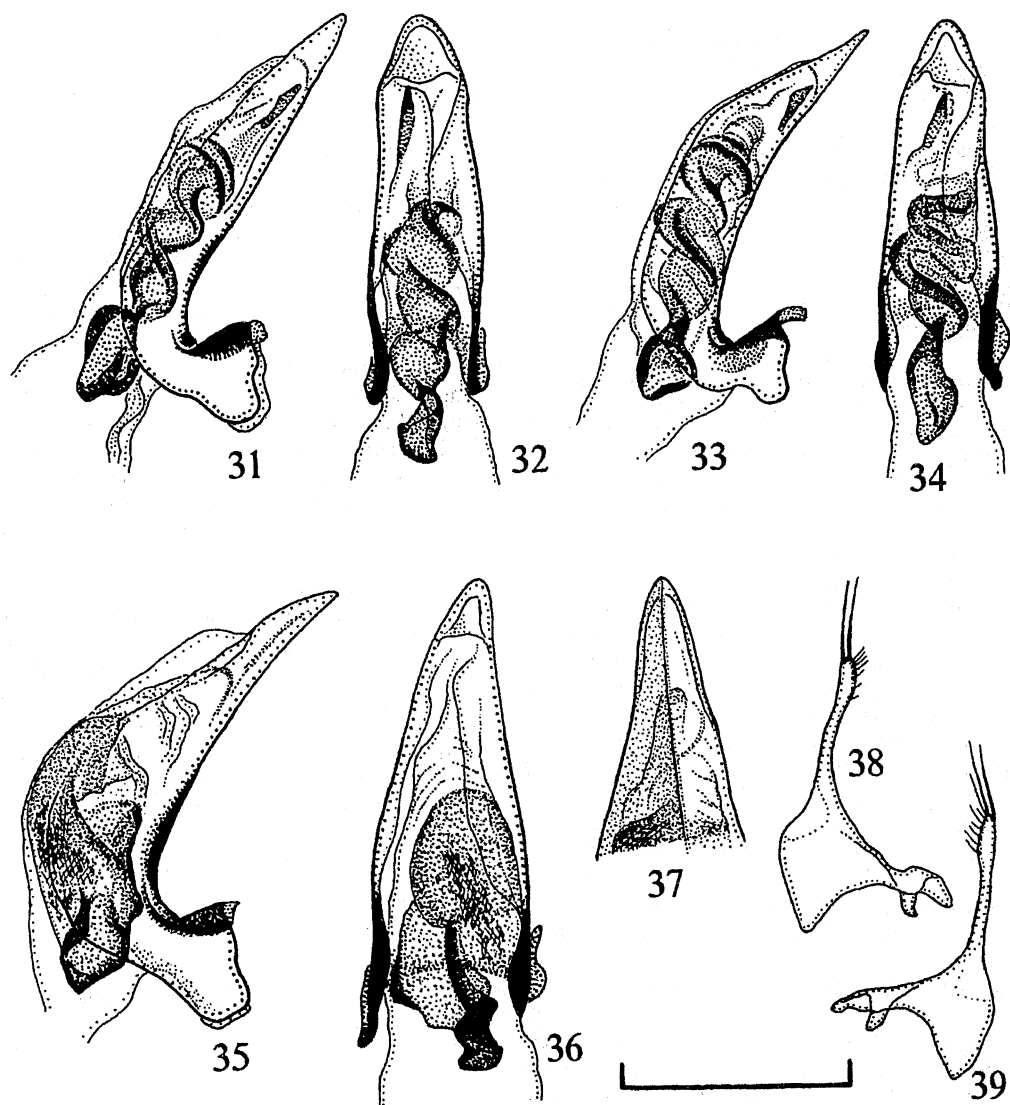
Diplous yunnanus ab. *flavipes* Jedlička, 1932b: 108, *syn. n.*

Material. 1 ♂ (NMP), labelled "Tatsienlu, Prov. Setschuan, China Merid.", "Type", "*szetschuanus* sp. n. det. Ing. Jedlička", "Mus. Nat. Pragae Inv. 24670" (designated here as lectotype); 2 ♂ and 1 ♀ (NMP), labelled as lectotype, except the second label is "Cotype", and Inv. 24671, 24672 and 24673 respectively (paralectotypes); 1 ♂ (NMP), labelled "Tatsienlu, Prov. Setschuan, China Merid.", "*chinensis* sp. n. det. Ing. Jedlička", "Cotype"; 1 ♀ (NMP), labelled "Tatsienlu, Prov. Setschuan, China Merid.", "Type"; "*Diplous chinensis* sp. n. det. Ing. Jedlička".

Description. Body dark brown to black, shiny; head and pronotum dark brown to black; elytra dark brown (elytral apices and suture somewhat paler), brown, or yellow; antennae and palpi brown; femora and tibiae yellow; tarsi brown. Head ovate, 0.79-0.85 times as wide as pronotum, strongly constricted behind large, convex eyes; temples short, about 3-4 times shorter than eye diameter, oblique; frontal furrows more or less prominently divergent posteriorly, usually broad, broadened backwards; surface at frontal furrows, temples, and neck-constriction densely and rather coarsely punctate; vertex smooth; 2 setiferous pores present on each side, one somewhat at anterior half eye level and another nearly equidistant between posterior margin of eye and neck-constriction. Lateral lobes of mentum long, angulate at apices; tooth rather long, moderately broad, with deep apical hollow (Figs 10, 11). Pronotum cordate, moderately transverse,

faintly convex, 1.25-1.33 times as wide as long, widest slightly before or just in the middle; front margin somewhat concave, sides widely rounded in front and faintly to fairly sinuated before hind angles, moderately to widely bordered, marginal explanate border being widest somewhat in the middle and usually contracted both anteriorly and posteriorly; basal margin nearly straight; front angles angulately rounded, prominent, hardly or not projecting forwards, hind angles obtuse, pointed, faintly protruding laterally; anterior transverse impression deep and broad, rather coarsely and densely punctate; base and sides intensively rugose-punctate; disc faintly rugose to almost smooth; median line deep and broad, almost reaching both extremities; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, almost flat, 1.57-1.67 times as long as wide and 1.59-1.67 times as wide as pronotum; shoulders somewhat roundly angulate, without prominent humeral teeth; interspaces faintly convex, almost flat; all striae distinct, with fine punctation at base; interspace 3 with 3-6 setiferous pores, in one specimen base of interspace 5 with traces of one more pore; marginal series composed of 16-25 setae; microreticulation forming fine isodiametric meshes. Pro- and mesotarsal segment 4 strongly emarginate at apex, bilobed. Proepisterna and lateral areas of prosternum with dense and coarse, large punctures; mes- and metepisterna, mesosternum, and sides of metasternum with dense and coarse, but somewhat smaller punctures; sternites rugose in lateral areas; sternite 1 rugose-punctate. Aedeagus (Figs 27, 28) resembling that of *D. yunnanus*, small, slightly attenuated towards apex, which is widely rounded (viewed dorsally) and faintly bent ventrally (viewed laterally). Armature of endophallus consisting of single large spiralized (with about 2 coils) proximal copulatory piece. Left paramere (Fig. 29) larger than right one (Fig. 30); their apical projections long and narrow, bearing both 2 long apical and 11-15 short apical and subapical setae. Spermatheca (Fig. 44) with sclerotized oval ring of irregular shape ventrally. Total length 10.6-11.6 mm.

