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THE CUCKOO BEE GENUS *SPHECODES* LATREILLE, 1804 (HYMENOPTERA: HALICTIDAE) IN KAZAKHSTAN

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Summary. In total, 31 cleptoparastic bee species of the genus *Sphecodes* Latreille (Halictinae: Halictini: Sphecodina) are listed from Kazakhstan, 18 of which are newly recorded for the country: *Sphecodes albilabris* (Fabricius, 1793), *S. alternatus* Smith, 1853, *S. anatolicus* Warncke, 1992, *S. armeniacus* Warncke, 1992, *S. crassus* Thomson, 1870, *S. cristatus* Hagens, 1882, *S. ferruginatus* Hagens, 1882, *S. haladai* Warncke, 1992, *S. hyalinatus* Hagens, 1882, *S. longulus* Hagens, 1882, *S. miniatus* Hagens, 1882, *S. monilicornis* (Kirby, 1802), *S. puncticeps* Thomson, 1870, *S. reticulatus* Thomson, 1870, *S. saxicolus* Warncke, 1992, *S. scabricollis* Wesmael, 1835, *S. schwarzi* Astafurova et Proshchalykin, 2014, and *S. spinulosus* Hagens, 1875. A new species *Sphecodes pesenkoi* Astafurova et Proshchalykin, **sp. n.** is described from Kyzylorda Province. New synonymy is established for *Sphecodes gibbus* (Linnaeus, 1758) = *S. tadauchi* Mitai, 2012, **syn. n.**

Key words: fauna, new records, taxonomy, new species, Palearctic region.

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Резюме. Приведен аннотированный список 31 вида пчел из клептопаразитического рода *Sphecodes* Казахстана, из которых 18 видов указываются впервые для фауны этой страны: *Sphecodes albilabris* (Fabricius, 1793), *S. alternatus* Smith, 1853, *S. anatolicus* Warncke, 1992, *S. armeniacus* Warncke, 1992, *S. crassus* Thomson, 1870, *S. cristatus* Hagens, 1882, *S. ferruginatus* Hagens, 1882, *S. haladai* Warncke, 1992, *S. hyalinatus* Hagens, 1882, *S. longulus* Hagens, 1882, *S. miniatus* Hagens, 1882, *S. monilicornis* (Kirby, 1802), *S. puncticeps* Thomson, 1870, *S. reticulatus* Thomson, 1870, *S. saxicolus* Warncke, 1992, *S. scabricollis* Wesmael, 1835, *S. schwarzi* Astafurova et Proshchalykin, 2014 и *S. spinulosus* Hagens, 1875. Из Кызылординской области описан новый вид *Sphecodes pesenkoi* Astafurova et Proshchalykin, **sp. n.** Установлена новая синонимия: *Sphecodes gibbus* (Linnaeus, 1758) = *S. tadauchi* Mitai, 2012, **syn. n.**

INTRODUCTION

Species of the cosmopolitan bee genus *Sphecodes* Latreille (Halictinae) are notable cleptoparasites in the nests of wide variety of short-tongued bees, particularly species of *Lasioglossum* Curtis and *Halictus* Latreille (Michener, 1978, 2007). The genus is one of several genera of cleptoparasitic species that are commonly classified as a subtribe, Sphecodina, among the Halictini. Presently there are nearly 300 species recognized in *Sphecodes*, and while certain broad groups have been discerned among these (e.g., Meyer, 1919; Michener, 1978), it remains to be discovered what natural clades exist. The only phylogenetic attempt at resolving relationships among species of *Sphecodes* represented less than 14% of the diversity but nonetheless revealed some potential patterns of interest (Habermannová *et al.*, 2013). Of greatest interest was the revelation that *Austrosphecodes* Michener, widely considered a subgenus of *Sphecodes*, were likely more basal among Sphecodina, and related to *Microsphecodes* Eickwort and Stage (Habermannová *et al.*, 2013). These are perhaps also related to *Nesosphecodes* Engel and *Ptilocleptis* Michener, while *Callosphecodes* Friese may be allied to *Sphecodes* s. str. In addition, *Eupetersia* Blüthgen was recovered as the potential sister group to *Sphecodes* s. str., while groups such as *Drepanium* Robertson and *Proteraner* Robertson seem to be consistent (Habermannová *et al.*, 2013), and might be worth recognizing in future, comprehensive revisions of the genus (as suggested by Engel, 2006a). Species are at times challenging to identify, with many similar, even cryptically similar, taxa in most major faunas. While certain faunas have received excellent revisionary treatments and isolated species are described from time to time (e.g., Pesenko, 1979; Tsuneki, 1983, 1984; Warncke, 1992; Nobile & Campadelli, 1998; Campadelli & Nobile, 2000; Nobile & Turrise, 2004; Engel, 2006b; Bogusch & Straka, 2012; Özbek *et al.*, 2015; Gibbs, 2016), the vast majority of the diversity within *Sphecodes* remains to be adequately characterized at the specific level using modern concepts of circumscription, a challenge common to many large bee genera (Engel, 2011; Gonzalez *et al.*, 2013).

In recent years there have been a series of contributions attempting to explore the diversity of *Sphex* occurring in Russia and neighboring countries (e.g., Proshchalykin & Astafurova, 2012; Astafurova & Proshchalykin, 2015a, b, 2016a, b, 2017a; Astafurova *et al.*, 2014, 2015), particularly across Central Asia and the Russian Far East (Astafurova & Proshchalykin, 2014, 2015c, 2017b; Astafurova *et al.*, 2018). The present work builds upon these by summarizing the current information of the largely unexplored, yet highly diverse fauna of Kazakhstan.

The Republic of Kazakhstan is the largest country in Central Asia (and the ninth largest in the world), defining the northern boundary of this core region of Asia. It is also the only Central Asiatic country that extends into the easternmost part of Europe, and is therefore transcontinental with territory extending from the Caspian Sea in the west to Mongolia in the east (Fig. 1). This massive area encompasses diverse habitats ranging from high mountains to deserts, broad plains, steppes, and even northern taiga. The Kazakh steppes alone cover nearly one-third of the country and form the world's largest dry steppe region, with many unique biotic elements.



Fig. 1. Map of Central Asia with particular focus on Kazakhstan and insert showing the 14 administrative divisions within the country. Administrative regions: 1 – West Kazakhstan; 2 – Atyrau; 3 – Mangystau; 4 – Aktope; 5 – Kostanay; 6 – Kyzylorda; 7 – North Kazakhstan; 8 – Akmola; 9 – Karagandy; 10 – South Kazakhstan; 11 – Zhambyl; 12 – Pavlodar; 13 – East Kazakhstan; 14 – Almaty.

In terms of the melittological diversity of Kazakhstan, there are currently 570 species of bees known from the country, although this is undoubtedly a gross underrepresentation owing to the sparse sampling that has been done on the fauna, and new records and species are often discovered (e.g., Engel & Packer, 2013; Kuhlmann & Proshchalykin, 2013, 2014, 2015; Müller, 2014; Pauly *et al.*, 2015; Astafurova & Proshchalykin, 2018; Byvaltsev *et al.*, 2018; Proshchalykin & Kuhlmann 2018). Not surprisingly, the genus *Sphecodes* has been one of the more overlooked of taxa partly owing to the large number of species and the complexity of positively identifying material.

Hitherto, six species of *Sphecodes* have been described from Kazakhstan (Morawitz, 1876; Meyer, 1922; Mitai, 2012; Astafurova & Proshchalykin, 2018), although today only two is considered valid, and in total only 11 species have been recorded for the country (Meyer, 1919, 1922, 1924; Popov, 1933, 1951, 1967; Warncke, 1992; Astafurova & Proshchalykin, 2017b). Here we have attempted to build a comprehensive survey of Kazakh material available, and provide an overview of the 31 species found across Kazakhstan. Of these species, 18 are for the first time recorded for the Kazakh fauna and one species is described as new. In addition, *Sphecodes tadauchi* Mitai, 2012 is newly recognized as a junior synonym of the widespread *S. gibbus* (Linnaeus, 1758). For each species we provide a diagnosis, brief descriptive notes, a list of Kazakh localities from material examined and previously published occurrences, and a summary of the broader distribution.

MATERIAL AND METHODS

The taxonomy and distribution of species generally follows that of Warncke (1992), Bogusch and Straka (2012), Mitai and Tadauchi (2013), Astafurova and Proshchalykin (2014, 2015a, b, 2016a, b, 2017b), and Özbek *et al.* (2015). A detailed current synonymy of the species has been given by Astafurova and Proshchalykin (2017b). Morphological terminology employed below follows that of Michener (2007) and Engel (2001). The ventral surfaces of some flagellomeres bear a distinctive patch or zone of sensilla trichodea A (sensu Årgent & Svensson, 1982), and we refer to these as the “tyloids”, easily observable under light microscopy. The abbreviations F, T, and S are used for flagellomere, metasomal tergum, and metasomal sternum, respectively. The density of integumental punctures is described using the following formula: puncture diameters (in μm) / ratio of distance between punctures to average puncture diameter, e.g., 15–20 μm / 0.5–1.5. Integumental sculpturing, aside from distinctive surface punctation, is described as follows: *areolate* – coarse, contiguous punctures; *reticulate* – superficially net-like or made up of a network of raised lines; *rugose* – irregular, nonparallel, wrinkled raised lines (rugae); *rugulose* – minutely rugose; *strigate* – narrow, transverse or longitudinal streaks (strigae), variety of parallel *lineations* – tessellate: regular network of shallow grooves with flat interspaces.

Specimens were studied with the use of a Leica M205A stereomicroscope and photographs taken with a combination of stereomicroscope Olympus SZX10 and

digital camera Canon EOS70D. Final images representing a composite of several photographs taken at different focal planes and combined using Helicon Focus 6. All images were post-processed for contrast and brightness using Adobe® Photoshop®.

Abbreviations for institutional collections from which specimens of *Sphecodes* were borrowed and are deposited are as follows: ELKU – Kyushu University, Fukuoka, Japan (O. Tadauchi); ISEN – Institute of Animal Systematics and Ecology, Russian Academy of Sciences, Novosibirsk, Russia (Yu. Danilov); OLBL – Oberösterreichisches Landesmuseum, Biologiezentrum, Linz, Austria (F. Gusenleitner); PCMS – Private collection of M. Schwarz, Ansfelden, Austria; ZISP – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (Yu. Astafurova, S. Belokobylskij); ZMMU – Zoological Museum of Moscow University, Russia (A. Antropov).

We have used the following abbreviations for collectors: AP – A. Ponomareva, DK – D. Kasparyan, JH – J. Halada, LZ – L. Zimina, KD – K. Denes, MH – M. Halada, MK – M. Kozlov, SB – S. Belokobylskij, TM – T. Marikovskaya, VK – V. Kazenas, VP – V. Popov, VT – V. Tobias, YP – Yu. Pesenko, ZP – Z. Padr. In summarizing collection data hard brackets indicate annotations to the information as provided on specimen labels (e.g., clarifying dates, current names for older localities). When summarizing general distributions, administrative regions are provided within Kazakhstan and asterisks (*) denote new regional records.

LIST OF SPECIES

Genus *Sphecodes* Latreille, 1804

Sphecodes Latreille, 1804: 182. Type species: *Nomada gibba* Fabricius, 1804 (= *Sphex gibba* Linnaeus, 1758), by monotypy.

DIAGNOSIS. Metasoma red (at least T1–T3) or rare entirely black, shiny, without band of setae. Male: clypeys black, face with appressed white pubescence below antennal toruli, ventral surfaces of flagellomeres usually bear a distinctive patch or zone of sensilla (tyloids). Female: labrum with wide apical process without longitudinal carina; metabasitibial plate is absent; metatibia without scopa; prepygidial fimbria (on T5) not divided longitudinal hairless stripe.

REMARK. Across Kazakhstan there are at least 31 species now recorded (Table 1), and which are treated here.

Sphecodes albilabris (Fabricius, 1793)

DIAGNOSIS. *Sphecodes albilabris* is similar to those species of the Palaearctic *gibbus* species-group (*S. anatolicus* Warncke, 1922, *S. gibbus* (Linnaeus, 1758), *S. nippon* Meyer, 1922, 1838, *S. rufiventris* (Panzer, 1798), *S. schenckii* Hagens, 1882, *S. tadschicus* Blüthgen in Popov, 1935) by sharing with them a long and rather strongly elevated vertex (distance from top of head to upper margin of lateral ocellus more 2.2 and 2.5–3.0 lateral ocellar diameters as seen in frontal and dorsal views, respectively, versus species with a short vertex where this distance is at most

2 diameters as seen in frontal and dorsal views), as well as a coarsely punctate body. This species is quite similar to *S. rubripes* Spinola, 1838 [1839], both differ from other species of the *gibbus* species-group in a mesoscutal integument that is effectively areolate. However, of *S. albilabris* differs from vicarian *S. rubripes* by white head and mesoscutum setae of female (brown in *S. rubripes*) and brown tibia and basitarsus of both sexes (red in *S. rubripes*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 12–14 hamuli. **Female.** Total body length 9.0–15.0 mm. Head strongly transverse, 1.3 times as wide as long; distance from top of head to upper margin of lateral ocellus 2.5–3.0 lateral ocellar diameters as seen in dorsal view. Mesoscutum coarsely areolate-punctate (50–125 μm); mesepisternum reticulate-rugose; propodeum laterally strigate-rugose or reticulate-rugose. Metasoma with marginal zones of T3–T4 impunctate; T1–T5 red, T5 usually black apically; pygidial plate dull, as wide as metabasitarsus or slightly narrower. **Male.** Total body length 9.0–12.0 mm. Head strongly transverse, 1.25–1.3 times as wide as long; tyloids (at least from F4 onward) semicircular across basal 1/5–1/3 and linear across remainder of flagellomere as seen in lateral view. Mesoscutum areolate-punctate (50–100 μm); mesoscutellum irregularly punctate, medially with punctures separated by more than a puncture diameter. Metasoma with T1–T5 red, rarely T1 blackish basally; gonocoxite dorsally without impression; gonostylus larger, not narrowed apically (Fig. 2).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* 21 ♀, 28 ♂ (Uralsk [Oral]; Yanvartsevo; 110 km ESE Dzhambeyta); *Aktobe:* 2 ♀, 1 ♂ (Bolshiye Barsuki desert, near Chelkar [Shalqar]; Chelkar [Shalqar]; Malaya Kobda River, 70 km E Aktyubinsk [Aktobe]); *Kostanay:* 1 ♂ (near Uzunkol); *Kyzylorda:* 1 ♀ (Baigakum near Zhulek, Syr Darya River); *Akmola:* 8 ♂ (Ishim River, 20 km SW Esil); *Karagandy:* 8 ♀, 9 ♂ (Taldy-Manak River, S Zhana-Ark [Atasu]; Aktau, 80 km S Zhana-Ark [Atasu]; Koksengir S Zhana-Arka [Atasu]); *South Kazakhstan:* 5 ♀, 4 ♂ (15 km SE Suzak, Karatau Mts; 20 km SE Zhanatas, Karatau Mts; Ayaguz River, 40 km SE Targabatay; Altyn-Ilmen Nature Park); *Zhambyl:* 8 ♀, 1 ♂ (Dzhambul [Taraz] env., Kara Tau; Makbal; 15 km Dzhambul [Taraz], Assa; 10 km E Dzhambul [Taraz]; Balkhash Lake, 30 km NNW Mynaral; 30 km N Karabastau; 15 km NW Shardara); *Pavlodar:* 2 ♀, 3 ♂ (Pavlodar); *East Kazakhstan:* 4 ♀, 11 ♂ (Semipalatinsk [Semey]; Talmenka River, 30 km Kokpety; 5 km S Zharma; Char River, 50 km SE Semipalatinsk; 20 km SE Aksay; Georgievka); *Almaty:* 8 ♀, 16 ♂ (Iliysk; Axaj; Chuiliysk Mts, 5 km E Kurday; Aksu River, 25 km SSE Dzhansugurov [Zhangsügirov]; Dzhungar Alatau Mts; 3 km S Issik; Alakol lake, Koktuma; Matai-desert; 10 km SE Kaskelen; Charyn valley, W Chundza).

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Aktobe, Kostanay, Kyzylorda, Akmola, Karagandy, South Kazakhstan, Zhambyl, Pavlodar, East Kazakhstan, Almaty), Central Asia, Russia (east to Primorskiy Terr.), Europe (north to Finland and Sweden), Turkey, Syria, Caucasus, India.

