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# A Review of the Leaf-Beetle Genus *Chrysolina* Motschulsky (Coleoptera, Chrysomelidae) from Russia and European Countries of the Former USSR. III. Remarks on the Systematics and Distribution of the Species

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**Abstract**—*Chrysolina didymata* (Scriba, 1791) is repeatedly recorded from Ukraine (Kamianets-Podilskyi), *Ch. cuprina* (Duftschmid, 1825) is recorded from the South Urals (Bashkiria) for the second time, *Ch. oirola* Lopatin, 1990 is recorded from Russia (W. Altai), *Ch. staphylaea sharpi* (Fowler, 1890) is recorded from Russia (the Kandalaksha Bay coast) for the first time. The presence of *Ch. roddi* in Lipetsk Province (the Galichia Gora Nature Reserve) is confirmed after the finding of three males. The host plant of this species is found to be *Seseli intermedia*. *Chrysolina daghestanica* (Reitter, 1912) is synonymized with *Ch. cuprina* (Duftschmid, 1825); *Ch. dudkoi ivanovskiana* Mikhailov, 2000 is synonymized with *Ch. dudkoi dudkoi* Mikhailov, 2000; *Ch. tolli kodarensis* is synonymized with *Ch. cavigera pirka* Takizawa, 1970. The infrasubspecific rank of the variety *Ch. hyrcana* var. *cyanescens* Jacobson, 1894 is confirmed. The neotype of *Ch. sahlbergii* (Ménétriés, 1832) is designated. The systematic position of *Ch. arctoalpina* Mikhailov, 2006, *Ch. kholsunica* Mikhailov, 2001, *Ch. kuznetzowi* (Jacobson, 1897), *Ch. soiota khakassa* Mikhailov, 2002, *Ch. cuprina dilecta* Bechyné, 1952, *Ch. poretzkyi* (Jacobson, 1897), *Ch. seriepunctata* (Weise, 1887), and *Ch. ambulans* (Faldermann, 1835) is discussed. The authorship and date of the original publication of one name are improved, namely: *Chrysomela discipennis* Ménétriés, 1848.

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This communication contains notes on the taxonomy and distribution of some species of the genus *Chrysolina* Motschulsky, 1860, most of which were considered in my previous papers (Bieńkowski, 2010, 2011).

## *Chrysolina ambulans* (Faldermann, 1835).

The type of this taxon has not been examined by modern authors, whereas the original description (Faldermann, 1835) does not allow the species to be reliably identified. Therefore, I have not included *Ch. ambulans* in the key. Weise (1898) regarded *Ch. ambulans* a synonym of *Ch. oricalcia* (Müller, 1776) without any explanation. This synonymy appears doubtful since *Ch. ambulans* was described from Irkutsk, whereas *Ch. oricalcia* is a European species that is absent in Siberia (Bieńkowski, 2001).

## *Chrysolina arctoalpina* Mikhailov, 2006.

The species was described from Kuznetsk Alatau. The original description of this taxon (Mikhailov,

2006), giving no way to differentiate it from *Ch. sylvatica*, provides the following differences between this taxon and *Ch. sylvatica* specimens collected together with it: in males, smaller body length and width, and correspondingly, shorter and narrower pronotum and elytra; coarse punctation on the pronotum, strongly convex interstices of the elytra; in the aedeagus morphology: the presence of lateral preapical “shoulder”-like protrusions on the lower side. Females are distinguished by strongly convex interstices of the elytra, a more flattened body, and a bicolored dorsum. These external differences fall within the range of individual variation of *Ch. sylvatica* in different parts of its range (Bieńkowski, 2007), whereas the differences in the aedeagus morphology are in my opinion not sufficient to justify the status of a distinct species. Given the small number of males compared by Mikhailov (2006) (5 specimens of *Ch. arctoalpina* from each of the two localities and 9 specimens of *Ch. sylvatica* from the type locality of *Ch. arctoalpina*) and considerable variation within each sample

(the elytra of *Ch. arctoalpina* are 5.2–6.0 mm long and 4.1–4.8 mm wide; those of *Ch. sylvatica* are 5.8–6.8 mm long and 4.8–5.5 mm wide), the differences cannot be considered statistically significant. In view of the above, I have not included *Ch. arctoalpina* in the key.