Remarks. Jedlička labelled, basing on the above material, two species different in elytral coloration: "*D. chinensis*", possessing dark brown to black elytra, and *D. szetschuanus*, possessing yellow (in "Type") or brown elytra. Actually, specimens of "*D.*



Figs 31-39. *Diplous* spp., ♂ genitalia. 31-32, *D. sibiricus sibiricus* Motschulsky, lectotype; 33-34, *D. sibiricus caligatus* Bates, Japan, Kanagawa; 35-39, *D. jedlickai* sp. n., holotype. 31, 33, 35, aedeagus, left lateral view; 32, 34, 36, aedeagus, dorsal view; 37, apical part of aedeagus, ventral view; 38, left paramere, left lateral view; 39, right paramere, right lateral view. Scale: 1 mm.

szetschuanus" with brown elytra represent general individuals of the same coloration type as "*D. chinensis*". No principal differences in all other studied characters were found between the specimens belonging to these two coloration types. I have been un-

able to find the description of "*D. chinensis*" in Jedlička's papers, and material labelled as *Diplous yunnanus* ab. *flavipes* Jedl. also missing in his collection. Since the latter form corresponds completely in its main characters and locality to "*D. chinensis*", it seems

very probable that the specimens labelled "*D. chinensis*" are actually the types of *D. yunnanus* ab. *flavipes*.

D. szetschuanus actually resembles in many characters *D. yunnanus*, representing probably its nearest relative. However it is distinguishable in the absence of setiferous pores on elytral interspace 5, yellow legs, and spermathecal ring of irregular shape.

***Diplous gansuensis* Jedlička, 1932**

(Figs 12, 45)

Diplous gansuensis Jedlička, 1932a: 42; Zamotajlov & Sciaky, 1996: 39.

Material. 1 ♀ (NMP), labelled "Kansu orient., Hweisi", "Type"; "*Diplous gansuensis* sp. n., Type, det. Ing. Jedlička", "Mus. Nat. Pragae Inv. 24675" (designated here as lectotype). 2 ♀ (NMP), labelled "Hweisin, Kansu"; "Cotype"; "*gansuensis* mihi det. Ing. Jedlička"; "Mus. Nat. Pragae Inv. 24676" (and respectively 24677) (paralectotypes).

Description. Body black; head and pronotum black, shiny, in teneral specimen brown; elytra yellow; antennae, palpi, and legs reddish-yellow. Head ovate, 0.79-0.83 times as wide as pronotum, strongly constricted behind large, convex eyes; temples short, about 4 times shorter than eye diameter, oblique; frontal furrows faintly divergent posteriorly, rather broad; surface at frontal furrows and neck-constriction densely and rather finely punctate; vertex smooth; 2 setiferous pores present on each side, one at anterior third eye level and another somewhat equidistant between posterior margin of eye and neck-constriction. Lateral lobes of mentum short, at apices rounded; tooth rather short and broad, with shallow apical hollow (Fig. 12). Pronotum cordate, faintly convex to flat, 1.26-1.35 times as wide as long, widest slightly before its middle; front margin even to faintly concave; sides widely rounded in front and faintly sinuated before hind angles, narrowly bordered; basal margin nearly straight; front angles rounded, indistinctly angulate, not projecting forwards; hind angles obtuse, pointed, hardly protruding laterally; anterior transverse impression rather shallow, more or less finely and sparsely punctate; basal foveae rather deep, somewhat coarsely and densely punctate; base and sides intensively punctate; disc smooth; median line deep, narrow, obliterated apically; lateral margins with 1 seta between middle and apical third and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.63-1.69 times as long as wide and 1.62-1.66

times as wide as pronotum; shoulders rounded, without prominent humeral teeth, interspaces faintly convex; all striae distinct, with fine, indistinct punctation at base, interspace 3 with 3-4 setiferous pores; marginal series composed of 13-16 setae; microreticulation forming fine isodiametric meshes and wrinkles. Pro- and mesotarsal segment 4 moderately emarginate at apex, bilobed. Proepisterna with small, strongly smoothed punctures; prosternum, mesosternum, mes- and metepisterna with medium-sized, rather dense punctation; sides of metasternum with small, smoothed punctures; lateral areas of sternite 1 rugose-punctate. Spermatheca (Fig. 45) with sclerotized oval ring of irregular shape ventrally. Total length 11.3-11.7 mm.

Remarks. Both in habitus and according to the structure of the female genitalia, this species resembles most closely the light-coloured specimens of *D. szetschuanus*, though it differs in the somewhat more slender body, shape of mentum, peculiarities of chaetotaxy, and some other characters. Although male of *D. gansuensis* is unknown, we place it in the *sibiricus*-group, and *D. yunnanus*, *D. sterbai*, and *D. szetschuanus* could be considered its closest relatives. Judging from the light-coloured legs and absence of setiferous pores at elytral interspace 5, *D. gansuensis* could be put close to *D. szetschuanus* and continental forms of *D. sibiricus*, contrary to *D. yunnanus* and *D. sterbai* possessing dark-coloured legs and setiferous pores at elytral interspace 5.

***Diplous sibiricus* (Motschulsky, 1844)**

(Figs 13, 31-34, 46)

Patrobis sibiricus Motschulsky, 1844: 128, Tab. VI, Fig. 2.

Diplous sibiricus: Motschulsky, 1850: 71, X Tab. synopt.; Chaudoir, 1871: 49; Jedlička, 1932a: 42; Kühnelt, 1941: 157.

Diplous caligatus Bates, 1873: 294; Lewis, 1879: 301; Schönfeldt, 1887: 50; Jedlička, 1932a: 42; Kühnelt, 1941: 156; Habu, 1951: 69; Morita, 1985: 102.

Diplous caligatus atratus Habu, 1951: 70.

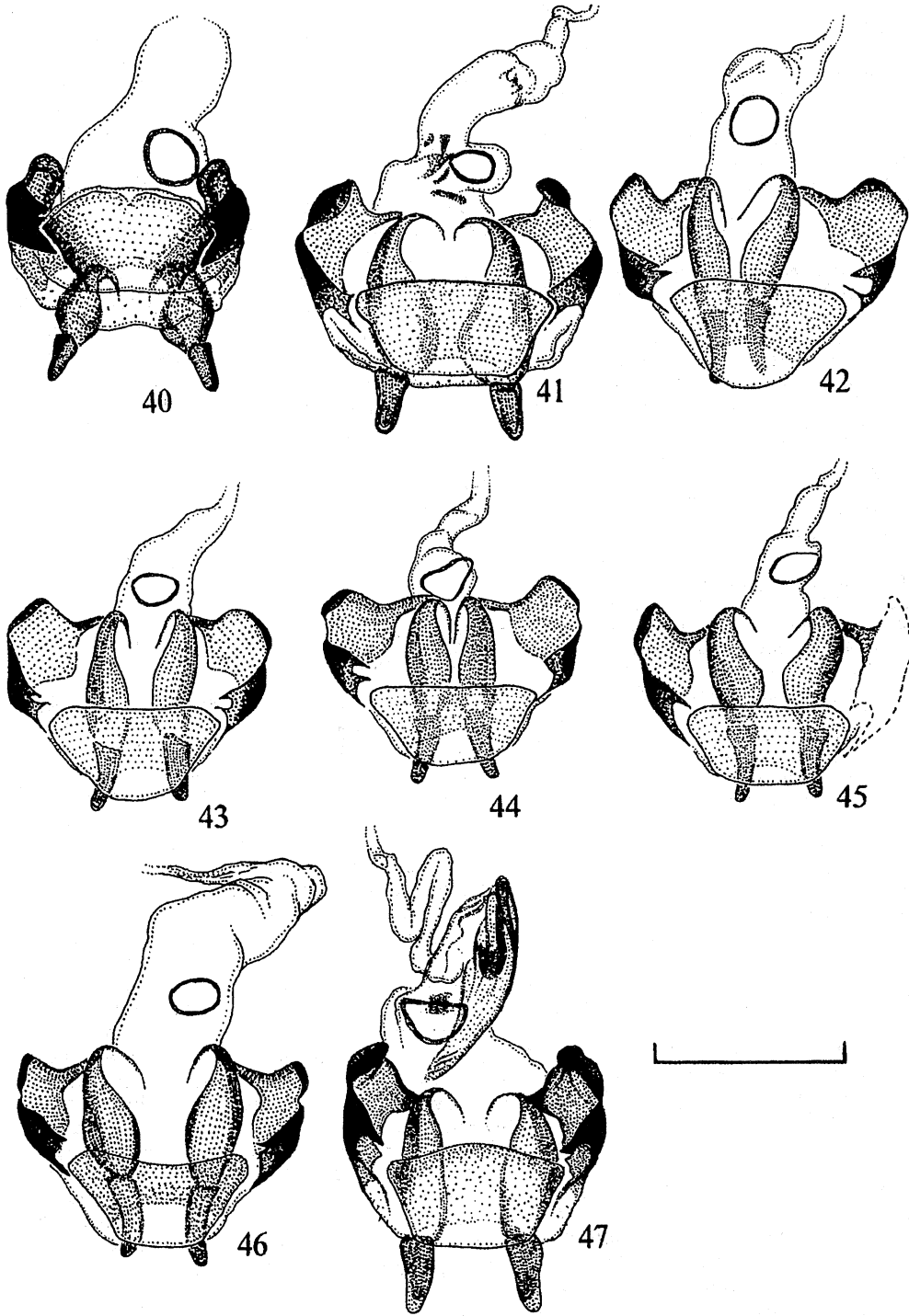
Diplous caligatus yezoensis: Habu, 1951: 70.

