

New and little-known bees of the genus *Colletes* Latreille, 1802 (Hymenoptera, Colletidae) from Siberia

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Abstract

An annotated list of seven species of rarely collected and little-known bees of the genus *Colletes* from Siberia is given, including five species whose ranges within the region are enlarged. *Colletes ravuloides* Kuhlmann & Proshchalykin, **sp. nov.** is described from Tyva Republic (Russia). An updated checklist of the 27 species of *Colletes* so far known from Siberia is provided.

Keywords

Anthophila, Apiformes, fauna, new records, new species, Palaearctic

Introduction

Siberia is a major geographical region (total area about 13,100,000 km²) extends eastwards from the Ural Mountains to the Pacific Ocean, and includes most of the drainage basin of the Arctic Ocean. The river Yenisey divides Siberia into two parts: Western and Eastern (Fig. 1).

There are currently about 490 species of bees known from Siberia (Lelej et al. 2017), although this is undoubtedly a gross underrepresentation due to sparse sampling that has been done on the fauna, and new records and species are frequently discovered (Byvaltsev et al. 2018, 2021; Byvaltsev and Proshchalykin 2019; Proshchalykin and Müller 2019; Sidorov et al. 2020; Litman et al. 2021; Astafurova and Proshchalykin 2022; Sidorov and Proshchalykin 2022).

The genus *Colletes* Latreille, 1802 currently includes roughly 520 described species with an estimated total of about 700 species (Kuhlmann and Proshchalykin 2011) from all continents except Antarctica and Oceania (Michener 2007; Kuhlmann 2014). In recent years significant progress has been made towards a better knowledge of species of *Colletes* in Russia (Kuhlmann and Proshchalykin 2011, 2014; Proshchalykin and Kuhlmann 2012, 2015, 2019, 2020). Currently 53 species are known from this country (Proshchalykin and Kuhlmann 2020). Considering our latest data, the genus *Colletes* is one of the best studied genera among the bees of Siberia.

Based on a study of recently collected specimens we here provide additional geographical data for seven rarely collected and little-known species of *Colletes*, with one species described as new and five species recorded from certain regions of Siberia for the first time. Including published records, a total of 27 species are now known from this region (Western Siberia – 18; Eastern Siberia – 26) (Table 1). The number of *Colletes* species in the fauna of Russia is now increased to 54.

Materials and methods

The results presented in this paper are based on 115 specimens newly collected in Siberia and currently housed in the Zoological Institute, Russian Academy of Sciences (St. Petersburg, Russia, **ZISP**); Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of Russian Academy of Sciences (Vladivostok, Russia, **FSCV**) and the research collection of M. Kuhlmann at the Zoological Museum of Kiel University (Kiel, Germany, **RCMK**).

Notes on the general distribution of species follow Proshchalykin (2017) and Proshchalykin and Kuhlmann (2018).

Morphological terminology as well as measurements used in the descriptions follow those of Michener (2007). Puncture density is expressed as the relationship between puncture diameter (d) and the space between them (i), such as $i = 1.5d$ or $i < d$. The letters T and S are used as abbreviations of metasomal tergum and sternum, respectively. Body length is measured from the vertex to the tip of the metasoma in profile.

Images were taken with a digital microscope (Keyence VHX-5000) using the VH-Z20R/Z20T (20× to 200×) zoom lens and the OP-42305 super diffused illumination adapter. Images were stacked for extended depth-of-field and processed using Adobe Photoshop Elements 2021 (Adobe Systems Software Ireland Limited, Republic of Ireland) and then assembled into the figure plates.