***Chrysolina cavigera pirka*** Takizawa, 1970.

*Ch. tolli kodarensis* Mikhailov, 2006, **syn. n.**

In my recent revision (Bieńkowski, 2007) of the subgenus *Pleurosticha* of the genus *Chrysolina*, *Ch. cavigera* (Sahlberg, 1887) was found to include three subspecies: the nominotypical one distributed in the Chukchi, Kamchatka, and Alaska peninsulas; *Ch. cavigera tolli* (Jacobson, 1910) distributed in the Arctic Asia west of the Chukchi Peninsula; and *Ch. cavigera pirka* known from Irkutsk Province, Buryatia, Transbaikalia and Khabarovsk territories, and Sakhalin and Hokkaido islands. The subspecies *Ch. tolli kodarensis* was recently described from the Kodar Range in the Transbaikalia (Mikhailov, 2006). Its type series includes 3 males and 1 female, which is not enough to reliably demonstrate the existence of a subspecies. My material (Bieńkowski, 2007) comprises 2 males and 6 females from the type locality of *Ch. cavigera kodarensis*, including those collected simultaneously with the specimens from the type series of this taxon. They correspond to the original description in all the characters. In my opinion, these specimens actually belong to *Ch. cavigera pirka*, which is usually characterized by dark metallic coloration of the legs (and dorsum). Specimens of this subspecies from the Baikal Range (Irkutsk Prov.) and the Kodar Range sometimes have rufous legs (Bieńkowski, 2007); therefore, specimens with rufous legs cannot be regarded as a geographic form different from *Ch. cavigera pirka*. It is interesting that the nominotypical subspecies *Ch. cavigera cavigera* is also represented on the Chukchi and Alaska peninsulas by specimens with both rufous and dark metallic coloration of the legs.

***Chrysolina cerealis*** (Linnaeus, 1767).

In the recent interpretation (Bieńkowski, 2004), this species is believed to be represented in Russia and the adjacent European countries by three subspecies which are difficult to differentiate: *Ch. cerealis cerealis* is distributed from the taiga to the forest-steppe zone and in the South Urals, *Ch. cerealis rufolineata* (Motschulsky, 1860) occurs in the Crimea, in the

steppe zone of European Russia, and in the Caucasus, while *Ch. cerealis alternans* (Panzer, 1799) occurs in Ukraine. The structure of the species is in need of revision which would require extensive material; therefore I have not dealt with these subspecies in the key (Bieńkowski, 2010).

***Chrysolina circumducta*** (Ménétriés, 1848).

The rank of *Chrysomela hyrcana* var. *cyanescens*, described from Astrakhan Province (Jacobson, 1894), was downgraded by Weise (1916) to an aberration of *Ch. hyrcana* (Weise, 1884). Examination of the syntypes of the variety *cyanescens* has shown them to be conspecific with *Ch. circumducta*. The dorsal coloration in the syntypes of the variety *cyanescens* ranges from blue (the distinguishing character of this variety) to bronze black (the usual coloration of *Ch. circumducta*).

**Material.** Syntypes of *Chrysomela hyrcana* var. *cyanescens* with labels: “Khanskaya Stavka, Ryn sands Astr[akhan] Plyushchevskii,” “coll. G. Jacobson”: 7 ♂, 2 ♀ (ZIN). Specimens of *Ch. circumducta* from Georgia, Armenia, Azerbaijan, European Russia (Volgograd, Saratov, and Astrakhan provinces, Kalmykia), Kazakhstan, and Turkey were examined.