Diplous depressus yezoensis Habu, 1941: 654.

Diplous depressus (non Gebler, 1829): Habu, 1941: 653; 1950: 963, Fig. 2741.

Diplous tesari Jedlička, 1951: 209, *syn. n.* (of *D. sibiricus caligatus* Bates, 1873).

Diplous sibiricus sibiricus: Lafer, 1989: 129; Kryzhanovskij & al. 1995: 91; Zamotajlov & Sciaky, 1996: 39.



Figs 40-47. *Diplous* spp., ♀ reproductive tract, dorsal view. 40, *D. petrogorbatschevi* sp. n., paratype; 41, *D. sciakyi* sp. n., paratype; 42, *D. yumanus* Jedlička, lectotype; 43, *D. sterbai* Jedlička, holotype; 44, *D. szetschuanus* Jedlička, "Type" of "*D. chinensis*"; 45, *D. gansuensis* Jedlička, lectotype; 46, *D. sibiricus caligatus* Bates, Japan, Kanagawa Pr.; 47, *D. sp.*, Tibet, Tsurphu env. Scale: 1 mm.

Diplous sibiricus caligatus: Lafer, 1989: 129; Zamotajlov & Sciaky, 1996: 39.

Diplous sibiricus atratus: Lafer, 1989: 129; Kryzhanovskij & al., 1995: 91.

Types of D. sibiricus examined: 1 ♂ (ZISP), labelled "Nischnia Udinsk", "*Diplous sibiricus* Motsch., Sib. occ.", "c. Motschulsky", with golden circle (designated here as lectotype); 1 ♂ (ZMUM), labelled "*Diplous sibiricus* Motsch., Sib. occ." (paralectotype); 3 ♂, 3 ♀ (ZMUM), badly damaged, labelled "Nischnia Udinsk" (paralectotypes); 1 ? (ZISP), labelled "c. Motschulsky" (?paralectotype).

Other material examined. **Russia**: *Buryatia*: 1 ♂ (ZISP), Troitskosavsk (= Kyakhta) env., 1903 (Mikhno); 1 ♀ (ZISP), Yamarovka on Chikoy nr Troitskosavsk, 2-5.VII (Mikhno); 1 ♂ (ZISP), same locality, 8.VII.1902 (Mikhno; coll. of Glazunov); *Primorsk Terr.*: 1 ♀ (ZISP), Kedrovaya Pad', 22.VIII.1963 (Kerzhner); *Kuril Islands*: 2 ♂ (OK), Iturup Island, riv. Gorbusha nr Dobroye Nachalo bay, 16.VIII.1981 (O. Kabakov). **Mongolia**: 2 ♂, 1 ♀ (ZISP), Urga (= Ulan-Bator), valley of riv. Tola, 25.VI.1928 (A. Ivanov); 2 ♂ (ZISP), same locality, 4.VII.1926 (Kiritshenko); 1 ♂ (ZISP), btw. riv. Iro and Kharagol, Khentey, 23.VI.1926 (Kiritshenko). **China**, *Gansu*: 2 ♂ (RS), Dogcanghamo, 4200 m, 12-15.VII.1990 (M. Nikodým). **Japan**: 2 ♀ (ZISP), Kanagawa Pr., Odawara, 21.V.1983 (S. Morita); 2 ♂, 4 ♀ (SM), Tokushima Pr., Ichinomya, riv. Akui-gawa, 21.IV.1990 (S. Morita); 1 ♂, 1 ♀ (SM), Aomori Pr., Yakeyama, riv. Oirase, 23.VII.1988 (S. Morita); 3 ♀ (SM), Saitama Pr., Honjyou-shi, riv. Tonegawa, 13.V.1990 (S. Morita); 2 ♀ (SM), Nagano Pr., Kamokochi, 1.VIII.1986 (S. Morita); 1 ♂ (ZISP), Fukuoka Pr., Raizan, Itoshima, 22.IV.1946 (A. Habu); 1 ♀ (ZISP), Saitama Pr., 11.V.1954 (A. Habu); 1 ♂, 1 ♀ (ZISP), Saitama Pr., Yorii, 30.XI.1954 (H. Kajimura); 2 ♂ (ZISP), Inada, riv. Tama, 21.IX.1949 (K. Tanaka). 1 ♂ (ZISP), Asakawa, Tokyo, 17.V.1953 (A. Habu), with label "*Diplous caligatus* f. *atratus* Habu"; 1 ♂ (ZISP), Oku-Tone Gumma, 27.VII.1954 (C. Hirano); 1 ♂ (NMP), labelled "Aizu, N Japan, VII.1940", "*tesari* sp. n. det. Ing. Jedlička", "Typus", "Mus. Nat. Prae Inv. 24679"; 1 ♂ (NMP), labelled "North Aizu, Japan, 7.V.1951, Kurosawa leg.", "Typus", "*Diplous Edai* sp. n. det. Ing. Jedlička"; 1 ♀ (NMP), labelled "Kuzukawa, Aomori Pref., Japan, X.1958", "Paratypus", "*Edai* sp. n. det. Ing. Jedlička"; 1 ♀ (NMP), labelled "Aseishigawara, Huaka cho, Aomori, Japan", "Paratypus", "*edai* sp. n. det. Ing. Jedlička".

Remarks. Syntypes of *D. sibiricus* kept at the ZMUM (collection of V. Motschulsky) are almost completely destroyed, so I prefer to designate as lectotype a specimen (also originating from Motschulsky's collection) from the ZISP. Basing on examined material, I am inclined to follow Lafer's (1989) concept of forms close to *D. sibiricus*, treating them as subspecies (or even infrasubspecific forms). Examination of the type specimen of *D. tesari* Jedlička, 1951 revealed no significant differences from *D. sibiricus cali-*

gatus Bates, 1873. "*D. edai* Jedlicka" (nomen nudum) is identical to *D. sibiricus atratus* Habu, 1951 and similar forms of *D. sibiricus*, possessing entirely black legs. Sympatric occurrence of forms with different coloration of legs and presence of transitional individuals in some Japanese localities ("Yakeyama, riv. Oirase, Aomori Pref."; "Kamikochi, Nagano Pref.") confirm the infraspecific status of these forms. In general, *D. sibiricus caligatus* tends to have black or almost black legs on islands of Iturup and Hokkaido, and black to yellowish brown legs at North or Central Honshu (G. Lafer and S. Morita, personal communications). Unfortunately, we cannot make a precise conclusion on the status of these forms before study of populations (particularly of the percentage of different phenotypes within them) from the island Hokkaido, where the type localities of both *D. sibiricus atratus* and *D. sibiricus yezoensis* are situated.

