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A revision of the *Chrysolina* (*perforata*) species group (Coleoptera: Chrysomelidae)

Ревизия группы видов *Chrysolina* (*perforata*) (Coleoptera: Chrysomelidae)

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KEY WORDS: Chrysomelidae, *Chrysolina perforata*, *Chrysolina purpurata*, systematics, key.

КЛЮЧЕВЫЕ СЛОВА: Chrysomelidae, *Chrysolina perforata*, *Chrysolina purpurata*, систематика, определительная таблица.

ABSTRACT. 2 species, namely *Chrysolina perforata* (Gebler, 1830) with 4 subspecies and *Ch. purpurata* (Faldermann, 1833) are included in the *Chrysolina* (*perforata*) species group herewith. Lectotype of *Chrysomela variolosa* Motschulsky, 1854 is designated. Neotype of *Chrysomela perforata* Gebler, 1830 is established. The following new synonymy is established: *Chrysomela perforata simillima* Mohr, 1966 = *Chrysolina perforata changaiensis* L.Medvedev, 1980 **syn.n.** = *Ch. perforata pallidipes* L.Medvedev, 1980 **syn.n.**, and *Chrysomela purpurata* Faldermann, 1833 = *Chrysomela campestris* Weise, 1912 **syn.n**. *Ch. perforata turczaninoffi* (Harold, 1875) (= *Chrysomela variolosa* Motschulsky, 1854) is a separate subspecies, but not a synonym of *Ch. perforata perforata*. *Chrysolina perforata* var. *camptolbensisestris* L.Medvedev, 1980 is an inavailable name.

РЕЗЮМЕ. К группе видов *Chrysolina* (*perforata*) отнесены 2 вида: *Chrysolina perforata* (Gebler, 1830) с 4 подвидами и *Ch. purpurata* (Faldermann, 1833). Обозначены лектотип *Chrysomela variolosa* Motschulsky, 1854 и неотип *Chrysomela perforata* Gebler, 1830. Предложена новая синонимия: *Chrysomela perforata simillima* Mohr, 1966 = *Chrysolina perforata changaiensis* L.Medvedev, 1980 **syn.n.** = *Ch. perforata pallidipes* L.Medvedev, 1980 **syn.n.**; *Chrysomela purpurata* Faldermann, 1833 = *Chrysomela campestris* Weise, 1912 **syn.n**. *Ch. perforata turczaninoffi* (Harold, 1875) = *Chrysomela variolosa* Motschulsky, 1854 рассматривается как отдельный подвид, а не синоним *Ch. perforata perforata*. *Chrysolina perforata* var. *camptolbensisestris* L.Medvedev, 1980 является непригодным названием.

Introduction

The taxa close to *Chrysolina perforata* (Gebler, 1830) present a natural group within the subgenus *Allohypericia* Bechyne, 1950 of the genus *Chrysolina* Motschulsky, 1860. The following characters permit us to distinguish this species group from the other members of the subgenus.

Diagnosis of the *Chrysolina* (*perforata*) species group

Body entirely metallic dorsally and ventrally, antennae and legs metallic or rufous.

Last maxillary palpomere oval, not broader than the next to last, similar in both sexes. Antenna inserted more close to clypeus than to eye.

Pronotum with convex lateral calli at entire length, which separated from disk by narrow, deep impression filled with large coalescent punctures in basal 1/3–1/2, and by wide, more shallow impression covered with large, partly coalescent punctures anteriorly. Propleura convex. Lateral impression more or less distinct, covered by transverse wrinkles, but without sharp outer border.

Elytron with 11 regular puncture rows, including abbreviated scutellar row and marginal row. The last is placed at the bottom of furrow along epipleuron. Rows 2–3, 4–5, 6–7, and 8–9 slightly arranged in pairs.

Tarsi: male: segments 1–3 with entire sole, broader than in female; female: segment 1 of all tarsi with broad glabrous stripe beneath, 2 — with narrow glabrous stripe beneath.

Pygidium with distinct groove at entire length. Last abdominal sternite evenly convex in both sexes.

Chrysolina (*perforata*) species group includes eight nominal taxa, but only *Ch. perforata* (with subspecies *simillima*, *changaiensis*, and *pallidipes*) and *Ch. purpurata* (Faldermann, 1833) are considered to be valid names recently [Medvedev, 1982; Medvedev & Dubeshko, 1992]. Mohr [1966] believed *Ch. campestris* (Weise, 1912) to be the third valid species of the group in question.

Material

I have examined the type specimens from the following collections (names of curators in brackets):
MNHUB — Museum fur Naturkunde der Humboldt-Universitat, Berlin, Germany (Dr. J. Frisch),
DEI — Deutsches Entomologisches Institut, Eberswalde, Germany (Dr. L. Zerche),
LMC — Collection of Dr. L.N. Medvedev, Moscow, Russia.
MTD — Museum fur Tierkunde Dresden, Dresden, Germany (Dr. R. Krause),
ZMMU — Zoological Museum of Moscow State University, Moscow, Russia (Dr. N.B. Nikitsky, Mr. A.A. Gusakov),
ZSM — Zoologische Staatssammlung Munchen, Munchen, Germany (Dr. M. Baehr),
and additional materials from: Deutsches Entomologisches Institut; Entomological Department, Biological Faculty, Moscow State University (Dr. V.Yu. Savitsky); Moscow Pedagogical State University (Dr. K.V. Makarov); Museum fur Naturkunde der Humboldt-Universitat; Museum fur Tierkunde Dresden; Naturhistorisches Museum Wien, Austria (Dr. H. Schoenmann); Zoological Institute of Russian Academy of Sciences, St.-Petersburg (Dr. G.S. Medvedev, Mrs. A.K. Chistiakova); Zoological Museum Amsterdam, Niederlands (Dr. B. Brugge); Zoological Museum of Moscow State University; Zoological Museum of University of Helsinki, Finland (Dr. H. Silfverberg); Zoologische Staatssammlung Munchen, Germany; and author's collection.

Subgenus *Allohypericia* Bechyne, 1950: 159

Chrysolina (*perforata*) species group

Chrysolina perforata (Gebler, 1830: 216)

Chrysolina perforata perforata (Gebler, 1830: 216)

Figs 1–5, 31.

Chrysomela perforata Gebler, 1830: 216 ("ad fl. Irtysch et prope Riddersk" — type probably lost, "Barnaul" — neotype in MTD, examined).

Chrysomela perforata: Marseul, 1886: 68, 1887: 86.

Chrysomela (*Pezocrosita*) *perforata perforata*: Mohr, 1966: 98.

Chrysolina perforata perforata: L. Medvedev, 1980: 318.

Chrysolina (*Allohypericia*) *perforata perforata*: L. Medvedev, 1982: 80; L. Medvedev & Dubeshko, 1992: 100, 102 [partim].

MATERIAL. TYPES. *Chrysomela perforata*, neotype ♂, designated here, with labels: "40.", "*perforata* Gebl. Barn.", "ex coll. Fischer von Waldheim" [yellow], "Neotype *Chrysomela perforata* Gebler, 1830. Bienkowski design. 2004" [red], "*Chrysolina perforata perforata* (Gebl.) Bienkowski det. 2004".