***Chrysolina cuprina*** (Duftschmid, 1825).

*Chrysomela daghestanica* Reitter, 1912, **syn. n.**

Bechyné (1949, 1950) considered *Chrysolina daghestanica* an East Caucasian subspecies of *Ch. hyperici* (Forster, 1771). The characters of *Ch. daghestanica* mentioned by the cited author reveal an erroneous interpretation of the taxon. Based on examination of the syntype of *Ch. daghestanica* (Fig. 4) and additional material, I can conclude that *Ch. daghestanica* and *Ch. cuprina* are conspecific. The syntype of *Ch. daghestanica* is a female 6.5 mm long: dorsum purple red with golden-green scutellum, venter dark blue, legs with aeneous sheen, 1st and 2nd antennal segments reddish (other segments missing); sides of pronotum uniformly arcuately rounded, lateral grooves at base of pronotum deep, extending to 1/3 its length; rows 4, 5, 8, and 9 on elytra comprising 20, 21, 24, and 25 punctures, respectively; wings normally developed, longer than elytra. The coloration of other specimens from the Caucasus is either the same as in the type of *daghestanica*, or with a unicolored dorsum: blue, blue-green, copper-green, or purple. *Chrysolina*

*cuprina* was recently reported for the first time from the South Urals: Chelyabinsk Province (Bieńkowski, 2004). Later, one more male was found within the same region, in Bashkiria.

**Material.** Syntype of *Chrysomela daghestanica* with labels: “Daghestan Leder. Reitter,” “*Chr. daghestanica* m. 1910,” “Coll. Reitter,” ♀ (HNHM). **Russia.** *Bashkiria*, Irgizly: Lysaya Mt., 24.VI.1899 (Jacobson and Schmidt), 1 ♂; 26 spec. from Ukraine, Krasnodar Territory, Kabardino-Balkaria, North Ossetia, Chechnya, Georgia, and Azerbaijan.

***Chrysolina cuprina dilecta*** Bechyné, 1952.

The subspecies was very briefly described by Bechyné (1952) based on material from Altai (Semenovskoe) and the south of Krasnoyarsk Territory (Minusinsk): “much smaller (5–6 mm) than the European form, with both sexes strongly shining, bright copper in color with purple sheen.” These characters correspond to *Ch. difficilis*, the only species of the subgenus *Hypericia* presently known from South Siberia. Bechyné (1952) erroneously regarded *Ch. difficilis* a subspecies of *Ch. (Allohypericia) aeruginosa* (Faldermann, 1835). It may therefore be assumed that *Chrysolina cuprina dilecta* Bechyné, 1952 is a junior synonym of *Ch. difficilis*. To make the final conclusion on the status of *Ch. dilecta* one needs to examine the type specimens. Due to its uncertain position, this taxon is not included in the key.

***Chrysolina didymata*** (Scriba, 1791).

The species was reported twice from the territory of Ukraine: from West Podolia (Kuntze and Noskiewitz, 1938) and from Uzhgorod (Roubal, 1941), but it was not listed in the review of the Ukrainian fauna (Brovdii, 1977). My material includes 1 female from Ukraine (Fig. 5) which does not differ from the West European specimens of *Ch. didymata* in coloration (blue body), morphology of the pronotum (with short and shallow lateral grooves and numerous punctures in front of them), and elytral punctation.

**Material. Ukraine.** Kamianets-Podilskyi, 1 ♀. Eight specimens from Austria, Yugoslavia, Armenia, Turkey, and Turkmenia were also examined.