The *dauidis*-group

Diplous jedlickai sp. n. (Figs 4, 35-39)

Holotype. ♂ (NMP), labelled "W Szechuan, China, Sankiangkou, leg. Friedrich", "Balang, 7.-8. 1934, Wassuland", "Museum Frey München", "Holotypus", "*Diplous wassulandi* sp. n. det. Ing. Jedlička".

Description. Body black; head, pronotum, and elytra black, shiny; tarsi and palpi dark brown. Head ovate, 0.84 times as wide as pronotum; eyes rather large, fairly convex; temples tumid, about 1.5 times longer than eye diameter; neck-constriction deep and prominent; frontal furrows fairly divergent posteriorly, rather deep and broad; surface generally smooth, in frontal furrows somewhat rugose, only neck-constriction finely punctate; 2 setiferous pores present on each side, one nearly at mid-eye level and another somewhat closer to neck-constriction than to eye. Tooth of mentum bifid, broad and rather short. Pronotum cordate, faintly convex, 1.34 times as wide as long, widest at apical third, prominently attenuated towards base; front margin nearly even; sides widely rounded in front, fairly sinuated close to hind angles, rather narrowly bordered; basal margin almost straight; front angles hardly projecting forwards, rounded, indistinct; hind angles nearly rectangular, pointed; anterior transverse impression broad, though rather shallow, somewhat rugose, indistinctly and smoothly punctate; basal foveae deep, rugose, indistinctly punctate; base

and sides rugose, indistinctly punctate; disc faintly rugose, with foveole at each side; median line rather sharp and narrow, obliterated at both extremities; lateral margins with 1 seta slightly before middle and 1 seta in hind angles. Elytra oblong-ovate, faintly convex, 1.64 times as long as wide and 1.60 times as wide as pronotum; shoulders rounded, faintly angulate; humeral teeth small, though distinct; interspaces flat; all striae distinct, without pronounced punctation at base; interspace 3 with 3 setiferous pores adjoining stria 3; marginal series composed of 12 setae, almost interrupted in the middle; microreticulation forming isodiametric meshes. Tarsal segments broad; all protarsal segments in male nearly subequally broad, pro- and mesotarsal segment 4 strongly emarginate at apex, bilobed. Proepisterna finely and sparsely punctate; prosternum and mesepisterna almost smooth; metepisterna, mesosternum, and sides of metasternum finely punctate; lateral areas of sternites finely rugose. Aedeagus (Figs 35, 36, 37) strongly bent at base, its basal part rather short, apex faintly bent ventrally (viewed laterally), apical lamella narrow, gradually attenuated towards apex (viewed dorsally), somewhat carinate ventrally, apex pointed. Armature of endophallus consisting of single, large, faintly sclerotized and slightly spiralized proximal copulatory piece. Left paramere (Fig. 38) larger than right one (Fig. 39); their apical projections long and narrow, bearing both 2 long apical and 7 short subapical setae. Total length 12.2 mm.

Etymology. I dedicate this species to the memory of the famous carabidologist Ing. Arnost Jedlicka, who recognized this species as a new one.

Remarks. The species belongs to the *dauidis*-group. It is easily distinguishable from other members of the group by the extremely broad tarsi and shape of aedeagus, particularly the narrow apical lamella carinate ventrally. Judging from the punctation of elytral striae, composing marginal series, and structure of endophallus, it seems to be most closely related to *D. giacomazzo* Zamot. & Sciaky, 1996.

Diplous sp. (Figs 14, 47)

Material. 1 ♀ (AZ), China, Tibet, 70 km E of Lkhasa, cloister Tsurphu env., 20.VI.1995 (P. Gorbachev).

Description. Body black; head, pronotum, and elytra black, shiny; fore tarsi, palpi, and antennae dark brown. Head ovate, 0.82

times as wide as pronotum; eyes rather large, fairly convex; temples faintly tumid, slightly longer than eye diameter; neck-constriction rather deep; frontal furrows very faintly divergent posteriorly, rather deep and broad, very long, continuing backwards into row of wrinkles and punctures reaching hind supraorbital pore; surface generally smooth, in frontal furrows somewhat rugose; neck-constriction finely punctate; 2 setiferous pores present on each side, one closer to anterior eye level and another somewhat closer to neck-constriction than to eye. Tooth of mentum bifid, very broad and rather short (Fig. 14). Pronotum cordate, faintly convex, 1.26 times as wide as long, widest at apical third; front margin nearly even; sides widely rounded in front, fairly sinuated close to hind angles, rather narrowly bordered; basal margin almost straight; front angles hardly projecting forwards, distinctly angulate; hind angles nearly rectangular, pointed; anterior transverse impression shallow and inconspicuous; basal foveae rather deep, rugose-punctate; base and sides rugose-punctate; disc faintly rugose; median line rather sharp and narrow, almost reaching both base and apex; lateral margins with 1 seta slightly before middle and 1 seta in hind angles. Elytra oblong-ovate, fairly convex, 1.69 times as long as wide and 1.64 times as wide as pronotum; shoulders rounded, faintly angulate; humeral teeth small, though distinct; interspaces flat; all striae distinct, without distinct regular punctation at base; interspace 3 with 3 setiferous pores adjoining stria 3; marginal series composed of 17-18 setae; microreticulation forming isodiametric meshes. Pro- and mesotarsal segment 4 strongly emarginate at apex, bilobed. Pro- and mesepisterna, pro- and mesosternum with coarse and sparse punctation; metepisterna and sides of metasternum with rather fine and smoothed punctures; sternites finely rugose. Spermatheca (Fig. 47) with sclerotized oval ring ventrally about 0.35 mm in diameter and large, longitudinal, strongly sclerotized plate dorsally on the right. Total length 11.9 mm.

Remarks. Based on the shape of protarsal segment 4 and presence of sclerotized plate of spermatheca, this species should be placed in the *dauidis*-group, being its only known Tibetan representative. General appearance and composition of marginal series testify it to be closest to *D. dauidis* (Fairmaire). How-

ever, it differs in its much smaller body size, longer frontal furrows, less convex eyes and longer temples, pronotum fainter contracted towards base, with its sides less sinuated before hind angles, comparatively more elongate elytra, and larger and much stronger sclerotized spermathecal plate dorsally. Differences from the other members of the group are even more evident, though we leave naming of the present form until the study of the male genitalia will make its status within the group more clear.