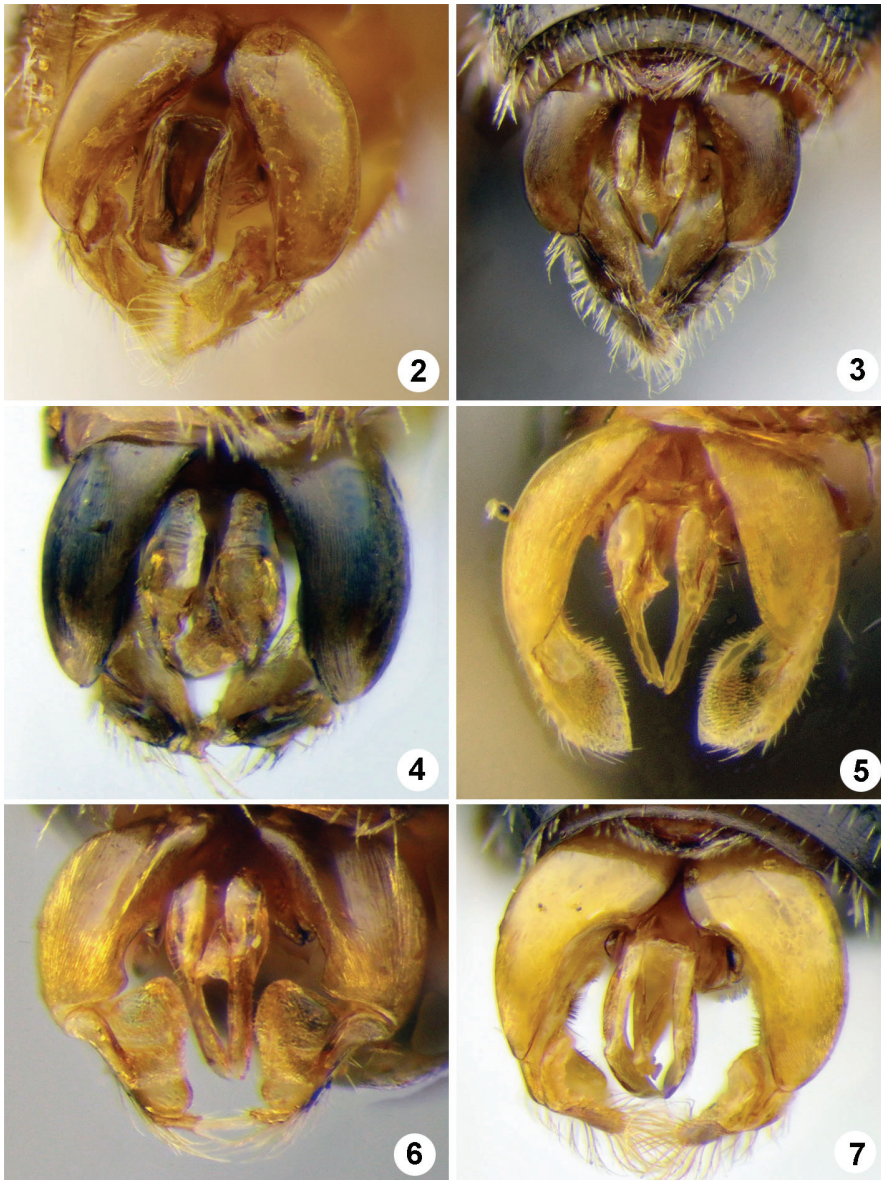
***Sphecodes alternatus* Smith, 1853**

DIAGNOSIS. This species belongs to the Palaearctic *reticulatus* species-group (*S. alternatus* Smith, 1853, *S. crassanus* Warncke, 1992, *S. reticulatus* Thomson,

1870) as evidenced by the short and relatively weakly elevated vertex (distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters as seen in frontal and dorsal views, versus those with a long vertex where this distance is more 2.0 and 2.5–3.0 lateral ocellar diameters as seen in frontal and dorsal views, respectively), the marginal zone of T3 distinctly punctate, and the female mesepisternum and propodeum laterally reticulate-rugose. The species differs from *S. crassanus* by the sparser tergal punctation with distinct interspaces on T4 (T4 of *S. crassanus* densely punctate, without distinct interspaces) and less developed tyloids in male (semicircular across basal 1/7–1/5 of flagellomeres versus 1/3–1/2 in *S. crassanus*). The species differs from *S. reticulatus* by having the marginal zone of T4 distinctly punctate, smooth between punctures and with T4 red in the female (the marginal zone of T4 impunctate, finely tessellate and T4 usually black in females of *S. reticulatus*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8–9 hamuli. **Female.** Total body length 8.0–11.0 mm. Head strongly transverse, 1.25 times as wide as long. Mesoscutum and mesoscutellum usually sparsely and finely punctate (20–40 µm), medially with punctures separated by 2–4 puncture diameters. Metasoma with tergal marginal zones smooth and distinctly punctate; pygidial plate dull, 0.5 times as wide as metabasitarsus; T1–T5 red, sometimes T5 blackish apically. **Male.** Total body length 7.0–12.0 mm. Head transverse, 1.2 times as wide as long; tyloids semicircular across basal 1/7–1/5 of flagellomeres. Mesoscutum with punctures (20–30 µm) medially separated by at most 1–3 puncture diameters, rarely sparser; mesoscutellum irregularly punctate, with punctures separated by 0.1–3 puncture diameters. Metasoma with T1–T3 red, T4 varying from red to black; gonocoxite dorsally without impression; gonostylus larger as on Fig. 3.

MATERIAL EXAMINED. Kazakhstan. *West Kazakhstan:* near Uralsk [Oral], 10.VII 1908, 1 ♂, B. Uvarov [ZISP]; Yanvarztevo, Ural River, 22.V–11.IX 1949, 17 ♀, 10 ♂, VR [ZISP]; Chinarev, 31.VIII 1949, 2 ♂, Vyrzhikovskaya [ZISP]; Solyanka River, 13.IX 1949, 3 ♂, L. Arnoldi [ZISP]; Kharkin, Ural River, 22.V–30.VII 1951, 7 ♀, 15 ♂, VR [ZISP]; Bolshoy Uzen River, 23.VII 1951, 1 ♂, VT [ZISP]; 110 km ESE Dzhambeyt, 30.VIII 1987, 3 ♂, YP [ZISP]; *Atyrau:* 30 km W Miyaly, Uil River, 12.IX 1991, 2 ♀, 4 ♂, YP [ZISP]; *Aktobe:* Chelkar [Shalqar], 29.V 1984, 1 ♀, N. Malysheva [ZISP]; *Kyzylorda:* Kazalinsk, 25.V 1928, 8 ♀, N. Olenev, VP [ZISP]; 32 km SE Kyzylorda, Syr Darja River, 2.VI 1979, 1 ♀, YP [ZISP]; *South Kazakhstan:* 30 km NE Chiili, Karatau Mts, 25.VI 1982, 1 ♂, SB [ZISP]; 35 km SE Chomkent, 2.IX 1992, 1 ♂, V. Dubatolov [ISEN]; *Zhambyl:* Balkhash Lake, 30 km NNW Mynaral, 6–8.IX 1988, 3 ♀, YP [ZISP]; *Pavlodar:* Irtysh River, 13 km NW Lebyazhye, 21.VIII 1987, 4 ♂, YP [ZISP]; *East Kazakhstan:* Dzhambul env., Kara Tau, 3.VI 1980, 1 ♀, ZP [PCMS]; 15 km ENE Targyn, Altay Mts, 2.VIII 1983, 1 ♂, SB [ZISP]; 40 km SE Targabatay, 1400 m, 1.VIII 1986, 1 ♀, YP [ZISP]; 10 km E Dzhambul, 31.V 1994, 1 ♀, MH [PCMS]; *Almaty:* 2 ♀, Iliysk, 29.V 1953, LZ [ZMMU]; 5 km S Talgar, 26.VIII 1983, 1 ♂, VK [ZISP]; Alma-Ata, 25.VI 1992, 1 ♀, JH [PCMS]; 10 km NW Chundzha, Charyn, 22.VI 1998, 1 ♀, VK [ZISP].



Figs 2–7. Genitalia, males, dorsal view. 2 – *Sphecodes albilabris*; 3 – *S. alternatus*; 4 – *S. anatolicus*; 5 – *S. armeniacus*; 6 – *S. crassus*; 7 – *S. cristatus*.

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Atyrau, Aktobe, Kyzylorda, South Kazakhstan, Zhambyl, Pavlodar, East Kazakhstan, Almaty), Central Asia, Russia (east to Khakassia Republic), Iran, South and Central Europe, Caucasus, Turkey, North Africa.

Sphecodes anatolicus Warncke, 1992

DIAGNOSIS. This species belongs to the *gibbus* species-group owing to the long and strongly elevated vertex (distance from top of head to upper margin of lateral ocellus 2.5–3.0 lateral ocellar diameters as seen in dorsal view, versus those with a short vertex where this distance is at most 2 diameters), the female propodeum laterally strigate or rarely reticulate-rugose, and the coarsely punctured body. The female is quite similar *S. gibbus* in structure and sculpture of the body, but differs from it by the less elevated vertex (distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters as seen in frontal view, versus this distance about three in *S. gibbus*). The male easily differs from other species of the group by its unique gonostylar shape and that lacks an apical process (Fig. 4).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 10–12 hamuli. **Female.** Total body length 8.0–9.0 mm. Head strongly transverse, 1.30–1.32 times as wide as long. Mesoscutum with coarse punctures (50–75 μm) separated by 0.5–2 puncture diameters; mesepisternum reticulate-rugose, propodeum laterally strigate-rugose or reticulate-rugose. Metasomal T1 disc sparsely and finely punctate (25–30 μm); marginal zones of T3 and T4 impunctate; T1–T5 red; pygidial plate 0.5 times as wide as metabasitarsus. **Male.** Total body length 8.0–10.0 mm. Head transverse, 1.25 times as wide as long; tyloids weakly developed, semicircular across basal 1/7–1/5 of flagellomeres. Mesoscutum with coarse and dense punctures (50–75 μm) separated by less than a puncture diameter; mesoscutellum irregularly punctate, with punctures separated by 0.1–3 puncture diameters. Metasoma with T1–T5 red, T1 often black (except red marginal zone); gonocoxite dorsally without impression; gonostylus short, without apical process (Fig. 4).

MATERIAL EXAMINED. **Kazakhstan.** *Zhambyl:* Zhambul [Taraz], 23.VI 1987, 1 ♂, M. Volkovich [ZISP]; *Almaty:* 5 km SW Raevka, Aksu River, Talas Alatau [Rige], 26.VI 2001, 1 ♂, VK [ZISP].

DISTRIBUTION. *Kazakhstan (Zhambyl, Almaty), Central Asia, Georgia, Armenia, Turkey, Italy (Sicily).

Sphecodes armeniacus Warncke, 1992

DIAGNOSIS. This species is similar to small Palaearctic species with simple mandibles which lack an inner tooth (i.e., *S. longuloides* Blüthgen, 1923, *S. hirtellus* Blüthgen, 1923, Thomson, 1870, *S. longulus* Hagens, 1882, and *S. puncticeps* Thomson, 1870, *S. turanicus* Astafurova et Proshchalykin, 2017, and *S. trjapitzini* Astafurova et Proshchalykin, 2018). The male differs from this species by well developed tyloids covering entire ventral flagellar surface (versus those at most 3/4 in other species). The female close to *S. turanicus* by dense, appressed, snow-white pubescence obscuring integument on face, gena and mesepisternum (sparse and not obscuring integument in other species), but differs from this species by sparsely and irregularly punctate mesoscutum with punctures separated by 1–5 puncture diameter (versus densely punctate mesoscutum with punctures separated at most a puncture diameter in *S. turanicus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 5.0 mm. Head transverse, 1.3 times as wide as long; clypeus (at least in its lower half) with punctures separated by about a puncture diameter; antenna reddish or yellow; F1–F2 transverse, about 0.8 times as long as wide, F3 square. Mesoscutum finely and irregularly punctate (10–20 μm / 1–5), mesoscutellum coarsely and denser punctate (20–30 μm / 0.1–3); tibia and femur brownish red, tarsi yellow. Metasomal T1 with a few fine punctures, T2 and T3 finely, but distinctly and densely punctate (7–10 μm / 1–2); T1–T3 red or yellowish red; pygidial plate shiny, wide, 1.5 times as wide as metabasitarsus. **Male.** Total body length 5.0 mm. Head weakly transverse, 1.1 times as wide as long; antenna yellow, tyloids covering entire ventral flagellar surface. Mesoscutum medially with sparse and fine punctures (20–25 μm / 1–5), becoming denser peripherally; mesoscutellum coarsely and denser punctate (25–40 μm / 0.1–2); tibia and femur brownish with yellow, tarsi yellow. Metasomal T1 with a few fine punctures, T2–T3 finely, but distinctly and densely punctate (7–10 μm / 1–2); T1–T2 red; gonocoxite dorsally without impression; gonostylus small, oval (Fig. 5).

MATERIAL EXAMINED. **Kazakhstan.** *Kyzylorda*: 90 km NE Kyzylorda, 10.VI 1979, 1 ♀, YP [ZISP]; *Almaty*: Ili River, Aidarli, 14.VI 1992, 2 ♂, JH [PCMS].

DISTRIBUTION. *Kazakhstan (Kyzylorda, Almaty), Tajikistan, Turkey.

***Sphecodes crassus* Thomson, 1870**

DIAGNOSIS. *Sphecodes crassus* differs from other small Palaearctic species [i.e., *S. geoffrellus* (Kirby, 1802)] and the *croaticus* species-group (*S. croaticus* Meyer, 1922, *S. pseudofasciatus* Blüthgen, 1925, *S. zangherii* Noskiewicz, 1931) and *miniatus* species-group (*S. creticus* Warncke, 1992, *S. haladai* Warncke, 1992, *S. larochei* Warncke, 1992, *S. marginatus* Hagens, 1882, *S. miniatus* Hagens, 1882, *S. nomiooidis* Pesenko, 1979, *S. schawrzi* Astafurova et Proshchalykin, 2014, *S. sandykachis* Astafurova et Proshchalykin, 2018) by combination of female characters: head strongly transverse, 1.25 times as wide as long; labrum trapezoidal, 0.7 times as long as width (head less transverse, 1.1–1.2 times as wide as long and labrum semicircular, 0.5 times as long as width in *S. geoffrellus*); F3 square, 1.3–1.4 as long as F1 and F2 (F3 transverse and equal F1 and F2 in the *miniatus* species-group); T1 impunctate or with a few fine punctures (distinctly punctate in the *croaticus* species-group). The male differs by short tyloids usually covering less than one third of ventral flagellar surfaces (more longer in *S. geoffrellus* and in species of the *miniatus* and *croaticus* species-groups).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5 hamuli. **Female.** Total body length 5.0–8.0 mm. Head strongly transverse, 1.25 times as wide as long; vertex not elevated; labrum trapezoidal, 0.7 times as long as wide; clypeus relatively sparsely punctate, punctures separated by at least a puncture diameter. Mesoscutum sparsely punctate, with fine punctures (10–20 μm) separated by 2–6 (sometimes sparser) puncture diameters. Metafemur strongly enlarged in proximal half, maximum width 0.4 times its length. Metasomal T1 usually

impunctate or with a few fine punctures; anterior half of T2 with fine and relatively dense punctures; T1–T3 red, T3 sometimes dark apically; pygidial plate 0.6–0.7 times as wide as metabasitarsus. **Male.** Total body length 5.0–7.0 mm. Head weakly transverse, 1.15 times as wide as long; tyloids usually covering less than 1/3 (rarely longer, up to 1/2) of ventral flagellar surfaces. Mesoscutum with fine punctures (10–20 µm) medially separated by 1–4 puncture diameters. Metasomal T1 with a few fine punctures, sometimes almost impunctate; T2 distinctly punctate; T1–T3 red, T1 basally, T2 and T3 apically often dark; gonocoxite dorsally with impression; gonostylus oval (Fig. 6).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* near Uralsk [Oral], 30.IV 1907, 1 ♀, Borodin [ZISP]; Yanvartsevo, Ural River, 15.V–31.VIII 1949, 8 ♀, VR [ZISP]; Kharkin, Ural River, 12.V–4.VI 1951, 12 ♀, VR [ZISP]; *Kyzylorda:* 70 km NNW Kyzylorda, 8.VI 1979, 1 ♂, YP [ZISP]; *Akmola:* Kokshetau Mts, Tersakkan River, 21.V 1957, 1 ♀, VT [ZISP]; *Karagandy:* 30–40 km S Zhana-Ark [Atasu], 10.V 1959, 3 ♀, VT [ZISP]; Taldy-Manak River, S Zhana-Ark [Atasu], 10.VI 1959, 1 ♀, AP [ZISP]; 55–80 km SEE Karakalinsk, 21.VI.1978, 1 ♂, VK [ZISP]; *Pavlodar:* Zhelezinka, 17.VI 1928, 1 ♀, Belizin [ZMMU]; Pavlodar, 22.V 1928, 1 ♀, Belizin [ZMMU]; *East Kazakhstan:* Ayaguz River, 40 km SE Targabatay, 1400 m, 1.VIII 1986, 1 ♂, YP [ZISP]; Cherdoyak River, 45 km NE Kurchum, 1000 m, Naryn Mts, 11.VIII 1986, 1 ♂, YP [ZISP]; 20 km ENE Charsk, 600 m, 17.VII 1987, 1 ♂, YP [ZISP]; *Almaty:* near Almaty, 8.VI 1977, 1 ♂, MK [ZISP]; 3 km S Issik, 22–23.VI 1992, 1 ♀, KD [PCMS].

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Kyzylorda, Akmola, Karagandy, Pavlodar, East Kazakhstan, Almaty), Mongolia, Russia, Europe (north to 64° latitude), Caucasus, Turkey, Central Asia, Iran, Japan, North Africa.

***Sphcodes cristatus* Hagens, 1882**

DIAGNOSIS. This species is similar to *S. olivieri* Lepeletier de Saint Fargeau, 1825 and *S. pectoralis* Morawitz, 1876 owing to the possession of a sharp, longitudinal carina on the vertex and in sharing a similar male gonostylar shape (Figs 18, 19), but differs from both by more developed tyloids on male flagellomers (semi-circular across basal 1/3–1/2 of flagellomeres versus 1/7–1/5 in *S. olivieri* and *S. pectoralis*); the lack of appressed, dense pubescence on the female face; and the fine punctation of the female metasomal T1 (3–10 µm versus 10–30 µm in *S. olivieri* and *S. pectoralis*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8 hamuli. **Female.** Total body length 6.0–8.0 mm. Head strongly transverse, 1.20–1.25 times as wide as long; vertex weakly elevated. Mesoscutum and mesoscutellum relatively sparsely punctate, medially with punctures (15–30 µm) separated by mostly 1–3 puncture diameters. Metasomal T1 (including marginal zone) indistinctly punctate, with shallow and fine (3–10 µm), but often numerous punctures; T1–T5 and legs red, sometimes T4, T5 and legs dark. **Male.** Total body length 7.0–10.0 mm. Head weakly transverse, 1.1 times as wide as long; vertex strongly elevated;

tyloids, at least from F4 onward, semicircular across basal 1/3–1/2 of flagellomeres. Mesoscutum densely punctate, with punctures (25–40 µm) separated by at most a puncture diameter. Metasomal T1 with marginal zone very finely and indistinctly punctate; T1 apically red, T2 and T3 red; gonocoxite dorsally without impression (Fig. 7).