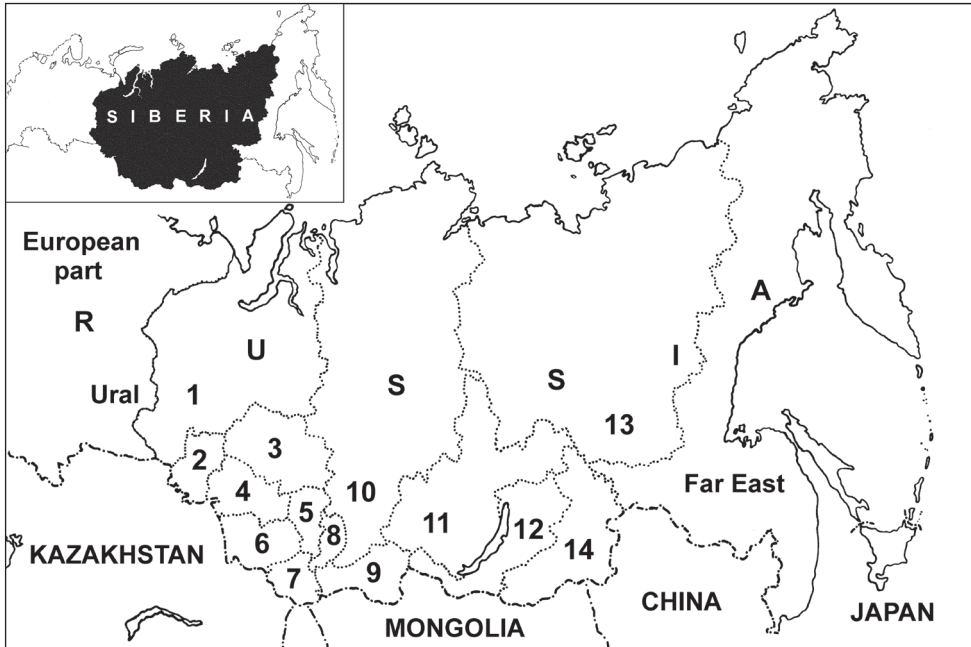


Figure 1. Administrative map of Siberia (I–II, 1–14) (from Proshchalykin and Kuhlmann 2015). **I** Western Siberia. **1** Tyumen Province **2** Omsk Province **3** Tomsk Province **4** Novosibirsk Province **5** Kemerovo Province **6** Altaijskiy Territory **7** Altai Republic. **II** Eastern Siberia. **8** Khakass Republic **9** Tyva Republic **10** Krasnoyarsk Territory **11** Irkutsk Province **12** Buryatia Republic **13** Sakha Republic (Yakutia) **14** Zabaikalskiy Territory.

Images were taken with a digital microscope (Keyence VHX-5000) using the VH-Z20R/Z20T (20× to 200×) zoom lens and the OP-42305 super diffused illumination adapter. Images were stacked for extended depth-of-field and processed using Adobe Photoshop Elements 2021 (Adobe Systems Software Ireland Limited, Republic of Ireland) and then assembled into the figure plates.

Results

List of species for which new geographical data are provided

Colletes caspicus Morawitz, 1873

Colletes caspicus Morawitz, 1873: 174–175, ♀, ♂ (lectotype: ♀, designated by Proshchalykin and Kuhlmann 2019: 160, Derbent, Dagestan Republic, Russia [Oberösterreichisches Landesmuseum, Linz, Austria]).

Material examined. **RUSSIA:** Khakassia Republic, Sosnovoe Lake, 53°15'41"N, 90°54'4"E, 2.VIII.2018, (1 ♂), SL, DS [FSCV]; *Tyva Republic:* 11 km W of Ust'-Elegest, 51°33'9"N, 93°59'22"E, 27.VII.2018, (3 ♀), SL, DS [FSCV/RCKM].

Distribution. Europe, Russia (European part, Urals, Siberia), Georgia, Azerbaijan, Iran, Central Asia, China.

Remarks. *Colletes caspicus* is herein recorded from Khakassia Republic for the first time.

Colletes cinerascens Morawitz, 1893

Colletes cinerascens Morawitz, 1893: 80, ♂ (lectotype: ♂, designated by Kuhlmann 2000: 179, Jagnob: Kol, Tajikistan [ZISP]).