Key to the Palaeartic species and subspecies of the genus *Diplous*

1. Base of pronotum wider than apex, sides strongly, though roundly convergent towards head. Antennomere 3 comparatively long. Protarsal segment 4 less emarginate at apex, engraving being less than third of its length. Base of aedeagus regularly arcuate dorsally. Distribution: NE China, Altai, S Siberia, Yakutia, Russian Far East, Japan, Korea (The *depressus*-group) *D. depressus* (Gebler, 1829)
- Base of pronotum narrower than apex or equal to it, front angles widely remote from each other. Antennomere 3 comparatively short. Protarsal segment 4 strongly emarginate at apex, engraving being half or more of its length, bilobed. Aedeagus strongly bent at base 2
2. Excision of protarsal segment 4 usually more shallow, about half of its length, it is faintly bilobed. Aedeagal base long; apical lamella long and narrow, usually faintly bent dorsally and twisted to the right; proximal copulatory piece of two distinct fused sclerites, seldom somewhat spirialized (The *przewalskii*-group) 3
- Excision of protarsal segment 4 usually deeper, more than half of its length, it is strongly bilobed. Aedeagal base usually shorter; apical lamella short and broad, almost plane or slightly bent ventrally at apex; proximal copulatory piece always more or less distinctly spirialized 10
3. Elytra 1.66-1.75 times as wide as pronotum. Posterior supraorbital seta indistinct. Distribution: northern slopes of Himalayas near Mt. Everest *D. nortoni* Andrewes, 1924
- Elytra 1.44-1.65 times as wide as pronotum. Posterior supraorbital seta prominent. Distribution: Tibet 4
4. Elytral striae more or less uniform, interspaces strongly convex. Tooth of mentum longer. Distribution: E Qinghai (*D. grummi* Zamotajlov & Kryzhanovskij, 1990) 5
- Elytral striae outside stria 4 more or less smoothed, interspaces faintly convex to flat. Tooth of mentum shorter. 6
5. Elytra dark piceous to black. Temples fairly tumid. Anterior transverse impression of pronotum deep, rugose-punctate. Endophallus without apical copulatory piece *D. grummi grummi* Zamotajlov & Kryzhanovskij, 1990
- Elytra brown, distinctly paler than pronotum. Temples faintly tumid, shorter. Anterior transverse impression of pronotum shallow, smooth. Endophallus often with apical spot-like copulatory piece *D. grummi bicolor* Zamotajlov & Sciaky, 1996
6. Larger. Dorsum shiny. Elytral striae outside stria 4 smoothed out, though distinct, with more or less prominent punctuation at base; interspaces faintly convex. Distribution: W Sichuan 7
- Smaller. Dorsum somewhat mat. Elytral striae outside stria 4 superficial, inconspicuous, without distinct punctuation at base; all interspaces flat and broad 8
7. Proximal copulatory piece moderately sclerotized, of two fused faintly overlapping lobes, apical copulatory piece tooth-shaped *D. wrasei* Zamotajlov & Sciaky, 1996
- Proximal copulatory piece strongly sclerotized, distinctly spiralized, its lobes considerably overlapping; apical copulatory piece absent (Figs 19, 20) *D. sciakyi* sp. n.
8. More slender. Aedeagal apex somewhat bent dorsally 9
- More robust. Aedeagal apex bent ventrally. Distribution: E Qinghai *D. przewalskii* (Semenov, 1889)
9. Tooth of mentum broader. Hind angles of pronotum nearly rectangular. Marginal series of elytra of 12 setae not forming distinct groups. Proximal copulatory piece somewhat spirialized. Distribution: S Qinghai *D. tonggulensis* Zamotajlov & Sciaky, 1996
- Tooth of mentum narrower (Fig. 5). Hind angles of pronotum obtuse. Marginal series of elytra of 11-13 setae, forming distinct basal (3-5 setae) and apical (8-9 setae) groups. Proximal copulatory piece bilobed, not spirialized (Figs 15, 16). Distribution: S Tibet. *D. petrogorbatschevi* sp. n.
10. Temples markedly shorter than eye diameter. Sides of elytra nearly subparallel. Aedeagus shorter; aedeagal base short; proximal copulatory piece occupies about 3/4 of aedeagal tube length, always strongly spirialized. Spermatheca without sclerotized plate dorsally. Distribution: S Siberia, Japan, Mongolia, China (Kühnelt, 1941; Lafer, 1989) (The *sibiricus*-group) 11
- Temples subequal in length to eye diameter. Sides of elytra faintly rounded. Aedeagus larger; aedeagal base long; proximal copulatory piece occupies about 2/3 of aedeagal tube length, slightly to indistinctly spirialized. Spermatheca with more or less distinct sclerotized plate dorsally. Distribution: W Sichuan (The *dauidis*-group) 18
11. Elytral interspace 5 without setiferous pores. Legs entirely yellowish (except for *D. sibiricus atratus* Habu, 1951). Ring of spermatheca ovate or irregular. 12
- Elytral interspace 5 with 1-2 setiferous pores at base. Legs piceous or black. Ring of spermatheca round 17
12. More robust, elytra 1.57-1.69 times as long as wide. Tooth of mentum comparatively shorter

- and narrower, with deeper apical emargination. Aedeagus shorter, its length 1.47-1.57 mm; proximal copulatory piece less spiralized. Elytra and pronotum unicolorous or elytra distinctly paler than pronotum, yellowish 13
- More slender, elytra 1.70-1.98 times as long as wide, tooth of mentum comparatively longer and broader (Fig. 13), with shallower apical emargination. Aedeagus longer, its length 1.81-2.01 mm; proximal copulatory piece stronger spiralized. Elytra and pronotum unicolorous (*D. sibiricus* Motschulsky, 1844) 14
13. Somewhat more robust. Mentum broader, its lateral lobes longer, at apices angulate. Pronotum densely punctate, only in the middle smooth, lateral border broader. Pro-, mes-, and metepisterna, sides of pro-, meso-, and metasternum coarsely and densely punctate. Marginal series of 16-25 setae. Tarsi darkened. Distribution: Sichuan *D. szetschuanus* Jedlička, 1932
- Somewhat more slender. Mentum narrower, its lateral lobes shorter, at apices rounded. Pronotum punctate at sides, base, and apex, disc smooth, lateral border more narrow. Proepisterna and metasternum with small and fine, smoothed punctures, mes- and metepisterna, pro- and mesosternum rather densely and conspicuously punctate. Marginal series of 13-16 setae. Tarsi yellow. Distribution: Gansu *D. gansuensis* Jedlička, 1932
14. Eyes smaller, less convex; temples longer; neck-constriction less conspicuous. Front angles of pronotum rounded, angulate, apex of pronotum longer. Distribution: N China, southern part of E Siberia, Primorsk Terr., Mongolia *D. sibiricus sibiricus* (Motschulsky, 1844)
- Eyes larger, more convex; temples very short; neck-constriction more conspicuous. Front angles of pronotum strongly rounded, apex of pronotum shorter 15
15. Legs, antennae, and palpi (except for tips of palpi) black. Distribution: Isles Iturup and Hokkaido *D. sibiricus atratus* Habu, 1951
- Legs reddish brown or yellowish, at least partly 16
16. Femora yellowish brown. Distribution: Japan, Island Iturup, ? S China *D. sibiricus caligatus* Bates, 1873
- Femora reddish brown. Distribution: Island Hokkaido *D. sibiricus yezoensis* Habu, 1941, *stat. n.*
17. Pronotum less cordate, much broader and more transverse, 1.31-1.43 times as wide as long. Elytra narrower, 1.55-1.60 times as wide as pronotum. Marginal series of 14-16 setae. Pro-, meso-, and metasternum at sides, and episterna with dense medium-sized punctures. Tarsi and palpi black. Distribution: Yunnan *D. yunnanus* Jedlička, 1932
- Pronotum stronger cordate, much narrower, 1.26 times as wide as long. Elytra broader, 1.64 times as wide as pronotum. Marginal series of 17-18 setae. Pro-, meso-, and metasternum at sides, proepisterna covered by coarse and large punctures, mesand metepisterna with smoothed