MATERIAL EXAMINED. Kazakhstan. *West Kazakhstan:* Uralsk [Oral], 18.VII 1897, 1 ♀, Berezovskiy [ZISP]; Yanvarztevo, Ural River, 3.VII, 11.IX 1949, 3 ♂, VR [ZISP]; *Kyzylorda:* Kazalinsk, 25.V 1928, 3 ♀, N. Olenov, VP [ZISP]; *Pavlodar:* Chernoretzkiy, 21.IX 1928, 1 ♀, Belizin [ZMMU]; *East Kazakhstan:* Semipalatinsk [Semey], 1 ♂, F. Morawitz's coll. [ZISP]; Ayaguz River, 40 km SE Targabatay, 1400 m, 1.VIII 1986, 2 ♂, YP [ZISP]; *Almaty:* 3 km S Issik, 22-23.VI 1992, 1 ♀, JH [PCMS]; Alma-Ata, 25.VI 1992, 2 ♀; idem, 1.VI.1994, 3 ♀, JH, KD [PCMS]; Talas Alatau Mts, near Zhabagly, 3.VII 1998, 1 ♀, VK [ZISP].

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Kyzylorda, Pavlodar, East Kazakhstan, Almaty), Russia, Mongolia, Central Asia, China (Beijing), Europe (north to Sweden), Caucasus, Turkey.

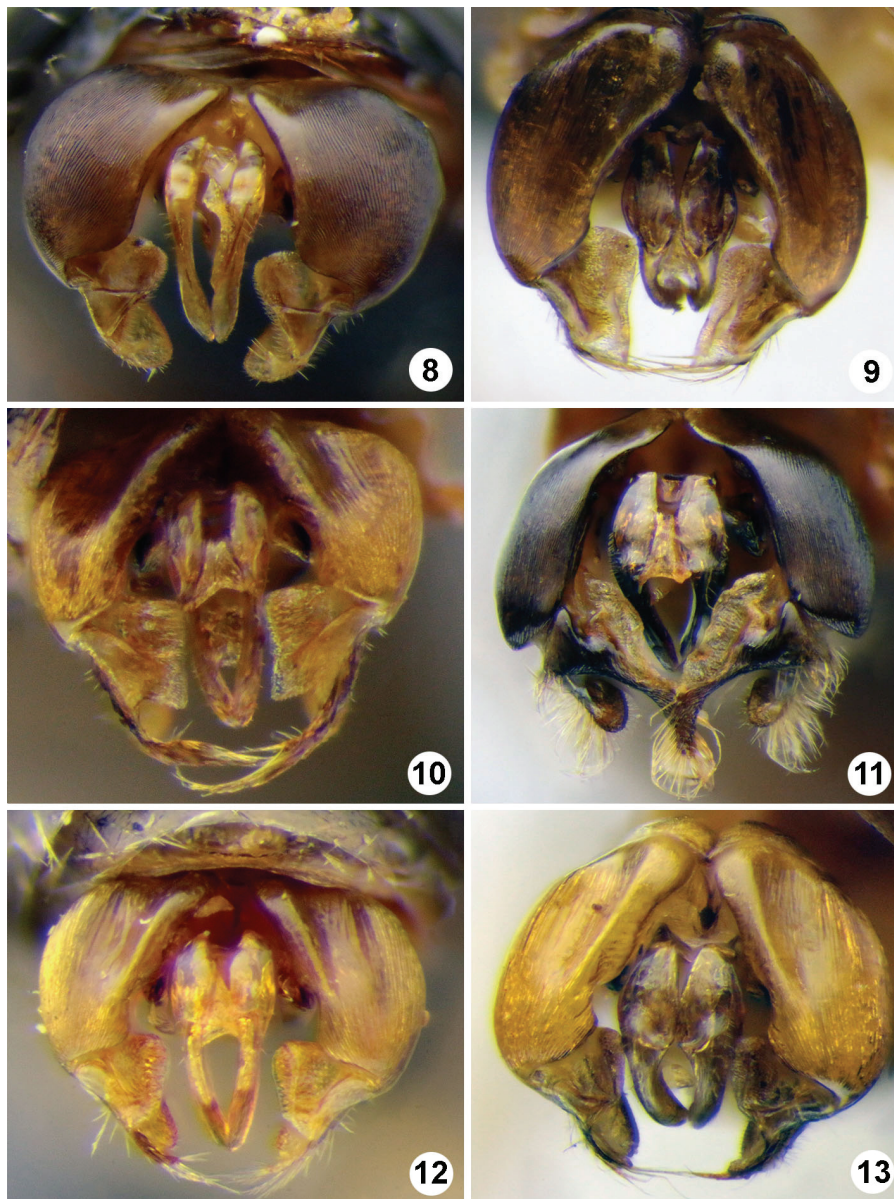
REMARK. Meyer's (1919) record of *S. cristatus* Hagens, 1882 from Kazakhstan (Zhambul) was based on a misidentification and actually refers to *S. pectoralis* (refer to Blüthgen, 1924).

***Sphecodes ehippius* (Linné, 1767)**

DIAGNOSIS. This species is closest to the eastern Palaearctic *S. pieli* Cockerell, 1931 owing to similar structure, sculpture and coloration of the body (the female is similar in relative width of head and pygidial plate, length of scape setae, elevated vertex, impunctate metasomal T1, red T1–T3; the male is similar in sparsely punctate T2, proportion of tyloids and shape of gonostylus as in Fig. 8), but differs from this species by the lack of a longitudinal carina on the vertex in both sexes and by T1–T3 all or partly red in males (entirely black or dark brown in *S. pieli*). The female is also similar to *S. pellucidus* Smith, 1845, but differs from it in the short setae of the scape (shorter than width of scape), by the less transverse head, 1.20–1.25 times as wide as long, and by elevated vertex with distance from top of head to upper margin of lateral ocellus at least 0.5 lateral ocellar diameters as seen in frontal view (setae on scape distinctly longer than width of scape; head more transverse, 1.30–1.35 times as wide as long, and distance from top of head to upper margin of lateral ocellus at most 0.2 lateral ocellar diameters as seen in frontal view in *S. pellucidus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 7.0–9.0 mm. Head transverse, 1.20–1.25 times as wide as long; vertex weakly elevated (distance from top of head to upper margin of lateral ocellus about 0.5 a lateral ocellar diameter as seen in frontal view); clypeus densely punctate, punctures separated by less than a puncture diameter. Mesoscutum and mesoscutellum densely punctate (20–30 µm / 0.5–1.0). Metasomal T1 impunctate or with a few fine punctures; T2 distinctly punctate, denser on anterior third and sparsely on remainder of disc; marginal zones impunctate; T1–T3 red, T4

red laterally; pygidial plate dull, 1.2–1.4 times wider than metabasitarsus. **Male.** Total body length 6.0–9.0 mm. Head transverse, 1.2 times as wide as long; tyloids



Figs 8–13. Genitalia, males, dorsal view. 8 – *Sphecodes ephippius*; 9 – *S. ferruginatus*; 10 – *S. geoffrellus*; 11 – *S. gibbus*; 12 – *S. haladai*; 13 – *S. hyalinatus*.

(from F4 onward) usually covering about 1/2 (rarely 3/4) ventral surface of flagellomeres. Mesoscutum and mesoscutellum densely punctate (20–30 µm), with punctures separated by less than a puncture diameter (usually with contiguous punctures). Metasomal T1 impunctate or rarely with a few fine punctures; T2 sparsely punctate with punctures separated by 2–5 puncture diameters and impunctae along marginal zone; T1–T3 red, T3 sometimes partly dark; gonocoxite dorsally without impression.

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* near Uralsk [Oral], 10.VII 1908, 1 ♀, B. Uvarov [ZISP]; Kyshtym, 27.VIII 1922, 1 ♂, Burakova [ZISP]; Yanvartsevo, Ural River, 22.V–2.IX 1949, 7 ♀, 5 ♂, VR [ZISP]; Solyanka River, 13.IX 1949, 1 ♀, 3 ♂, L. Arnoldi [ZISP]; Kharkin, Ural River, 6–12.V 1951, 2 ♀, VR [ZISP]; Mergenevo, 7.VII 1951, 1 ♂, Steinberg [ZISP]; *Kyzylorda:* Perovsk [Kyzylorda], 15.V 1928, 1 ♂, N. Olenov, VP [ZISP]; *Akmola:* Borovoye, Kokshetau, 4–26.VII 1932, 4 ♂, VP [ZISP]; *Karagandy:* 2♀♀, Berchogur, 15.VI 1910, L. Androssow [ZISP]; Bayzhanzhals Mts, 11.VII 1957, 1 ♂, VR [ZISP]; 80 km S Zhana-Arka [Atasu], 8.VI 1958, 1 ♀, AP [ZISP]; Karzhal, 11.VII 1989, 1 ♂, Yu. Chekanov [ZISP]; *South Kazakhstan:* 70 km E Chimkent, Vanovka, 1.V 1982, 1 ♀, SB [ZISP]; *Zhambyl:* Novo-Voskresenovka [Andas batyra], 40 km E Merke, 4.V 1994, 1 ♀, KD [PCMS]; 60 km E Dzhambul, 1–9.V 1994, 3 ♀, P. Cechovsky [PCMS]; 40 km E Merke, Novovoskresenovka, 4.V 1994, 3 ♀, JH [PCMS]; Tatti, 80 km E Merke, 5.V 1994, 4 ♀, MH [PCMS]; 60 km E Dzhambul, Monjunkum desert, 1–9.V 1994, 3 ♀, P. Cechovsky [PCMS]; 10 km E Dzhambul, 31.V 1994, 5 ♀, MH [PCMS]; Chernaya Rechka, 30.VI 2000, 1 ♀, V. Gurko [PCMS]; *Pavlodar:* Irtysh River, 13 km NW Lebyazhye, 21.VIII 1987, 1 ♂, YP [ZISP]; *East Kazakhstan:* 18 km SE Zaysan, Temir-Su, 15.VI 1973, 1 ♀, MK [ZISP]; Maralikha [Sarytau], 11.VII 1973, 1 ♂, MK [ZISP]; 10 km NW Kievka, 12.VII 1983, 1 ♂, Alekseev [ZISP]; Kedrovka River, 10 km S Leninogorsk [Ridder], Ulba Mts, 1500 m, 18.VIII 1986, 1 ♀, YP [ZISP]; *Almaty:* near Almaty, 3–18.VI 1953, 5 ♀, LZ [ZMMU]; idem, 29.V 1970, 1 ♀, TM [ZISP]; idem, 2.VI.1974, 5 ♀; idem, VT [ZISP]; Ili River, Karasu River, 21.V 1970, 1 ♂, TM [ZISP]; Almaty NR, Talgar River, 1700 m, 8.VIII 1979, 2 ♀, DK [ZISP]; 30 km SSE Dzhansugurov [Zhangsügirov], 1600 m, 27.VII 1986, 1 ♂, YP [ZISP]; 20 km N Kegen, 24.IV 1994, 2 ♀, KD [PCMS]; Alma-Arasan, 15 km S Alma-Ata, 27.V 1994, 2 ♀, KD [PCMS].

PUBLISHED RECORDS. Popov (1933: 53, as *S. davisus*) recorded the species from Akmola.

DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Kyzylorda, Akmola, *Karagandy, *South Kazakhstan, *Zhambyl, *Pavlodar, *East Kazakhstan, *Almaty), Russia (east to Irkutsk Prov.), Mongolia, Central Asia, Caucasus, Turkey, Europe (north to 62° latitude).

REMARK. In the southern parts of Kazakhstan this species principally occurs in the mountains.

***Sphecodes ferruginatus* Hagens, 1882**

DIAGNOSIS. This species belongs to the Palaearctic *hyalinatus* species-group (*S. ferruginatus* Hagens, 1882, *S. hyalinatus* Hagens, 1882, *S. mariyamanus* Tsuenki,

1983, *S. murotai* Tsuneki, 1983, *S. tanoi* Tsuneki, 1983) with the pronotum rounded between the dorsal and lateral surfaces. The male differs from other species of the group by its unique gonostylar shape which is long and trapezoidal (Fig. 9), and by the short tyloids (covering at most one quarter of the flagellar surfaces, versus more than one third in other species). The female is similar to the eastern Palaearctic *S. murotai* and *S. tanoi*, but differs from both by the elevated vertex (not elevated in *S. murotai* and *S. tanoi*), and can easily be distinguished from *S. hyalinatus* by its shiny, coarsely reticulate-rugose ventral portions of the mesosoma (dull, finely reticulate-rugulose in *S. hyalinatus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 6.0–9.0 mm. Head transverse, 1.20–1.25 times as wide as long; clypeus densely punctate, punctures separated by less than a puncture diameter. Mesoscutum with punctures separated by 1–4 puncture diameters. Metasomal T1 impunctate; T2–T3 indistinctly and very finely punctate; T1–T3 red; pygidial plate 0.7 times as wide as metabasitarsus. **Male.** Total body length 6.0–9.0 mm. Head transverse, about 1.15 times as wide as long; tyloids covering at most one quarter ventral surface of flagellomeres. Mesoscutum and mesoscutellum densely punctate, punctures separated by less than a puncture diameter to contiguous. Metasomal T1 impunctate; T2–T3 indistinctly and very finely punctate; T1–T3 red; gonocoxite dorsally with impression; gonostylus long, trapezoidal.

MATERIAL EXAMINED. **Kazakhstan.** *East Kazakhstan:* 40 km SE Targabatay, 1400 m, 1.VIII 1986, 1 ♂, YP [ZISP]; *Almaty:* Zailiysk Alatau Mts, Malyi Almmaatin River, 6.VII 1898, 1 ♂, Kostylev [ZMMU]; near Almaty, V 1936, 1 ♀, Shaydurov; idem, 25.IV 1953, 1 ♀, G.A. Viktorov [ZMMU]; Almaty NR, Talchara River, 1700 m, 8.VII 1979, 1 ♀, DK [ZISP]; Almaty, Medeo, 27.VI 1995, 1 ♀, JH [PCMS].

DISTRIBUTION. *Kazakhstan (East Kazakhstan, Almaty), Russia, Europe (north to 66° latitude), Caucasus, Kyrgyzstan, Turkey, Japan.

REMARK. In the southern parts of Kazakhstan this species principally occurs in the mountains.

***Sphecodes geoffrellus* (Kirby, 1802)**

DIAGNOSIS. This species is close to *S. hakkariensis* Warncke, 1992 owing to a similar structure and sculpture of the body, including weakly transverse head, sparsely punctate metasomal terga, well developed male tyloids usually covering entire ventral surface of flagellomeres and genitalia with trapezoidal membranous portion of gonostylus (Fig. 10). *Sphecodes geoffrellus* differs from *S. hakkariensis* by denser punctate mesoscutum with punctures separated by 1–4 puncture diameters in female and 0.5–2 in male (versus 2–6 and 0.5–4 diameters in *S. hakkariensis*) and entirely coarsely rugose hypoepimeral area (medially smooth and peripherally rugose in *S. hakkariensis*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5 hamuli. **Female.** Total body length 4.5–6.5 mm. Head weakly transverse, 1.1–1.2 times as wide as long; labrum semicircular, 0.5 times as long as wide; clypeus sparsely punctate, punctures separated by 0.5–2 puncture diameters; F1 transverse, 0.5–0.6 times as long as wide; F2 and F3 slightly transverse, 0.8–0.9 times as long as wide. Mesoscutum sparsely punctate, punctures (10–20 µm) separated by 2–4 puncture diameters. Metafemur weakly enlarged in proximal half, maximum width 0.35 times its length. Metasomal T1 impunctate; T2 indistinctly, sparsely and very finely punctate on anterior third only; T1–T3 yellowish-red or red; pygidial plate 0.7–0.8 times as wide as metabasitarsus. **Male.** Total body length 5.0–6.5 mm. Head weakly transverse, 1.1 times as wide as long; F2 short, 0.9–1.0 times as long as F3; tyloids (from F4 onward) usually covering entire ventral surface of flagellomeres, sometimes about 4/5 surfaces. Mesoscutum with punctures separated by 0.5–2 puncture diameters, becoming denser peripherally; T1 and T2 smooth, with a few very fine punctures; T1–T3 yellowish-red, usually brownish on a disc; gonocoxite dorsally with impression; gonostylus small, triangular (Fig. 10).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* Yanvartsevo, Ural River, 12-16.V–31.VIII 1949, 3 ♀, 1 ♂, VR [ZISP]; Kharkin, Ural River, 16.V–19.VII 1951, 2 ♀, VT, Romadina [ZISP]; 20 km SE Aksay, 16-19.VI 1992, 1 ♀, KD [PCMS]; *Kostanay:* Toguzak, 28.VIII 1958, 1 ♂, Kamenkova [ZISP]; *Akmola:* Borovoye, Kokshetau, 28.VII 1932, 1 ♀, VP [ZISP]; 10 km N Zharkol Lake, 23.VI 1957, 1 ♀, VT [ZISP]; Tengiz Lake, 3.VII 1957, 1 ♀, 2 ♂, VT [ZISP]; *Karagandy:* Bayzhanzhal Mts, 7–11.VII 1957, 2 ♀, 3 ♂, VR [ZISP]; Koksengir, S Zhana-Ark [Atasu], 10–29.V; 12.VII–14.VIII 1959, 8 ♀, 5 ♂, VR, VT, AP, Kurchinskaya [ZISP]; Taldy-Manak River, S Zhana-Ark [Atasu], 6–15.VII 1959, 21 ♂, AP [ZISP]; *South Kazakhstan:* Aksu-Zhabagly Nature Park, Bala-Baldybek River, 11.V 1980, 1 ♀, N. Storozheva [ZISP]; 70 km E Chimkent, Vanovka, 1.V 1982, 1 ♀, SB [ZISP]; 15 km SE Suzak, Karatau Mts, 28.VI 1982, 1 ♂, SB [ZISP]; Aksu-Zhabagly Nature Park, 12 km E Novonikolayevka, 1800 m, 1.VII 1997, 1 ♂, DK [ZISP]; *Zhambyl:* Novo-Voskresenovka [Andas batyra], 40 km E Merke, 4.V 1994, 1 ♀, KD [PCMS]; *East Kazakhstan:* Ayaguz River, 40–45 km SE Targabatay, 1400–1600 m, 1–2.VIII 1986, 1 ♀, 4 ♂, YP [ZISP]; Kyzylkiya, 42 km SE Zaysan, 2200 m, 7.VIII 1986, 1 ♀, 3 ♂, YP [ZISP]; Cherdoyak River, 45 km NE Kurchum, 1000 m, Naryn Mts, 11.VIII 1986, 1 ♀, YP [ZISP]; 30 km WSW Katon-Karagay, 1350 m, Naryn Mts, 24.VIII 1986, 2 ♂, YP [ZISP]; *Almaty:* Talgar, Almaty NR, 1800 m, 14.VI 1970, 1 ♀, Tanasiychuk [ZISP]; 3–5 km S Almaty, 17.VI 1998, 3 ♀, 14.VII 2000, VK [ZISP]; 10 km E Talgar, 1600 m, Ziliyskiy Alatau Mts, 19.VII 1986, 1 ♂, YP [ZISP]; Kokpak River, 25 km E Narynkol, 2300 m, 22.VII 1986, 1 ♂, YP [ZISP]; 20 km ESE Andreyevka, 900 m, 12.VII 1987, 2 ♂, YP [ZISP]; 30 km SSE Dzhangsugurov [Zhangsügirov], 1600 m, 27.VII 1987, 1 ♂, YP [ZISP]; 3 km S Issik, 22-23.VI 1992, 4 ♀, JH, KD [PCMS]; Fabrichny, 40 km E Almaty, 23.VI 1992, 1 ♀, Jirousek [PCMS]; Taldy-Kurgan, 200 km NE Cherkasskoe, 27.VI 1992, 1 ♂, Jirousek [PCMS]; Kapshagai, 60 km N Alma-Ata, 26.V 1994, 1 ♀, J. Kadlec [PCMS]; Alma-Arasan, 15 km S Almaty, 27.V 1994, 4 ♀, KD [PCMS]; Almaty, 1.VI 1994, 1 ♀, MH [PCMS]; Talgar, 7-21.V 2013, 4 ♀, Bartak [PCMS]; 10 km S Almaty, 1430 m, 9.VI 2016, 1 ♀, JH [PCMS].