Additional specimens. MONGOLIA: 1 ♂, 1 ♀, Khubsungul Aimak: Khubsugul lake, V. Dorogostaiskiy leg.; 2 ♂♂, 1 ♀, Ubsu Nur Aimak: 35km WNW from Somon Tes, Altan els desert, 1400m, exp. Z. Kaszab leg., 23.6.1968; 1 ♂, Dzabkhan Aimak: 15km NW from Somon Songino, 1840m, exp. Z. Kaszab leg., 13.7.1968; 1 ♂, Uncertain locality: "Mongolia bor. Reitter"; RUSSIA: 4 ♂♂, 2 ♀♀, Irkutsk Area: "Quell. d. Irkut Reitter"; 1 ♂, 3 ♀♀, Krasnoyarsk Prov.: Minusinsk, L. A. Molchanov leg., 8.1902; 4 ♂♂, 4 ♀♀, the same place and collector, 1899; 1 ♂, Tuva: 4 km E. Erzin, Benediktov leg., 23.8.1994; 3 ♂♂, 7 ♀♀, Upsa-Nur: Tes-Khem river and Kholu river valley, D. Berman leg., 5–6.1962; Uncertain localities: 1 ♀, "37250", "*perforata* Gebl. Sibir. Gebl." [yellow]; 2 ♀♀, "Hist.-Coll. (Coleoptera) Nr. 37250 *Chrysomela perforata* Gebler Sibirien, Gebler Zool. Mus. Berlin".

DESCRIPTION. Colour of dorsum variable: 1) above green; elytra with weak golden reflection, with suture, punctures, and scutellum violet; 2) above green, elytra reddish-golden, punctures violet with aureole green; 3) above green, with pronotal lateral calli and scutellum violet, elytra with golden reflection and with punctures violet. Antennomeres 1–4 rufous (1 darkened dorsally), 5–11 gradually darkened. Legs entirely blue or with femora green. Ventral side green. Elytron with regular rows of large punctures. Rows paired. Intervals flat. Hind wings absent. In ♂, hind tarsomere 1 broader than 3.

Aedeagus rounded and broadened at apex, without lateral emarginations (or with only very slallow emarginations), ventrally with distinct subapical denticles, lateral borders of apical orifice not elevated (see from lateral side); flagellum broad.

Length: 5.2–6.5 mm (♂), 6.0–8.0 mm (♀).

DISTRIBUTION. Altai, Sayans, N. Mongolia.

REMARKS. Gebler [1830] described *Chrysomela perforata* on the base of three specimens from the environs of Irtysh river and Ridersk (=Leninogorsk). The type specimens from Dr. Gebler collection were deposited in Museum National d'Histoire Naturelle (Paris), ZIN, and ZMMU [Horn & Kahle, 1935–1937]. Unfortunately, I have not found the type of *Ch. perforata* there. In Zoological Museum of University of Helsinki (collection by Dr. Mannerheim) I found two specimens (♂ and ♀) labelled as "*perforata* Gebler", and obtained by Dr. Mannerheim from Gebler. However, these specimens do not correspond to the original description because they have developed hind wings [Gebler, 1830 mentioned "Aptera" in the original description].

In MNHUB I found a series (1 ♂, 5 ♀♀) labelled "*perforata* Gebl. Sibir. Gebl.". Some of them, namely 1 ♂ and 2 ♀♀, have normal hind wings and, therefore, can not be conspecific with *perforata* (I identified these specimens as *purpurata*). Others (3 ♀♀) are conspecific with *perforata*. However, the information on the labels does not permit us to consider the respective specimens as the types. In MTD (collection by Dr. Fischer von Waldheim) I found two specimens: ♀ with label "*perforata* Gebl." and ♂ with label "*perforata* Gebl. Barn." These specimens correspond to the original description and the recent interpretation of this species [Medvedev, 1982; Medvedev & Dubeshko, 1992]. The fixation of the interpretation of the name *perforata* is necessary for the revision of the group in question. Therefore, I designate a neotype. It is a ♂, without hind wings, above green, elytra with weak golden reflection, pronotal calli and impressions, elytral suture, epipleuron, and punctures violet, elytral rows paired, consist of large punctures, with intervals flat (lateral intervals slightly convex).

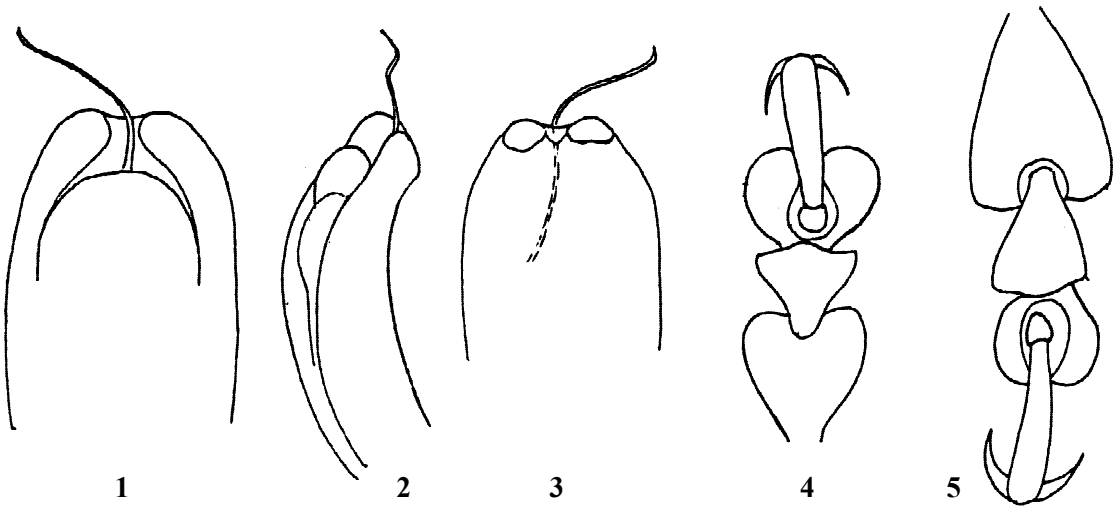
Some specimens from Irkutsk being at my disposal are intermediate between this subspecies and *perforata turczaninoffi*. They have aedeagus with preapical lateral emarginations, and lateral borders of apical orifice (viewed from lateral side) elevated, but elytral punctures finer than in *perforata turczaninoffi*, and elytral intervals flat.

Chrysolina perforata turczaninoffi (Harold, 1875: 176)

Figs 6–14, 31.

Chrysomela variolosa Motschulsky, 1854: 40 ("Kiachta", lectotype and paralectotypes in ZMMU, examined; paralectotypes in MNHUB, examined).

Chrysomela turczaninoffi Harold, 1875: 176 nom. nov. pro *variolosa* Motschulsky, 1854: 40 nec Petagna, 1819: 19.



Figs 1–5. *Chrysolina perforata perforata*, ♂ (neotype, Barnaul): 1–3 — aedeagus, apical part (1 — dorsal view, 2 — lateral view, 3 — ventral view); 4 — fore-tarsus; 5 — hind-tarsus.

Рис. 1–5. *Chrysolina perforata perforata*, самец (неотип, Барнаул): 1–3 — эдеагус, вершинная часть (1 — сверху, 2 — сбоку, 3 — снизу); 4 — передняя лапка; 5 — задняя лапка.

Chrysomela purpurata: Marseul, 1886: 68, 1887: 87.

Chrysomela variolosa: Weise, 1887: 174.

Chrysomela (*Pezocrosita*) *campestris*: Mohr, 1966: 96.

Chrysolina perforata simillima: L. Medvedev, 1980: 318.

Chrysolina (*Allohypericia*) *perforata simillima*: L. Medvedev, 1982: 80.

