Review of *Chrysolina immarginata* species group from the subgenus *Chalcoidea* (Coleoptera: Chrysomelidae) with description of a new species

Обзор видовой группы жуков-листогрызунов *Chrysolina immarginata* из подрода *Chalcoidea* (Coleoptera: Chrysomelidae) с описанием нового вида

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KEY WORDS: Chrysomelidae, *Chrysolina*, Chalcoidea, Tien-Shan, East Kazakhstan, species group, new species.


ABSTRACT. *Chrysolina immarginata* species group is introduced and defined within the subgenus *Chalcoidea*. *Chrysolina ivanovi* Mikhailov sp.n. described from Eastern Kazakhstan demonstrates the northern-most limit for the distribution of this group. *Chrysolina alaiensis* (Lopatin, 1998) is resurrected from synonymy with *Chrysolina dieckmanni* (Mohr, 1966) and *Chrysolina* (*Chalcoidea*) *luchti* Lopatin, 2000 is resurrected from synonymy with *Chrysolina zangana* Chen et Wang, 1981 based on type examination.


Introduction

The subgenus *Chalcoidea* Motschulsky, 1860 initially included 7 species with the type species *Chrysomela marginata* Linnaeus, 1758. Bechyné [1950] increased the number of species in *Chalcoidea* up to 15 and divided them in two groups, but *Chrysolina unicolor* (= *marginata* Rybakow, 1884) he placed in the newly described subgenus *Allohypericia* Bechyné, 1950. Bienkowski [2007] transferred the whole *Chrysolina* (*rufilabris*) species group to *Chalcoidea* from the subgenus *Pezocrosita* Jacobson, 1901. In the recent treatment *Chalcoidea* includes more than 30 species distributed throughout Holarctic region [Kippenberg, 2010; Bourdonné, 2012]. It is clear that this subgenus is heterogeneous and recognizing species groups inside it is the best way for understanding of its phylogeny.

Some time ago my colleague Alexander Ivanov gave me the specimen of leaf beetle collected by him in 2017 in the sands eastwards of Lake Alakol in Eastern Kazakhstan. It appeared to be close but somewhat different from *Ch. immarginata* from Tien-Shan. This finding in East Kazakhstan made me study the material from various localities within the distribution area of *Ch. immarginata* and the types of similar taxa.

Material and methods

All measurements were made using an ocular grid mounted on MBS-10 stereomicroscope. Total body length was measured from the anterior edge of pronotum to the elytral apex; body width was measured in the broadest part of elytra; length of tarsi was measured only for tarsomeres 1–3 (without claw tarsomere).

The material examined in the paper is deposited in the following collections: HNHM — Hungarian Natural History Museum, Budapest (Hungary), MFNB — Museum...
The species *Chrysomela unicolor* Gebler, 1845 described from the valley of the river Chu and due to the primary homonymy replaced by the younger name *Chrysomela immarginata* is peculiar in the subgenus *Chalcoidea* by its characteristic bottle-shaped aedeagus and flagellum broad and flat at basal part and narrow whip-shaped at apical part (Fig. 1). The distribution area of this species is mainly situated in Northern and Central Tien-Shan in Kyrgyzstan and SE Kazakhstan [Lopatin, 2010]. It occurs also in the Chinese part of Tien-Shan, the specimen from Kuldja is in the type series and the species is listed in Fauna Sinica [Yang et al., 2014]. However, it is not clear how far eastwards *Ch. immarginata* goes. The similar species *Ch. dieckmanni* (Mohr, 1966) was described from Karlyktag Mt. range in the extreme East of Chinese part of Tien-Shan. It is peculiar with short and broad apical process of aedeagus having similar shape of flagellum (Fig. 2). Several problems are associated with *Ch. dieckmanni*. First of all, it was described after two specimens, from which the male is from “Amur” and the female is from Karlyktag Mt. range. The record of *Ch. dieckmanni* from the Far East is questionable and more likely due to the erroneous locality label, while Karlyktag Mt. range is a real locality because the closely related species *Ch. immarginata* also occurs in Tien-Shan. However, the initial treatment of the female from Karlyktag Mt. range as *Ch. dieckmanni* by Mohr [1966] is unreliable because it is not from the same locality as the male.
and only the aedeagus shape can give a reliable treatment. Therefore, the real type locality of *Ch. dieckmanni* (based on the male) is unknown.