PUBLISHED RECORDS. Popov (1933: 53, as *S. fasciatus* var. *affinis* Hagens, 1882) recorded the species from Akmola.

DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Kostanay, Akmola, *Karagandy, *South Kazakhstan, *Zhambyl, *East Kazakhstan, *Almaty), Mongolia, Central Asia, Russia, Europe (north to 66° latitude), Caucasus, Turkey, Near East, Japan, North Africa.

REMARK. In the southern parts of Kazakhstan this species principally occurs in the mountains.

***Sphecodes gibbus* (Linnaeus, 1758)**

Sphecodes tadauchi Mitai, 2012: 95–97 (holotype: ♀, Kazakhstan, South Kazakhstan Prov., Achisai, Mts. Karatau, 5.VI 2003, leg. K. Mitai, ELKU, examined), **syn. n.**

DIAGNOSIS. *Sphecodes gibbus* belongs to the *gibbus* species-group (refer to Diagnosis for *S. anatolicus* for group description, above). Among species of this group *S. gibbus* is most similar to the western Palaearctic *S. nippon* as they have a similar sculpture and stricture of the body (this two species are challenging to distinguish), but differs from it most notably by the more developed tyloids on the male flagellomeres, covering large part of flagellomere as seen in lateral view (semicircular across basal 1/3 in *S. nippon*). The female also resembles that of *S. anatolicus*, but differs by the more elevated vertex with distance from top of head to upper margin of lateral ocellus about three lateral ocellar diameters in frontal view (this distance is about two in *S. anatolicus*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 10–15 hamuli. **Female.** Total body length 7.0–15.0 mm. Head transverse, 1.25–1.32 times as wide as long. Mesoscutum medially with punctures separated by 1–4 (sometimes more) puncture diameters; mesoscutellum often with impunctate areas; mesepisternum reticulate-rugose; propodeum laterally strigate or reticulate-rugose. Metasomal T1 sparsely and finely punctate; marginal zones on T1 and T2 distinctly punctate, but on T3 and T4 impunctate; T1–T4 red, T5 from red to black, sometimes T4 whole or partly black; pygidial plate 0.6–0.7 times as wide as metabasitarsus. **Male.** Total body length 7.0–14.0 mm. Head transverse, 1.2 times as wide as long; tyloids well developed, covering large part of flagellomere as seen in lateral view. Mesoscutum coarsely punctate, density of punctures variable, usually relatively densely punctate, medially with punctures separated by at most 1–1.5 puncture diameters, sometimes sparser (up to 3 puncture diameters). Metasomal T1–T3 red (T1 often black basally), T4 from red to black; gonocoxite dorsally without impression; gonostylus with long apical process (Fig. 11).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan*: 33 ♀, 30 ♂ (Uralsk [Oral]; Yanvartsevo; Chinarev; Kharkin; Dzhanybek; 110 km ESE Dzhambeyta); *Atyrau*: 3 ♂ (Abas; 30 km W Miyaly, Uil River); *Mangystau*: 1 ♀ (120 km E Aktau, Ushtagan, Sauskan sands); *Aktobe*: 3 ♀, 3 ♂ (Bolshiye Barsuki desert, near Chelkar [Shalqar]; Malye Barsuki desert); *Kyzylorda*: 1 ♂ (Baygakum); *Akmola*: 12 ♀, 22 ♂

(Borovoye, Kokshetau; Kokshetau Mts, Tersakkan River; 10 km N Zharkol Lake); *Karagandy*: 2 ♀, 7 ♂ (Bayzhanzhai Mts; Koksengir S Zhana-Arka [Atasu]; Ak-Tau; Karzhal); *South Kazakhstan*: 9 ♀, 4 ♂ (15 km SE Suzak, Karatau Mts; 40 km N Tashkent, Darbaza; Achisai; Karatau Mts; Aksu Valley; Altyn-Ilmen Nature Park; Kokseit, Kyzykkumskiy canal); *Zhambyl*: 5 ♀, 2 ♂ (5 km E Kurday; Aidarli, Ili River; 10 km E Dzhambul; NW Tatti, Muyunkum desert); *Pavlodar*: 5 ♀, 2 ♂ (Dzhambul env., Kara Tau; 60 km, Akir Tobe; 50 km, Bjelikol Kara Tau; 15 km Dzhambul, Assa; Irtysh River, 13 km NW Lebyazhye); *East Kazakhstan*: 8 ♀, 44 ♂ (Semipalatinsk [Semey]; 15 km N Nikitinka; 18 km SE Zaysan, Temir-Su; 15 km ENE Targyn, Altay Mts; 20 km ENE Charsk; 55 km WNW Saryzek; Ayaguz River, 40–45 km SE Targabatay; Cherdoyak River, 45 km NE Kurchum; Kedrovka River, 10 km S Leninogorsk [Ridder], Ulba Mts; 5 km S Zharma; 40 km SW Ayaguz [Aya-göz]; Talmenka River, 30 km Kokpety; 20 km SE Aksay; Georgievka); *Almaty*: 51 ♀, 44 ♂ (Almaty; 50 km S Bakanas; Iliysk [Kapchagay]; Bakanas, Ili River; Chamgan, Ala-Tau Ridge; Talgar River; Axaj; Ayaksu River, 25 km SSE Dzhanugurov [Zhangsügirov]; Dzhanugurov; SE Tchilik [Shelek] env.; 144 km N Alma-Ata, Malaysari; 3 km S Issik; 40 km E Alma-Ata, Fabrichny; Lepsi; Alakol Lake, Koktuma; Matai-desert; Panfilov [Zharkent]; 40 km W Panfilov; 3 km NE Barandysy, 30 km E Shelek; Almaatinskoe Lake; 45 km W Kapshagay [Qapshaghay], Ili River; 45 km NW Kapchagay).

PUBLISHED RECORDS. The species was recorded from South Kazakhstan by Meyer (1919: 105, as *S. nigripennis*), Popov (1951: 167), and Warncke (1992: 30, as *S. gibbus nigripennis*). Morawitz (1876: 257, as *S. nigripennis* Morawitz, 1876), Meyer (1922: 1, as *S. gibbus* var. *turcestanicus* Meyer, 1919) and Popov (1967: 46) recorded the species from Kyzylorda, while Popov (1933: 53) gave locality records for Akmola. Mitai (2012: 97, as *Sphecodes tadauchi* Mitai, 2012) recorded the species from South Kazakhstan, Zhambyl and Almaty.

DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Atyrau, *Mangystau, *Aktobe, Kyzylorda, Akmola, *Karagandy, South Kazakhstan, Zhambyl, *Pavlodar, *East Kazakhstan, Almaty), Central Asia, Russia (east to Yakutia), Pakistan, Mongolia, China (Xinjiang), Europe (north to 63° latitude), Turkey, Israel, North Africa, India.

***Sphecodes haladai* Warncke, 1992**

DIAGNOSIS. This species belongs to the *miniatus* species-group owing to the same length and transverse F1–F3 in females (0.6–0.7 times as long as wide). The male of *S. haladai* is similar to *S. schwarzi*, *S. marginatus*, *S. sandykachis* and *S. larochei* by having a densely punctate metasomal T1 and by gonostylus with small triangular membranous portion; but differs from these species by the less developed tyloids, covering about 1/2 (rare 2/3) of the ventral flagellar surfaces (covering at least 3/4 ventral flagellar surfaces in other species). The female differs from other species of the group by on average the less transverse head (1.10–1.15 times as wide as long versus 1.15–1.25 times as wide as long in other species).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 4.5–5.5 mm. Head weakly transverse, about 1.10–1.15 times as wide as long; clypeus with punctures separated by about a puncture diameter (10–25 μm / 0.5–2), smooth and shiny between punctures. Mesoscutum and mesoscutellum relatively sparsely punctate medially (15–25 μm / 1–4), becoming denser peripherally. Metasomal T1 usually almost impunctate with a few very fine and indistinct punctures (3–10 μm), but sometimes punctation more distinct and denser; remaining terga with dense and fine punctures (approximately 10 μm / 0.5–1.5), punctures reaching marginal zone, but becoming sparse along it; marginal zones impunctate; T1–T2 red, T3 red or brownish; pygidial plate slightly narrower than metabasitarsus. **Male.** Total body length 4.0–5.0 mm. Head weakly transverse, 1.1 times as wide as long; vertex short, distance from top of head to upper margin of lateral ocellus about 1.5 lateral ocellar diameters; tyloids covering (from F4 onward) about 1/2 ventral flagellar surface, rare about 2/3. Mesoscutum with punctures (10–20 μm) separated by 1–3 puncture diameters. Metasomal terga with fine and numerous punctures (5–10 μm / 1–2), sparser on T1; marginal zones impunctate; metasoma dark brown; gonocoxite dorsally with impression; membranous portion of gonostylus small, triangular (Fig. 12).

MATERIAL EXAMINED. **Kazakhstan.** *South Kazakhstan:* 30 km E Chayan, Karatau Mts, 20.VI 1982, 1 ♀, SB [ZISP]; 20 km SE Zhangatas, Karatau Mts, 1.VII 1982, 1 ♂, SB [ZISP]; Shagyr, 40 km S Arys, 6.V 1994, 3 ♀, MH [PCMS]; *Zhambyl:* Novo-Voskresenovka [Andas batyra], 40 km E Merke, 4.V 1994, 1 ♀, KD [PCMS]; 60 km E Dzambul, Monjunkum desert, 1-9.V 1994, 1 ♀, P. Cechovsky [PCMS].

DISTRIBUTION. *Kazakhstan (South Kazakhstan, Zhambyl), Central Asia.

***Sphecodes hyalinatus* Hagens, 1882**

DIAGNOSIS. This species belongs to the *hyalinatus* species-group and those members with the pronotum rounded between the dorsal and lateral surfaces. The female differs from other species of the same group by the ventral portion of the mesosoma being dull, finely reticulate-rugulose (shiny, coarsely reticulate-rugose in other species). The male is similar to the eastern Palearctic species *S. murotai*, and *S. tanoi* in sharing a common genitalic form with oval membranous portion of gonostylus (Fig. 13), but differs from them by the less developed tyloids (covering one third to one half of ventral flagellar surfaces versus more than one half in these other species).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 5.0–7.5 mm. Head transverse, about 1.2 times as wide as long; clypeus densely punctate, punctures separated by less than a puncture diameter. Mesoscutum with punctures separated by 1–3 (sometimes sparser) puncture diameters. Metasomal T1 impunctate; T2–T3 indistinctly and very finely punctate; T1–T3 red, sometimes T4 red basally; pygidial plate 0.7 times as wide as metabasitarsus. **Male.** Total body length 5.0–7.0 mm. Head transverse,

about 1.15 times as wide as long; tyloids (from F4 onward) covering about 1/3–1/2 ventral surface of flagellomeres, rarely 3/4 on apical flagellomeres. Mesoscutum and mesoscutellum densely punctate, punctures separated by less than a puncture diameter to contiguous. Metasomal T1 impunctate; T2–T3 indistinctly and very finely punctate; T1–T3 red; gonocoxite dorsally with impression.

MATERIAL EXAMINED. **Kazakhstan.** *East Kazakhstan:* Kyzylkiya, 42 km SE Zaysan, 2200 m, 7.VIII 1986, 1 ♂, YP [ZISP].

DISTRIBUTION. *Kazakhstan (East Kazakhstan), Russia, Europe (north to 68° latitude), Caucasus.

***Sphecodes intermedius* Blüthgen, 1923**

DIAGNOSIS. This species is similar to *S. pinguiculus* Pérez, 1903 as both have densely and coarsely punctate metasomal terga (including T1), well-developed tyloids on the male flagellomeres (covering at least three quarters of ventral flagellar surfaces), a male face with appressed white pubescence below and above the antennal toruli, and having appressed, dense pubescence (obscuring the integument) on the paraocular area and upper half of the gena in females. The female differs from *S. pinguiculus* in a denser mesoscutal punctation (separated by 1–3 puncture diameters versus 1–7 diameters in *S. pinguiculus*), while the male differs in the shorter antennal length with F2 1.2 times as long as wide (versus F2 1.4 times as long as wide in *S. pinguiculus*), as well as its gonostylar shape with membranous portion weakly S-curved on inner edge, as on Fig. 14 (almost straight in *S. pinguiculus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 6.5–8.5 mm. Head transverse, 1.25 times as wide as long; vertex weakly elevated and long (distance from top of head to upper margin of lateral ocellus about 3–3.5 lateral ocellar diameters). Mesoscutum and mesoscutellum relatively sparsely punctate, with punctures (25–35 µm) separated by 1–3 puncture diameters. Metasomal terga relatively coarsely and densely punctate (15–25 µm / 0.5–2); marginal zones impunctate; T1–T5 red; pygidial plate 0.4 times as wide as metabasitarsus. **Male.** Total body length 5.0–7.5 mm. Head weakly transverse, 1.1 times as wide as long; vertex elevated; tyloids well developed and usually covering entire ventral flagellar surfaces (rarely shorter, covering about 3/4 flagellar length). Mesoscutum and mesoscutellum relatively sparsely punctate, with punctures (15–20 µm) separated by 1–4 puncture diameters. Metasomal terga densely punctate (15–20 µm / at most 1.5–2); marginal zones impunctate; T1–T5 reddish-brown to dark-brown; gonocoxite dorsally with impression; gonostylus large (Fig. 14).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* 2 ♀, 5 ♂ (Yanvar-tsevo; Kharkin); *Mangystau:* 2 ♀ (120 km E Aktau, Ushtagan, Sauskan sands); *Kyzylorda:* 4 ♀, 4 ♂ (Kazalinsk; Baigakum near Zhulek; 21 km NW Kyzylorda; 70 km NNW Kyzylorda); *Akmola:* 2 ♀, 2 ♂ (10 km N Zharkol Lake; Kokshetau Mts); *Karagandy:* 8 ♀, 57 ♂ (Taldy-Manak River, S Zhana-Ark [Atasu]; Koksengir, S Zhana-Ark [Atasu]; 50 km E Balkhash); *Zhambyl:* 10 ♀, 7 ♂ (Auliye-Ata [Taraz];

Anrakhay; Dzhabul env., Assa; 115 km, Akkei; Kara Tau; 12 km ESE Blagoveshenka, Chu River; 12 km NE Krasnogorka [Ulakensulutor], Aktas Mts; Tatti, 80 km E Merke; 10 km E Dzambul; *East Kazakhstan*: 3 ♀ (Ayaguz River, 40 km SE Targabatay; 45 km ESE Targabatay); *Almaty*: 11 ♀, 17 ♂ (Almaty; Iliysk; near Ili, Ili River; Kapchagai, 60 km N Almaty; Alakol Lake; Charyn valley, W Chundza; 30 km NW Ushtobe).

PUBLISHED RECORDS. Popov (1967: 47) recorded the species from Aktobe.