MATERIAL. TYPES. *Chrysomela variolosa*, lectotype ♂, designated here, with labels: "*variolosa* Mannh." [handwritten by Motschulsky], "Lectotype *Chrysomela variolosa* Motschulsky, 1854. Bienkowski design. 2004" [red]. Paralectotypes: ♂ with labels: "*variolosa* Manner", my "Paralectotype" label similar to that under lectotype; ♂ with labels: "Kiachta" [pink], my "Paralectotype" label similar to that under lectotype; ♀ with labels: "b. Kiachta", my "Paralectotype" label similar to that under lectotype (all in ZMMU); ♀ with labels: "37249", "*variolosa* Mannerh. Sibir. Menetr." [yellow], "Syntypus *Chrysomela variolosa* Motschulsky, 1854 labelled by MNHUB 2003" [red] (MNHUB); 2 ♀♀ with labels: "Hist. Coll. (Coleoptera) Nr. 37249 *Chrysomela variolosa* Mannerh. Sibirien. Menetries. Zool. Mus. Berlin", "Syntypus *Chrysomela variolosa* Motschulsky, 1854 labelled by MNHUB 2003" [red] (MNHUB); ♂ with labels: "Kiachta" [yellow], "Hist. Coll. (Coleoptera) Nr. 37249 *Chrysomela variolosa* Mannerh. Sibirien. Menetries. Zool. Mus. Berlin", "Syntypus *Chrysomela variolosa* Motschulsky, 1854 labelled by MNHUB 2003" [red] (MNHUB); ♂ with labels: "Hist. Coll. (Coleoptera) Nr. 37249 *Chrysomela variolosa* Mannerh. Sibirien. Menetries. Zool. Mus. Berlin", "Syntypus *Chrysomela variolosa* Motschulsky, 1854 labelled by MNHUB 2003" [red] (MNHUB).

Additional specimens. CHINA: 1 ♂, 2 ♀♀, Dzungaria: Karlyk-Tag, V-VI.1908; MONGOLIA: 1 ♀, Selenginsky aimak: Shamar, 29.VI.1971; 1 ♂, the same place, 29.VI.1977; 1 ♀, the same place, Yu.M. Zaitsev leg., 30.6.1978; 1 ♂, 1 ♀, Dzabkhan Aimak: Ulassiatai, O. Bamberg leg., 28.5.1908. Uncertain localities: 2 ♂♂, 2 ♀♀, Mongolia; 1 ♂, "Nordl. Mongolei, Changai, Leder"; 1 ♂, Borloo-Gol, left bank, 8.VIII.1985; 1 ♂, 1 ♀, S. Mongolia: Kudava, O. Bamberg leg.; 1 ♂, 1 ♀, Mongolia: Gorji, O. Bamberg leg., 10.7.1908; 1 ♂, 1 ♀, N. Mongolia: Simowaja, O. Bamberg leg., 3.6.1908; RUSSIA: 1 ♂, Transbaikalia: Dauria, F. Sahlberg leg.; 1 ♂, 1 ♀, Dauria; 1 ♂, Chikoi river; 1 ♂, Troitskosavsk (=Kyakhta), F. Lukjanovich leg.; 17.5.1928; 1 ♂, 2 ♀♀, the same place, 6–8.8.1910; 1 ♂, 1 ♀, Kyakhta; 1 ♂, 1 ♀, the same place, Goetzelmann leg.; 1 ♂, 1 ♀, Kyakhta Distr.: 5km NE Kiran Vill., 50°21'43"N, 106°46'11"E, I.V. Melnik leg., 25-30.VI.1999; 2 ♀♀, Selenga river valley, 5–6.1908; 5 ♂♂, 3 ♀♀, Selenga river valley; 6 ♂♂, 8 ♀♀, Sayans: Turan; 1 ♂, 1 ♀, Irkutsk Area: "Menetr.", "Irkutsk", "Coll. Mannerh.", "*Purpurata* Falderm. *variolosa* Mann."; 1 ♀, Irkutsk.

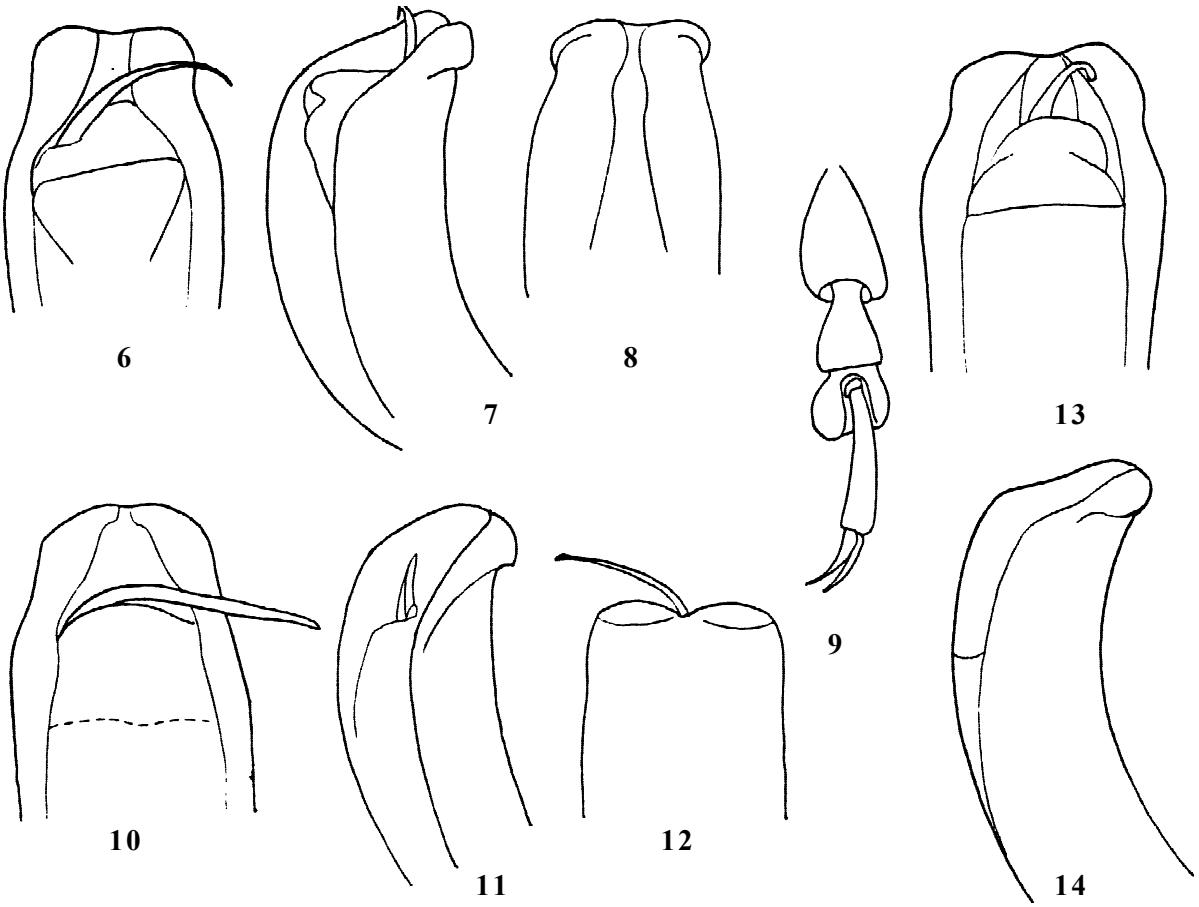
DESCRIPTION. Colour of dorsal side variable: 1) green (clypeus sometimes violet, elytra sometimes blue), aureole of elytral punctures, elytral suture, pronotal lateral calli (partly or entirely) violet, 2) entirely bluish-violet, 3) head green, pronotum green with lateral calli violet, elytra violet, 4) violet-purple, with labrum and clypeus blue, aureole of elytral punctures and elytral suture golden, 5) violet-purple, with head and pronotum partly blue, elytral intervals blue, 6) violet-purple with head and lateral sides of elytra greenish-blue. Antennae dark brown with antennomeres 1–3 or 1–4 rufous entirely or only below (1 mostly darkened dorsally). Legs violet, or violet with diffuse blue pattern, or femora and tibiae violet, tarsi dark brown. Ventral side violet, blue, or green. Elytron with regular or slightly irregular rows of large, very dense punctures. Punctures larger than in other related taxa. Rows paired or equidistant. Intervals convex, at least, in lateral 1/2. Some of the punctures of one row joined by impression. Because of that, elytral surface looks like wrinkled. Hind wings absent. In ♂, hind tarsomere 1 broader than 3.