*Chrysolina alaisensis* from Alaisky Mt. range in southern Kyrgyzstan was originally described as a subspecies of *Ch. unicolor (=immarginata*) [Lopatin, 1998]. But later on the author [Lopatin, 2010] upgraded it to a species rank. On the contrary, Bienkowski [2007] first treated this taxon also as a subspecies but of *Ch. dieckmanni* based on similarity of aedeagus shape, and later on [Bienkowski, 2019] synonymised *Ch. alaisensis* to *Ch. dieckmanni*. But my examination of the types of *Ch. alaisensis* and *Ch. dieckmanni* resulted the conclusion that these were two separate taxa with difference in habitus, dorsal colouration and punctuation and aedeagus shape (Fig. 3).

The mentioned species *Ch. immarginata*, *Ch. dieckmanni* and *Ch. alaisensis* occur in Tien-Shan and have similar aedeagus structure. One more species *Ch. luchti* Lopatin, 2000 described from Bogdo-Ola mt. range in Eastern Tien-Shan was compared with *Ch. immarginata* by Lopatin [2000] and also belongs to this species group. The aedeagus drawing given in the original description is very schematic, although it shows the peculiar outline (Fig. 4). The type of *Ch. luchti* was found in ZIN and examined, but unfortunately the mounted aedeagus had been lost. Bienkowski [2019] proposed to synonymise *Ch. luchti* from Tien-Shan with *Ch. zangana* Chen et Wang, 1981 from Tibet. However, these two taxa inhabit distant mountain ranges and differ in dorsal colouration, and punctation and aedeagus shape (Fig. 3).

Here I define a group of species close to *Ch. immarginata* in the subgenus *Chalcoidea*, and a finding from the East Kazakhstan representing the extreme northern and lowland locality for this group below is described as a species new to science.

**Definition of the *Chrysolina immarginata* species group**

Medium sized species (males around 6.0–7.0 mm, females 7.0 mm and more), dorsum moderately to distinctly shining, black with bronze reflection, bronze or greenish bronze, elytral epipleura and sometimes lateral stripe brown. Pronotum swollen laterally along entire length; lateral impressions shallow posteriorly and moderate anteriorly, deeper posteriorly than anteriorly, covered by coarse punctures. Elytra with weak humeral calli and flat intervals; elytral punctuation arranged in paired, mostly regular rows. Hind wings developed, slightly reduced, as long as elytra.

Male fore tarsomers only slightly broadened, with entire sole beneath. Female tarsi narrow, first tarsomers of all tarsi with broad glabrous stripe. Aedeagus flattened in cross-section, thric curved laterally (ventrally at middle, dorsally at level of apical opening and ventrally at apex). Apex characteristic bottle-shaped with long or short apical projection, flagellum basally broad and flat and narrow whisp-shaped at apical part. Basal part of apical opening and broader part of flagellum is covered with oblong plate, laterally separated with sinusoid incisions (Figs 1–5).

*Chrysolina immarginata* species group is distributed in Tien-Shan and its northern spurs and unites 5 species listed below, including one new species described herein.

**Chrysolina (Chalcoidea) alaisensis** (Lopatin, 1998) **stat.rest.**

*Chrysolina unicolor* alaisensis Lopatin, 1998: 833 (“Киргизия, Алайский хр., к югу от г. Ош, 3400 м” [Kirgizia, Alaiisky mt. range, southwards of Osh, 3400 m], holotype in ZIN, examined)

*Chrysolina (Chalcoidea) dieckmanni* alaisensis Bienkowski, 2001: 116; 2007: 193

*Chrysolina (Chalcoidea) alaisensis*: Lopatin, 2010: 203

*Chrysolina (Chalcoidea) dieckmanni (= alaisensis):* Bienkowski, 2019: 65

**Chrysolina (Chalcoidea) dieckmanni** (Mohr, 1966)

*Chrysomela (Pezoscosta) dieckmanni* Mohr, 1966: 94 (“Amur”, holotype in SDEI, examined; “Duniqari, Karlyk-Tag” paratype in MFNB, examined);


*Chrysolina (Chalcoidea) dieckmanni*: Bienkowski, 2019: 65

**Chrysolina (Chalcoidea) immarginata** (Rybakov, 1884)

*Chrysomela unicolor* Geibler, 1845: 105 (“in vicinis fl. Tschui”) nec Herbst, 1786: 161;

*Chrysomela (Allohypericia) unicolor* Bechyné, 1950: 159;


*Chrysomela immarginata* Rybakov, 1884: 135 (“Kulscha”, “Son-Kil”, “Issyk-Kil”, syntypes in HNHH and MFNB, examined);