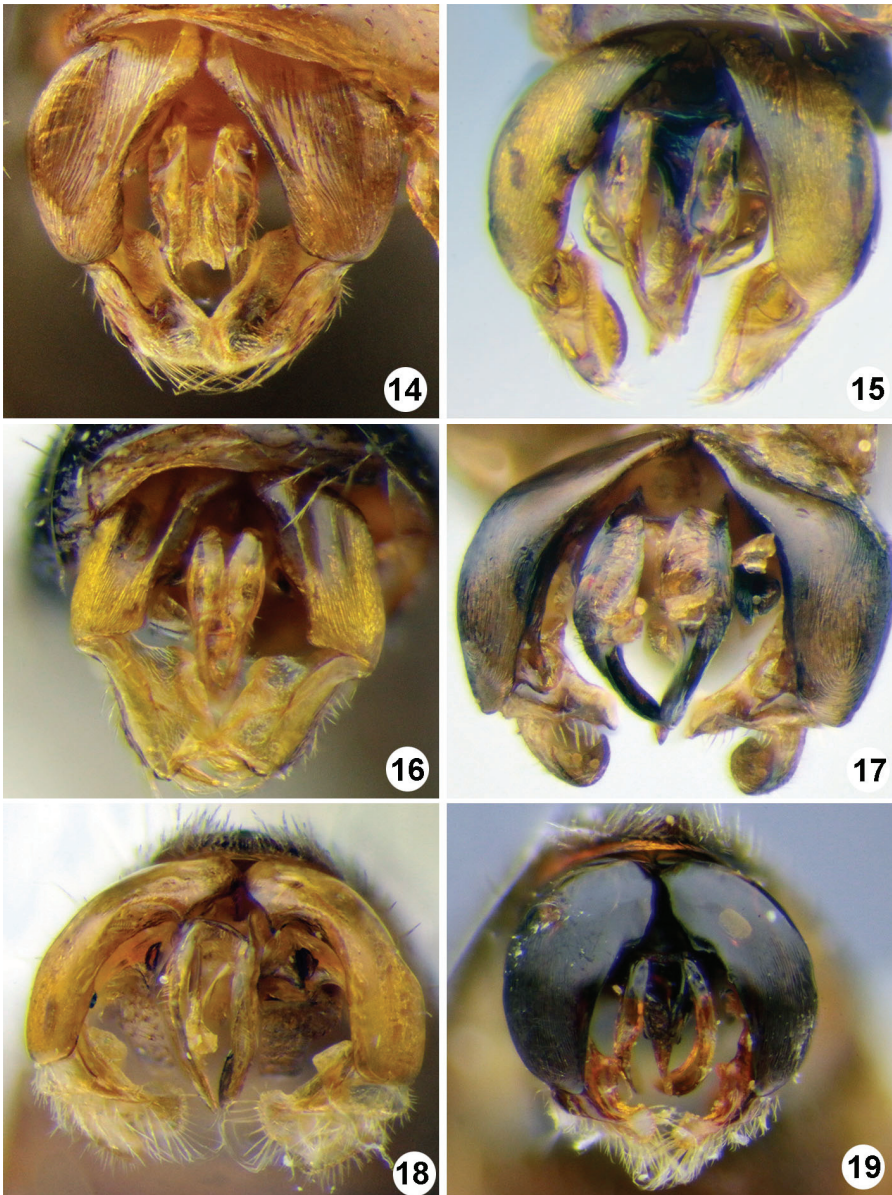
DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Mangystau, Aktobe, *Kyzylorda, *Akmola, *Karagandy, *Zhambyl, *East Kazakhstan, *Almaty), Russia (south of European part, South Ural), Central Asia, Pakistan, Caucasus, Turkey, North Africa.

***Sphecodes longulus* Hagens, 1882**

DIAGNOSIS. This species is similar to small Palaearctic species with simple mandibles (refer to Diagnosis *S. armeniacus*, above). *Sphecodes longulus* differs from these species by the weakly transverse female head (1.15 times as wide as long versus 1.2–1.3 in other species). The female is similar to *S. longuloides* and *S. trjapitzini* by sparsely punctate ocello-ocular area with punctures separated by 2–5 punctate diameters (0.5–2 in other species). The male is most close to *S. trjapitzini*, *S. turanicus*, and *S. hirtellus* in sharing similar genitalic form with short, oval gonostylus without membranous part (Fig. 15), but differs from two last by a shorter antenna with F2 1.4–1.5 times as long as wide (versus F2 1.7–1.8 as long as wide) and by the less developed tyloids on the flagellomeres extending at most a half of ventral flagellar surfaces (versus those across 1/2–3/4). The male *S. longulus* differs from *S. trjapitzini* only by a slightly smaller ratio of the wide of gonostylus to its length.

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 4.0–6.0 mm. Head weakly transverse, at most 1.15 times as wide as long; clypeus, at least in its lower half, with punctures separated by about a puncture diameter; ocello-ocular area with sparse and fine punctures separated by 2–5 puncture diameters; F1–F3 transverse, F1 and F2 about 0.6–0.7 times as long as wide, F3 0.8 times as long as wide. Mesoscutum finely punctate (10–20 µm / 1–4). Metasomal T1 impunctate; T2–T3 finely, sparsely, and usually indistinctly punctate; T1–T3 yellowish red, T4 and T5 brownish; pygidial plate shiny, 0.6 times as wide as metabasitarsus. **Male.** Total body length 3.5–6.0 mm. Head weakly transverse, at most 1.1 times as wide as long; tyloids semioval-shaped, not extending beyond middle of each flagellomere. Mesoscutum medially with punctures separated by 1–2 puncture diameters, becoming denser peripherally. Metasomal T1 impunctate, T2–T3 finely but distinctly punctate; T1 and T2 yellowish or brownish-red to red, remaining terga usually darker; gonocoxite dorsally without impression; gonostylus small, triangular (Fig. 15).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan*: near Uralsk [Oral], 7.VII 1908 1 ♀, 1 ♂, Borodin, Uvarov [ZISP]; Yanvarztevo, Ural River, 3.VI–2.IX



Figs 14–19. Genitalia, males, dorsal view. 14 – *Sphecodes intermedius*; 15 – *S. longulus*; 16 – *S. miniatus*; 17 – *S. monilicornis*; 18 – *S. olivieri*; 19 – *S. pectoralis*.

1949, 6 ♀, 7 ♂, VR, VP [ZISP]; Kharkin, Ural River, 19.VI 1951, 1 ♀, 1 ♂, VT [ZISP]; *Karagandy*: Taldy-Manak River, S Zhana-Ark [Atasu], 10.VI 1959, 3 ♀, AP [ZISP]; S Zhana-Ark [Atasu], 2.VIII 1959, 1 ♀, VR [ZISP]; *South Kazakhstan*: Chagir, 40 km S Aris, 6.V 1994, 1 ♀, MH [PCMS]; *Zhambyl*: Dzhambul env., Assa, 31.V 1980, 1 ♀, ZP [PCMS]; 40 km E Merke, Novovoskresenovka, 4.V 1994, 1 ♀, JH [PCMS]; 10 km E Dzhambul, 31.V 1994, 1 ♀, MH [PCMS]; *East Kazakhstan*: Semipalatinsk [Semey], 1 ♀, F. Morawitz's coll. [ZISP]; Topolevka, E Sarkand, 22.V 1957, 2 ♀, I. Kerzhner [ZISP]; 15 km ENE Targyn, Altay Mts, 2.VIII 1983, 1 ♂, SB [ZISP]; 20 km SE Aksay, 16-19.VI 1992, 1 ♀, JH [PCMS]; *Almaty*: near Almaty, VI.1936, 1 ♀, Birulya [ZISP]; 3 km S Issik, 22-23.VI 1992, 2 ♀, JH [PCMS]; Alma-Ata, 1.VI 1994, 1 ♀, MH [PCMS]; 6 km SW Almaty, 6.VIII 2002, 1 ♀, VK [ZISP].

DISTRIBUTION. Kazakhstan (West Kazakhstan, Karagandy, East Kazakhstan, South Kazakhstan, Zhambyl, Almaty), Russia, Europe (north to Finland, Sweden, Denmark, England), Central Asia, Turkey, Syria, Japan.

***Sphcodes miniatus* Hagens, 1882**

DIAGNOSIS. This species belongs to the *miniatus* species-group, with the same length and transverse F1–F3 in females. Among species of this group *S. miniatus* is most close to *S. marginatis* and *S. nomioidis* as they have a similar sculpture and stricture of the body. So females of this three species are challenging to distinguish; on average *S. miniatus* T2 sparser punctate on posterior half with punctures usually not reach marginal zone (but not always, especially in specimens from Kazakhstan). Reliable determination of this species is possible in male, which differs from other species of the group by the large, trapezoidal membranous portion of gonostylus (Fig. 16) (smaller or triangular in other species).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female**. Total body length 4.0–6.0 mm. Head transverse, 1.15–1.23 times as wide as long; clypeus sparsely punctate, punctures separated by 0.5–2 puncture diameters; F3 transverse, 0.6–0.7 times as long as wide, equal to F1. Mesoscutum sparsely punctate, with punctures separated by 1–4 puncture diameters. Metasomal T1 impunctate or with few fine punctures; T2 with fine and dense punctures on anterior half and usually sparsely and irregularly punctate on posterior half, punctures not reach marginal zone; T1–T3 red; pygidial plate as wide as metabasitarsus. **Male**. Total body length 4.0–6.0 mm. Head transverse, about 1.1–1.15 times as wide as long; tyloids on apical flagellomeres covering more than three quarters flagellar ventral surfaces, sometimes extending entire ventral surface. Mesoscutum with punctures (at least medially) separated by more than puncture diameter; punctuation of terga variable: discs of T1 and T2 with punctures from indistinct, sparse, and fine (2–5 µm) to distinctly, relatively dense and coarse (5–10 µm); T1–T3 from red to brown, with red marginal zones; gonocoxite dorsally with impression.

MATERIAL EXAMINED. **Kazakhstan**. *West Kazakhstan*: near Uralsk [Oral], 17.VII 1908, 2 ♀, Uvarov [ZISP]; idem, 8.V 1935, 1 ♀, Fridolin [ZISP]; Kharkin, Ural River, 6.V–8.VII 1951, 13 ♀, 3 ♂, VT, Romadina [ZISP]; Yanvarztevo, Ural

River, 16.V–2.IX.1949, 26 ♀, 6 ♂, VR [ZISP]; *Aktobe*: 10 km W Khromotau, 28.VIII 1987, 1 ♂, YP [ZISP]; *Akmola*: Akmolinsk, 21.VI 1932, 1 ♀, VP [ZISP]; Kokshetau Mts, Tersakkan River, 7–21.VI 1957, 1 ♀, 2 ♂, VT [ZISP]; Tengiz Lake, 3.VII 1957, 1 ♂, VT [ZISP]; *Karagandy*: Koksengir, S Zhana-Ark [Atasu], 3–23.VII, 6.VIII 1959, 1 ♀, 34 ♂, VR, AP, Kurchinskaya [ZISP]; Taldy-Manak River, S Zhana-Ark [Atasu], 6–15.VII 1959, 54 ♂, AP [ZISP]; *East Kazakhstan*: Semipalatinsk [Semey], 1 ♀, F. Morawitz's coll. [ZISP]; 18 km SE Zaysan, Temir-Su, 15.VI 1973, 1 ♀, MK [ZISP]; 12 km SE Georgievka, 17.VII 1979, 1 ♀, VK [ZISP]; Targabatay Mts, 10 km ENE Kirovka, 12.VII 1983, 2 ♀, M. Volkovich [ZISP]; Ayaguz River, 40–45 km SE Targabatay, 1600 m, 2.VIII 1986, 1 ♀, YP [ZISP]; Cherdoyak River, 45 km NE Kurchum, 1000 m, Naryn Mts, 11.VIII 1986, 1 ♀, YP [ZISP]; 20 km ENE Charsk, 600 m, 17.VII 1987, 2 ♀, 6 ♂, YP [ZISP]; *Almaty*: near Almaty, 6.VI.1953, 2 ♀, G.A. Viktorov [ZMMU]; Dzhungar Alatau Mts, Topolevka, E Sarkand, 8–22.V 1957, 8 ♀, I. Kerzhner [ZISP]; Issik, 22.VI 1992, 1 ♀, JH [PCMS]; 3 km S Issik, 22–23.VI 1992, 1 ♀, KD [PCMS]; 6 km SW Almaty, 7.VI 2003, 1 ♀, VK [ZISP].

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Aktobe, Akmola, Karagandy, East Kazakhstan, Almaty), Russia, Kyrgyzstan, Mongolia, Europe (north to 62° latitude), Caucasus.

REMARK. In the southern part of Kazakhstan this species occurs only in mountainous areas.

***Sphecodes monilicornis* (Kirby, 1802)**

DIAGNOSIS. This species is close to species of the *gibbus* species-group (refer to Diagnosis of *Sphecodes anatolicus*, above), but differs from them by the strongly curved basal vein (1M) in the hind wing, square-shaped head in females (versus round or oval in females of the *gibbus* species-group), and unique structure of the male gonostylus (Fig. 17).

DESCRIPTIVE NOTES. Hind wing costal margin with 7–8 hamuli. **Female.** Total body length 7.0–10.0 mm. Head rounded-rectangular on upper margin, square-shaped as seen in frontal view; vertex sparsely punctate, punctures mostly separated by more than a puncture diameter; distance from top of head to upper margin of lateral ocellus about 3.5 lateral ocellar diameters. Mesoscutum and mesoscutellum irregularly punctate (25–50 μm / 0.5–3); mesepisternum reticulate-rugose; propodeum laterally strigate-rugose. Metasomal T1 disc indistinctly punctate, with a few very fine punctures; T1–T3 red, T4 partly to entirely red; pygidial plate equal or slightly narrower than metabasitarsus. **Male.** Total body length 7.0–10.0 mm. Head rounded, about as long as wide; vertex strongly elevated, distance from top of head to upper margin of lateral ocellus about 2.5–3 lateral ocellar diameters; tyloids weakly developed, semicircular across basal 1/7–1/5 of ventral flagellar surfaces. Mesoscutum densely punctate, with punctures contiguous to separated by at most 1.5 a puncture diameter. Metasomal T1 finely and sparsely (sometimes indistinctly) punctate; T1 (usually apically), T2, and T3 red; gonocoxite dorsally without impression.

MATERIAL EXAMINED. Kazakhstan. *West Kazakhstan*: 29 ♀, 12 ♂ (Yanvartsevo; Kharkin, Ural River; 110 km ESE Dzhambeyta); *Kostanay*: 1 ♀ (near Uzynkol [Leninskoye]); *Akmola*: 1 ♀ (Akmolinsk); *South Kazakhstan*: 2 ♀, 2 ♂ (10 km SE Novonikolaevka; 40 km N Tashkent, Darbaza); *Pavlodar*: 2 ♂ (Chernoretsk; Irtysh River, 13 km NW Lebyazhye); *East Kazakhstan*: 3 ♀, 7 ♂ (18 km SE Zaysan, Temirsu; Cherdoyak River, 45 km NE Kurchum; 20 km ENE Charsk; Ayaguz River, 40 km SE Targabatay; Char River, 50 km SE Semipalatinsk; 20 km SE Aksay; Georgievka); *Almaty*: 27 ♀, 10 ♂ (Almaty; Aksay; 30 km Aksay; 144 km N Alma-Ata, Malaysari; Koktal garden; 3 km S Issik; Lepsi; Alakol Lake, Koktuma; Matai-desert; Talas Alatau Mts, near Zhabagly; 4 km E Arkharla, Dzhungar Alatau Mts).

DISTRIBUTION. Kazakhstan (West Kazakhstan, Kostanay, Akmola, South Kazakhstan, Pavlodar, East Kazakhstan, Almaty), Russia, North Pakistan, Europe (north to 64° latitude), Caucasus, Turkey, Central Asia, Mongolia, North Africa.

***Sphecodes olivieri* Lepeletier de Saint Fargeau, 1825**

DIAGNOSIS. This species is close to *S. cristatus* Hagens, 1882 and *S. pectoralis* as they share a sharp, longitudinal carina on the vertex and similar male gonostylar shape (Fig. 18), but differs from both by the coarser punctation of the mesoscutum (25–75 µm versus 20–40 µm in other species) and by the more strongly transverse head (1.30–1.35 times as wide as long in female and 1.2 times as wide as long in male versus 1.20–1.25 times in female and 1.10–1.15 times as wide as long in male in *S. cristatus* and *S. pectoralis*, respectively).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 11–12 hamuli. **Female.** Total body length 8.0–11.0 mm. Head strongly transverse, 1.30–1.35 times as wide as long; vertex elevated; face and gena with dense, appressed, snow-white pubescence obscuring integument. Mesoscutum coarsely and irregularly punctate, with punctures (25–75 µm) separated by 0.1–3 puncture diameters; mesoscutellum sometimes with sparser punctures, separated by 0.1–5 puncture diameters; mesosoma black to entirely red; legs red or reddish brown; mesepisternum and metanotum with dense, appressed, snow-white pubescence obscuring integument. Metasomal T1 distinctly punctate, on disc irregularly so (15–30 µm / 1–8), densely so on marginal zone (0.5–2); T1–T5 red; pygidial plate slightly narrower than metabasitarsus. **Male.** Total body length 7.0–11.0 mm. Head transverse, 1.2 times as wide as long; vertex strongly elevated; tyloids weakly developed, narrow, semicircular across basal 1/7–1/5 of flagellomeres. Mesoscutum and mesoscutellum coarsely and densely punctate, with punctures (30–75 µm) separated by 0.1–2 puncture diameters; mesosoma black to entirely red; legs red or reddish brown. Metasomal T1 with marginal zone distinctly punctate; T1–T5 red; gonocoxite dorsally with impression; gonostylus as in Fig. 18.