***Chrysolina difficilis*** (Motschulsky, 1860).

The species includes 3 subspecies with unclear differences. According to the modern views (Bieńkowski,

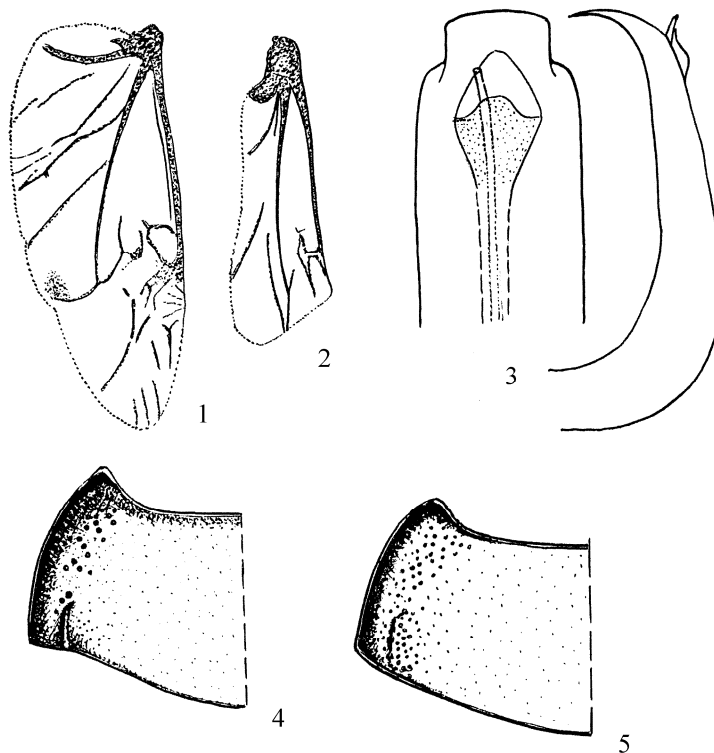
2001), the nominotypical subspecies occurs in Altai and the Sayan Mountains; *Ch. difficilis ussuriensis* (Jacobson, 1901) (*sibirica* Weise, 1887, nec Gebler, 1830) occurs in Amurskaya Province, Khabarovsk (the Badzhal Range) and Primorskii territories, and Northeast China; *Ch. difficilis yezoensis* (Matsumura, 1911) occurs on Sakhalin Island, in Japan, the Korean Peninsula, and Northeast China. The status of these taxa needs to be revised based on investigation of an extensive material, therefore they are not included in the key (Bieńkowski, 2010).

***Chrysolina dudkoi*** Mikhailov, 2000.

*Ch. dudkoi ivanovskiana* Mikhailov, 2000, **syn. n.**

The nominotypical subspecies and *Ch. dudkoi ivanovskiana* were described by Mikhailov (2000) based on 4 and 6 specimens, respectively. Each subspecies was described from one locality, the distance between the two type localities being 42 km. In a subsequent paper devoted to the biology of *Ch. dudkoi*, Mikhailov (2001) did not consider different subspecies, even though at that moment he already had over 20 specimens from several West Altai localities. Having examined the paratypes of the two nominal taxa and some additional material, I found only insignificant differences in coloration which, in the absence of geographic isolation, cannot justify the status of distinct subspecies.

**Material.** *Chrysolina dudkoi dudkoi*: paratype with labels: “W Altai, 35 km NNE of Leninogorsk, 20 km NW of Lyamin Belok Mt., h = 800 m, dark taiga R. Dudko leg. 14.06.1996,” “PARATYPUS *Chrysolina dudkoi dudkoi* sp. et ssp. n. Yu. Mikhailov det. 1999,” ♀ (SZM). *Chrysolina dudkoi ivanovskiana*: paratypes with labels: “W Altai, Ivanovskii Range, 15 km SE of Leninogorsk, W slope of Rossypnoi Belok Mt., h = 2000 m, tundra, boulder stream R. Dudko leg. 1.06.1996,” 1 ♀ (SZM); “W Altai, Ivanovskii Range, 15 km SE of Leninogorsk, top of Rossypnoi Belok Mt., h = 2300 m, tundra R. Dudko, A. Vorontzov 2.06.1996,” 1 ♀ (SZM), both specimens with red labels “Paratypus *Chrysolina dudkoi ivanovskiana* ssp. n. Yu. Mikhailov det. 1999”; East Kazakhstan, Ivanovskii Range, subalpine meadows, 1700 m above sea level, 6–7.VI.2000 (Yu. Mikhailov), 4 ♂, 4 ♀; 10 km SE of Leninogorsk, 600 m above sea level, 30.V.1996 (R. Dudko, A. Vorontzov), 2 ♀; 35 km NNE of Leninogorsk, 20 km NW of Lyamin Belok Mt., h = 800 m, taiga, 14.VI.1996 (R. Dudko), 1 ♀; “Altai,” 1 ♂; “Siberia,” 1 ♀.



