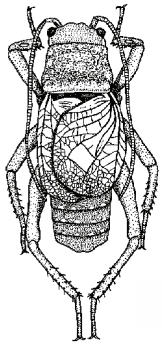


Far Eastern Entomologist

Дальневосточный энтомолог

Journal published by Far East Branch of the Russian Entomological Society and Laboratory of Entomology, Federal Scientific Center of the East Asia Terrestrial Biodiversity, Vladivostok

Number 499: 1-18 | ISSN 1026-051X (print edition) ISSN 2713-2196 (online edition) | April 2024

https://doi.org/10.25221/fee.499.1
https://elibrary.ru/efpdtq
https://zoobank.org/References/850184AB-872F-414F-AB17-9087D7A88577

REVIEW OF LEAF BEETLES OF THE SUBGENUS *HYPERICIA* BEDEL, 1899 (COLEOPTERA: CHRYSOMELIDAE: *CHRYSOLINA*) FROM EAST ASIA

Yu. E. Mikhailov[1,2)]

1) *Ural State Forest Engineering University, Sibirsky trakt, 37, Yekaterinburg 620100, Russia. E-mail: yuemikhailov@gmail.com*
2) *Ural Federal University, Mira str., 19, Yekaterinburg 620002, Russia.*

Summary. The East Palaearctic group of species in the subgenus *Hypericia* Bedel, 1899 (genus *Chrysolina* Motschulsky, 1860) is reviewed. *Chrysolina* (*H.*) *nikkoensis* (Jacoby, 1885) is first recorded for Kurile Islands and the Russian fauna, its type specimens studied and redescription is provided. *Chrysolina* (*Hypericia*) *changbaishana* **sp. n.** is described from Jilin Province of China; it differs from *Ch.* (*H.*) *difficilis* (Motschulsky, 1860) by smaller size, last abdominal ventrite without depression and narrow lateral calli of pronotum.

Key words: *Chrysolina*, *Hypericia*, new species, new record, key, China, Russia, East Palaearctic.

Ю. Е. Михайлов. Обзор жуков-листоедов подрода *Hypericia* Bedel, 1899 (Coleoptera: Chrysomelidae: *Chrysolina*) из Восточной Азии // Дальневосточный энтомолог. 2024. N 499. С. 1-18.

Резюме. Приводится обзор восточнопалеарктической группы видов подрода *Hypericia* Bedel, 1899 рода *Chrysolina* Motschulsky, 1860. Впервые в фауне России на Курильских островах отмечен *Chrysolina* (*H.*) *nikkoensis* (Jacoby, 1885),

изучены типовые экземпляры этого вида и сделано переописание. Из провинции Гирин в Китае описан *Chrysolina* (*Hypericia*) *changbaishana* **sp. n.**; новый вид отличается от *Ch.* (*H.*) *difficilis* (Motschulsky, 1860) меньшим размером, отсутствием вдавления на последнем брюшном вентрите и узкими боковыми валиками переднеспинки.

INTRODUCTION

The preparation of the Chrysomelinae part for the revised and updated second edition of the Catalogue of Palaearctic Coleoptera (Volume 6) co-authored with Horst Kippenberg helped to indicate several problems in the taxonomy of various groups of leaf beetles. The subgenus *Hypericia* Bedel, 1899 from the genus *Chrysolina* Motschulsky, 1860 was among them. In this subgenus the species from the West Palaearctic are examined quite well, while the East Palaearctic species are insufficiently known. The summarizing books on the Chinese leaf beetles (Yang *et al*., 2014; Yang *et al*., 2015) only list four species without any figures or identification key. *Chrysolina difficilis* (Motschulsky, 1860) widely distributed in South Siberia and Russian Far East was not indicated for China in these books, although is confirmed from there. The monograph "*Chrysolina* of the World" (Bieńkowski, 2019) gives both the figures and key to species, but still some problems remain in the treatment of exact species. Our examination of the types and new material makes it possible to clarify the taxonomy and distribution of the East Palaearctic representatives of the subgenus *Hypericia*. Furthermore one more species is described herein as new to science.

MATERIAL AND METHODS

This paper is based on examination of the collections of several museums listed below and the specimens collected by Dr. Roman Dudko in NE China and Dr. Yuri Sundukov in South Kurile Islands. The examined material is housed in the following collections: HKC – Horst Kippenberg personal collection (Herzogenaurach, Germany), ISEA – Institute of Systematic and Ecology of Animals, Russian Academy of Sciences (Novosibirsk, Russia), MPSU – Moscow Pedagogical State University (Moscow, Russia), NHMUK – Natural History Museum (London, UK), NHMB-GFC – G. Frey collection in Naturhistorisches Museum Basel (Basel, Switzerland); NMPC – National Museum (Prague, Czech Republic); SEHU – Dept. of Systematic Entomology, Hokkaido University (Sapporo, Japan); YMC – Yuri Mikhailov personal collection (Yekaterinburg, Russia); ZMMU – Zoological Museum of Moscow State University (Moscow, Russia).

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. In the descriptions of *Chrysolina* species the list of necessary morphological features proposed by Bienkowski (2019) was taken into account. The exact label data are cited for all type specimens. Separate labels are divided with "|", separate lines of one label – with "/". Other comments and remarks: p – preceding data are printed, h – preceding data are handwritten, r – red label.

TAXONOMY

Genus *Chrysolina* Motschulsky, 1860

Subgenus *Hypericia* Bedel, 1899

Hypericia Bedel, 1899: 258. Type species: *Chrysomela hyperici* Forster, 1771, by original designation.

In the leaf beetle genus *Chrysolina* the larvae and imagines are feeding on the host plants from eight families among that Lamiaceae and Asteraceae are predominating (Mikhailov, 2011). The peculiarity of the subgenera *Hypericia* Bedel, 1899 and *Sphaeromela* Bedel, 1899 is their feeding on the plant family Hypericaceae from subclass Rosids, while Lamiaceae and Asteraceae are in the subclass Asterids (The Angiosperm Phylogeny Group, 2016). Also Pasteels *et al*. (1984) found that the mentioned subgenera *Hypericia* and *Sphaeromela* form a special group among Chrysomelinae producing polyoxygenated steroids as defensive toxins instead of cardenolides typical for other subgenera. *Ch. dydimata* produces only one cardenolide instead of 4–12 different ones in other *Chrysolina* species (Pasteels *et al*., 1984). Both peculiarities in host-plant associations and defensive chemistry may suggest the possibility to raise this group to a distinct genus; however the molecular topologies inferred by Jurado-Rivera & Petitpierre (2015) were not compatible with this hypothesis and treat *Hypericia* among other lineages of the genus *Chrysolina.*

The subgenus *Hypericia* is characterized by the following combination of morphological characters (Bienkowski, 2019): dorsum entirely metallic; pronotum broadest basally, weakly to strongly swollen laterally along entire length, with narrow lateral furrow deep to shallow in basal part, anteriorly with broad shallow to obsolete lateral impression covered by few or numerous punctures; elytra with regular paired puncture rows of moderately large to coarse punctures densely or sparsely placed; hind wings developed; pygidium with longitudinal groove along entire length or except near apex; tarsomeres 1–3 with entire sole in both sexes; aedeagus presented by two types: 1) narrow, tubular, apically rounded or triangular; flagellum straight, apically broadened into complicated plate; 2) dorso-ventrally flattened, apically bearing long projection; flagellum narrow, tubular, turned aside and truncated apically.