MATERIAL EXAMINED. Kazakhstan. *West Kazakhstan*: 2 ♀ (Kharkin, Ural River; Bolshoy Uzen River); *Atyrau*: 2 ♂ (30 km W Miyaly, Uil River); *Mangystau*: 1 ♀, 1 ♂ (Fort Aleksandrovsk [Shevchenko]; 120 km E Aktau, Ushtagan, Sauskan sands); *Kyzylorda*: 2 ♀ (near Zhulek, Syr Darya River; Kazalinsk); *Akmola*: 1 ♀

(15 km NW Ashchikol Lake [W Kokshetau]); *Karagandy*: 2 ♀, 1 ♂ (Balkhash Lake, 90 km E Balkhash); *South Kazakhstan*: 1 ♀, 4 ♂ (Arys River, Syr Darya River; Golodnaya Step Desert; Karatau Mts, Darvaza River; 40 km N Tashkent, Darbaza; Shardara, Syr-Dar'ya River); *Zhambyl*: 6 ♀, 16 ♂ (Talas River; Kara Tau; Togusken; 12 km NE Lugovoy; 30 km SW Khantau, Chu River; Balkhash Lake, 30 km NNW Mynaral; Balkhash env.); *East Kazakhstan*: 1 ♀, 1 ♂, Bolshoy Uzen River; 15 km W Buran, Cherny Irtys River; *Almaty*: 4 ♀, 5 ♂ (Iliysk [Kapchagay]; 25 km W Bakanas; 40 km NNW Chardara, Syr Darya River; 15 km SSW Ushtobe; Lepsi; Matai-desert; Charyn River, Sortogay; 15 km W Chundzha).

PUBLISHED RECORDS. The species has been recorded from South Kazakhstan by Morawitz (1876: 225, as *S. rufithorax* Morawitz, 1876) and Meyer (1919: 107, as *S. rufithorax*), while Meyer (1924: 5, as *S. tenuis* Meyer, 1919) provided a record from Almaty.

DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Atyrau, *Mangystau, *Kyzylorda, *Akmola, *Karagandy, South Kazakhstan, *Zhambyl, *East Kazakhstan, Almaty), Central Asia, South Europe, Russia (south of European part), Caucasus, Turkey, Iran, Pakistan, India, Israel, United Arab Emirates, Qatar, North Africa.

***Sphecodes pectoralis* Morawitz, 1876**

DIAGNOSIS. This species is close to *S. cristatus* and *S. olivieri* (refer to Diagnosis for *S. olivieri*, above), but aside from differences mentioned in the diagnosis for those species, *S. pectoralis* is also metasomal T2 with marginal zone distinctly punctate (impunctate in *S. cristatus* and *S. olivieri*) and on average smaller in total body size (length 6.5–8.5 mm in females and 5.0–7.0 mm in males, versus 8.0–11.0 mm in females and 7.0–11.0 mm in males of *S. olivieri*, and 6.0–8.0 mm in females and 7.0–10.0 mm in males of *S. cristatus*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8–9 hamuli. **Female.** Total body length 6.5–8.5 mm. Head transverse, 1.23–1.25 times as wide as long; vertex weakly elevated; black to entirely red; face with dense, appressed, snow-white pubescence obscuring integument. Mesosoma black to entirely red; mesoscutum irregularly punctate, with punctures (25–40 µm) separated by 0.1–3 puncture diameters; mesoscutellum with punctures usually sparser (0.1–5); mesepisternum (partly) and metanotum with dense, appressed, snow-white pubescence obscuring integument; legs red. Metasomal T1 distinctly punctate, on disc irregularly (10–25 µm / 1–6), denser and finer on marginal zone (5–15 µm); T1–T5 red; pygidial plate slightly narrower than metabasitarsus. **Male.** Total body length 5.0–7.0 mm. Head weakly transverse, 1.10–1.15 times as wide as long; vertex strongly elevated; tyloids weakly developed, narrow, semicircular across basal 1/7–1/5 of flagellomeres. Mesosoma black to entirely reddish brown; mesoscutum densely punctate, with punctures (25–40 µm) separated by 0.1–2 puncture diameters; mesoscutellum with punctures usually sparser (0.1–4); legs red. Metasoma T1 with marginal zone distinctly punctate; T1–T5 red; gonocoxite dorsally with impression; gonostylus as in Fig. 19.

MATERIAL EXAMINED. **Kazakhstan.** *South Kazakhstan*: 40 km NNW Shardara, 27.V 1978, 1 ♂, YP [ZISP]; Chagir, 40 km S Aris, 6.V 1994, 1 ♀, MH [PCMS]; *Almaty*: Iliysk, 8.VI 1953, 1 ♂, LZ [ZMMU]; *Zhambyl*: Kara-Dzhar-Tas, 29.VI 1930, 1 ♀, [ZISP]; Dzhambul env., Assa, 31.V 1980, 1 ♀, ZP [PCMS]; Dzhambul env., Kara Tau, 3.VI 1980, 1 ♂, ZP [PCMS]; 12 km NE Lugovaya, 3.IX 1988, 3 ♂, YP [ZISP]; Tatti, 80 km E Merke, 5.V 1994, 1 ♀, MH [PCMS].

PUBLISHED RECORDS. Morawitz (1876: 257) recorded this species from Kyzylorda (“Kosaral Lake”). Both Meyer (1919: 154) and Warncke (1992: 24) recorded this species from Almaty.

DISTRIBUTION. *Kazakhstan (Kyzylorda, *South Kazakhstan, *Zhambul, Almaty), Central Asia.

***Sphecodes pellucidus* Smith, 1845**

DIAGNOSIS. This species is similar to the western Palaearctic *S. pieli* Cocke-rell, 1931, *S. kozlovi* Astafurova et Proshchalykin, 2015a, and *S. simillimus* Smith, 1873 in sharing a similar shape of male genitalia with large membranous portion of gonostylus (Fig. 26), but differs from these species by the lack of a longitudinal carina on the vertex. The female is also similar to *S. ephippius* differing in the long setae of the scape (distinctly longer than width of scape) and the more transverse head with the vertex not elevated (setae on scape shorter than width of scape and vertex weakly elevated in *S. ephippius*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 7.0–11.0 mm. Head strongly transverse, 1.30–1.35 times as wide as long; vertex not elevated. Mesoscutum and mesoscutellum densely punctate (20–30 µm / 0.5–1). Metasomal T1 impunctate or with a few fine punctures; T2 distinctly punctate, denser on anterior third and sparsely on remainder of disc; marginal zones impunctate; T1–T3 red; pygidial plate dull, 1.3–1.5 times wider than metabasitarsus. **Male.** Total body length 7.0–11.0 mm. Head transverse, 1.25 times as wide as long; tyloids (from F4 onward) covering 1/2–4/5 of ventral surface of flagellomeres. Mesoscutum and mesoscutellum densely punctate (20–30 µm) with punctures separated by less than a puncture diameter, often with contiguous punctures. Metasomal T1 impunctate or rarely with a few fine punctures; T2 sparsely punctate; T1 partly red (black basally and medially), T2 entirely red, T3 entirely or partly red; gonocoxite dorsally without impression.

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan*: 51 ♀, 72 ♂ (Uralsk [Oral]; Yanvarztevo; Kharkin, Ural River; Mergenevo; Dzhanybek); *Aktobe*: 3 ♂ (Chelkar [Shalqar]); *Kostanay*: 10 ♂ (Borovoye, Kokshetau; Naurzum [Aksuat]; Narsum Nature Reserve); *Kyzylorda*: 3 ♀, 1 ♂ (Baigakum near Zhulek, Syr Darya River; Kazalinsk); *Akmola*: 15 ♀, 34 ♂ (Akmolinsk; Kokshetau Mts, Tersakkan River; Tengiz Lake; 10 km N Zharkol Lake); *Karagandy*: 17 ♀, 180 ♂ (Bayzhanzhal Mts; Taldy-Manak River, S Zhana-Ark [Atasu]; Ak-Tau; Koksengir, S Zhana-Ark [Atasu]; Karagash, 60 km NW Zhana-Ark [Atasu]; Karazhal [Qarazhal]); *Zhambyl*:

1 ♀, 1 ♂ (Kurday; 60 km E Dzambul, Monjunkum desert); *Pavlodar*: 5 ♀, 7 ♂ (Pavlodar; Chernoretzkiy; Irtysh River, 13 km NW Lebyazhye; 80 km E Dzambul, Vanovka; 40 km E Merke, Novovoskresenovka; Tatti, 80 km E Merke; 10 km E Dzambul); *East Kazakhstan*: 13 ♀, 27 ♂ (Semipalatinsk [Semey]; Topolevka, E Sarkand; 18 km SE Zaysan, Temir-Su; Ayaguz River, 40 km SE Targabatay; Sasykkol Lake; 40 km SW Ayaguz [Ayagöz]; 20 km ENE Charsk; 20 km SE Aksay; 12 km S Slavyanka, Narym Mts); *Almaty*: 18 ♀, 9 ♂ (Almaty; Ili River, 50 km S Bakanas; Otar; Iliysk; Chuiysk Mts, 5 km E Kurday; Dzhangsugurov [Zhangsügirov], Aksu River; 144 km N Alma-Ata, Malaysari; Alakol lake, Koktuma; 40 km E Alma-Ata, Fabrichny; Kapchagai, 60 km N Alma-Ata; Matai-desert; Charyn valley, W Chundza).

PUBLISHED RECORDS. The species was recorded from West Kazakhstan by Meyer (1924: 7) and Warncke (1992: 43), and from Akmola by Popov (1933: 53).

DISTRIBUTION. Kazakhstan (West Kazakhstan, *Aktobe, *Kyzylorda, *Kostanay, Akmola, *Karagandy, *Zhambyl, *Pavlodar, *East Kazakhstan, *Almaty), Central Asia, Russia, China (Xinjiang, Sichuan), Mongolia, Europe (north to 66° latitude), Caucasus, Turkey, North Africa.

***Sphecodes pesenkoi* Astafurova et Proshchalykin, sp. n.**

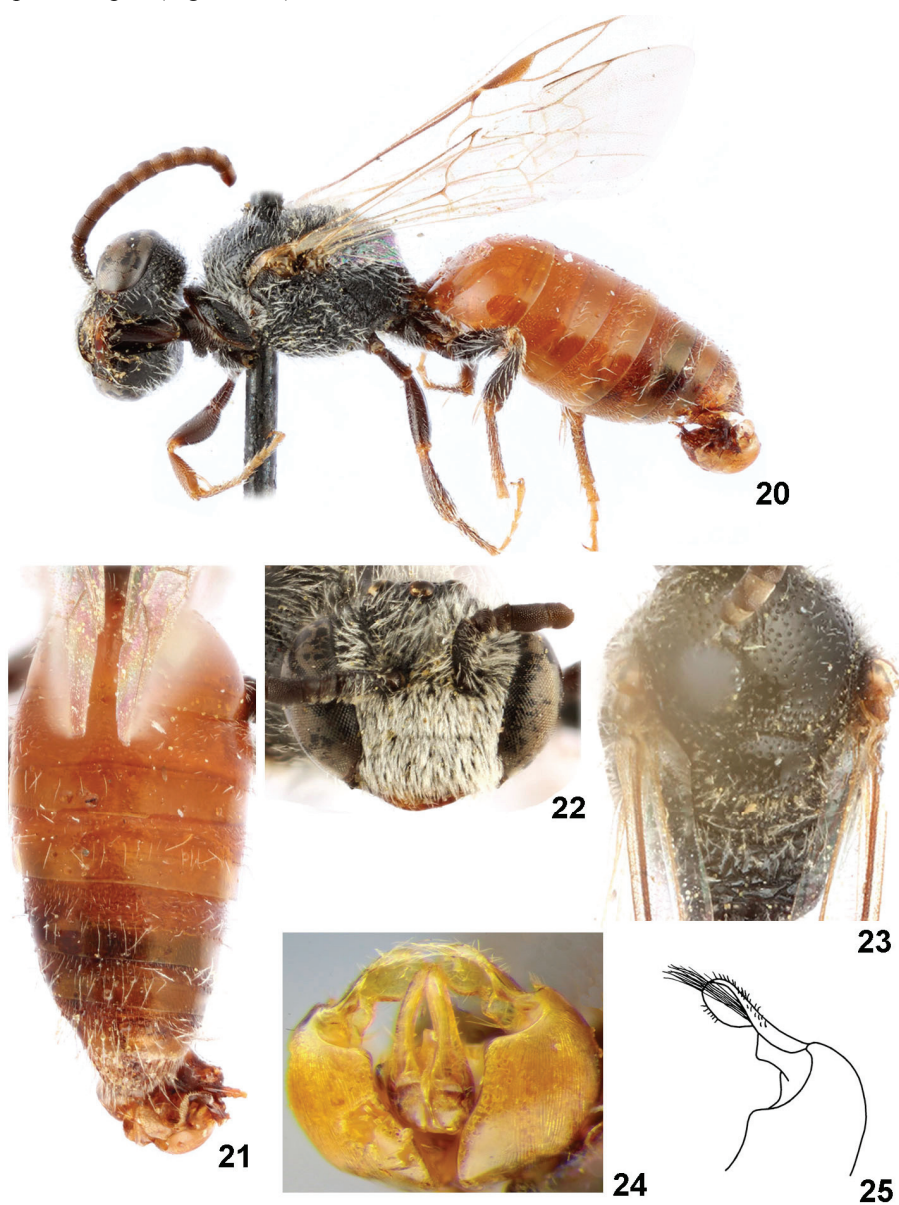
DIAGNOSIS. The new species most closely approximates *S. rubicundus* Hagens, 1875 and *S. ruficrus* (Erichson, 1835) owing to a similar gonostylar shape (elongate, spoon-shaped), but differs from these species by sparser punctation of mesoscutum separated by 1–3 puncture diameters (versus areolate) and T1 with a few fine punctures (versus coarsely and densely punctate in *S. rubicundus* and *S. ruficrus*).

DESCRIPTION. Male. Total body length 6.0 mm. Head black (except reddish mandibles) (Fig. 22); transverse, 1.15 times as wide as long; vertex not elevated, distance from top of head to upper margin of lateral ocellus about 1.5 lateral ocellar diameters as seen in dorsal view; antenna attain middle of mesoscutum; F1 transverse, 0.6 times as long as wide; F2 1.4 times as long as wide; tyloids deep, covering (from F4 onward) about a half ventral surface of flagellomeres; face densely punctate, with contiguous punctures, ocello-ocular area with punctures separated by 0.5–2 puncture diameters; face with dense, appressed, snow-white, plumose pubescence obscuring integument; vertex and gena rugose.

Mesosoma black; mesoscutum and mesoscutellum with fine punctures (20–25 µm) separated by 1–3 puncture diameters (Fig. 23); mesepisternum densely rugose (Fig. 20), ventrally finer rugose, with long, appressed, plumose pubescence; propodeal triangle shiny with coarsely longitudinal-winding wrinkles; remainder of propodeum similarly sculptured (coarsely reticulate-rugose); legs dark brown except mediotarsus yellow. Hind wing with basal vein strongly curved; costal margin with 5 hamuli.

Metasoma red; T1 with a few fine punctures; T2–T4 with fine (10–20 µm), but numerous punctures separated by 1–4 puncture diameters (Fig. 21); marginal zones impunctate, smooth on T1–T3 and delicately tessellate on T4–T6; sterna finely tessellate; S1–S2 with fine punctures (5–10 µm) separated by 3–6 puncture diameters;

remaining sterna densely punctate with puncture (10–15 μm) separated by 1–3 puncture diameters; gonocoxite without dorsal depression; gonostylus elongate, spoon-shaped (Figs 24, 25).



Figs 20–25. *Sphecodes pesenkoi* Astafurova et Proshchalykin, sp. n., male, holotype. 20 – habitus, lateral view; 21 – metasoma, dorsal view; 22 – head, frontal view; 23 – mesosoma, dorsal view; 24 – genitalia, dorsal view; 25 – gonostylus, dorsal view.

Female. Unknown.

HOLOTYPE: ♂, **Kazakhstan:** Kyzylorda Prov., Perovsk, Syr Darja [Kyzylorda], 15.V 1928, leg. N. Olenev, VP [ZISP].

PARATYPE: 1♂, same label as holotype [ZISP].

ETYMOLOGY. The specific epithet is dedicated to Yuri Andreevich Pesenko (1944–2007), a renowned melittologist and during his life one of the leading experts on the systematics of halictid bees.

DISTRIBUTION. Kazakhstan (Kyzylorda).

***Sphecodes pinguiculus* Pérez, 1903**

DIAGNOSIS. Refer to Diagnosis for *S. intermedius* (above).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 5.0–7.0 mm. Head transverse, 1.20–1.25 times as wide as long; vertex elevated; head from black to reddish brown. Mesoscutum and mesoscutellum sparsely punctate, with punctures (15–25 µm) separated by 1–7 puncture diameters. Metasomal terga relatively coarsely and densely punctate (10–20 µm / 1–3), finer on T1 (10–15 µm); marginal zones impunctate; T1–T5 from reddish brown to red; pygidial plate 0.4 times as wide as metabasitarsus.