Material examined. RUSSIA: Altai Republic, Tydtuyaryk River valley, 50°04'25"N, 88°25'12"E, 12.VI.2022, (4 ♂); idem, 18.VI.2022, (2 ♂), MP [FSCV/ZISP]; 6 km SW of Chagan-Uzun, "Mars", 50°03'50"N, 88°18'45"E, (1 ♂), 22.VI.2022, MP [FSCV]; idem, 25.VI.2022, (1 ♂), AF [RCMK]; 5 km NE of Kokorya, 49°57'00"N, 89°04'19"E, 24.VI.2022, (7 ♂); MP [FSCV/RCMK]; 4 km SW of Tashanta, 49°42'06"N, 89°06'53"E, 27.VI.2022, (1 ♂) MP [FSCV].

Distribution. Russia (Siberia), Kazakhstan, Kyrgyzstan, Tajikistan, Mongolia, China.

Remarks. *Colletes cinerascens* is herein recorded from Altai Republic for the first time.

Colletes ebmeri Kuhlmann, 2002

Colletes ebmeri Kuhlmann in Kuhlmann and Dorn 2002: 95–96, ♀, ♂ (holotype: ♂, Bajanchongor aimak, Changai Gebirge, Ulaan olon, 18 km S vom Pass Egijn davaa, Mongolia [Hungarian Natural History Museum, Budapest, Hungary]).

Material examined. RUSSIA: Altai Republic, Tydtuyaryk River valley, 50°04'25"N, 88°25'12"E, 12.VI.2022, (1 ♂), MP [RCMK]; 4 km SW of Tashanta, 49°42'06"N, 89°06'53"E, 27.VI.2022, (1 ♀, 17 ♂), MP [FSCV/ZISP/RCMK]; 14 km SE of Aktash, 50°13'59"N, 87°45'28"E, 28.VI.2022, (1 ♂), MP [FSCV].

Distribution. Russia (Siberia), Kazakhstan, Mongolia.

Remarks. *Colletes ebmeri* is herein recorded from Altai Republic for the first time.

Colletes fulvicornis Noskiewicz, 1936

Colletes fulvicornis Noskiewicz, 1936: 416, ♀, ♂ (lectotype: ♂, designated by Kuhlmann 2000: 180, Cholt, Gobi, Mongolia [Museum of Natural History, University of Wrocław, Poland]).

Material examined. RUSSIA: Altai Republic, 4 km SW of Tashanta, 49°42'06"N, 89°06'53"E, 27.VI.2022, (28 ♂) MP [FSCV/ZISP/RCMK].

Distribution. Russia (Siberia), Mongolia, China.

Remarks. This species has been known in Altai Republic only from two females collected in Dzhulukul Lake [50°29'N, 89°42'E] (Proshchalykin and Kuhlmann 2015: 332).

Colletes pseudocinerascens Noskiewicz, 1936

Colletes pseudocinerascens Noskiewicz, 1936: 424, ♀, ♂ (lectotype: ♂, designated by Kuhlmann 2000: 181, Jakutsk, Sakha Republic, Russia [ZISP]).

Material examined. **RUSSIA:** Altai Republic, Tydtuyaryk River valley, 50°04'25"N, 88°25'12"E, 15.VI.2022, (1 ♀, 18 ♂); idem, 18.VI.2022, (12 ♂); idem, 19.VI.2022, (1 ♂) MP [FSCV/ZISP/RCMK]; 15 km SE of Kuray, 50°11'10"N, 88°07'04"E, 17.VI.2022, (1 ♀, 2 ♂), MP; idem, (2 ♂), AF [FSCV/ZISP]; 5 km NE of Kokorya, 49°57'00"N, 89°04'19"E, 24.VI.2022, (1 ♀, 5 ♂); idem, 26.VI.2022 (2 ♂), MP [FSCV/RCMK].

Distribution. Russia (Siberia), Mongolia.

Remarks. *Colletes pseudocinerascens* is herein recorded from Altai Republic for the first time.

Colletes ravuloides Kuhlmann & Proshchalykin, sp. nov.

<https://zoobank.org/A9907C6C-0060-46D0-9E85-8A4A69C7E965>

Figs 2A, B, 3A, B, 4A, B

Type material. **Holotype:** 1 ♂, 51.5525°N, 93.9894°E, TYVA, 11 km W of Ust'-Elegest, steppe, 27.VII.18, Luzyanin, Sidorov" (label in Russian) (ZISP).

Paratype: 1 ♂, same data as Holotype (RCMK).