The structure of male tarsomeres and aedeagus clearly distinguishes western and eastern groups of species in the subgenus (see below). In the West Palaearctic species tarsomeres 1–3 much broader in male than in female (Figs 1, 2), while in the East Palaearctic species tarsomeres 1–3 narrow in both sexes (Fig. 3). Only West Palaearctic species have aedeagi without apical projection and straight flagellum apically broadened into complicated plate (Fig. 4). East Palaearctic species have aedeagi with narrow flat projection apically and flagellum turned aside and truncated apically (Figs 8–12). Only *Ch. hyperici* from the western group of species has similar aedeagus (Fig. 5), but in combination with broad male tarsomeres.

Hypericia has no trans-Eurasian species, only Kemerovo region (Kuzbass) in West Siberia is the place, where one West Palaearctic species *Ch. hyperici* and one East Palaearctic species *Ch. difficilis* (Motschulsky, 1860) meet (Gus'kova *et al*., 2018). In West Siberia *Ch. hyperici* is known from Tyumen' (Medvedev, 2013) and Kemerovo regions, however the record in Omsk region was based on misidentification (Moseyko *et al*., 2021). *Ch. difficilis* has the westernmost localities in Gornaya Shoria and Altai: at Teletskoye Lake in Russian Altai and near Ridder (former Leninogorsk) in Kazakh Altai. The known distributions of the species below are based on the data from the first edition of the Palaearctic Catalogue (Kippenberg, 2010), the monograph of Bieńkowski (2019) and the data from the examined collections.

Figs 1–3. Habitus in dorsal view. 1 – *Chrysolina hyperici* Forster, male (Groissenbrunn, Austria); 2 – *Ch. geminata* Paykull, male (Achit district, Sverdlovsk region, Russia); 3 – *Ch. difficilis* Motschulsky, male (Lazo village, Maritime province, Russia). Scale bar = 1 mm.

West Palaearctic species group

(nine species from Europe, North Africa, Near East, Asia Minor, Caucasus, Iran)

Ch. anatolica (Dahlgren, 1984) Bulgaria, Türkiye.

Ch. brunsvicensis (Gravenhorst, 1807) West and Central Europe (Portugal, Spain, France, Great Britain, Belgium, The Netherlands, Luxembourg, Denmark, Germany, Switzerland, Austria, Czech Republic, Poland).

Ch. corcyria (Suffrian, 1851) Italy (including Sicily) and Greece.

Ch. cuprina (Duftschmid, 1825) France, Italy, Austria, Czech Republic, Slovakia, Poland, Hungary, Croatia, Serbia, Slovenia, Albania, Greece, Bulgaria, Romania, Belarus, Ukraine, Russia (south of European part, North Caucasus, South Urals), Azerbaijan, Georgia, Iran, Türkiye.

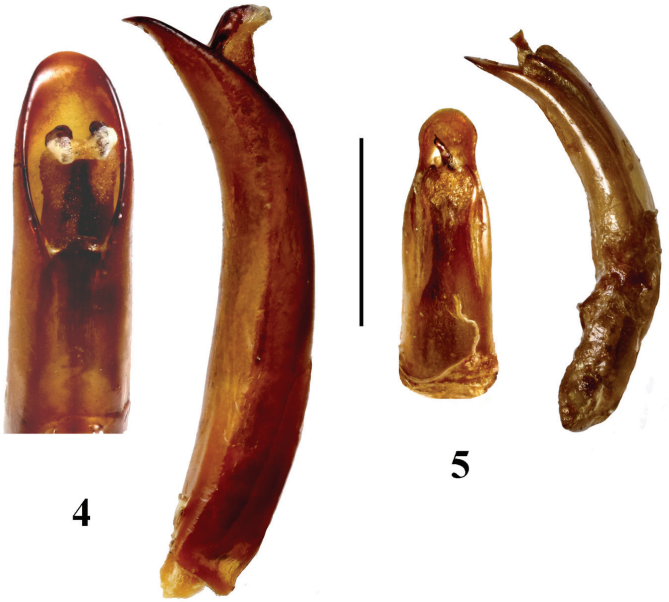
Ch. didymata (Scriba, 1791) Europe (France, Italy, Hungary, Croatia, Bosnia, Montenegro, Albania, North Macedonia, Greece, Bulgaria, W Ukraine), Türkiye, Cyprus, Syria, Lebanon, Armenia, W Turkmenistan, N Iran.

Ch. geminata (Paykull, 1799) Europe (incl. European Russia eastwards to SW part of Sverdlovsk region), Türkiye, Azerbaijan, Georgia.

Ch. hyperici (Forster, 1771) Europe (including European Russia and Caucasus), West Siberia (Tyumen' and Kemerovo regions), North Kazakhstan, Asia Minor, Transcaucasia, Uzbekistan, Iran, North Africa.

Ch. quadrigemina (Suffrian, 1851) West and South Europe (Portugal, Spain, France, Belgium, The Netherlands, Denmark, Germany, Switzerland, Austria, Italy, Croatia, Albania, Greece), Azores, North Africa.

Ch. syriaca (Weise, 1884) Israel, Syria.



Figs 4–5. Aedeagus in dorsal and lateral view. 4 – *Chrysolina geminata* Paykull (Achit district, Sverdlovsk region, Russia); 5 – *Ch. hyperici* Forster (Groissenbrunn, Austria). Scale bar = 1 mm.

East Palaearctic species group

(seven species from Siberia, Russian Far East, China, Korea, Japan, Northern Vietnam)

Ch. difficilis (Motschulsky, 1860) Russia (South Siberia (Gornaya Shoria, Altai, Sayans), Transbaikalia, Far East), Eastern Kazakhstan, Eastern Mongolia, NE China (Inner Mongolia, Jilin (first record, see below)), Korea, Japan (Hokkaido, Honshu, Shikoku).

Ch. fricata Bechyně, 1950 SE China (Fujian, Guizhou).