- and sparse punctures. Tarsi and palpi paler, somewhat yellowish. Distribution: Gansu *D. sterbai* Jedlička, 1932
18. Somewhat more robust. Elytra shorter; striae distinctly punctate at base; marginal series of two more or less clear-cut groups of setae. Total length 10.1-12.9 mm. Distribution: N Yunnan *D. julonshanensis* Zamotajlov, 1994
- Somewhat more slender. Elytra longer; striae without distinct punctation at base; marginal series not forming clear-cut groups of setae 19
19. Protarsi in male broad, all segments subequally broad. Apical part of aedeagus narrower (viewed dorsally), gradually attenuated towards apex; apical lamella somewhat carinate ventrally (Figs 35-37). Distribution: W Sichuan *D. jedlicskai* sp. n.
- Protarsi in male normal, protarsal segments 3 and 4 smaller, narrower than segments 1 and 2. Apical part of aedeagus broader (viewed dorsally), stronger attenuated at apex; apical lamella completely smooth ventrally 20
20. Smaller (total length 10.3-12.5 mm). Pronotum faintly cordate, less narrowed towards base; anterior transverse impression with fainter and less conspicuous punctures. Marginal series of 9-12 setae. Armature of endophallus indistinctly spiralized and faintly sclerotized. Spermatheca with ovate sclerotized ring and strongly sclerotized longitudinal plate. Distribution: W Sichuan *D. giacomazzo* Zamotajlov & Sciaky, 1996
- Larger (total length 12.5-15.3 mm). Pronotum strongly cordate, strongly narrowed towards base; anterior transverse impression and base coarsely punctate. Marginal series of 14-19 setae. Armature of endophallus distinctly spiralized and strongly sclerotized. Spermatheca with sclerotized ring of irregular shape and other poorly sclerotized or inconspicuous structures. Distribution: W Sichuan *D. davidis* (Fairmaire, 1891)

II. DESCRIPTIONS OF IMMATURE STAGES

Diplous depressus (Gebler, 1829) (Figs 48-60)

Material. **Russia, Altai**, env. of Teletskoye Lake (leg. A. Kovrigin, SPUM): 2 L₃, nr vil. Chiri, 27.VII.1985; 2 L₃, bank of river Bayas, 26.VII.1985; 1 L₃, nr vil. Yailiu, bank of river Kamga, 15.VII.1985; 1 L₃, valley of river Kacha, 22.VII.1985; **West Sayan**: 2 L₃ (SPUM), Tashtyp Distr., env. of Bolshoy On, bank of river Bolshoy On, 10.VIII.1989 (S. Bugrov). **Kazakhstan, W. Altai**: 1 L₂ (SPUM), Leninogorsk, 21.VI.1984 (V. Shilenkov).

Description of 3rd instar larva. Head testaceous to brown; tergites of thorax dark brown; pronotum somewhat darker; abdominal tergites brown to pale brown. Head (Fig. 49) ovate, 0.91-1.02 times as wide as long, strongly contracted towards neck; tem-

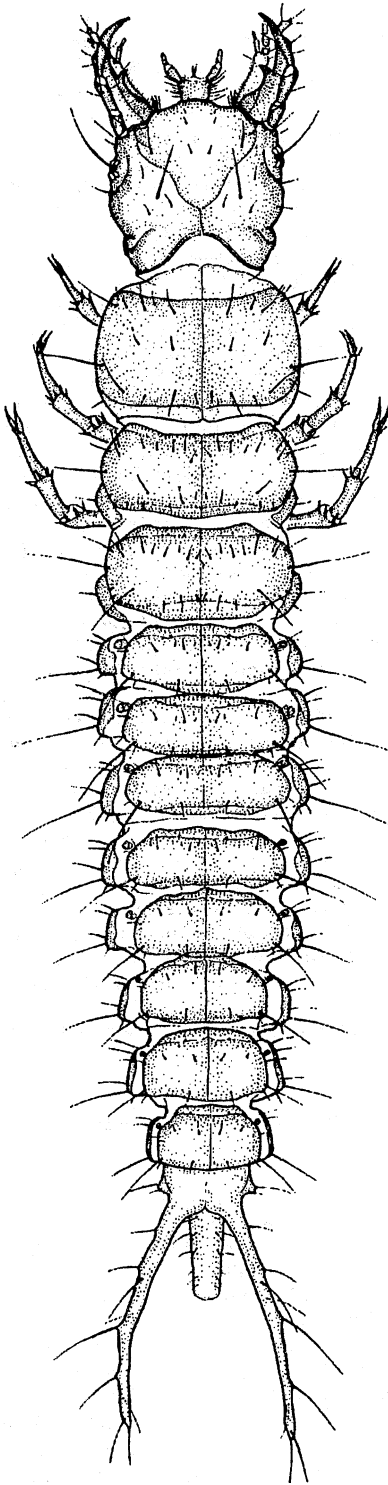
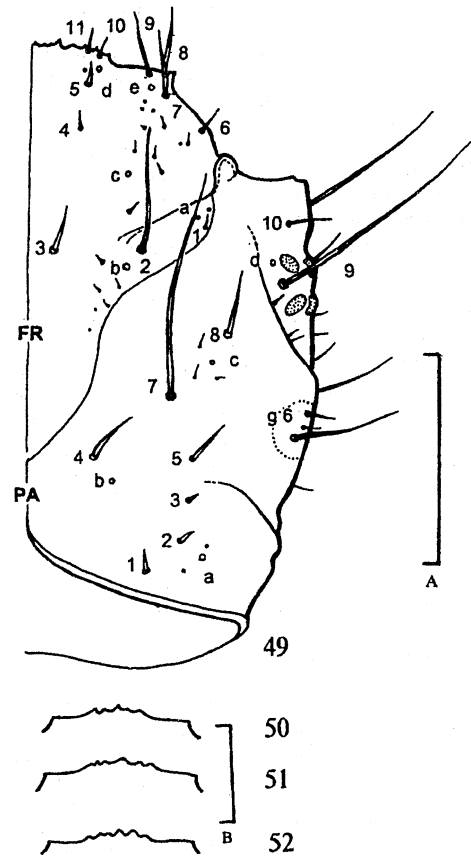
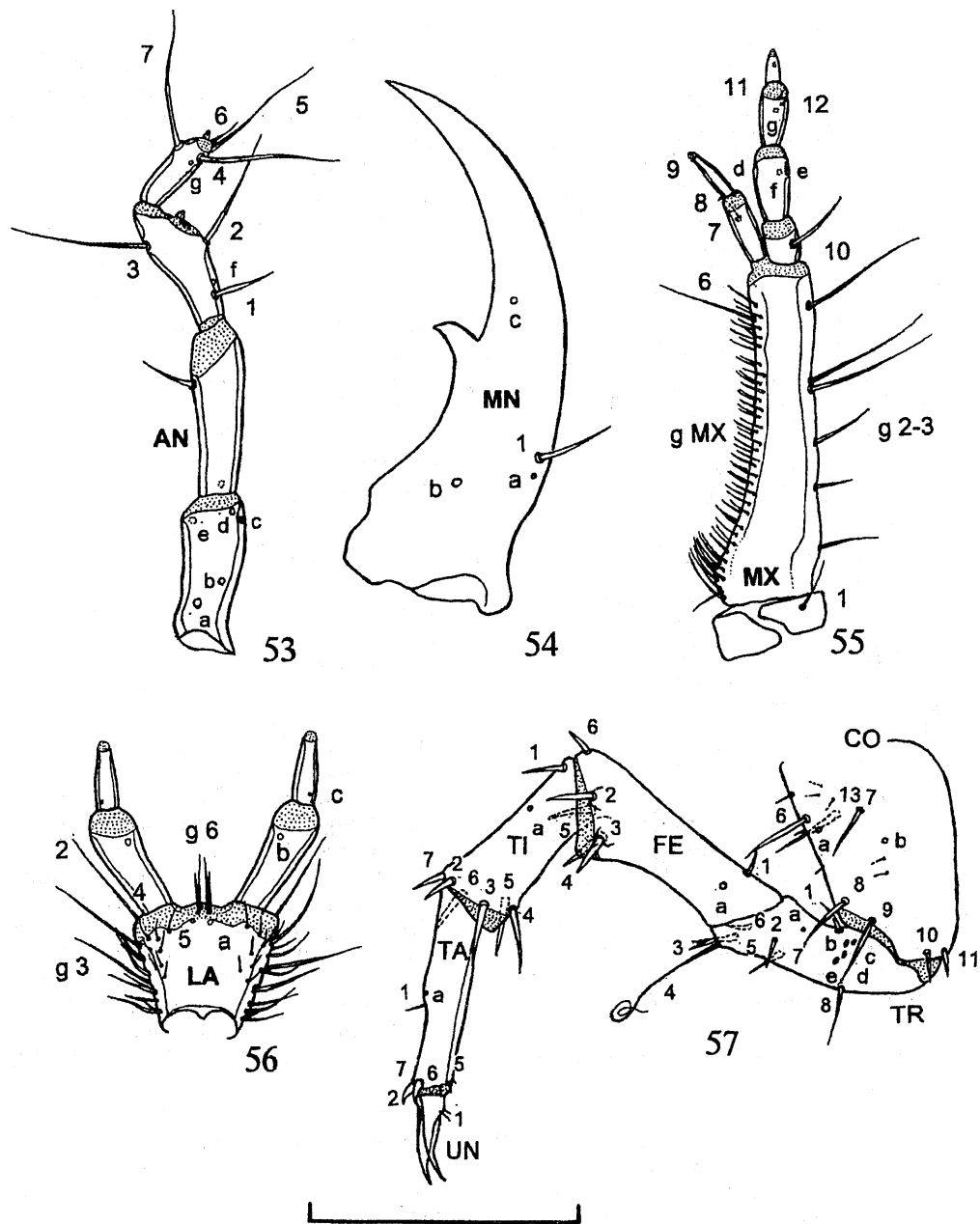