*Chrysolina (Chalcoidea) immarginata*: Bienkowski, 2007: 197 (= unicolor)

**Chrysolina (Chalcoidea) luchti** Lopatin 2000 **stat.rest.**


*Chrysolina zangana* Chen et Wang in Wang et Chen, 1981: 512 (“Xizang: Nyalam”) (= *luchti* Lopatin); Bienkowski, 2007: 72

**Chrysolina (Chalcoidea) ivanovi** Mikhailov sp.n. Figs 5, 10.

**Holotype, C** with the labels: 1) Vost. Казахстан, 46 км ЮВ п. Маканчи, пески, 12.05.2017, А.В. Иванов [East Kazakhstan, 46 km SE Makanchi, sands, 12.05.2017, A.V. Ivanov]; 2) HOCOTY-PUS, *Chrysolina (Chalcoidea) ivanovi* sp.n., Yu. Mikhailov design. 2021 [red] (ZIN).

**DESCRIPTION** of holotype. Moderately convex, oblong ovate, dorsum shining, unicolor, black with bronze reflex, antennae, maxillary palpi and tarsi blackish brown, antennomeres 1 and 2 and claws reddish. Body length — 6.3 mm, width — 3.9 mm.

Head: frontoclypeus finely and sparsely punctured; frontal suture slightly deepened, epicranial suture barely indicated. Last maxillary palpmere almost square, with rounded sides and truncated apex, 1.2x longer then broad, 1.4x longer and only 1.1x wider than previous palpmere. Antenna inserted 2.2x closer to eyeypeus than to eye. Relative length of antennomeres 1–3 as ratios 7, 4, 6. Tenth antennomere 2x longer than broad, eleventh antennomere — 2.6x. Orbital lines slightly deepened, short, can be traced only in distal 1/3 and far not reach antennal insertion.

Thorax: pronotum transverse, almost square, with rounded anterior and posterior setiferous pores bear short setae. Anterior angles 1.4x less than basal width. Anterior angles moderately developed, rounded triangular; basal angles obtuse. Both anterior and posterior setiferous pores bear short setae. Anterior side widely margined and ciliate, incised in bracket-shape; basal edge moderately arcuately convex. Lateral sides...
Figures 6–13. *Chrysolina immarginata* species group, general dorsal view: 6–8 — *Ch. immarginata* from Kyrgyzstan (6 — male from Sary-Dzhas river; 7 — female from Kadzhi-Say at south bank of Issyk-Kul lake; 8 — syntype, male from Issyk-Kul lake); 9 — *Ch. alatensis*, male, holotype; 10 — *Ch. ivanovi* sp. n., male, holotype; 11 — *Ch. luchtii*, male, holotype; 12, 13 — *Ch. dieckmanni*, male, holotype (13 — lateral view). Scale bar: 1 mm (6–7, 10 — photo by K. Makarov, 9, 11 — photo by A. Moseyko, 12–13 — photo by M. Schröter).

swollen along entire length, lateral calli narrow, both constitute slightly less than ¼ of basal width of pronotum. Lateral impressions in basal 1/3 moderately deepened, consist of coarse, partly merged deep punctures, in anterior part punctures are large but less deep and not merged. Prothoracic hypomera smooth, almost flat in the middle, slightly impressed along outside and covered with coarse transverse wrinkles; basal fold short and deep. Prosternal process with longitudinal impression only below apex; anterolateral portion of prosternum narrow, with slightly impressed furrow medially. Prosternum 1.4x shorter than metasternum; metasternum 1.3x shorter than as first ventrite. Scutellum triangular, 1.4x broader than long, with sharp apex and sparse fine punctures only at base. Elytra slightly wider than base of pronotum, with weak humeral callus, each elytron 2.3x longer than wide, elytral length 4.7 mm. Large primary punctures form long scutellar row of 10–12 punctures and 9 paired rows. Rows mostly regular, only 6th row slightly confused. Intervals flat, smooth, rows of 10–12 punctures same as on pronotum. Marginal stria with large dense punctures. Sutural stria distinct at apical slope. Epipleurae inclined outside, visible along entire length. Hind wings developed. Tarsi narrow, fore tarsi 2.7x longer than broad; ratio of width of fore tarsomeres 1–3 as 1.0, 0.8, 1.2. 3rd tarsomere 1.2x broader than long. All tarsomeres with entire sole beneath.

References


Lopatin I.K. 2010. [Leaf Beetles (Insecta, Coleoptera, Chrysomelidae) of Central Asia]. Minsk: Byelorusian University Publ. 511 pp. [In Russian]