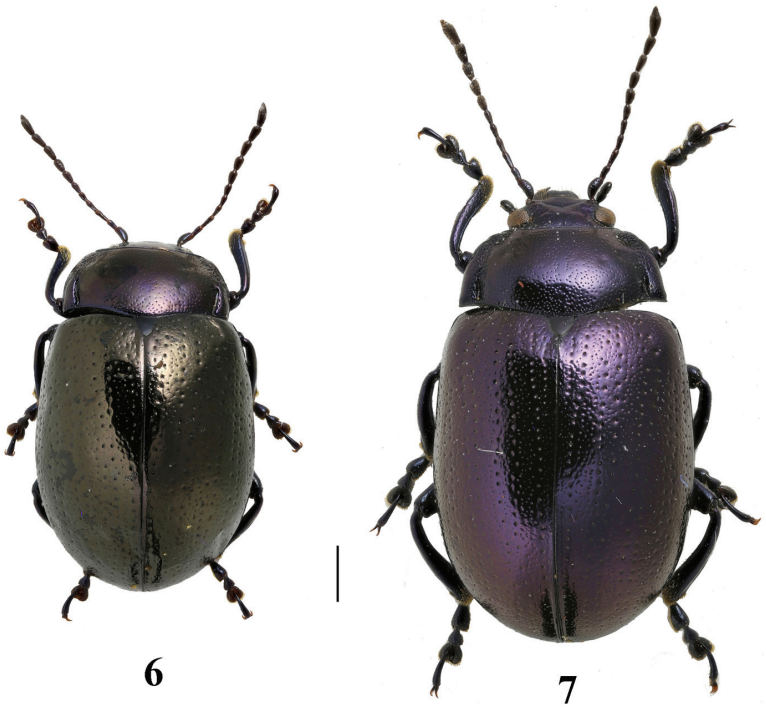
Ch. gracilis Bechyně, 1950 S China (Guandong, Guizhou, Guangxi, Hubei, Jiangxi, Sichuan, Yunnan), North Vietnam.

Ch. nikkoensis (Jacoby, 1885) Japan (Honshu, Hokkaido), Russia (South Kurile Islands: Shikotan (first record, see below).

Ch. medogana Chen et Wang, 1981 SW China (Tibet).

Ch. ohoi Chûjô, 1958 China (Taiwan).

Ch. changbaishana **sp. n.** NE China (Jilin).



Figs 6–7. Habitus in dorsal view. 6 – *Chrysolina changbaishana* sp. n., holotype, male (S of Erdaobaihe, Jilin province, China); 7 – *Ch. difficilis* Motschulsky, male (Naitoushan Mts., Jilin province, China). Scale bar = 1 mm.

Ch. difficilis is the only representative of *Hypericia* in Altai, the Sayans, Transbaicalia, Russian Far East, and Korea (Mikhailov & Hayashi, 2000; Cho & An, 2020). In Japan *Ch. difficilis* is widely distributed throughout Hokkaido, while the majority of records from Honshu and Shikoku need confirmation (Saitoh, 2012). The reliable record from Honshu is only Mt. Garyu in Hiroshima prefecture and from Shikoku is Mt. Tsurugi – locus typicus of *Ch. shikokensis* Nakane, 1963 (Suenaga & Takemoto, 2017).

***Chrysolina* (*Hypericia*) *difficilis* (Motschulsky, 1860)**
Figs 3, 7–9

Taeniosticha difficilis Motschulsky, 1860: 228 ("Siberie occidentale", lectotype in ZMMU, designated by L. Medvedev, 2006).

Chrysomela sibirica Weise, 1887: 177 ("Amur"), nec Gebler, 1830: 218. Synonymised by Bienkowski, 2019: 860.

Chrysomela ussuriensis Jacobson, 1901: 126 ("Amur", holotype is a specimen identified by Weise, 1887: 180 as "*Chrysomela aeruginosa*"). Synonymised by Bienkowski, 2019: 104.

Chrysomela yezoensis Matsumura, 1911: 142 (Sakhalin: "Galkinowraskoe", syntypes exanimed by Takizawa, 1970). Synonymised by Bienkowski, 2019: 104.

Chrysolina (*Hypericia*) *nikinoja* Bechyné, 1950: 155 ("Corée: Niki Nojo", lectotype in NHMB-GFC, designated by Bieńkowski, 2001). Synonymised by Bienkowski, 2001: 169.

Chrysolina (*Hypericia*) *pseudogeminata* Bechyné, 1950: 156 ("Japon: Kioto", lectotype and paralectotype in NMPC, designated by Bienkowski, 2019). Synonymised by Bienkowski, 2019.

Chrysolina (*Hypericia*) *nikinoja exgeminata* Bechyné, 1952: 380 ("S. Mandschurei: Chikuanstan", lectotype in NHMB-GFC, designated by Bieńkowski, 2001). Synonymized by Bienkowski, 2001: 169.

Chrysolina (*Hypericia*) *cuprina dilecta* Bechyné, 1952: 380 ("Altai: Semenovsk", "Minussinsk", syntypes in NHMB-GFC). Synonymized by Bienkowski, 2019: 105.

Chrysolina (*Hypericia*) *shikokensis* Nakane, 1963: 19 ("Mt. Tsurugi, Shikoku", holotype in SEHU, examined by photo). Synonymized by Takizawa, 1970, proved by Suenaga & Takemoto, 2017.

MATERIAL EXAMINED. NE Kazakhstan, 40 km NNE Leninogorsk, mine Chekmar, 700 m, 06–09.VII 1992, 1♂, A. Napolov leg. (HKC); [Russia, Altai] N shore of Teletskoye lake, uroch. Dzhailau, 07.VI 1901, 1♂, (HKC); Russia, Maritime Province, Lazovsky nature reserve, Lazo village, 1–9.VIII 2005, 1 ♂, V. Shokhrin leg. (YMC); Russia, Maritime Province, Lazovsky nature reserve, Chekhunenko lake, 12–13.VIII 2005, 1 ♂, Yu. Sundukov and V. Shokhrin leg. (YMC); China, Jilin Prov., 25 km SSE of Erdaobaihe Town, Naitoushan Mts., upper of Naidaohe river, 1100 m, 42.22°N 128.27°E, 12.VII 2012, 1 ♂, R. Dudko leg. (YMC); China, Jilin Prov., 33 km SSE Erdaobaihe Town, upstream of Erdaojian river, 1100 m, 42.19°N 128.35°E, 13.VII 2012, 1 ♂, R. Dudko leg. (YMC); Japan, Hokkaido, Sapporo, Shiraikawa, 06.VII 2004, 1♂, S. Saitoh leg. (HKC).