Fig. 48. 3rd instar larva of *Diplous depressus* (Gebler), general view.



Figs 49-52. 3rd instar larva of *Diplous depressus* (Gebler). 49, head, topography of setae and pores, dorsal view; 50-52, shape of nasale, dorsal view. Scales: A for Fig. 49; B for Figs 50-52. Scales: 1mm.

ples tumid, ventro-lateral furrows prominent, fairly deep; orbital and cervical grooves deep; nasale (Figs 50-52) 4.00-4.40 times as wide as long and 1.47-1.65 times broader than each adnasale, hardly produced; front edge irregularly serrate, without distinct central tooth; adnasalia nearly straight in front; epicranial sulcus prominent, about as long as first antennal segment; ocelli small. Mouthparts rather short and stout. Length ratio of antennal segments (AN, Fig. 53) ca. 1.7 : 1.8 : 1.7 : 1.0; antennomere 2 with one long additional seta. Mandibles (MN, Fig. 54) slightly curved, slightly shorter than antennae; retinaculum small, beak-like, pointed, about in the middle of mesal edge; penicillus absent; MN_2 indistinct. Maxillae (MX, Fig. 55) without lacinia; stipes 3.50-3.67 times as long as wide;



Figs 53-57. 3rd instar larva of *Diplous depressus* (Gebler). 53, right antenna, dorsal view; 54, right mandible, dorsal view; 55, right maxilla, dorsal view; 56, labium, dorsal view; 57, right fore leg, lateroventral view. Scale: 1mm.

seta MX_6 long; 5-6 long setae compose a group of MX_2 - MX_3 ; MX_8 and MX_9 small, inconspicuous; length ratio of galea segments ca. 1.5 : 1.0, maxillary palpus 0.62-0.64 times as long as stipes, length ratio of its segments ca. 1.4 : 2.4 : 2.0 : 1.0. Labium

(LA, Fig. 56) without visible seta LA_1 ; sides of prementum with numerous setae (g LA_3), setae LA_4 and LA_5 short; all pores prominent; ligula membranous, hardly projected, with 2 long and 2 short setae (g LA_6); length ratio of labial palpus segments ca. 1.6 : 1.0.

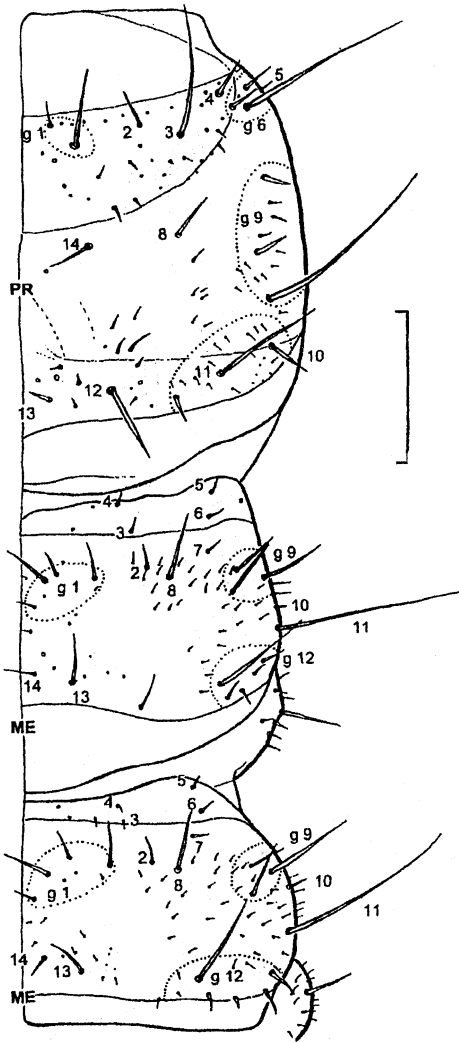


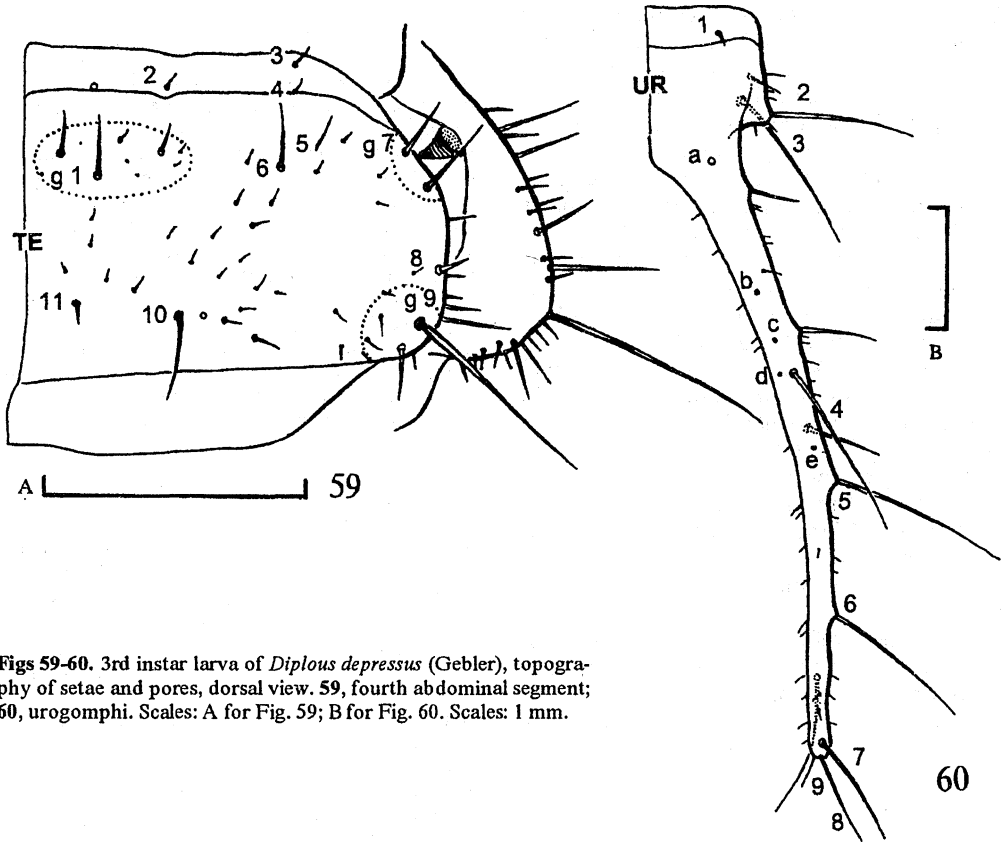
Fig. 58. 3rd instar larva of *Diplous depressus* (Gebler), thorax, topography of setae and pores. Scale: 0.5 mm.