Aedeagus narrowed at sides of apical orifice and slightly emarginate laterally, ventrally with obtuse or indistinct subapical denticles, lateral borders of apical orifice more elevated (see from lateral side); flagellum narrow.

Length: 6.2–7.2 mm (♂), 6.8–7.9 mm (♀).

DISTRIBUTION. Sayans, Transbaikalia, Dzungaria, N. Mongolia.

REMARKS. The name "*variolosa*" was firstly used for this taxon by Mannerheim in Dejean [1837], but without description, as nomen nudum. Motschulsky [1854] presented the description of "*Chrysomela variolosa* Mannerheim" based on more than 30 specimens collected, in part, in the environs of Kyakhta. I found a series of four type specimens of *Ch. variolosa* in Motschulsky collection (ZMMU). Five more type specimens of *Ch. variolosa* were found in MNHUB. The name *turczaninoffi* Harold is a valid one for this taxon because of *variolosa* Motschulsky is a junior primary homonym of *Chrysomela variolosa* Petagna, 1819.



Figs 6–14. *Ch. perforata turczaninoffi*: 6–9 — ♂ (Mongolia: Khangai): 6–8 — aedeagus, apical part (6 — dorsal view, 7 — lateral view, 8 — ventral view); 9 — hind-tarsus; 10–12 — ♂ (Transbaikalia), aedeagus, apical part (10 — dorsal view, 11 — lateral view, 12 — ventral view); 13–14 – ♂ (*Chrysomela variolosa*, lectotype), aedeagus, apical part (13 — dorsal view, 14 — lateral view).

Рис. 6–14. *Ch. perforata turczaninoffi*: 6–9 — самец (Монголия: Хангай): 6-8 — эдеагус, вершинная часть (6 — сверху, 7 — сбоку, 8 — снизу), 9 — задняя лапка; 10–12 — самец (Забайкалье), эдеагус, вершинная часть (10 — сверху, 11 — сбоку, 12 — снизу); 13–14 — самец (*Chrysomela variolosa*, лектотип), эдеагус, вершинная часть (13 — сверху, 14 — сбоку).

Chrysolina perforata simillima (Mohr, 1966: 96)
Figs 15–27, 31.

Chrysomela (*Pezocrosita*) *perforata simillima* Mohr, 1966: 96 ("Sibiria", holotype in Narodni Muzeum, Prague).

Chrysolina perforata changaiensis L.Medvedev, 1980: 318 (Mongolia: Khangai, holotype and paratypes in LMC examined, paratype in ZSM, examined), syn. nov.

Chrysolina (*Allohypericia*) *perforata changaiensis*: L. Medvedev, 1982: 80, **syn.n**.

Chrysolina perforata pallidipes L.Medvedev, 1980: 318 (Mongolia: Ubsu Nur Aimak, paratypes in ZSM and LMC, examined), **syn.n**.

Chrysolina (*Allohypericia*) *perforata pallidipes*: L. Medvedev, 1982: 80; L. Medvedev, Dubeshko, 1992: 100.

MATERIAL. TYPES. *Chrysolina perforata changaiensis*, holotype, ♂ with labels: "r. Ider, 30km below Toson-Tsengel, 22.VII-71. under Thymus" [in Russian], "Holotypus *Chrysolina perforata changaiensis* L. Medv." [red], "*Chrysolina perforata changaiensis* L. Medv. L. Medvedev det." (LMC). Paratypes: ♀ with labels: "MPR Dzabzansk.[sic!] a. 30km E. Toson-Tsengel, r. Ider, thyme thicket, Medvedev 12.7.1971" [in Russian], "Paratypus" [red], "Crysolina *perforata changaiensis* L.Medv. Bienkowski det. 2004" (LMC); ♂ with labels: "170km W Aldarkhana, under worm-wood, 15.VII-71" [in Russian], "*Chrysolina perforata* Gebl. L.Medvedev det. 96", "Paratypus" [red], "Crysolina *perforata changaiensis* L.Medv. Bienkowski det. 2004" (LMC); ♀ with labels [in Russian]: "Mongolia, 10km SW Khukh-Mor'ta, Gobi Altai aimak, Arnoldi leg. 21.VIII.968", "PARATYPUS" [red], "*Chrysolina perforata changaiensis* Medv. L.N.Medvedev det. 1992", "Mongolia" (ZSM).

Chrysolina perforata pallidipes, paratypes, 2 ♂♂ with labels [in Russian]: "Mongolia, 15km S. Ulangom, Ubsu Nur aimak, Arnoldi leg., 30.VIII.968", "PARATYPUS" [red], "*Chrysolina perforata pallidipes* Medv. L.N. Medvedev det. 1992", "Mongolia" (ZSM); ♂ with labels [in Russian]: "Ubsu Nur aimak, 45–55km WNW Ulangom, 17.VII.76, L.N. Medvedev, N. Voronova. 1900-2050m", "Paratypus" [red], "*Chrysolina perforata pallidipes* L. Medv. L. Medvedev det." (LMC); ♂ with labels: "Mongolia, 20km W from south shore of Doro Nur lake, Kobdo aimak, Arnoldi, 22.VIII.968" [in Russian, "Kobdo aimak" — is incorrect, really "Baian Ulegei aimak"), "Paratypus" [red], "*Chrysolina perforata pallidipes* L.Medv. Bienkowski det. 2004" (LMC); 2 ♂♂ with labels: "Mongolia, Ubsu Nur aimak, 15km SSE Tarialan, Kerzhner, 5.VIII.970" [in Russian], "Paratypus" [red], "*Chrysolina perforata pallidipes* L.Medv. Bienkowski det. 2004" (LMC).

Additional specimens. MONGOLIA: 3 ♂♂, 1 ♀, Bajan-Khongor Aimak: Bajan-Khongor, 6–17.6.1962; 1 ♂, Dzabkhan Aimak: 30km E. from Santamargac-Somon, Cholbo-See 1900m, 48°38'N 95°46'E, Mongolish-Deutsche Biolog. Exped. leg., 15.8.1964; 2 ♂♂, 2 ♀♀, N.-W. from Uliassutai: Ulan-Erig,

Yurganova leg., 1.VI.1911; 1 ♀, Gobi Altai aimak: 10km S.-W. from Khukh-Mor'ta, Arnoldi leg. 21.VIII.1968; 2 ♂♂, 1 ♀, Ubsu-Nur Aimak: Ulangom, Charchira, Dorn leg., 16.7.1977; 2 ♂♂, 1 ♀, Choeondloen gol river: 32km N.-W. from Ulangom, 1200m, exp. Z. Kaszab leg., 7.7.1968; 2 ♂♂, 1 ♀, 20km S. from Ulangom, 1380m, exp. Z. Kaszab leg., 8.7.1968; 1 ♂, 1 ♀, Ubsu-Nur Aimak: between Oeroeg nur lake and Ulangom, 12km ESE from Ulaan davaa pass, 1450m, exp. Z. Kaszab leg.: 28.6.1968.