REMARKS. Usually *Ch. difficilis* was divided into three subspecies (Kippenberg, 2010), *Ch. difficilis difficilis*, *Ch. difficilis ussuriensis* Jacobson, 1901 and *Ch. difficilis yezoensis* Matsumura, 1911, occupying respectively Siberian, Far Eastern continental and island parts of the range. Bienkowski (2019) examined the specimens from different regions and did not find clear differences in the body size and shape, only found some geographical difference in dorsal colouration, although with exceptions. The colouration of the articular membrane between abdominal sternites may be rufous or black, but these differences are not connected with the region. Therefore all subspecies were synonymized.

Bechyné (1950, 1952) erroneously considered *Ch. difficilis* to be a member of the subgenus *Allohypericia* Bechyné, 1950, either as a synonym of *Ch. sibirica* Weise, 1887 or as a subspecies of *Ch. aeruginosa*. Therefore he compared his newly described species of *Hypericia* with *Ch. geminata* or *Ch. nikkoensis* but not with *Ch. difficilis*.

Figs 8–12. Aedeagus in dorsal and lateral view. 8 – *Chrysolina difficilis* Motschulsky (Lazo village, Maritime province, Russia); 9 – *Ch. difficilis* (Naitoushan Mts., Jilin Province, China); 10 – *Ch. changbaishana* sp. n., holotype (S of Erdaobaihe, Jilin Province, China); 11, 12 – *Chrysolina nikkoensis* Jacoby (Krabovaya bay, Shikotan Island, Russia). Scale bar = 1 mm.

In the description of *Chrysolina* (*Hypericia*) *nikinoja* Bechyné, 1950, where male body length was 8 mm, female – 9 mm, this species was characterized as the largest among eastern representatives of *Hypericia*. Also for the male of *Ch. nikinoja* the transverse depression on the last abdominal ventrite was indicated as a peculiar character (Bechyné, 1950). Bienkowski (2019) examined the type of the subspecies *Ch. nikinoja exgeminata* Bechyné, 1952 and did not find any reliable differences from the nominotypical subspecies except only a slightly stronger transverse depression on the abdominal ventrite 5.

The examined material on *Ch. difficilis* proved that relatively large body length around 8.0 mm and depression on the male abdominal ventrite 5 are peculiar for this species and all taxa synonymized to it. Although in Jilin province of China almost in sympatry with the findings of *Ch. difficilis* the specimen was collected distinctly smaller (Fig. 6), with the last abdominal ventrite without depressions and with different dorsal punctation. This specimen is described herein as a species new to science.

***Chrysolina* (*Hypericia*) *changbaishana* Mikhailov, sp. n.**

https://zoobank.org/NomenclaturalActs/E87DC5FA-8AC1-4F69-8BF8-2E20A6F24021

Figs 6, 10

TYPE MATERIAL. Holotype: ♂, with labels: **China**: Jilin Prov., / S of Erdaobaihe / Town 800 m, / 42,40º N, 128,106º E / 17.07.2012 / R. Dudko leg. [p] | HOLOTYPUS / *Chrysolina* (*Hypericia*) / *changbaishana* sp. n. / Yu. Mikhailov design. 2022 [p, r] (ISEA).

DESCRIPTION. Male (holotype) (Fig. 6). Moderately convex, ovate. Body length – 6.2 mm, width – 4.0 mm. Dorsum shining, smooth, bicolor, elytra bronze, pronotum and head blackish violet; underside and legs black, with feeble greenish reflex. Antennae, maxillary palpi and tarsi dark brown.

Head: frontoclypeus finely and sparsely punctured with smooth median stripe; frontal and epicranial sutures slightly deepened. Last maxillary palpomere axe-shaped, apically truncated, 1.2x longer then broad, 1.4 x longer and 1.2x wider than previous palpomere. Relative length of antennomeres 1–3 as ratios 7, 4, 6. Tenth antennomere 2x longer than broad, eleventh antennomere – 3.1x. Orbital lines short and narrow, far not reach antennal insertion. Antenna inserted 1.2x closer to eye than to clypeus.

Thorax: pronotum transverse, twice broader than long, broadest behind middle; slightly rounded laterally, almost straight basally and apically; pronotal disc evenly convex, covered with dense fine punctures; width between anterior angles 1.5x less than basal width. Anterior angles moderately produced, rounded triangular; basal angles obtuse; anterior side margined and ciliate, widely incised in bracket-shape; basal edge arcuately convex. Lateral sides steeply swollen along entire length, lateral callus narrow, separated from disc by deep groove with vertical outer border in basal 2/5 and by broad almost obsolete impression with large punctures in anterior part. Prothoracic hypomera with longitudinal furrow, outer side slightly convex and smooth, basal 1/4 covered with coarse wrinkles; basal fold short and moderately deep; prosternal process narrow, slightly convex longitudinally; anterolateral portion of prosternum with convex bulge medially; prosternum 1.3x shorter than metasternum; metasternum of the same length as first ventrite, smooth.

Elytra with weak humeral callus, each elytron 2.1 times longer than wide, elytral length 4.7 mm. Large primary punctures form scutellar row of 8 punctures and 9 regular paired rows. Punctures in rows sparsely placed. 5th puncture row consists of

24–26 punctures. Secondary punctures fine and sparse (same as on pronotum) on wider intervals and very fine on narrow intervals between paired rows. Marginal stria with large sparse impressed punctures. Sutural stria distinct at apical slope. Epipleura inclined outside, visible along entire length. Hind wings developed.

Tarsi narrow, fore tarsi (tarsomeres 1–3) 2.6x as long as broad; ratio of width of fore tarsomeres 1–3 as 1.5, 1.3, 2.0. All tarsomeres with entire sole beneath.

Abdomen: pygidium with impression in basal 2/3. Ventrite 1 broadly margined on anterior edge, covered with very sparse fine punctures, only anterior intercoxal process covered with medium-sized punctures. Last ventrite evenly convex, with slightly incised apex, smooth, covered with very sparse fine punctures. Aedeagus (Fig. 10).

DIFFERENTIAL DIAGNOSIS. From *Ch. difficilis* (Fig. 7) also found in Jilin Province is readily distinguished by smaller size, narrow scutellum, longer and narrower distinctly rounded apical projection of aedeagus (Fig. 10) and narrow, very steeply swollen lateral calli of pronotum. In *Ch. difficilis* pronotal lateral calli are broader and flatter. Body size of the new species is closer to *Ch. nikkoensis*, presented below, which has different combination of dorsal punctation (larger elytral and smaller pronotal one) and broad apical projection of eadeagus (Figs 11, 12).

ETYMOLOGY. The name is derived from the Changbai Mountains (Changbai-shan), in the foothills of which the type locality is situated.