Diagnosis. According to the male S7 the new species is apparently closely related to two other very rarely collected and little-known species: *Colletes tardus* Noskiewicz, 1936, that is only known from southern Ukraine (Proshchalykin and Kuhlmann 2012), and *C. ravulus* Noskiewicz, 1936, that so far has only been recorded by a few specimens from Siberia (Buryatia Republic, Tyva Republic), NE Mongolia and China (Inner Mongolia, Xinjiang, Shanxi) (Kuhlmann and Proshchalykin 2011; Niu et al. 2014; Proshchalykin and Kuhlmann 2015). As far as known no specimen of *C. tardus* has survived in museum collections but according to the detailed description of Noskiewicz (1936: 294) the male of *C. ravuloides* differs from this species by the lack of short appressed hair on the disc of T1 (Fig. 3A), shorter hind basitarsus (Fig. 3B), S7 longer with posteriolateral corner tapered (Fig. 4A) (in *C. tardus* rounded like in *C. ravulus* (Fig. 4C)) and gonostylus slightly narrower. *Colletes ravuloides* and *C. ravulus* apparently occur in the same region and are very similar in appearance (Fig. 2A–D). In *C. ravulus* the punctuation of scutum and T1 is finer and denser (Fig. 3C), discs of T3–4 without short erect blackish hair, hind basitarsus longer (Fig. 3D), posteriolateral corner of S7 rounded and apical emargination deeper (Fig. 4C), gonostylus slightly longer and apically rounded (Fig. 4D). The male of *C. ravuloides* is best identified by the unique shape of S7 (Fig. 4A) in combination with the shortened hind basitarsus (Fig. 3B).

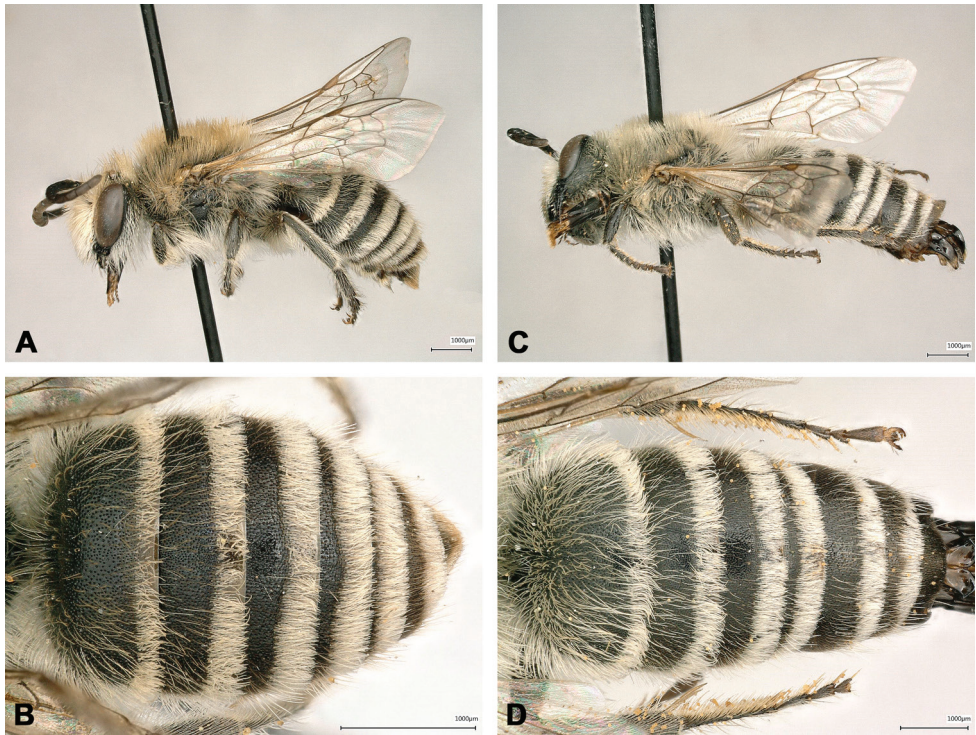


Figure 2. *Colletes navuloides* Kuhlmann & Proshchalykin, sp. nov., paratype, male **A** habitus, lateral view **B** metasoma, dorsal view. *Colletes navulus* Noskiewicz, male **C** habitus, lateral view **D** metasoma, dorsal view.