Uncertain locality: NW MONGOLIA: 1 ♂, Burgasutai river, Sevko & Sizova leg.: 7.VI.1923; RUSIIA: 3 ♂♂, Krasnoyarsk Prov.: Minusinsk; 1 ♂, 1 ♀, the same place, Csiki leg.; 1 ♂, the same place, A. Jacobson leg., 1 ♀., 3.6.1897; 2 ♂♂, Tuva: Khandagaity, B. Korotyaev leg., 28.7.1972; 1 ♀, 20km S. from Erzin, R. Zlotin leg.: 23.VII.1961; 1 ♂, 30km N.-W. from Erzin, R. Zlotin leg.: 11.VII.1961; 1 ♂, 2 ♀♀, Kuraiskiy Ridge above Kurai Vill., 1800m, 27.6.1993; 1 ♀, Tannu-Ola ridge: N. slope, Grum-Grzhimailo leg., 3-5.VIII.1909. Uncertain locality: 1 ♂, "Tomsk gub.: Chagan-uzunu-Taldur, Redikortsev leg., 6.VIII.1912".

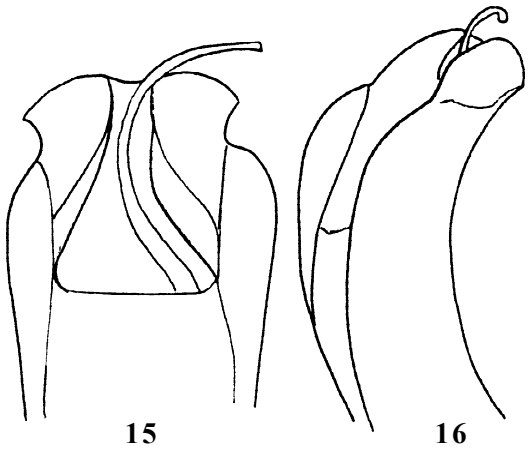
Intermediate specimens between subspecies *perforata perforata* and *perforata simillima*.

MONGOLIA: 2 ♂♂, Bajan-Ulegej Aimak: 27km S. from Somon Tsagannur, 2690m, exp. Z. Kaszab leg., 3.7.1968; 3 ♂♂, 1 ♀, Ubsu-Nur Aimak: 6km S.-W. from Somon Baruunturuun, 1350m, exp. Z. Kaszab leg., 24.6.1968; RUSSIA: 1 ♂, 1 ♀, Tuva: Mugur-Aksy Vill.: Talaity lake, B.A. Korotyaev leg., 29.VII.1971; 1 ♂, 1 ♀, Teeli Vill., steppe, B.A. Korotyaev leg., 27.6.1971; 1 ♂, the same place, Khemchik river valley, B.A. Korotyaev leg., 26.VI.1971; 1 ♂, 29.6.1971.

DESCRIPTION. Colour of dorsum very variable: 1) head green, pronotum green with anterior margin, posterior margin, and lateral calli, violet; elytra blue, with suture and aureole of elytral punctures violet; 2) body above green, with only suture and elytral punctures violet; 3) head blue with area around frontal suture violet; pronotum violet with bluish-green spots; scutellum violet, elytra green with suture, punctures, and epipleura violet; 4) dorsum entiely black with weak violet reflection; 5) head green, pronotum green with base, lateral impressions, and sometimes lateral calli violet, elytra golden-green with scutellum, suture, punctures violet, epipleura violet or green, 6) head green with clypeus violet, pronotum green, scutellum and elytral suture violet, elytra golden-purple with aureole of punctures green. 7) above bluish-green, with frons, middle part of vertex, longitudinal stripes on pronotum interiorly to lateral impressions, and elytral punctures violet; pronotal lateral calli and elytral suture golden; 8) head bluish-green (or violet with vertex bluish-green, or green with clypeus violet), pronotum blue (or green) medially, violet laterally, or entirely iridescent violetish-bluish-green, elytra green with suture, punctures, scutellum, and lateral margin violet, epipleura green or violet; 9) head violet with vertex bluish-green, pronotum violet, elytra greenish-blue with suture golden, punctures golden-violet, epipleura violet.

Antennomeres 1–4 rufous (1 darkened dorsally), following antennomeres gradually darkened, or antennae dark brown with antennomeres 1 and 2 rufous below, or antennae entirely rufous. Legs entirely blue, or femora green, tibiae and tarsi dark brown, or femora and tibiae violet, tarsi brown, or femora and tibiae pale brown with violet reflection, or legs entirely rufous. Ventral side entirely metallic, gree, bluish-green, or violet, or with last abdominal sternite rufous with violet reflection. Elytron with regular rows of fine or large punctures. Rows more or less paired. Intervals flat. Hind wings absent. In ♂, hind tarsomere 1 broader than 3.

Aedeagus with deep or shallow lateral emarginations before apex, ventrally with distinct subapical denticles, lateral borders of apical orifice less elevated or not elevated (see from lateral side); flagellum narrow.



Figs 15–16. *Ch. perforata simillima*, ♂ (*Ch. perforata changaiensis*, holotype, Mongolia: Ider river), aedeagus, apical part (15 — dorsal view, 16 — lateral view).

Рис. 15–16. *Ch. perforata simillima*, самец (*Ch. perforata changaiensis*, голотип, Монголия: р. Идэр), эдеагус, вершинная часть (15 — сверху, 16 — сбоку).

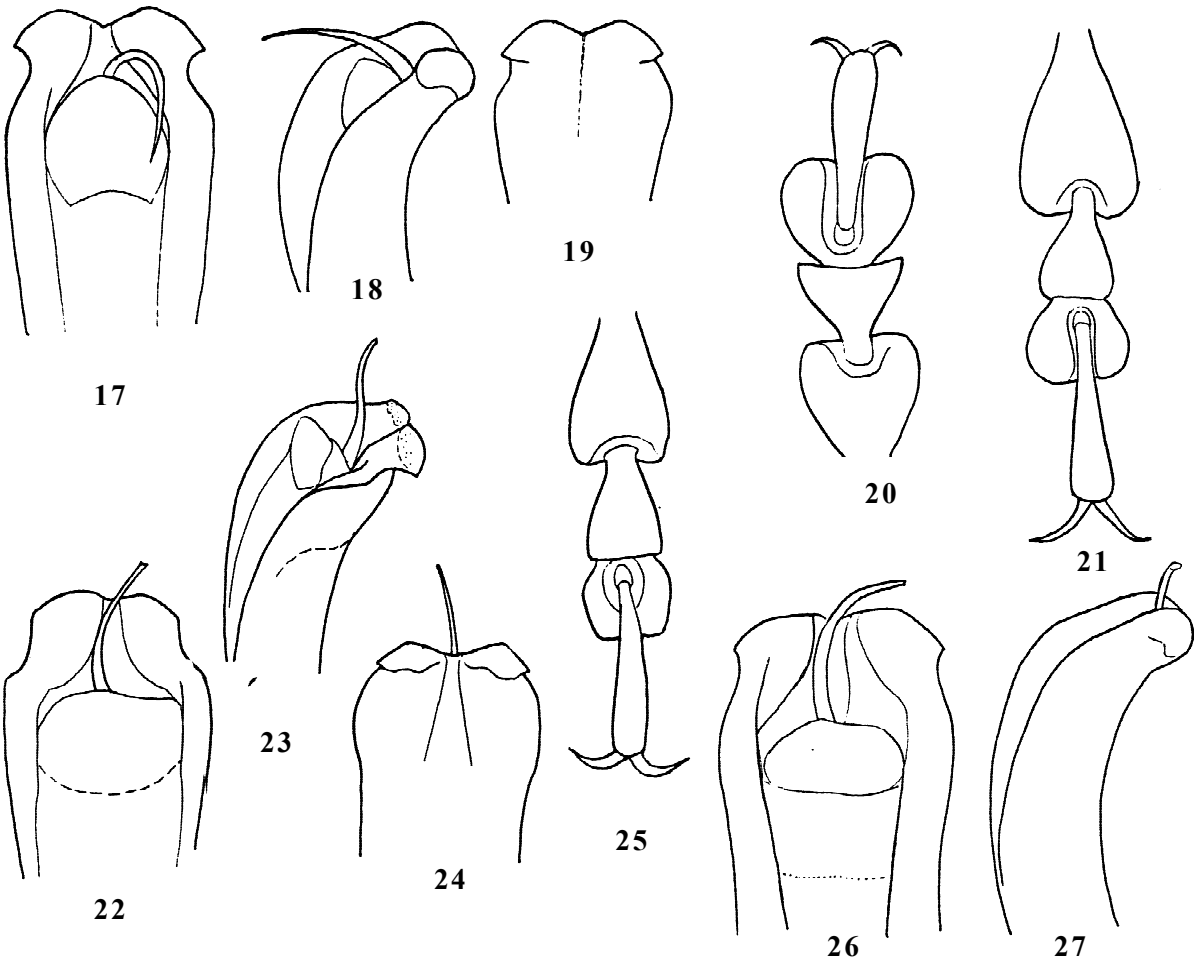
Length: 5.1–6.6 mm (♂), 6.1–6.8 mm (♀).