REMARKS. In Japan two *Hypericia* species are known (Saitoh, 2012), namely *Ch. difficilis* and *Ch. nikkoensis* (Jacoby, 1885). The latter is described and known mainly from Honshu with only few records from Hokkaido (Hirano, 2003; Araki *et al*., 2013). No *Hypericia* species have been recorded from the Kurile Islands so far. But as a part of long term entomological survey in South Kurile Islands organized by Dr. Kirill Makarov (MPSU) in the year 2012 a series of relatively small beetles (Figs 13, 14) from the genus *Chrysolina* was collected by Dr. Yuri Sundukov in Shikotan Island. After careful examination these beetles proved to be *Ch. nikkoensis*.

Although the place of housing of Jacoby's collection is well known, the types of *Ch. nikkoensis* have not been controlled so far (Kimoto & Takizawa, 1994; Saitoh, 2012; Bienkowski, 2019). Thanks to Dr. Michael Geiser (NHMUK) I got the opportunity to study the types (Figs. 15, 16) and therefore can exactly prove the identity of the beetles from Shikotan. This is the first record not only for Kurile Islands but for the fauna of Russia as well.

***Chrysolina* (*Hypericia*) *nikkoensis* (Jacoby, 1885)**

Figs 11, 12, 13–16

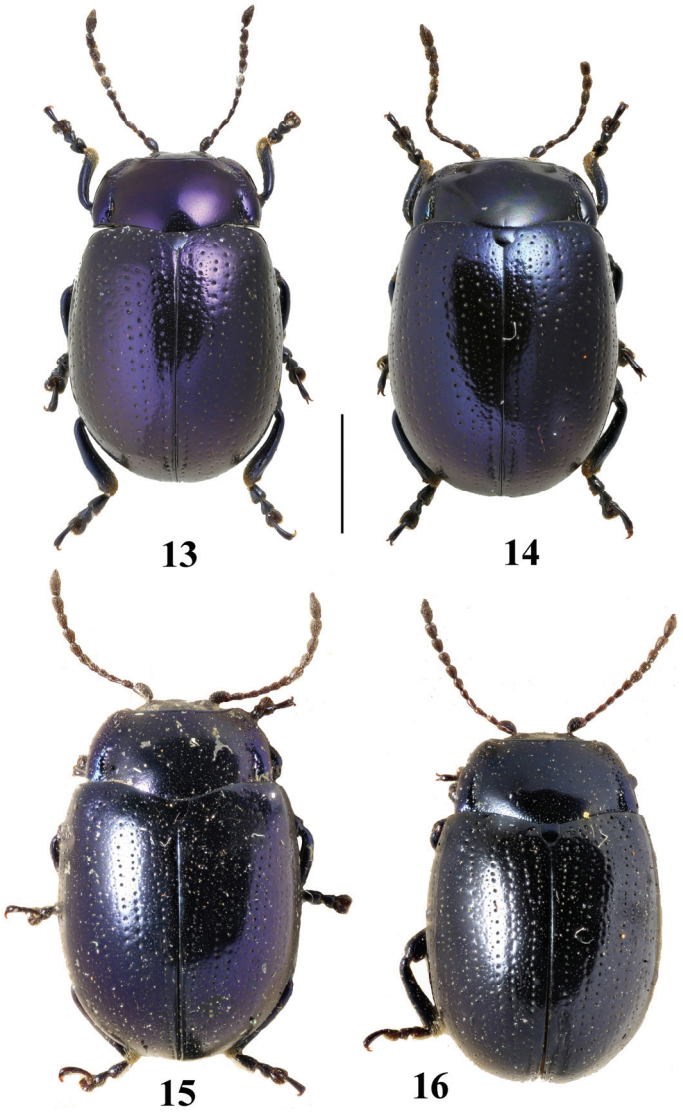
Chrysomela nikkoensis Jacoby, 1885: 207 ("Nikko, Yunoshiku, Urasa", syntypes in NHMUK, examined).

Chrysolina (*Hypericia*) *nikkoensis*: Bechyne, 1950: 155.

Chrysolina (*Hypericia*) *ohoi* Chûjô, 1958: 50 ("Formosa: Taihoku-Si, Taihoku-Syû"). Synonymised by Bienkowski (2019). Not confirmed here.

TYPE MATERIAL. Syntype, male with labels: Type / H.T. [p, round circled with broad red band] | Nikko. / VIII – 18.VII [p] | Japan./ G. Lewis. / 1910–320. [p]

| Syntype [p, round circled with broad blue band] | Chrysomela nikkoensis Jac. [h] | NHMUK 014379807 [p] (NHMUK); syntype, male with labels: Japan [h] | Jacoby coll./ 1909-28a [p] | nikkoensis Jac. [h] | Syntype [p, round circled with broad blue band] | NHMUK 014379806 [p] (NHMUK).



Figs 13–16. Habitus in dorsal view of *Chrysolina nikkoensis* Jacoby. 13, 14 – male and female from Shikotan Island, South Kurile Islands; 15, 16 – syntypes, males from Japan. Scale bar = 2 mm.

OTHER MATERIAL EXAMINED. Russia: South Kurile Islands, Shikotan Island, Krabovaya bay, env. of Krabozavodskoye, 43º50'04.75" N, 146 º 45'12.46" E, 4–8.VII 2012, 2 ♀, Yu.N. Sundukov leg. (MPSU); the same locality, 21–22.VII 2012, 3♂, 2♀, Yu.N. Sundukov leg. (YMC); the same locality, 8–9.VIII 2012, 1♂, 2♀, Yu.N. Sundukov leg. (MPSU).

REDESCRIPTION (based on original description and the specimens from Kurile Islands).

Body: subparallel, moderately convex, males obovate, females subquadrate (Figs. 13–16). Body length: 5.2–6.1 mm (male), 5.7–6.3 mm (female), width: 3.4–3.8 mm (male), 3.9–4.1 mm (female). Dorsum shining, smooth, violet blue or dark blue; underside and legs black, with feeble bluish reflex. Antennae, maxillary palpi and tarsi dark brown.

Head: frontoclypeus smooth, entirely impunctate; frontal suture absent, epicranial suture slightly deepened. Last maxillary palpomere axe-shaped, apically truncated, 1.2x longer then broad, 1.4x longer and 1.2x narrower than previous palpomere. Relative length of antennomeres 1–3 as ratios 7, 4, 6. Tenth antennomere 1.4x longer than broad, eleventh antennomere – 2.1x. Orbital lines short and narrow, far not reach antennal insertion. Antenna inserted 1.6x closer to eye than to clypeus.