**Figs. 1–5.** *Chrysolina* Motsch., wing (1, 2), aedeagus in dorsal and lateral views (3), and pronotum (4, 5): (1) *Ch. sahlbergii*, neotype, ♀; (2) *Ch. halysa*, ♀; (3) *Ch. roddi*, ♂, Galichia Gora; (4) *Ch. cuprina* (*Ch. daghestanica*, syntype, ♀); (5) *Ch. didymata*, ♀, Kamianets-Podilskyi.

***Chrysolina kholsunica* Mikhailov, 2001.**

Due to its uncertain systematic position, this taxon is not included in the key. It is known from a single male and is very close to *Ch. dudkoi*, differing from the latter (according to the original description) in greenish blue coloration, the shape of the notch on the last abdominal sternite, the proportions of hind tarsomeres (the 1st tarsomere is longer, the 2nd and 3rd tarsomeres are narrower than in *Ch. dudkoi*), and a more elongate apical lobe of the aedeagus (Mikhailov, 2001).

***Chrysolina kuznetzowi* (Jacobson, 1897).**

The species was described from 2 females collected on the Lozva River (a tributary of the Tavda) in the North Urals (Jacobson, 1897). The type specimens were kept in the collection of P.P. Semenov-Tian-Shansky, which is now incorporated into the ZIN collections. I have found only the label with the species' name written by G. Jacobson but the specimens themselves are missing. Medvedev and Korotyayev (1980) synonymized this name with *Ch. septentrionalis* (Ménétriés, 1851) without any reference to the type material examined. According to the original description,

*Ch. kuznetzowi* may be conspecific with *Ch. (Pleurosticha) cavigera tolli* rather than with *Ch. septentrionalis*; this view is supported by such characters as the large body size (7 mm long and 5.3 mm wide) and the shape of the last abdominal sternite (with a coarsely punctate impression on either side). Examination of material from the type locality is required to determine the identity of this taxon. Due to its uncertain position, *Ch. kuznetzowi* is not included in the key.

***Chrysolina limbata discipennis* (Ménétriés, 1848).**

The original description of *Ch. discipennis* is usually cited as “Faldermann, 1835, Mem. Ac. Petersb. II, p. 268, t. 4, f. 14” (Suffrian, 1851; Suffrian and Fairmaire, 1854; Gemminger and Harold, 1874; Weise, 1884; Marseul, 1887; Weise, 1916; Brovdii, 1977; Medvedev, 1982; Medvedev and Okhrimenko, 1991; Warchałowski, 1993; Bieńkowski, 2001). However, no such publication has ever existed, nor is the description of *Ch. discipennis* present in any of F. Faldermann's works. The name *Chrysomela discipennis* Faldermann was first published in the catalogue of Dejean (1837), but this name is invalid since it is not

accompanied by a description, illustration, or reference to an earlier publication. The earliest description of the taxon was published by E. Ménétriés (1848), who should therefore be regarded as author of the name *discipennis*; the year of description is 1848.

***Chrysolina oirot*** Lopatin, 1990.

The species was described based on 2 specimens from “Altai” without a more precise indication of locality (Lopatin, 1990). My material includes a male which is similar to the holotype both in external characters and in aedeagus morphology. Specimens from West Altai, strongly differing from the holotype in coloration and aedeagus morphology, were identified as *Ch. oirot* by Mikhailov (2000); they may actually belong to some other, still undescribed species.