DISTRIBUTION. Tuva, NW Mongolia, finding in C Mongolia (Baian Khongor aimak) should be confirmed.

REMARKS. According to the original description [Mohr, 1966], subspecies *perforata simillima* differs from the nominotypical subspecies only in the aedeagus structure: "Seiten des Aedoeagus fast parallel oder kaum wahrnehmbar gerundet, unterseits sind die Seiten vor der Spitze deutlich verbreitert". I compared the original description and aedeagus figure of *perforata simillima* with the type specimens of *perforata changaiensis* and found them to be similar. Therefore, I believe *Ch. perforata changaiensis* to be a new junior synonym of *Ch. perforata simillima*. On the other hand, I examined the type specimens of both, *perforata changaiensis* and *perforata pallidipes*. They are similar externally, have identical aedeagus structure, and slightly differ only in the colour of legs: mostly rufous with violet reflection in *pallidipes* and dark metallic (violet or blue) in *changaiensis*. However, in one examined paratype of *pallidipes* (20km W from Duro-Nur lake) legs are pale brown with violet reflection. Distribution of these two forms (with rufous and metallic legs) also permits me to think them to be the same subspecies. Therefore, I consider *Ch. perforata changaiensis* = *Ch. perforata pallidipes*.

Besides that, I think that Medvedev [1980, 1982] used the name "*perforata simillima*" for *perforata turczaninoffi*. In Naturhistorisches Museum Wien, I found a series of specimens from Baian Khongor. They have legs and antennae entirely rufous and aedeagus structure typical of the subspecies *Ch. perforata pallidipes*. These specimens were, probably, incorrectly labelled, because the last location is about 700 km distant from the before known area to the southeast.

Medvedev [1980] described "var. *camptolbensisestris*, nov." as intermediate form between subspecies *perforata pallidipes* (because of rufous legs) and nominotypical subspecies (because of aedeagus without lateral emarginations before apex) from the environs of Tolbo Nur lake (Mongolia, Baian Ulegei aimak). However, the name *camptolbensisestris* should be regarded as infrasubspecific and inavailable according to ICZN [1999] Art. 45.6.3. I included this name as *perforata camptolbensisestris* (subspecific rank) in the checklist [Bienkowski, 2001], but this name did not become an available [ICZN, 1999, Art. 16A].



Figs 17–27. *Chrysolina perforata simillima*: 17–21 — ♂ (Mongolia: Ulangom): 17-19 — aedeagus, apical part (17 — dorsal view, 18 — lateral view, 19 — ventral view); 20 — fore-tarsus, 21 — hind-tarsus; 22–25 — ♂ (Mongolia: Cholbo-See): 22 — hind-tarsus, 23–25 — aedeagus, apical part (23 — dorsal view, 24 — lateral view, 25 — ventral view); 26–27 — ♂ (*Ch. perforata pallidipes*, paratype, Mongolia: 45–55km WNW Ulangom), aedeagus, apical part (26 — dorsal view, 27 — lateral view).

Рис. 17–27. *Chrysolina perforata simillima*: 17–21 — самец (Монголия: Улангом): 17–19 — эдеагус, вершинная часть (17 — сверху, 18 — сбоку, 19 — снизу); 20 — передняя лапка, 21 — задняя лапка; 22–25 — самец (Монголия: оз. Холбо): 22 — задняя лапка, 23–25 — эдеагус, вершинная часть (23 — сверху, 24 — сбоку, 25 — снизу); 26–27 – самец (*Ch. perforata pallidipes*, паратип, Монголия: 45–55км ЗСЗ Улангом), эдеагус, вершинная часть (26 — сверху, 27 — сбоку).

Medvedev [1980] found the specimens with the intermediate characters between *perforata simillima* (=*changaiensis*) and *perforata pallidipes* from Mongolia (Khan-Khukhei). I found the specimens with intermediate aedeagus characters between *Ch. perforata perforata* and *perforata simillima* in the series from Tuva (Mugur-Aksy, Teeli) and Mongolia (Ulan-Erig).

Chrysolina purpurata (Faldermann, 1833: 70)
Figs 28–30, 32.

Chrysomela purpurata Faldermann, 1833: 70 ("Irkutsk", neotype in DEI, examined).

Chrysomela perforata: Marseul, 1886: 68, 1887: 86; Weise, 1887: 174.

Chrysomela campestris Weise, 1912: 84 nom. nov. pro *perforata*: Marseul, 1886: 68, 1887: 86, nec Gebler, 1830: 216.

Chrysomela (*Pezocrosita*) *purpurata*: Mohr, 1966: 98; Lopatin, 1970: 184, 187.

Chrysolina (*Pezocrosita*) *purpurata*: Lopatin, 1977: 155.

Chrysolina perforata (= *campestris*): L. Medvedev, 1980: 317.

Chrysolina (*Allohypericia*) *purpurata*: Medvedev, 1982: 79; Medvedev, Dubeshko, 1992: 99.

MATERIAL. TYPES: *Chrysomela purpurata*, neotype, ♂ with labels: "Irkutsk 25.VII.1951", "*Chrysomela perforata* Gebl. L. Medvedev det.", "*purpurata* Fald. Mohr det. 1966", "Holotypsu Novotypus" [sic!] [red] (DEI).

Additional specimens: KAZAKHSTAN: 1 ♀, Dzhezkazgan Area: Uly-Tau Mts., N.G. Skopin leg., 27–28.5.1970; 1 ♂, E. Kazakhstan: Saur ridge, O.L. Kryzhanovsky leg., 30.8.1946; 1 ♀, Tarbagatai ridge; 1 ♂, Zaisan city, O.L. Kryzhanovsky leg., 15.8.1946; 1 ♀, Karaganda Area: Karkaralinsk, Matthiessen leg.; 3 ♂♂, the same place, N.G. Skopin leg., 20.6.1969; 3 ♂♂, 4 ♀♀, Karkaraly, E. Smirnov leg., 8–9.8.1937; 2 ♂♂, 82km N. from Karkaralinsk, E. Ptushenko leg., 22.8.1937; 3 ♂♂, 1 ♀, Kokchetav Area: Kokchetav, Burygin leg., 1907; 1 ♂, 1 ♀, Borovoe, B. Rodendorf leg., 16.6.1928; 1 ♀, 26.6.1928; 1 ♂, 1.VIII.1928; 1 ♀, N Kazakhstan: Imantau, 4.IX.1962; 2 ♀♀, the same place, V. Kirillov leg.; 1 ♀, Pavlodar Area: Bayanaul, E. Ptushenko leg.: 28.8.1937; 1 ♀, 31.8.1937; 1 ♀, Semipalatinsk Area: Semipalatinsk, A. Solotarew leg.; 1 ♂, the same place; 1 ♂, Semipalatinsk Area: Kolkhoznoe, D. Panfilov leg., 16.7.1958; 2 ♀♀, Mukur river, D. Panfilov leg., 4.7.1958; 1 ♂, Zhangiztobe, D. Panfilov leg.: 20.VI.1958; 1 ♂, 22.VI.1958; 1 ♂, Kainar, D. Panfilov leg.: 16.VI.1958; 1 ♂, 4 ♀♀, Tselinograd