Thorax: pronotum transverse, twice broader than long in males, in females 1.9x broader than long; broadest behind middle, evenly rounded laterally; pronotal disc evenly convex, smooth and shining, looks like impunctate, but covered with sparse very fine punctures; width between anterior angles 1.8x less than basal width. Anterior angles acute and somewhat produced; basal angles obtuse. Both basal and apical setiferous pores present. Anterior side broadly margined, widely incised in bracket-shape; basal edge arcuately convex; lateral sides swollen along entire length, lateral callus broad, separated from disc by deep groove with vertical outer border in basal 2/5 and by broad almost obsolete impression with large punctures in anterior part. Prothoracic hypomera with longitudinal furrow, outer side slightly convex and smooth, basal 1/4 covered with sparse punctures and wrinkles; basal fold short and moderately deep; prosternal process narrow, almost flattened longitudinally; anterolateral portion of prosternum flattened medially; prosternum 1.3x shorter than metasternum; metasternum of the same length as first ventrite. Scutellum broadly ovate, smooth.

Elytra with weak humeral callus, subquadrate, each elytron 2.2–2.4 times longer than wide, elytral length 4.2–4.7 mm (males), 4.7–4.9 mm (females). Large primary punctures form scutellar row of 9-12 punctures in males or 12-15 punctures in females and 9 regular paired rows. Punctures in rows sparsely placed. 5th puncture row consists of 20–26 punctures. Secondary punctures fine and sparse, on wider intervals distinctly larger than on pronotum, on narrow intervals between paired rows very fine similar to that on pronotum. Marginal stria with punctures of similar size as in rows. Sutural stria distinct at apical slope. Epipleura inclined outside, visible along entire length. Hind wings developed.

Tarsi narrow in both sexes, fore tarsi (tarsomeres 1-3) 2.2x as long as broad; ratio of width of fore tarsomeres 1–3 in males as 1.8, 1.6, 2.2, in females as 1.7, 1.5, 2.1. All tarsomeres with entire sole beneath in both sexes.

Abdomen: pygidium with impression in basal 2/3. Ventrite 1 broadly margined on anterior edge, covered with sparse fine punctures, only anterior intercoxal process covered with medium-sized punctures. Last ventrite evenly convex, with slightly incised apex, smooth, covered with sparse fine punctures. Aedeagus (Figs 11, 12) with apical projection broad and rounded.

DIFFERENTIAL DIAGNOSIS. Jacoby (1885) indicated the main distinguishing features of *Ch. nikkoensis* as "shining and almost impunctate disk of the thorax, on which fine punctures are only visible with a strong lens". Also he indicated that "the interstices between the double rows of punctures at the elytra are finely but distinctly punctured, the double rows themselves consist of strong and regular lines of punctures not very closely approached in pairs". These features readily distinguish *Ch. nikkoensis* from *Ch. difficilis* that have pronotum with dense, distinct punctures and secondary punctures of elytral intervals dense and relatively large (Fig. 7). Also the apical projection of aedeagus in *Ch. difficilis* is distinctly narrowed (Figs 8, 9).

REMARKS. Bechyne (1950), who placed *Ch. nikkoensis* in the subgenus *Hypericia*, indicated that he knew this species only from Japan and the records from continental Asia (China and Tonkin) were taken from Chen (1934).

Chen (1936: 151) gave the following description. "Coloration variant du vert bronzé au bleu foncé ou violacé, parfois cuivreux; dessous un peu plus foncé. Tête marquée de points très épars, un peu plus serrés sur le clypéus. Pronotum presque lisse sur le disque, la ponctuation étant microscopique; dépressions latérales profondes et bien délimitées en arrière du milieu, mais disparaissant et remplacées par de gros points en avant. Ponctuation des élytres géminée, les points gros et profonds; intervalles marqués de points fins, serrés. – Long.: environ 6 mm. Kouy-Tchéou: région de Pin-Fa; Kiang-Si; Yunnan: Sze-Tsong, Kouang-Si-Hien; Tonkin: Hoa-Binh; aussi du Japon.".

Chen (1936) treated the beetles from China and North Vietnam externally similar to Japanese *Ch. nikkoensis* as a same species because he did not examine the aedeagus shape. And it is essential that later on Bechyné (1950) described the new species *Chrysolina* (*Hypericia*) *gracilis* Bechyné, 1950 of a same size of 6 mm and similar colour (Fig. 17) and also from Guizhou province in South China ("prov. Kouy Tcheou: Kouy Yang Fou"). The records of *Ch. nikkoensis* from North Vietnam by Bechyné (1950) and Bienkowski (2019) were made following Chen (1936) and in reality should also belong to *Ch. gracilis*.

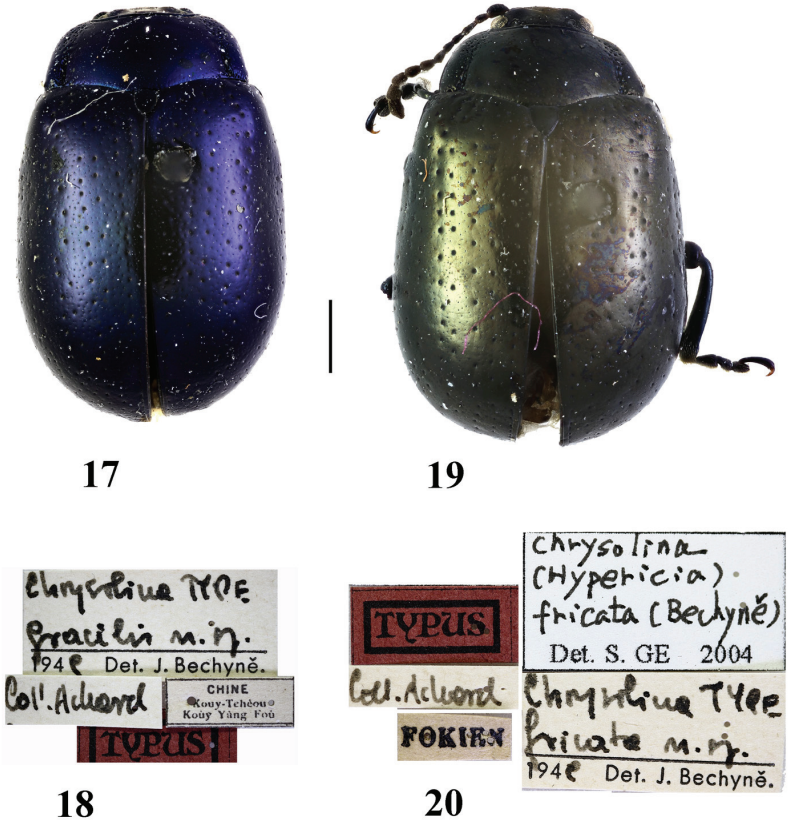
Bienkowski (2019) compared the photo of the type of *Ch. ohoi* and the original description of this taxon with the specimens that he treated as *Ch. nikkoensis* and came to the conclusion, that *Ch. nikkoensis* and *Ch. ohoi* were synonyms. However, the aedeagus of *Ch. ohoi* was not examined and this conclusion was based only on the density of the punctation in the elytral rows (*Ch. ohoi* has more than 19 punctures in the 5th puncture row at elytron like *Ch. nikkoensis*). But all known specimens of *Ch. nikkoensis* are violet blue or blackish blue, while *Ch. ohoi* is bronze (Lee, 2016). By now *Ch. ohoi* is the only species of the subgenus *Hypericia* recorded from Taiwan (Yang *et al*., 2015; Lee, 2016) and the indication of *Ch. nikkoensis* from

there by Bienkowski (2019) is based on the incorrect synonymization of these taxa. *Ch. nikkoensis* is in fact island species distributed only in Japan and South Kurile Islands.