**Material.** Holotype with labels “Altai,” “Siberia Alai,” [sic!], “*Chrysolina undulata* Gebl.,” “Holotypus” (red), “*Chrysolina oirot* sp. n. det. I. Lopatin, 1985,” ♂ (ZIN). **Russia**, West Altai, Kholzun Range, near source of Bannaya River, 2000–2300 m above sea level, 22.VI.2005 (A.G. Koval), 1 ♂.

***Chrysolina poretzkyi*** (Jacobson, 1897).

Having failed to locate the type of *Ch. poretzkyi*, Mikhailov (2006) designated a specimen from a locality more than 230 km north of the original type locality and in a different landscape, as the neotype of this species. As was demonstrated in my earlier paper (Bieńkowski, 2007), the characteristic of *Ch. poretzkyi* given by Mikhailov (2006) differs from the original description in a number of essential characters and in fact corresponds to *Ch. tundralis* (Jacobson, 1910). Thus, designation of the neotype of *Ch. poretzkyi* by Mikhailov (2006) cannot be considered valid (*International Code of Zoological Nomenclature*, 2000, Art. 75.3.5 and 75.3.6).

***Chrysolina roddi*** (Jacobson, 1897).

Galichia Gora (Lipetsk Prov., 30 km E of Elets) is the westernmost point of the known range of this species. The finding of 3 males (Fig. 3) and comparison of their aedeagi with those of the males from the South Urals confirm the correctness of my earlier record of *Ch. roddi* for Galichia Gora, which was based on a female specimen (Bieńkowski, 2004). Feeding of *Ch. roddi* on the umbellate *Seseli intermedia* was observed under natural conditions in Galichia Gora and

also confirmed for captive adults by M.N. Tsurikov (pers. comm.). The larvae hatched from eggs laid by a captive female were reared by me on *S. intermedia* leaves until they reached the 4th instar.

**Material.** **Russia**, *Lipetsk Prov.*, Galichia Gora, a limestone slope, in loose upper soil layer and on the soil surface under moss, 17.VI.2005 (M.N. Tsurikov), 1 ♂; 24.VI.2007 (M.N. Tsurikov), 1 ♂; 30.VII.2007 (A.O. Bieńkowski), 1 ♂; *Chelyabinsk Prov.*, Ilmen Reserve, 5.V.1958 (Yu.I. Novozhenov), 1 ♂. South Urals, 1 ♂.

***Chrysolina sahlbergii*** (Ménétriés, 1832).

The fauna of the Caucasus includes 2 close species: *Ch. sahlbergii* and *Ch. halysa* Bechyné, 1950. They can be most reliably differentiated by the length of their wings, which are normally developed, wide, 1.5 times as long as elytra in the former species (Fig. 1) and reduced, narrow, reaching only the tip of elytra in the latter (Fig. 2) (Bechyné, 1950). This character is not linked with sex; no intermediate variants have been found. However, the original description of *Ch. sahlbergii* includes no information on the wing length, whereas its type was not examined by any of the later authors. According to Horn and Kahle (1935–1937), the types of some species described by E. Ménétriés are in the ZIN collections. The type of another species described by the same author, *Ch. circumducta* Ménétriés, was located by me at ZMHU. The search for the type of *Ch. sahlbergii* in these and other museums has failed, therefore this specimen has to be considered lost. For the purpose of clear identification of both taxa, I designate here the neotype of *Ch. sahlbergii*. The neotype corresponds to the original description (Ménétriés, 1832) and maintains the accepted concept of this taxon (Bechyné, 1950). The choice of a female specimen for the neotype is acceptable since *Ch. sahlbergii* and *Ch. halysa* differ well in the wing length whereas the shape of the aedeagus is similar in the two species. *Chrysolina sahlbergii* was described from Azerbaijan (“Lenkoran”); the locality of the neotype lies 15 km from Lenkoran.