Description. Female: unknown.

Male. Body length: 9 mm. **Head:** Head wider than long. Integument black except mandible partly dark reddish-brown. Face densely covered with long, yellowish-white, erect hairs (Fig. 2A). Malar area medially about 1/3 as long as width of mandible base, finely striate. Antenna black, ventrally dark brown.

Mesosoma: Integument black. Mesoscutal disc sparsely punctate ($i = 3-4d$), between punctures smooth and shiny. Scutellum an anterior half nearly impunctate, apically densely punctate ($i < 1d$), surface smooth and shiny. Mesoscutum, scutellum, metanotum, mesepisternum and propodeum covered with long, yellowish-white to light yellowish-brown erect hair (Fig. 2A). Wings slightly yellowish-brown; wing venation and stigma brown. Legs with integument mostly blackish, tarsi partly dark yellowish-brown. Vestiture white (Fig. 2A). Hind basitarsus shortened (Fig. 3B).

Metasoma: Integument black except depressed apical tergal margins posteriorly yellowish-brown translucent (Fig. 3A). T1–2 densely covered with long, erect yellowish-white hairs (Fig. 3A), discs of T3–5 with short, erect blackish-brown hair; apical tergal depression and hair bands of T2 – T5 broad but narrower medially, about as broad as the respective discs and densely covered with long, appressed white hairs (Fig. 2B); apical tergal depression and hair band of T1 only about half the width of the other ones (Fig. 3A). T1 finely and densely punctate ($i = 0.5-1d$), between punctures

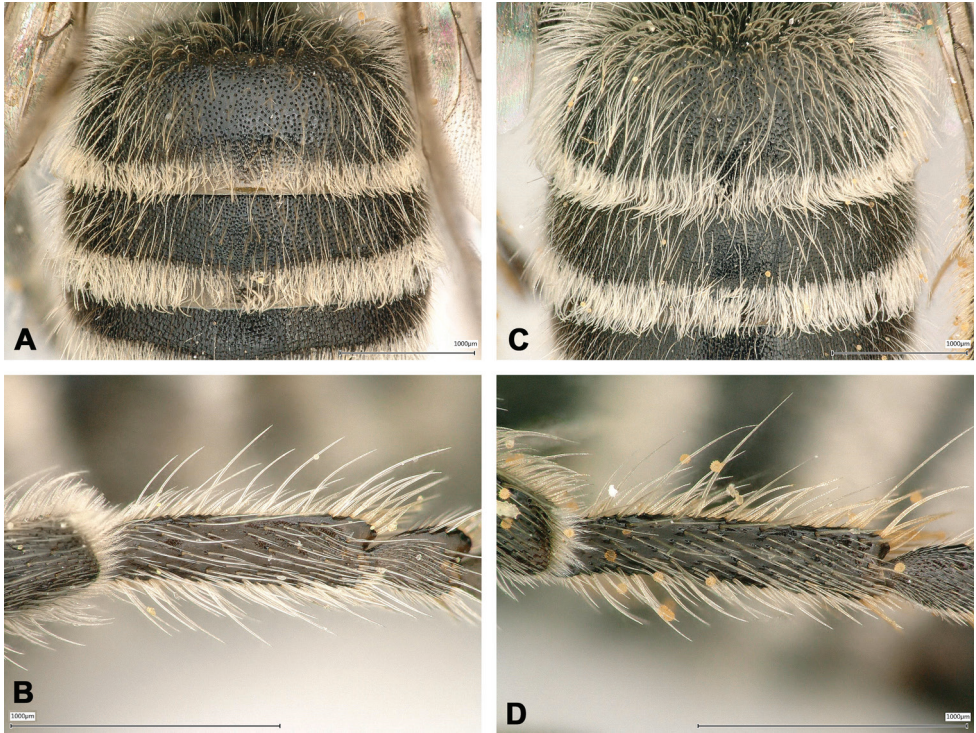


Figure 3. *Colletes ravulooides* Kuhlmann & Proshchalykin, sp. nov., paratype, male **A** metasomal terga 1 and 2, dorsal view **B** hind basitarsus, dorsal view. *Colletes ravulus* Noskiewicz, male **C** metasomal terga 1 and 2, dorsal view **D** hind basitarsus, dorsal view.

smooth and shiny (Fig. 3A), following terga successively with denser punctation. S7 (Fig. 4A) and gonostylus (Fig. 4B) as illustrated.