Area: Kuraly lake, N. Petrovsky leg., 29.6.1900; 1 ♂, 1 ♀, S. of Bestobe: Sileti river, V. Kuznetsov leg., 17.6.1963; 1 ♂, 30 km from Kulanutpes, Keleinikova leg., 2.7.1958. 1 ♀, Turgai Area: Turgai river. MONGOLIA: 1 ♀ without exact locality data. SIBERIA: 1 ♂, Altai: "Altai. Schaufs. coll. L.v.Heyden"; 1 ♂, 1 ♀, Altai Staudinger; 1 ♀, "Gebler", "Kolyvan.", "Coll. Mannerh.", "*Perforata* Gebler. Var.A. Mannerh."; 2 ♂♂, 1 ♂, Altai: Kolyvan'; Krasnoyarsk; 3 ♂♂, 1 ♀, Omsk: I. Telishev leg., 18.7.1938; 1 ♂, 6.VII.1937; 2 ♂♂, Tomsk; 1 ♀ , Transbaikalia: "Fixation Euparal" [associated with spermatheca slide], "Dauria" [old label], "Daourie — S.E. du lac Baikal — Siberie Russie" [written by Bourdonne], "*campestris* m." [written by Weise], "*perforata* Gebl.", "*purpurata* Mars. 195", "Zool. Mus. Berlin", "Lectotype" [red], "*Chrysolina campestris* Wse. L.N. Medvedev det. 1988", "Chrysomorpha (*Allohypericia*) *campestris* (Weise, 1912) — Daourie Russie — Lectotype ♀ — Nouvelle Combinaison — J.C. Bourdonne, 2001" (MNHUB). 1 ♂, 2 ♀♀, Yakutia: upper reaches of Indigirka river, Vas'kovsky leg., 27.VII–7.VIII.1942; Uncertain localities: ♀ with ♂ aedeagus (!) on the same pin, "Sibir. Staud.", old red square, "Typus" [red recent label], "*campestris* * 1912 Weise" [recent label] (MNHUB); 1 ♀, "Sibirien. coll. Stierlin"; 1 ♀, "Sibir. coll. Kraatz"; 1 ♂, "Sibirien. Coll. O. Leonhard"; 1 ♀, "Amur. Coll. Kraatz"; 1 ♀, Siberia; 2 ♀♀, 1 ♂, 2 ♀♀, W. Siberia; "Hist.-Coll. (Coleoptera) Nr. 37250 *Chrysomela perforata* Gebler Sibirien, Gebler Zool. Mus. Berlin"; 1 ♂, "Gebler", "Sibiria occid.", "Coll. Mannerh.", "*Perforata* Gebler".

DESCRIPTION. Colour of dorsal side variable: 1) violet with blue reflection, with pronotal lateral calli, elytral suture and aureole of elytral punctures violet, 2) bluish-green, with pronotum entirely or only at lateral calli, elytral suture and punctures violet, 3) green, with pronotal lateral calli, elytral suture and punctures violet, 4) head bluish-green, pronotum and elytra violet with greenish reflection, elytral punctures golden; 5) dorsum black with metallic reflection at pronotal lateral calli and lateral sides of elytra; 6) head blue with vertex violet, pronotum violetish purple, elytra greenish-blue with violet suture and aureole of punctures; 7) head purplish-violet, pronotum green with lateral calli purplish-violet, elytra bluish-green with suture and aureole of punctures violet; 8) entirely purplish-violet, head and pronotum partly bluish, elytral suture and aureole of punctures golden.

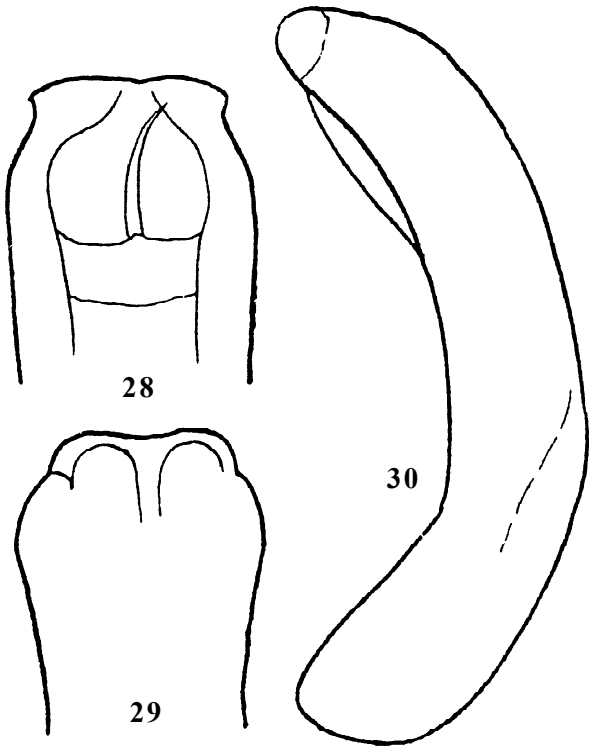
Antennae dark brown with antennomeres 1 and 2 rufous below and apically. Legs violet. Underside entirely violet, or partly blue, or bluish-green. Elytron with regular rows of moderately large or fine (in specimens from Yakutia, see Remarks) punctures. Rows slightly paired. Intervals flat or weakly convex. Hind wings develop, at least, reaching elytral apex. In ♂, hind tarsomere 1 not broader (or slightly broader) than 3.

Aedeagus with shallow lateral emarginations before apex or without emarginations; flagellum narrow.

Length: 5.8–6.5 mm (♂), 6.8–7.7 mm (♀).

DISTRIBUTION. N. and E. Kazakhstan, Altai, Sayans, Transbaikalia, Yakutia, Mongolia (?).

REMARKS. Faldermann [1833] described *Chrysomela purpurata* from the environs of Irkutsk. The original description is rather detailed, but, unfortunately, does not include the characters to distinguish *Ch. purpurata* and *Ch. perforata*. Dr. Faldermann's collection was deposited in ZMMU and Zoological Institute of Russian Academy of Sciences (St.-Petersburg) [Horn & Kahle, 1935–1937], but I was not succeeded in the finding of the type specimens of *Ch. purpurata* there. In Zoological Museum of University of Helsinki (Mannerheim's collection) I found two specimens (♂ and ♀) from Irkutsk labelled as "*purpurata*" and received by Mannerheim from Menetries. These specimens have not developed hind wings. I considered them to be conspecific with *Ch. perforata turczaninoffi*. The labels of these specimens do not include enough information to recognize them to be the types of *purpurata*. On the other hand, Mohr [1966] designated a neotype of *Ch. purpurata*. He selected a ♂ with developed hind wings, collected in Irkutsk. The last interpretation of *Ch. purpurata* is presently accepted [Medvedev, 1982; Medvedev & Dubeshko, 1992].



Figs 28–30 – *Chrysolina purpurata*, ♂ (Krasnoyarsk), aedeagus: 28 — apical part, dorsal view, 29 — the same, ventral view, 30 — lateral view.

Рис. 28–30 – *Chrysolina purpurata*, самец (Красноярск), эдеагус: 28 — вершинная часть, сверху, 29 — то же, снизу, 30 — сбоку.