***Chrysolina* (*Hypericia*) *gracilis* Bechyně, 1950**
Figs 17, 18, 21

Chrysolina (*Hypericia*) *gracilis* Bechyně, 1950: 157 (S China, prov. Guizhou, "Kouy Yang Fou", holotype in NMPC, examined).

TYPE MATERIAL. Holotype, ♂, with labels: CHINE / Kouy-Tchèou / Koùy Yang Fou [p] | Coll. Achard [h] | TYPUS [p, r] | Chrysolina TYPE / gracilis n. sp. [h] / 1949 Det. J. Bechyně [p] (NMPC).



Figs 17–20. Habitus in dorsal view and labels of the types. *Chrysolina gracilis* Bechyně: 15 – holotype, male; 16 - labels of holotype; *Ch. fricata* Bechyně: 17 – syntype, male; 18 – labels of syntype. Scale bar = 1 mm.

***Chrysolina* (*Hypericia*) *fricata* Bechyně, 1950**
Figs 19, 20, 22

Chrysolina (*Hypericia*) *fricata* Bechyně, 1950: 158 (China, prov. Fujian (Fokien), syntypes in NMPC, examined).

TYPE MATERIAL. Syntype, ♂, with labels: FOKIEN [p] | Coll. Achard [h] | TYPUS [p, r] | Chrysolina TYPE / fricata n. sp. [h] / 1949 Det. J. Bechyně [p] (NMPC).

Figs 21–22. Aedeagus in dorsal and lateral view. 21 – *Chrysolina gracilis* Bechyně, holotype; 22 – *Ch. fricata* Bechyně, syntype. Scale bar = 1 mm.

Key to species of the subgenus *Hypericia* from East Asia

1 (4) Tarsomeres 1–3 much broader in male than in female.
2 (3) Aedeagus with apical margin rounded or triangular, without apical projection. Flagellum straight, apically broadened into complicated plate. Lateral furrow at pronotal base shallow or deep ..... West Palaearctic species except *Ch. hyperici*
3 (2) Aedeagus with flat projection apically, flagellum turned aside and truncated apically (Fig. 5) ……..…….……..……..… ***Ch. hyperici* (Forster, 1771)**
4 (1) Tarsomeres 1–3 narrow in both sexes. Lateral furrow at pronotal base always deep (East Palaearctic species).
5 (8) Puncture row 5 at elytron consists of 9–18 punctures.
6 (7) Pronotum strongly rounded laterally. Dorsum blue, bluish violet, or bronze. Male last abdominal ventrite slightly convex, with narrow impression along apical margin. Aedeagus (Fig. 21). Body length 5.6–6.3 mm. S China (Guandong, Guizhou, Guangxi, Hubei, Jiangxi, Sichuan, Yunnan, ?Taiwan), North Vietnam …..... ***Ch. gracilis* Bechyné, 1950**

7 (6) Pronotum weakly rounded laterally. Dorsum bronze-brown with weak greenish reflection or dark bronze, strongly shining (especially elytra). Male last abdominal ventrite slightly convex. Aedeagus (Fig. 22). Body length 6.0–6.5 mm. SE China (Fujian, Guizhou) .....… ..…….…… ***Ch. fricata*** **Bechyné, 1950**

8 (5) Puncture row 5 at elytron consists of 19–32 punctures.

9 (12) Pronotum with dense, distinct punctures (Figs 6, 7). Secondary punctures of elytral intervals dense and relatively large. Apical projection of aedeagus distinctly narrowed (Figs 8–10).

10 (11) Larger, body length 7.2–8.0 mm. Elytral intervals between puncture rows covered with punctures relatively dense and large. Aedeagus with broad, somewhat truncate apical projection (Figs 8, 9). Pronotal disc with dense, distinct punctures, lateral calli broader and flatter. Dorsum violet, purplish violet, blackish violet, blackish bronze, bronze, blackish blue. Male last abdominal ventrite with transverse depression medially. Mountains of East Kazakhstan and South Siberia, Eastern Mongolia, NE China, Korea, Russian Far East (Amur region, Khabarovsk Krai, Primorsky Krai, Sakhalin), Japan (Hokkaido, Honshu, Shikoku) ……..…..… ***Ch. difficilis*** **(Motschulsky, 1860)**

11 (10) Smaller, body length 6.2 mm. Elytral intervals between puncture rows covered with punctures relatively sparse and small. Aedeagus with narrow distinctly rounded apical projection (Fig. 10). Pronotal disc covered with dense fine punctures, lateral calli narrow, very steeply swollen. Male last abdominal ventrite without depressions. NE China (Jilin) .....……. ***Ch. changbaishana*** **sp. n.**

12 (9) Pronotal disc with punctures very fine, looks like impunctate (Figs 13–16). Elytral intervals between puncture rows covered with punctures sparse and fine.

13(14) Apical projection of aedeagus broad, rounded, without denticles (Figs 11, 12). Dorsum violet blue, blackish blue or black with brassy tint. Body length 5.3–6.5 mm. Japan (Honshu, Hokkaido), Russia (South Kurile Islands: Shikotan) ……..... .....……. ***Ch. nikkoensis*** **(Jacoby, 1885)**

14(13) Apical projection of aedeagus with lateral denticles. Dorsum purplish blue, shining. Body length 5.0 mm. SW China ....……..….. ***Ch. medogana*** **Chen et Wang, 1981**

ACKNOWLEDGEMENTS

I am grateful to Dr. Roman Dudko (Institute of Systematic and Ecology of Animals, Novosibirsk, Russia) and Dr. Yuri Sundukov (Federal Scientific Center of the East Asia Terrestrial Biodiversity, Vladivostok, Russia), who kindly shared the collected material, to Dr. Michael Geiser (Natural History Museum, London, UK) and Lukáš Sekerka (National Museum, Prague, Czech Republic) for the possibility to work with the collections, to Dr. Kirill Makarov (Moscow Pedagogical State University, Moscow) and Mr. Keita Matsumoto (Natural History Museum, London, UK) for their help in taking photos of the beetles. My sincere thanks are also to Mr. Satoru Saitoh (Chiba, Japan) for his valuable advice on the Japanese *Chrysolina* species.