Etymology. The species name refers to its similarity to the closely related *C. ravulus* that occurs in the same region.

Distribution. The only record is from the type locality in Tyva Republic (Russia).

Phenology. Only recorded in July.

Colletes wacki Kuhlmann, 2002

Colletes wacki Kuhlmann in Kuhlmann and Dorn 2002: 102–103, ♀ (holotype: ♀, Uvs-Aimag, Charchira-ul, 30 km S Ulangom, Mongolia [Zentralmagazin Naturwissenschaftlicher Sammlungen, Martin-Luther-University, Halle, Germany]).

Material examined. **RUSSIA:** Altai Republic, Tydtuyaryk River valley, 50°04'25"N, 88°25'12"E, 14.VI.2022, (1 ♀); idem, 18.VI.2022, (1 ♀, 2 ♂), MP [FSCV/ZISP].

Distribution. Russia (Siberia), Kazakhstan, Mongolia, China.

Remarks. *Colletes wacki* is herein recorded from Altai Republic for the first time.

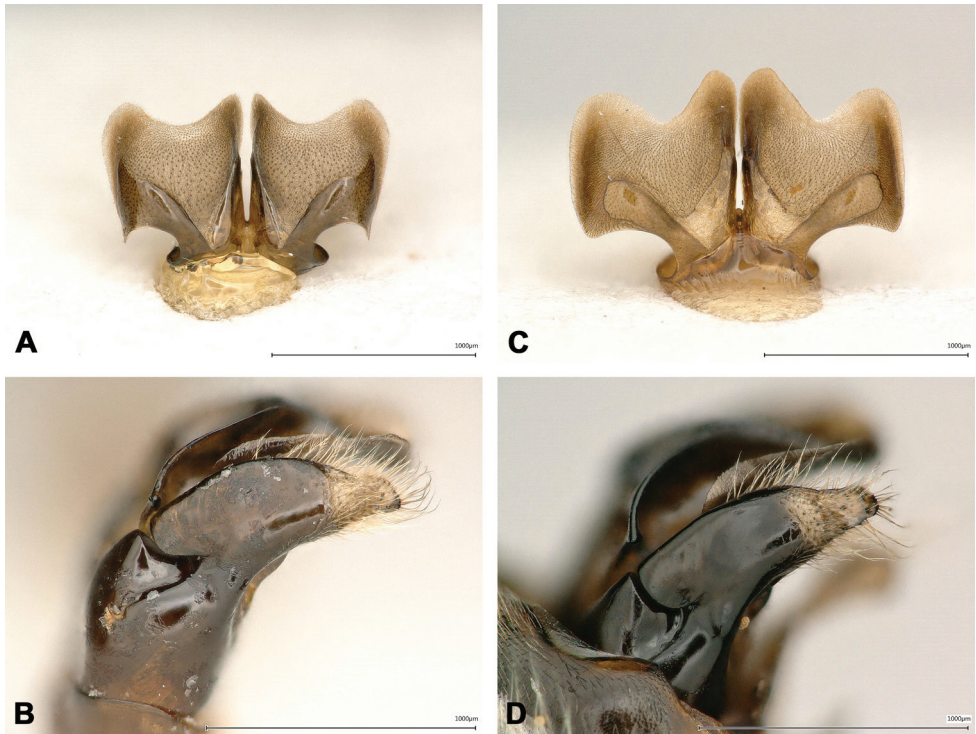


Figure 4. *Colletes ravuloides* Kuhlmann & Proshchalykin, sp. nov., paratype, male **A** metasomal sternum 7, dorsal view **B** gonostylus, lateral view. *Colletes ravulus* Noskiewicz, male **C** metasomal sternum 7, dorsal view **D** gonostylus, lateral view.