**Neotype** (Fig. 1). Dorsum olive-green, dull, large punctures on elytra black with narrow reddish-purple edge, venter and legs bluish black, basal 2/5 of pronotum with narrow lateral groove, apical 3/5 of pronotum without depression or large punctures; elytra with

10 rows of sparse large punctures (including a short row near scutellum), 4th complete row with 13 punctures; wings fully developed. Body length 8.4 mm.

**Material.** Neotype (designated here) with labels: "Azerb. SSR, Hirkan State Reserve, 27.1.1981, A. Zvantsov," "Neotype *Chrysomela sahlbergii* Menetries, 1832. Bieńkowski design. 2007" (red), ♀ (ZIN).

***Chrysolina seriepunctata*** (Weise, 1887).

Bechyné (1952) included *Ch. seriepunctata* in the subgenus *Allohypericia*. However, *Ch. seriepunctata* differs strongly from all the species of *Allohypericia* but resembles *Ch. tesari* (Roubal, 1936) and *Ch. pusa* (Lopatin, 1962) of the subgenus *Chalcoidea*, in the shape of the aedeagus (flat, apically truncate, with a narrow and short protrusion, bent twice in lateral view). At the same time, the last abdominal sternite in the male of *Ch. seriepunctata* has a deep semicircular notch, similar to that in representatives of the subgenus *Pleurosticha* from which the species differs sharply in the aedeagus morphology. In my opinion, *Ch. seriepunctata* occupies an isolated position in the genus.

**Material. Russia:** *Amurskaya Prov.*, interfluvium of the Malaya Pera and Bolshoi Ergel, 6.VI.1958 (Zinoviev), 1 ♂; *Primorskii Territory*: Ussuriisk District: Yakovlevka, 1927 (Kvashuk), 2 ♀; Kamenushka, 2.VIII.1989 (S. Khvylyya), 1 ♀; Shkotovo, 3.VI.1927 (Rezvoi), 1 ♀.

***Chrysolina soiota khakassa*** Mikhailov, 2002.

The subspecies *Ch. soiota khakassa* is presently known from the only male type specimen (Mikhailov, 2002). Even though this name is acceptable from the nomenclatural standpoint, it cannot be considered valid for a subspecies since there are no data to confirm the existence of an infraspecific geographic form showing significant morphological differences from the nominotypical subspecies. Geographic variation justifying the status of a separate subspecies should be demonstrated on a much more extensive material. The type specimen of *Ch. soiota khakassa* may as well be a teratous specimen of *Ch. soiota*, an interspecific hybrid (examples of this kind are known in the genus *Chrysolina*), or even a different species. Due to its uncertain taxonomic status, *Ch. soiota khakassa* was tentatively considered by me (Bieńkowski, 2001) a synonym of *Ch. soiota*.

***Chrysolina staphylaea sharpi*** (Fowler, 1890).

The subspecies was described from the saline coastal habitats in Great Britain (Fowler, 1890). The form found in the maritime meadows of Kandalaksha Bay, the White Sea, differs considerably from the nominotypical subspecies *Ch. staphylaea staphylaea* (Linnaeus, 1758) in coloration (dull, with no trace of metallic sheen) and belongs to the subspecies *Ch. staphylaea sharpi*. Earlier, I found another example of such a distributional pattern: *Longitarsus plantagomaritimus*, known from the British and continental coasts of the North Sea, was recorded on the coast of Kandalaksha Bay, the White Sea (Bieńkowski, 1997).

**Material. Russia.** *Murmansk Prov.*, Kandalaksha District, 12 km SE of Poyakonda, and *Karelia*, Loukhi District, Chernaya Reka, maritime meadows, V–IX.1987–1990 (A. Bieńkowski), 300 spms.

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