Weise [1912] proposed the new name *campestris* for the specimens which has been determined by Marseul [1886] as *perforata*. According to ICZN [1999] Art. 12.2.1 the name *campestris* is available. I agree with Weise [1912] in the interpretation of *perforata* sensu Marseul. The type specimens of *campestris* are those identified by Marseul [1886] as *perforata*. Therefore, the specimens, labelled as types of *Ch. campestris* in Dr. Weise collection (MNHUB), are really not types. However, they are conspecific with *Ch. purpurata*.

Specimens from Yakutia (upper reaches of Indigirka river) being at my disposal have elytral rows forming by fine, dense punctures, which are as large as those in pronotal impressions; elytral intervals very densely, minutely punctate. Other characters (including aedeagus structure) are typical of *Ch. purpurata*. Medvedev & Ammosov [1978] noted on the variation of *Ch. perforata* from upper reaches of Indigirka river which has numerous punctures in elytral rows. Probably, they are concerned with the same form.

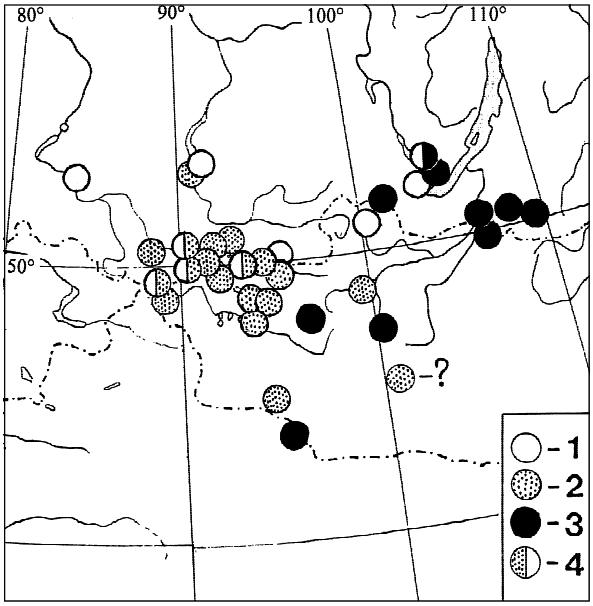


Fig. 31. *Chrysolina perforata*, distribution: 1 — *Ch. perforata perforata*; 2 — *Ch. perforata simillima*; 3 — *Ch. perforata turczaninoffi*; 4 — specimens with intermediate characters between the respective subspecies.

Рис. 31. Распространение *Chrysolina perforata*: 1 — *Ch. perforata perforata*; 2 — *Ch. perforata simillima*; 3 — *Ch. perforata turczaninoffi*; 4 — экземпляры с промежуточными признаками между соотверствующими подвидами.

KEY TO SPECIES AND SUBSPECIES OF *CHRYSOLINA* (*PERFORATA*) SPECIES GROUP

1(2) Hind wings develop, at least, reaching elytral apex. In male, hind tarsomere 1 not broader than 3 ..... *Ch. purpurata*

2(1) Hind wings absent. In male, hind tarsomere 1 broader than 3

3(4) Dorsum mostly violet or violetish-purple, more rarely green. Legs dark metallic. Elytron with rows of large, foveiform, very dense punctures which larger than in other subspecies; intervals convex, at least, in lateral 1/2. Elytral surface looks like wrinkled. Aedeagus narrowed at sides of apical orifice, ventrally with obtuse or indistinct subapical denticles, distinctly "humped" at level of apical orifice (see from lateral side) ..... *Ch. perforata turczaninoffi*

4(3) Elytron with rows of fine or large punctures; intervals flat, elytral surface smooth. Dorsum mostly green or bluish-green, with elytral suture and punctures violet.

5(6) Aedeagus rounded and broadened at apex, without distinct lateral emarginations, ventrally with distinct subapical denticles, not "humped" at level of apical orifice (see from lateral side). Legs dark metallic .... *Ch. perforata perforata*

6(5) Aedeagus with distinct, mostly deep lateral emarginations before apex, ventrally with distinct subapical denticles, less "humped" or not "humped" at level of apical orifice (see from lateral side). Legs dark metallic or rufous .... *Ch. perforata simillima*

ACKNOWLEDGEMENTS. I would like to thank all the curators mentioned above for the loan of the specimens, Dr. L.N. Medvedev for placing the material to my disposal. This

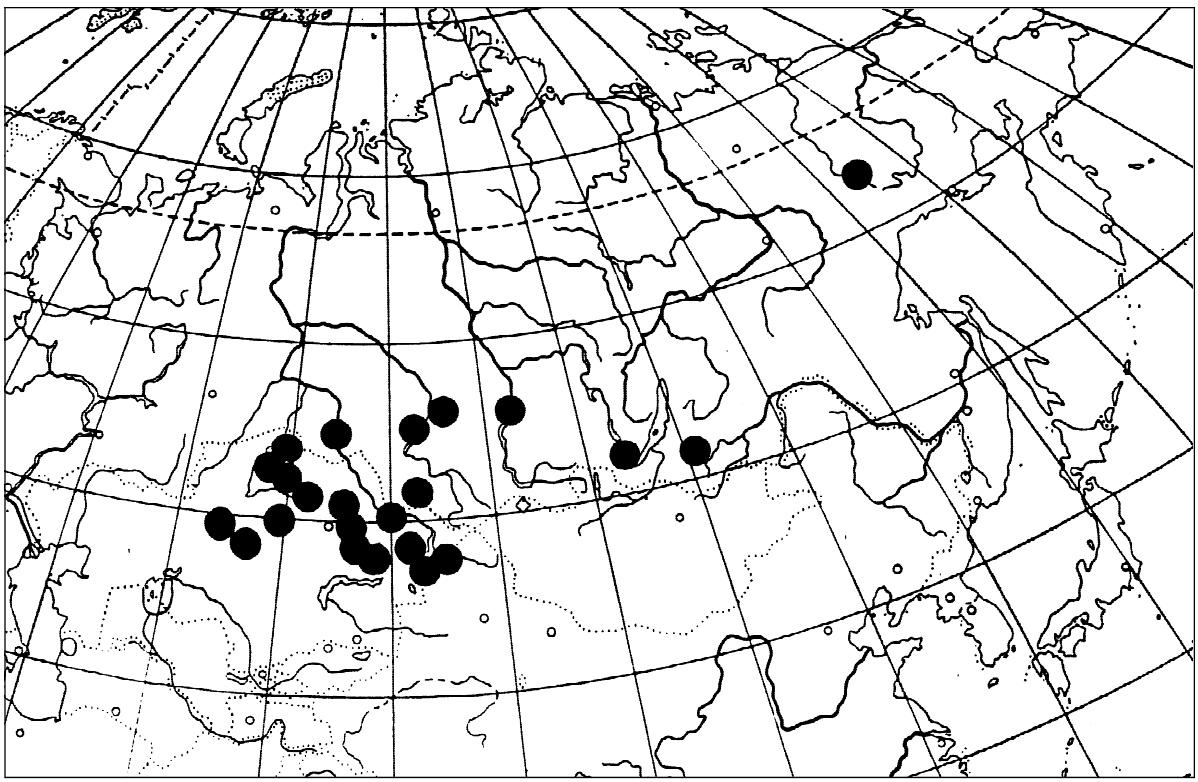


Fig. 32. *Chrysolina purpurata*, distribution.

Рис. 32. Распространение *Chrysolina purpurata*.

work forms a part of my re-examination of all *Chrysolina* materials in Deutsches Entomologisches Institut and Museum fur Tierkunde Dresden which secured the financial backing of the DFG grants 436 RUS 17/98/02 and 436 RUS 17/94/03, respectively.

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