Discussion

In the present study, we list new records for six species of the genus *Colletes* from various localities in Siberia and describe a seventh. Together with published records, 27 *Colletes* species are currently known to occur in Siberia (Table 1). For comparison, 54 species have been recorded from Russia so far, with 38 species occurring in the European part, 13 in the Ural and eleven in the Far East (Proshchalykin 2017; Proshchalykin and Kuhlmann 2019, 2020). The Siberian *Colletes* fauna is composed of twelve widespread trans-Palaeartic or Euro-Asian species. Among these, six species are distributed from Europe to the Russian Far East and the eastern provinces of China, such as *Colletes chengtehensis*, *C. collaris*, *C. cunicularius*, *C. daviesanus*, *C. floralis*, and *C. impunctatus*. The other 15 Siberian *Colletes* species have smaller distribution ranges being restricted to the eastern Palaeartic. Among these, *Colletes cinerascens*, *C. ebmeri*, *C. friesei*, *C. kaszabi*, *C. laevifrons*, and *C. ravulus* have their main distribution in Central Asia, Mongolia and China, but also occur in steppes and semi-deserts of the Russian Altai, Buryatia and Tyva Republics. The new species (*Colletes ravuloides* sp. nov.) is steppe Siberian endemic distributed in south part of Tyva Republic.

Table 1. Checklist of the *Colletes* bees of Siberia. White circle – published records (Kuhlmann and Proshchalykin 2011; Proshchalykin and Kuhlmann 2015); black circle – new data.

No.	<i>Colletes</i> species	Western Siberia	Eastern Siberia
1	<i>C. alini</i> Kuhlmann, 2000		○
2	<i>C. caspicus</i> Morawitz, 1873	○	○
3	<i>C. chengtshensis</i> Yasumatsu, 1935	○	○
4	<i>C. cinerascens</i> Morawitz, 1893	●	○
5	<i>C. collaris</i> Dours, 1872	○	○
6	<i>C. cunicularius</i> (Linnaeus, 1760)	○	○
7	<i>C. daviesanus</i> Smith, 1846	○	○
8	<i>C. ebmeri</i> Kuhlmann, 2002	●	○
9	<i>C. floralis</i> Eversmann, 1852	○	○
10	<i>C. fodiens</i> (Fourcroy, 1785)	○	○
11	<i>C. friesei</i> Cockerell, 1918		○
12	<i>C. fulvicornis</i> Noskiewicz, 1936	●	○
13	<i>C. impunctatus</i> Nylander, 1852	○	○
14	<i>C. jankowskyi</i> Radoszkowski, 1891	○	○
15	<i>C. kaszabi</i> Kuhlmann, 2002		○
16	<i>C. kozlovi</i> Friese, 1913		○
17	<i>C. laevifrons</i> Morawitz, 1893	○	
18	<i>C. marginatus</i> Smith, 1846	○	○
19	<i>C. patellatus</i> Pïirez, 1905		○
20	<i>C. perforator</i> Smith, 1869		○
21	<i>C. pseudocinerascens</i> Noskiewicz, 1936	○	○
22	<i>C. ravuloides</i> Kuhlmann & Proshchalykin, sp. nov.		●
23	<i>C. ravulus</i> Noskiewicz, 1936		○
24	<i>C. roborovskyi</i> Friese, 1913		○
25	<i>C. sidemii</i> Radoszkowski, 1891	○	○
26	<i>C. similis</i> Schenck, 1853	○	○
27	<i>C. wacki</i> Kuhlmann, 2002	●	○
Total:		18	26

The number of Siberian *Colletes* species is supposed to be at least one fourth higher than known so far. We expect that several species that are known from Mongolia, Kazakhstan or northern China also occur in Siberia, such as *Colletes annejohnae* Kuhlmann, 2003, *C. conradti* Noskiewicz, 1936, *C. edentuloides* Kuhlmann, 2011, *C. morawitzi* Noskiewicz, 1936, or *C. pauljohni* Kuhlmann, 2002.

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