Male. Total body length 5.0–7.5 mm. Head weakly transverse, 1.1 times as wide as long; vertex elevated; tyloids well developed and covering entire ventral surface of flagellomeres. Mesoscutum and mesoscutellum sparsely punctate, with punctures (15–20 µm) separated by 1–5 puncture diameters. Metasomal terga densely punctate (15–20 µm / 0.5–2); marginal zones impunctate; T1–T5 dark brown, rarely reddish brown; gonocoxite dorsally with impression; membranous portion of gonostylus large, rectangular (Fig. 27).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* Uralsk [Oral], 15.V 1935, 1♂, Fridolin [ZISP]; Kharkin, Ural River, 29.V–30.VII 1951, 39♀, 58♂, VR [ZISP]; *Atyrau:* 15–30 km Atyrau, 15–16.V 2003, 1♂, VK [ZISP]; *Aktobe:* Chelkar [Shalqar], 29.V 1984, 1♀, N. Malysheva [ZISP]; *Kyzylorda:* Baigakum near Zhulek, Syr Darya River, 8.V 1908, 6♂, S. Malyshev [ZISP]; 25 km E Zhosaly, 7.VI 1979, 1♀, 1♂, YP [ZISP]; *Akmola:* Kokshetau Mts, Tersakkan River, 21.V–5.VI 1957, 1♀, 3♂, VT, VR [ZISP]; Tengiz Lake, 3.VII 1957, 1♀, VT [ZISP]; 10 km N Zharkol Lake, 9.VII 1957, 1♂, VR [ZISP]; 15 km NW Ashchikol Lake [W Kokshetau], 11.VI 1979, 1♀, YP [ZISP]; *Karagandy:* Taldy-Manak River, S Zhana-Ark [Atasu], 5.VI 1959, 1♀, 3♂, AP [ZISP]; Koksengir, S Zhana-Ark [Atasu], 20.VII 1959, 3♂, VR [ZISP]; Balkhash, Balkhash Lake, 16–19.VII 1970, 1♀, TM [ZISP]; Betpak-Dala, 55 km ENE Karakoin Lake, 16.VI 1979, 4♂, YP [ZISP]; *Zhambyl:* Aidarli, Ili River, 14.VI 1992, 1♀, 1♂, KD [PCMS]; *Almaty:* Alma-Ata env., Axaj, 29.V 1980, 41♀, ZP [PCMS]; 20 km N Kegen, 24.V 1994, 1♀, 1♂, KD [PCMS]; Alma-Ata, 1.VI 1994, 1♂, MH [PCMS]; Lepsi, 19–20.VI 1995, 1♀, JH [PCMS]; Alakol Lake, Koktuma, 1200 m, 22.VI 1995, 2♀, JH [PCMS].

PUBLISHED RECORDS. Meyer (1922: 172, as *S. punctatissimus* Meyer, 1922) recorded the species from Kyzylorda.

DISTRIBUTION. Kazakhstan (*West Kazakhstan, *Atyrau, *Aktobe, Kyzylorda, *Akmola, *Karagandy, *Zhambyl, *East Kazakhstan), Central Asia, Mongolia, Russia (south of European part and Eastern Siberia), South Europe, Caucasus, Turkey, Iran, Israel, United Arab Emirates, North Africa, Cape Verde Islands.

***Sphecodes puncticeps* Thomson, 1870**

DIAGNOSIS. This species is similar to small Palaearctic species with simple mandibles (refer to Diagnosis of *S. armeniacus*, above), but the male differs from these by its larger membranous portion of the gonostylus (Fig. 28) and the female differs by the following combination of characters: head strongly transverse, 1.2–1.3 times as wide as long (1.15 times as wide as long in *S. longulus*), ocello-ocular area with punctures separated by 0.5–1 puncture diameters (a few diameters in *S. longuloides*, *S. longulus* and *S. trjapitzini*); face below antenal torili with sparse pubescence not obscuring integument (with dense pubescence obscuring integument in *S. armeniacus* and *S. turanicus*); pygidial plate as wide as metabasitarsus (wider than metabasitarsus in *S. hirtellus* and *S. armeniacus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 5.0–8.0 mm. Head strongly transverse, 1.2–1.3 times as wide as long; clypeus with punctures separated by at most a puncture diameter; F1 and F2 transverse, about 0.6–0.7 times as long as wide; F3 slightly shorter than wide. Mesoscutum with punctures (15–30 µm) separated by at most two puncture diameters. Metasomal T1 impunctate; anterior half of T2 and T3 discs usually distinctly and densely punctate (10–15 µm), sparsely or impunctate along marginal zones; T1–T3 red; pygidial plate as wide as metabasitarsus. **Male.** Total body length 5.0–7.5 mm. Head transverse, 1.15–1.18 times as wide as long; tyloids shallow, semi-oval, extending beyond 1/4–1/3 of ventral surface of flagellomeres. Mesoscutum with punctures (15–30 µm) separated by at most 1–2 puncture diameters. Metasomal T1 impunctate or with a few fine punctures; T2 relatively coarsely and densely punctate on anterior half of disc, but impunctate along marginal zone; T1 and T2 red, T3 red basally; gonocoxite dorsally without impression; membranous portion of gonostylus triangular.

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* Uralsk [Oral], 18.VIII 1897, 3 ♂, Berezovskiy [ZISP]; idem, 10.VII 1908, 1 ♀, 3 ♂, Borodin, Uvarov [ZISP]; Yanvartsevo, Ural River, 16.V–2.IX 1949, 6 ♀, 5 ♂, VR [ZISP]; Chinarev, 31.VIII 1949 1 ♂, Arnoldi [ZISP]; Solyanka River, 13.IX 1949, 2 ♂, Arnoldi; Kharkin, Ural River, 22.VII, 31.VII 1951, 3 ♂, VR, VP [ZISP]; 110 km ESE Dzhambeyta, 30.VIII 1987, 1 ♂, YP [ZISP]; *Akmola:* Kokshetau Mts, Terisakkan River, 8.VI 1957, 2 ♀, VT [ZISP]; 5–10 km W Malyy Tengiz Lake, 18.IX 2004, 1 ♂, DK [ZISP]; *Karagandy:* Koksengir, 20.VII 1959, 1 ♂, Kurchinskaya [ZISP]; *Zhambyl:* Balkhash Lake, 30 km NNW Mynaral, 6–8.IX 1988, 1 ♀, 2 ♂, YP [ZISP]; *Pavlodar:* 25 km SSE Ekibastuz, 290 m, 22.VIII 1987, 1 ♀, YP [ZISP]; *East Kazakhstan:* 20 km ENE Charsk, 600 m, 17.VII 1987, 2 ♂, YP [ZISP]; 20 km SE Aksay, 16–19.VI 1992, 1 ♀, JH [PCMS]; *Almaty:* near Almaty, VI 1936, 1 ♂, Birulya [ZISP]; 40 km E Alma-Ata, Fabrichny, 23.VI 1992, 1 ♀, MH [PCMS]; 15

km S Alma-Ata, 27.V 1994, 1 ♀, KD [PCMS]; Georgievka, 16.VI 1995, 1 ♀, JH [PCMS]; 30 km E Chilik [Shelek], 8.VIII 1999, 1 ♂, VK [ZISP]; 30 km NW Kapshagay [Qapshaghay], Ili River, 19.V 2002, 1 ♀, VK [ZISP].

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Akmola, Karagandy, Zhambyl, Pavlodar, East Kazakhstan, Almaty), Central Asia, Mongolia, Russia, Europe (north to Finland and Sweden), Caucasus, Turkey, Israel, North Africa.

Sphecodes reticulatus Thomson, 1870

DIAGNOSIS. This species belongs to the *reticulatus* species-group (refer to Diagnosis of *S. alternatus* for group description, above). *Sphecodes reticulatus* differs from other species of the group by having the marginal zone of T4 impunctate and finely tessellate, T4 usually black in females (in *S. alternatus* and *S. crassanus* marginal zone of T4 distinctly punctate, smooth between punctures; T4 red in females).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8–9 hamuli. **Female.** Total body length 7.0–10.0 mm. Head strongly transverse, 1.25 times as wide as long. Mesoscutum usually densely punctate, medially with punctures separated by not more than 1–3 puncture diameters; mesocutellum irregularly punctate, with punctures separated by 0.1–3 puncture diameters. Metasomal T1–T3 with marginal zones smooth and distinctly punctate, marginal zone of T4 finely tessellate and impunctate; T1–T3 red, T4 sometimes red basally; pygidial plate dull, 0.5 times as wide as metabasitarsus. **Male.** Total body length 7.0–10.0 mm. Head transverse, 1.2 times as wide as long; tyloids semicircular across basal 1/7–1/5 of flagellomeres. Mesoscutum densely punctate, medially with punctures separated by at most 1.5–2 puncture diameters; mesocutellum with punctures sparser (1–3). Metasomal T1–T3 red; gonocoxite dorsally without impression.

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* near Uralsk [Oral], 22.V 1907, 1 ♀, V. Uvarov [ZISP]; 60 km E Uralsk [Oral], 16.VII 1908, 1 ♂, V. Uvarov [ZISP]; Yanvarztevo, Ural River, 2.IX 1949, 1 ♀, VR [ZISP]; *South Kazakhstan:* 15 km SE Suzak, Karatau Mts, 28.VI 1982, 1 ♂, SB [ZISP]; *Zhambyl:* Balkhash Lake, 30 km NNW Mynaral, 6-8.IX 1988, 1 ♂, YP [ZISP]; 40 km E Merke, Novovoskresenovka, 4.V 1994, 1 ♀, JH [PCMS]; *East Kazakhstan:* Chedoyak River, 45 km NE Kurchum, 1000 m, Naryn Mts, 11.VIII 1986, 1 ♀, 1 ♂, YP [ZISP]; 20 km ENE Charsk [Shar], 600 m, 17.VII 1987, 1 ♂, YP [ZISP]; *Almaty:* near Almaty, V 1936, 1 ♀, Birulya [ZISP]; near Almaty, 6.VI 1953, 1 ♀, G.A. Viktorov [ZMMU]; Ayaksu River, 25 km SSE Dzhansugurov [Zhangsügirov], 1100 m, Dzhungar Alatau Mts, 26.VII 1986, 13 ♂, YP [ZISP]; Alma-Ata, 1.VI 1994, 1 ♀, MH [PCMS].

DISTRIBUTION. *Kazakhstan (West Kazakhstan, South Kazakhstan, Zhambyl, East Kazakhstan, Almaty), Kyrgyzstan, Tajikistan, Russia (east to Irkutsk Prov.), Europe (north to 62° latitude), Caucasus, Turkey.

REMARK. In the southern part of Kazakhstan this species occurs only in mountainous areas.



Figs 26–31. Genitalia, males, dorsal view. 26 – *Sphecodes pellucidus*; 27 – *S. pinguiculus*; 28 – *S. puncticeps*; 29 – *S. rufiventris*; 30 – *S. saxicolus*; 31 – *S. scabricollis*.

***Sphecodes rufiventris* (Panzer, 1798)**

DIAGNOSIS. This species belongs to the *gibbus* species-group (refer to Diagnosis for *S. anatolicus* for description, above) and is closest to *S. tadschicus* Blüthgen in Popov, 1935 and *S. schenckii* Hagens, 1882 in short male antenna F3 (1.1–1.5 as long as wide versus about 2 times longer than wide in other species of the group), the form of the male gonostylus apically strongly emarginate as seen in lateral view and the punctate marginal zone on T3 in females. The species differs from both in the less transverse head 1.2–1.25 times as wide as long in female and 1.1–1.15 times as wide as long in male (versus 1.25–1.3 times as wide as long in female and 1.2–1.25 times as wide as long in male) and by short (versus long) setae of latero-ventral gonostilar process (Figs 29, 37) (see also diagnosis of *S. tadschicus*, below).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 7–10 hamuli. **Female.** Total body length 6.5–8.5 mm. Head transverse, 1.2–1.25 times as wide as long. Mesoscutum sparsely punctate, medially with punctures (25–40 µm) separated by 1–3 puncture diameters; mesepisternum strigate or strigate-rugose; propodeum laterally strigate. Metasomal T1 finely and sparsely punctate (5–20 µm / 2–5); marginal zones of T1–T3 punctate, sparser on T3; T1–T3 red, T4 and T5 from red to black; pygidial plate 0.5–0.6 times as wide as metabasitarsus. **Male.** Total body length 6.0–8.0 mm. Head weakly transverse, 1.1–1.15 times as wide as long; tyloids well developed, variable: from covering larger part of flagellomeres to semicircular across basal 1/4–1/3 (at least from F4 onward) and widely linear across remainder of flagellomere as seen in lateral view. Mesoscutum coarsely and densely punctate, punctures separated by about 0.5–1.5 a puncture diameter; lower part of mesepisternum strigate or strigate-rugose. Metasomal T1–T3 red, T4 and T5 from red to black; gonocoxite dorsally without impression (Fig. 29).

MATERIAL EXAMINED. **Kazakhstan.** *West Kazakhstan:* 60 km E Ural'sk [Oral], 15.VII 1908, 2 ♀, V. Uvarov [ZISP]; Ural'sk [Oral], 29-30.VII 1926, 1 ♀, A. Shestakov [ZISP]; idem, 20.V 1936, 1 ♀, Fridolin [ZISP]; Chinarev, 31.VIII 1949, 1 ♂, 1 ♀, Arnoldi [ZISP]; Yanvartsevo, Ural River, 2.VIII–11.IX 1949, 10 ♀, VR [ZISP]; Dzhanybek, 18-19.VI 1977, 4 ♂, 2 ♀, DK [ZISP]; *Aktobe:* 10 km W Khromtau, 360 m, 28.VIII 1987, 1 ♂, YP [ZISP]; *Zhambyl:* 150 km W Dzhambul, Lugovoe, 7.VII 1992, 1 ♂, MH [PCMS]; 10 km E Dzhambul, 31.V 1994, 1 ♀, MH [PCMS]; *East Kazakhstan:* Semipalatinsk [Semey], 1 ♂, F. Morawitz's coll. [ZISP]; Talmenka River, 30 km ENE Kokpekta, 28.VIII 1986, 3 ♂, YP [ZISP]; 5 km S Zharma, 29.VIII 1986, 1 ♂, YP [ZISP]; 20 km ENE Charsk [Shar], 600 m, 17.VII 1987, 2 ♂, YP [ZISP]; *Almaty:* 40 km E Alma-Ata, Fabrichny, 23.VI 1992, 2 ♀, MH [PCMS]; 144 km N Alma-Ata, Malaysari, 25-29.VI 1992, 2 ♂, Jirousek [PCMS].

PUBLISHED RECORDS. Meyer (1924: 5, as *S. subovalis* Schenck, 1853) recorded this species from the region of West Kazakhstan.

DISTRIBUTION. Kazakhstan (West Kazakhstan, *Aktobe, *Zhambyl, *East Kazakhstan, *Almaty), Central Asia, Russia (east to Khakassia Republic), Europe (north to 57° latitude), Caucasus, Turkey, North Africa (north to 57° latitude).

Sphecodes saxicolus Warncke, 1992

DIAGNOSIS. This species is similar to *S. intermedius* and *S. pinguiculus* as they all have densely punctate metasomal terga and males with appressed white pubescence on the face both above and below the antennal toruli. The male differs from these species by the weakly developed tyloids extending beyond a half of ventral flagellar surface (at least three quarters of ventral flagellar surface in other species) and oviform gonostylar shape (rectangular and S-shaped in *S. intermedius* and *S. pinguiculus*). The female can be distinguished by the short vertex with a distance from the top of the head to the upper margin of lateral ocellus about two lateral ocellar diameters (this distance is three ocellar diameters in *S. intermedius* and *S. pinguiculus*), and the absence of dense appressed setae on the face.

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 5.5–6.0 mm. Head transverse, 1.3 times as wide as long, vertex not elevated; clypeus shiny, with punctures separated by 0.5–1 a puncture diameter; F1 transverse, 0.6 times as long as wide; F2 and F3 slightly transverse, 0.8–0.9 times as long as wide; antenna and mandible brownish to reddish brown; face with sparse pubescence, not obscuring integument. Mesoscutum and mesoscutellum sparsely punctate, punctures (15–25 μm) separated by 1–4 puncture diameters; legs brownish to reddish brown. Metasomal terga with distinct and dense punctures (15–25 μm / 0.5–2), sparser (1–4) on T1; marginal zones impunctate; T1–T3 brownish or red; pygidial plate as wide as metabasitarsus. **Male.** Total body length 5.5–6.0 mm. Head transverse, 1.2 times as wide as long, vertex not elevated; F2 long, 1.4 times as long as F3; tyloids semioval-shaped, extending beyond a half of ventral flagellar surface. Mesoscutum sparsely punctate, punctures (15–25 μm) separated by 1–3 puncture diameters; mesoscutellum with punctures denser and coarser (15–30 μm / 1–2). Metasomal terga densely punctate (5–15 μm / 1–2), marginal zones impunctate; T1–T3 from red to dark brown; gonocoxite with dorsal impression; gonostylus oviform (Fig. 30).

MATERIAL EXAMINED. **Kazakhstan.** *Akmola*: 10 km N Zharkol Lake, 23.VI 1957, 1 ♂; idem, 8.VII.1957, 1 ♂, VT [ZISP]; *Karagandy*: Koksengir, S Zhana-Ark [Atasu], 20.VII 1959, 1 ♂, Kurchinskaya [ZISP]; 50 km E Balkhash, 26–27.VI 1992, 1 ♂, JH [PCMS].

DISTRIBUTION. *Kazakhstan (Akmola, Karagandy), Central Asia.