Frontale (FR) nearly as long as wide, with readily distinguishable setae FR₁-FR₁₁ and 5 visible pores FR_a-FR_e. Parietale (PA) with well-developed setae PA₁-PA₁₀ and 4 visible pores PA_a-PA_d, g PA₆ of one long and 1-2 short setae. Width of head capsule 1.4-1.6 mm. Pronotum (PR, Fig. 58) with all characteristic primary setae and numerous minute setae and pores; 1 additional seta near long PR₁, both forming g PR₁; 2 setae close to PR₆, forming g PR₆; 1 seta close to PR₈; 2 setae close to PR₉, forming g PR₉; 1 additional seta between PR₁₁ and PR₁₂. Mesonotum and metanotum (ME) with all principal setae, 3 additional setae close to ME₁ form-

ing g ME₁, 2 setae close to ME₉ forming g ME₉, 4 setae close to ME₁₂ forming g ME₁₂, and sometimes 1 seta between ME₁₂ and ME₁₃. Epimeron and episternum with single long seta and several small ones. Legs rather short (Fig. 57), all principal setae of femur (FE) and tibia (TI) arranged mostly apically. Abdomen long, cylindrical, rather strongly tapering backwards; abdominal tergites (TE, Fig. 59) with all primary setae, 2 setae close to TE₁ forming g TE₁, 1 additional seta close to TE₇ both forming g TE₇, 1 seta close to TE₉ both forming g TE₉, and 1 additional seta between g TE₉ and TE₁₀. Sternites of typical structure, poorly sclerotized. Urogomphi (UR, Fig. 60) slightly nodulous, about 3.50-4.00 times as long as abdominal tergite 9, with all characteristic primary setae and 5 visible pores UR_a-UR_e; 1 additional seta present between UR₁ and UR₂; UR₃ extremely long; a group of 1-3 long setae present between UR₃ and UR₄. Pygidium nearly cylindrical, faintly contracted towards apex. Total length (anterior edge of nasale to apices of urogomphi) 12.6-13.3 mm.

Description of 2nd instar larva. Similar to L₃, differing mainly in body size and proportions. Head 1.06 times as wide as long; nasale 4 times as wide as long and 1.5 times broader than each adnasale; front edge serrate, though with indistinct central tooth. Length ratio of antennal segments 1.5 : 1.5 : 1.5 : 1.0; antennomere 2 with 1 additional seta. Maxillae short; stipes 2.75 times as long as wide; g MX₂-MX₃ comprises 5 setae; length ratio of galea segments 1.1 : 1.0; maxillary palpus 0.76 times as long as stipes; length ratio of its segments 1.0 : 2.3 : 1.8 : 1.5. Labium as in L₃, with membranous and hardly projected ligula, possessing 2 longer and 2 shorter setae; length ratio of labial palpus segments 1.3 : 1.0. Chaetotaxy of head as in L₃; g PA₆ of 2 setae. Width of head capsule 1.1 mm. Thorax and abdomen similar to those of L₃. Urogomphi about 4.3 times as long as abdominal tergite 9, with 1 additional seta between UR₃ and UR₄ and 1 additional seta between UR₆ and UR₇. Total length 8.3 mm.

Remarks. The above-described larva, fitting in its main characters to Patrobines, has been collected in the locality and conditions, characteristic of *Diplous depressus*. Since the species in question occurs in this region sympatrically with *Patrobis*-species only, their larvae being different in many respects, particularly in body size, we consider the pre-



Figs 59-60. 3rd instar larva of *Diplous depressus* (Gebler), topography of setae and pores, dorsal view. 59, fourth abdominal segment; 60, urogomphi. Scales: A for Fig. 59; B for Fig. 60. Scales: 1 mm.

sent larva to be one of *D. depressus*. Basing on the descriptions by Emden (1942), Sharova (1964), and Thompson (1979), the above-described larva seems to be different from *D. aterrimus* (Dejean, 1828) in more prominent ventro-lateral furrows and not so strongly inflated neck, other characters being unavailable for analysis. Curiously, Kryzhanovskij & al. (1995) referred to as *Diplous sibiricus* "ssp. *flavipes* Motsch." the description of the larvae of *Archipatrobus flavipes* (Motschulsky, 1864) by Habu & Sadanaga (1965). The latter actually differs from *D. depressus* in several important characters: much plumper appearance, rather strongly produced nasale with distinct median prominence, strongly inflated neck with inconspicuous neck-constriction, absence of FR₄, 2 additional setae between PA₄ and PA₅ and 2 more setae near PA₅, composition of g PA₆ comprising 4 long setae, absence of additional seta at antennomere 2, and presence of numerous supernumerary setae at thoracal and abdominal tergites. The following main features distinguishing the genus

Diplous (based on *D. depressus* larva) from all other hitherto known Palaeartic genera of Patrobinae (*Archipatrobus*, *Patrobus*, and *Deltomerus*) should be noted in addition to the key given by Makarov (1994):

- 1. Nasale fairly to strongly produced, more or less three-toothed, its front edge with distinct median prominence. Antennomere 2 without additional seta **Archipatrobus, Patrobus, Deltomerus**
- Nasale hardly produced, its front edge irregularly serrate, without distinct median prominence. Antennomere 2 with one additional seta **Diplous**

Ecology

Ecological information on the genus is rather scanty. All species are found under stones by pebbly or (rarely) sandy banks of the streams and mountain torrents (Andrewes, 1935; Kryzhanovskij, 1983; Lafer, 1989), larvae being somewhat further removed from the water than imago. Their altitudinal distribution is given in the Table 2.

The best known species, *D. sibiricus* and *D. depressus*, seem to be quite variable in their altitudinal preferences. Thus, in South Siberia *D. sibiricus* occurs at altitudes up to 1000 m, while *D. depressus* inhabits higher localities, up to 1600-1800 m (V. Shilenkov, personal communication). Sometimes *D. depressus* substitutes *D. sibiricus* up-stream of the same river. In Primorsk Terr. both forms usually occur at altitude about 0-300 m, at the Island Iturup *D. sibiricus atratus* is spread at 0-100 m (G. Lafer, personal communication), while in Japan all forms of *D. sibiricus* usually occur at 10-1000 m, sometimes up to 1500 m (S. Morita, personal communication). *D. depressus* is spread in Japan in both lowlands and mountains (Morita, 1990), however, at Hokkaido it occurs mainly at lowlands and plains, as in Primorsk Terr., and at Honshu it lives at 500-1700 m (S. Morita, personal communication). Distribution of species seems to be affected by local climatic (particularly temperature) conditions rather than altitude proper. They prefer moderately cold and fast streams and torrents, occurring at appropriate biotopes at any altitude, depending upon general climatic and relief conditions of the country.

Conclusions

Study of the Palaeartic species of the genus *Diplous* revealed that it comprises 18-19 presently known species, the bulk of them being rather locally distributed in different regions of China, and only two, namely *D. depressus* and *D. sibiricus*, possessing wide Eastpalaeartic or Boreal ranges. West Sichuan, with the most rich *Diplous* fauna, comprising perhaps ones with the most generalized for the tribe Patrobini aspect, seem to be the centre of the diversification of the genus. The derivatives expanded to Tibet and Himalayas (up to Nepal, personal communication of Dr. R. Sciaky), North China, Siberia, Japan, and probably to North America through the Beringian Bridge (all American species, like Siberian ones, possess rather large ranges), and form sometimes geographical or ecological races. Larval characters testify this genus to be sharply detached from the other genera of Patrobinae.

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