REFERENCES

Araki, S., Imoto, N., Kunikane, N. & Nagoshi, K. 2013. [On four species of the genus *Chrysolina* recorded from Oshima peninsula, southern Hokkaido]. *Jezoensis*, 39: 101–107. [In Japanese]

Bechyné, J. 1950. 7e contribution a la connaissance du genre *Chrysolina* Motsch. (Coleoptera, Phytophaga, Chrysomelidae). *Entomologische Arbeiten aus dem Museum G. Frey*, 1: 47–185.

Bechyné, J. 1952. Achter Beitrag zur Kenntnis der Gattung Chrysolina Motsch. (Col. Phytoph. Chrysomelidae). *Entomologische Arbeiten aus dem Museum G. Frey*, 3: 351–385.

Bieńkowski, A.O. 2001. A study on the genus *Chrysolina* Motschulsky, 1860, with a checklist of all the described subgenera, species, subspecies, and synonyms (Coleoptera: Chrysomelidae: Chrysomelinae). *Genus*, 12: 105–235.

Bieńkowski, A.O. 2019. *Chrysolina of the world – 2019 (Coleoptera: Chrysomelidae). Taxonomic review*. Mukhametov G.V. Publ., Livny. 919 pp.

Cho, H.-W. & An, S.L. 2020. An annotated checklist of leaf beetles (Coleoptera: Chrysomelidae) of Korea, with comments and new records. *Far Eastern Entomologist*, 404: 1–36. DOI: 10.25221/fee.404.1

Chûjô, M., 1958. A taxonomic study on the Chrysomelidae (Insecta, Coleoptera) from Formosa. Part X. Subfamily Chrysomelinae. *Quart J. Taiwan Mus.*, 11: 1–85.

Gus'kova, E.V., Efimov, D.A. & Atuchin, A.A. 2018. Leaf beetles (Coleoptera: Chrysomelidae) of the Kuznetsk-Salair Mountain Area (Russia, Siberia). Part One: Subfamilies Donaciinae, Criocerinae, Cassidinae and Chrysomelinae. *Entomologist's Gazette*, 69: 123–145.

Hirano, Y. 2003. A record of *Chrysolina nikkoenisis* from Hokkaido. *Gekkan-Mushi*, 394: 22. [In Japanese]

Jacoby, M. 1885. Descriptions of the Phytophagous Coleoptera of Japan, obtained by Mr. George Lewis during his Second Journey, from February 1880 to September 1881. Part I. *Proceedings of the Scientific Meetings of the Zoological Society of London,* [1885]: 190–211.

Jurado-Rivera, J.A. & Petitpierre, E. 2015. New contributions to the molecular systematics and the evolution of host-plant associations in the genus *Chrysolina* (Coleoptera, Chrysomelidae, Chrysomelinae). *In*: Jolivet, P., Santiago-Blay, J. & Schmitt, M. (Eds). Research on Chrysomelidae 5. *ZooKeys*, 547: 165–192. DOI: 10.3897/zookeys.547.6018

Kimoto, S. & Takizawa, H. 1994. *Leaf Beetles (Chrysomelidae) of Japan*. Tokai University Press, Tokyo. 539 pp. [In Japanese]

Kippenberg, H. 2010. Chrysomelidae: Chrysomelinae. P. 390–443. *In*: Löbl, I. & Smetana, A. (Eds.): *Catalogue of Palaearctic Coleoptera. Volume 6. Chrysomeloidea*. Apollo Books, Stenstrup.

Lee, C.-F., Tsou, M.-H. & Cheng, H.-T. 2016. *The Chrysomelidae of Taiwan. 3*. Taipei: Chinese Corporation for Promotion of Humanities. P. 74–78. [In Chinese]

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

Medvedev, L.N. 2006. To the knowledge of Chrysomelidae (Coleoptera) described by V. Motschulsky. *Russian Entomological Journal*, 15(4): 409–417.

Medvedev, L.N. 2013. To the fauna of leaf beetles (Coleoptera, Chrysomelidae) of Tyumen Province. P. 94–118. *In*: Gashev, S.N. (Ed.). *Ecology of animals and faunistics: a collection of sci. papers by the Department of Zoology and Evolutionary Ecology of Animals. Vol. 9*. Tyumen State University Publ., Tyumen.

Mikhailov, Yu.E. 2011. Interrelation of trophic and chromosomal evolution in leaf beetles (Coleoptera, Chrysomelidae). *Lesnoy Vestnik*, 4: 13–20.

Mikhailov, Yu.E. & Hayashi, M. 2000. Chrysomelidae of Sakhalin. Part I. *Entomological Revue Japan*, 55: 71–83.

Moseyko, A.G., Knyazev, S.A. & Dorofeyev, V.I. 2021. New Data on the Distribution and Host Plants of the Leaf Beetles (Coleoptera, Chrysomelidae) in the South of West Siberia. *Entomological Review*, 101 (8): 1180–1187.

Pasteels, J.M., Rowell-Rahier, M., Braeckman, J.-C. & Daloze, D. 1984. Chemical Defences in Leaf Beetles and their Larvae: the Ecological, Evolutionary and Taxonomic Significance. *Biochemical Systematics and Ecology*, 12(4): 395–406.

Saitoh, S. 2012. The genus *Chrysolina* in Japan. *Gekkan-Mushi*, 491: 10–26. [In Japanese]

Suenaga, H. & Takemoto, T. 2017. *Chrysolina seriepunctata* and *C. difficilis* collected from Chûgoku District, Honshu and Shikoku. *Sayabane N.S.*, 28: 24–26.

Takizawa, H. 1970. Descriptions of five new species of the genus *Chrysolina* Motschulsky in Japan (Coleoptera: Chrysomelidae). *Kontyû*, 38(2): 117–125.

The Angiosperm Phylogeny Group, Chase M.W., Christenhusz M. J. M., Fay M. F. *et al*. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society*, 181(1): 1–20. DOI: 10.1111/boj.12385

Yang, X.-K., Ge, S.-Q, Wang, S.-Y., Li, W.-Z. & Cui, J.-Z. 2014. *Fauna Sinica. Insecta Vol. 61. Coleoptera, Chrysomelidae, Chrysomelinae*. Science Press, Beijing. 641 pp. [In Chinese with English summary]

Yang, X.-K., Ge, S.-Q, Nie, R., Ruang, Y.-Y. & Li, W.-Z. 2015. *Chinese Leaf Beetles*. Science Press, Beijing. 507 pp. + 83 pl.