Sphecodes scabricollis Wesmael, 1835

DIAGNOSIS. This species is similar to the North African *S. atlanticus* Warncke, 1992 and Japanese *S. ikudomei* Mitai et Tadauchi, 2013, *S. nambui* Tsuneki, 1983, and *S. nipponicus* Yasumatsu et Hirashima, 1951 in the flat genal area, the developed preoccipital lateral carina, the densely punctate head and mesoscutum (with punctures separated by at most 1.5–2 puncture diameters in female and areolate in male), and in the similar gonostylar shape of males (Fig. 31). The species differs from *S. nipponicus* by the red T1–T3 in males (black in *S. nipponicus*), and in the

strongly developed median carina on the interantennal elevation in females (absent in *S. nipponicus*). The male of *S. scabricollis* also differs from other two Japanese species in the weakly developed tyloids (semicircular across basal 1/6–1/4 of ventral flagellar surfaces versus those at least widely linear across remainder of flagellomeres as seen in lateral view in other species); from *S. atlanticus* by sparser punctate metasomal terga with punctures separated by 1–3 punctures diameters (at most a puncture diameters in *S. atlanticus*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8–9 hamuli. **Female.** Total body length 9.0–12.0 mm. Head strongly transverse, 1.3 times as wide as long; vertex strongly elevated, sometimes with weak (indistinct) longitudinal ridge; distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters. Mesoscutum densely punctate and medially with punctures separated by at most 1.5–2 puncture diameters. Metasomal terga with punctures separated by 1–5 punctures diameters, sparser and often almost impunctate on T1; marginal zones impunctate, sometimes except tiny and sparse punctures on T1 zone. Metasomal T1 and T2 red, T3 usually red basally; pygidial plate slightly narrower than metabasitarsus. **Male.** Total body length 7.0–12.0 mm. Head weakly transverse, 1.1 times as wide as long; vertex elevated, distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters; tyloids semicircular across basal 1/6–1/4 of flagellar surfaces. Mesoscutum and mesoscutellum areolate (coarse punctures contiguous). Metasomal terga with punctures separated by 1–3 punctures diameters; marginal zones impunctate, except on T1 with tiny punctures. T1 red laterally and apically, T2 red, T3 red basally; gonocoxite dorsally without impression.

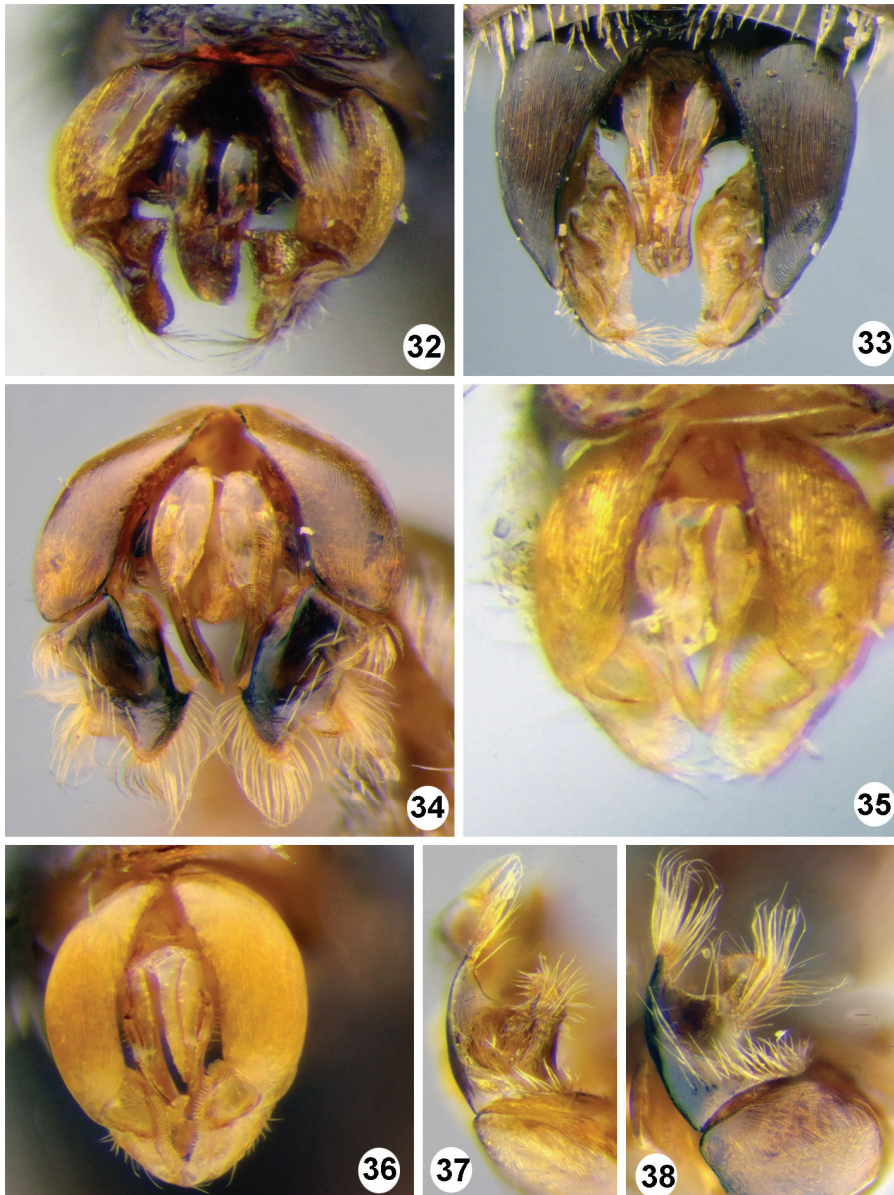
MATERIAL EXAMINED. **Kazakhstan.** *East Kazakhstan:* Kedrovka River, 10 km S Leninogorsk [Ridder], 1500 m, Ulbinskiy Ridge, 18.VIII 1986, 1 ♀, 11 ♂, YP [ZISP].

DISTRIBUTION. *Kazakhstan (East Kazakhstan), Russia, Europe (north to southern England and Latvia), Caucasus, Turkey, Kyrgyzstan, Uzbekistan, Iran, South Korea, Japan, India.

REMARK. Interestingly, this species is widespread across the Palaearctic Region but is rare wherever it is found.

***Sphecodes schwarzi* Astafurova et Proshchalykin, 2015**

DIAGNOSIS. This species belongs to the *miniatus* species-group, with the same length and transverse F1–F3 in the female. The female differs from other species of the group by the well-developed pubescence of the paraocular area with dense, strongly plumose, white setae. The male is similar to *S. haladai*, *S. larochei*, *S. sandykachis* and *S. marginatus* in the densely punctate T1 and small, triangular membranous portion of the gonostylus (Fig. 32), but differs from *S. haladai* and *S. larochei* by the coarse and denser tergal punctation (punctures separated by at most a puncture diameter versus 1–3 in other species); and more difficult distinguished from *S. marginatus* and *S. sandykachis*, but an average has shorter tyloids.



Figs 32–38. Genitalia, males, dorsal view (32–36), lateral view (37, 38). 32 – *Sphecodes schwarzi*; 33 – *S. spinulosus*; 34, 38 – *S. tadschicus*; 35 – *S. trjapitzini*; 36 – *S. turanicus*; 37 – *S. rufiventris*.

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 4.5–5.5 mm. Head transverse, about 1.25 times as wide as long; clypeus with punctures separated by about a puncture diameter (10–25 μm / 0.3–1.5), integument between punctures smooth and shiny. Mesoscutum and mesoscutellum relatively sparsely punctate medially (15–25 μm / 1–4 or more), becoming denser peripherally. Metasomal T1 smooth and shiny, almost impunctate, with a few fine punctures (3–10 μm); remaining terga with dense and fine punctures (10–15 μm / 0.5–2), becoming sparse along marginal zones; marginal zones impunctate; T1–T2 reddish brown, usually lighter on marginal zones; remaining terga brown; pygidial plate narrower than metabasitarsus. **Male.** Total body length 5.0–5.5 mm. Head weakly transverse, 1.1 times as wide as long; tyloids on F3 covering about 1/2 ventral flagellar surface, on F4 and F5 about 1/2–2/3, about 2/3–4/5 on remaining flagellomeres. Mesoscutum with deep punctures (15–25 μm / 1–4), becoming denser peripherally. Metasomal terga densely punctate with punctures separated by at most a puncture diameter; marginal zones impunctate; metasoma dark brown; gonocoxite dorsally with impression; gonostylus small, triangular.

MATERIAL EXAMINED. **Kazakhstan.** *Karagandy*: Koksengir S Zhana-Arka [Atasu], 20–23.VII 1959, 2 ♂, Kurchinskaya, AP [ZISP].

DISTRIBUTION. *Kazakhstan (Karagandy), Russia (Tyva Republic), Mongolia.

***Sphecodes spinulosus* Hagens, 1875**

DIAGNOSIS. This species is similar to the southern European *S. majalis* Pérez, 1903 and *S. barbatus* Blüthgen, 1923 as they all have well-developed spines on the outer surface of the male metatibiae and the long female antenna with F2 square (as long as wide). *Sphecodes spinulosus* differs from these species by the presence of a distinct preoccipital carina. The female also differs in the short clypeus that is twice as long as wide (three times as long as wide in *S. majalis* and *S. barbatus*), while the male differs in the size of the tyloids on the flagellum (semicircular on basal 1/7–1/5 and widely linear across remainder of flagellomeres versus only narrowly linear across remainder of flagellomeres as seen in lateral view in *S. majalis* and *S. barbatus*) and the form of the gonostylus, large and elongated backwards from apex of gonocoxite (Fig. 33) (small and not protudes from apex of gonocoxite in *S. majalis* and *S. barbatus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 7–9 hamuli. **Female.** Total body length 8.0–11.0 mm. Head strongly transverse, 1.25 times as wide as long; vertex not elevated, distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters; preoccipital carina present. Mesoscutum densely punctate, punctures (20–30 μm) separated mostly by less than a puncture diameter; mesoscutellum with impunctate areas. Metasomal T1 distinctly punctate (20–25 μm / 1–4; on anterior half with a few punctures); tergal marginal zones impunctate except for anterior half of T1 with dense punctures; T1–T3 red, T4 usually red basally. **Male.** Total body length 9.0–

11.0 mm. Head weakly transverse, 1.1 times as wide as long; vertex weakly elevated, distance from top of head to upper margin of lateral ocellus about two lateral ocellar diameters; preoccipital carina present, complete; tyloids semicircular across basal 1/7–1/4 (at least from F4 onward) and widely linear across remainder of flagellomeres as seen in lateral view. Mesoscutum and mesoscutellum densely punctate, punctures separated by less than a puncture diameter. Metasomal T1 (including marginal zone) densely punctate (20–25 μm / 0.5–2); T1 red laterally and apically, T2 and T3 entirely red, T4 red basally; gonocoxite dorsally without impression.

MATERIAL EXAMINED. Kazakhstan. *West Kazakhstan:* 1 ♀, 1 ♂ (Yanvarztevo; 10 km SE Mirgorodok); *Akmola:* 1 ♀, 2 ♂ (Kokshetau Mts, Terisakkan River); *Karagandy:* 5 ♂ (Koksengir, S Zhana-Ark [Atasu]; Bassaga); *South Kazakhstan:* 8 ♂ (70 km E Shymkent, Vanovka); *Zhambyl:* 3 ♂ (40 km E Merke, Novovoskresenovka; Talas Alatau); *East Kazakhstan:* 1 ♀, 3 ♂ (Semipalatinsk [Semey]; 18 km SE Zaysan, Temirsu; 20 km SE Aksay); *Almaty:* 13 ♀, 14 ♂ (Almaty; Turgen, Zailiyskiy Alatau; Issyk; 15 km SE Talghar; Axaj; SE Tchilik [Shelek] env.; 40 km E Alma-Ata, Fabrichny; 20 km N Kegen; Alma-Arasan; 10 km SE Kaskelen; Talgar; Bartak; 10 km S Almaty).

DISTRIBUTION. *Kazakhstan (West Kazakhstan, Akmola, Karagandy, South Kazakhstan, Zhambyl, East Kazakhstan, Almaty), Central Asia, Russia (east to Altaisky Terr.), Europe (north to 56°), Iran, Caucasus, Turkey.

***Sphecodes tadschicus* Blüthgen in Popov, 1935**

DIAGNOSIS. This species belongs to the *gibbus* species-group (refer to Diagnosis for *S. anatolicus* for group description, above) and is close to *S. rufiventris* and *S. schenckii* owing to a similar male gonostylar shape and the punctate marginal zone on the female T3. The male differs from *S. rufiventris* by dense and strongly plumose clypeal setae obscuring integument (versus sparse; setae weakly plumose and not obscuring integument in *S. rufiventris*) and from *S. schenckii* by more developed tyloids at least semicircular across basal 1/4–1/3 portion of flagellomere (versus at most semicircular across basal 1/5 in *S. schenckii*). The female differs from *S. rufiventris* by more transverse head 1.3 times as wide as long and long scapal setae twice longer than width of scape (versus head 1.2–1.25 times as wide as long and scapal setae about width of scape in *S. rufiventris*) and from *S. schenckii* by strigate-rugose, sometimes medially close to reticulate mesepisternum (versus reticulate-rugose to sometimes strigate-rugose ventrally in *S. schenckii*).

DESCRIPTIVE NOTES. Hind wing with basal vein weakly curved; costal margin with 8–9 hamuli. **Female.** Total body length 9.0–11.0 mm. Head transverse, 1.3 times as wide as long. Mesoscutum and mesoscutellum sparsely punctate, medially with punctures (40–75 μm) separated by 1–5 puncture diameters. Mesepisternum strigate-rugose or medially reticulate-rugose; propodeum laterally strigate. Metasomal T1 distinctly punctate (20–25 μm / 1–4); marginal zones of T1–T3 punctate;

T1–T5 red; pygidial plate 0.6 times as wide as metabasitarsus. **Male.** Total body length 7.0–10.0 mm. Head transverse, 1.2–1.25 times as wide as long; tyloids variable, ranging from covering larger portion of flagellomere to semicircular areas across basal 1/4–1/3 (at least from F4 onward). Mesoscutum coarsely and densely punctate, punctures separated by at most 1–1.5 puncture diameters. Metasomal T1–T5 red; gonocoxite dorsally without impression, gonostylus as in Figs 34, 38.

PUBLISHED RECORDS. Warncke (1992: 29, as *S. rufiventris tadschicus*) recorded the species from Almaty.

DISTRIBUTION. Kazakhstan (Almaty), Central Asia.

REMARKS. We examined 10 females and 12 males of *S. tadschicus* (see Astafurova & Proshchalykin, 2017b: 272) from Central Asia. However, we were not unable to locate material from Kazakhstan, nor could we locate the specimen from Almaty recorded by Warncke.

***Sphecodes trjapitzini* Astafurova et Proshchalykin, 2018**

DIAGNOSIS. This species is similar to small Palearctic species with simple mandibles which lack an inner tooth (refer to Diagnosis of *S. armeniacus*, above). In female characters *S. trjapitzini* is closest to *S. longuloides* and *S. longulus*, having the same sparsely punctate ocello-ocular area with punctures separated by 2–5 puncture diameters that well distinguish theirs from other species of the group where punctures are separated by 0.5–2 puncture diameters. The female of *S. trjapitzini* differs from *S. longuloides* only by smaller body length (3.5 mm versus 5–5.5 mm), but both easily differ from *S. longulus* by transverse head 1.3 times as wide as long (versus 1.15 times in *S. longulus*). In male characters *S. trjapitzini* is closest *S. longulus* and differs from this species only by a slightly larger ratio of the wide of gonostylus to its length.

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5 hamuli. **Female.** Total body length 3.5 mm. Head transverse, 1.3 times as wide as long; vertex not elevated; antenna and mandible reddish-yellow; F1–F3 transverse, 0.6–0.7 times as long as wide. Mesoscutum and mesoscutellum with coarse punctures (15–20 μm / 1–3). Metasomal terga smooth and shiny; T1 almost impunctate, except a few microscopical punctures (3 μm); T2–T4 with fine, but numerous punctures (5–10 μm / 2–4); marginal zones impunctate, smooth; T1 and T2 reddish-brown. **Male.** Total body length 3–3.5 mm. Head weakly transverse, at most 1.15 times as wide as long; tyloids semioval-shaped, not extending beyond middle of each flagellomere. Sculpture of mesosoma and metasoma as in a female; gonocoxite dorsally without depression; gonostylus oval (Figs 34, 38).

MATERIAL EXAMINED. **Kazakhstan.** *Almaty*: Aidarly, Ili River, 14.VI 1992, 1 ♀, 2 ♂, KD [ZISP/PCMS] (holotype and paratypes of *S. trjapitzini*).

DISTRIBUTION. Kazakhstan (Almaty).

***Sphecodes turanicus* Astafurova et Proshchalykin, 2017**

DIAGNOSIS. This species is similar to small Palaearctic species with simple mandibles which lack an inner tooth (refer to Diagnosis of *S. armeniacus*, above). The female differs from these species in the finely (3–5 µm) punctate T2 and T3 (5–15 µm in other species). The female is similar to *S. armeniacus* by dense pubescence body including appressed, snow-white pubescence obscuring integument on face (below the antennal toruli), gena and mesepisternum (this pubescence is sparse and not obscuring integument in other species), but differs from this species by densely punctate mesoscutum with punctures separated by at most a puncture diameter (versus sparsely and irregularly punctate mesoscutum with punctures separated 1–5 puncture diameters in *S. armeniacus*). The male is closest to *S. longulus*, *S. trjapitzini*, and *S. hirtellus* in sharing similar genitalic form with short, oval gonostylus, but differs from *S. longulus* and *S. trjapitzini* by stronger developed tyloids on the flagellomeres extending across 1/2–3/4 of ventral flagellar surfaces (versus those at most 1/2 in *S. longulus* and *S. trjapitzini*.), and differs from *S. hirtellus* by reticulate-rugose propodeal triangle (smoothed with weak wrinkles in *S. hirtellus*) and finely punctate metasomal terga (5 µm versus 10 µm in *S. hirtellus*).

DESCRIPTIVE NOTES. Hind wing with basal vein strongly curved; costal margin with 5–6 hamuli. **Female.** Total body length 4.5–6.0 mm. Head strongly transverse 1.2–1.3 times as wide as long; vertex not elevated; antenna and mandible yellow or reddish; F1–F3 transverse, 0.6–0.7 times as long as wide. Mesoscutum and mesoscutellum densely punctate (15–30 µm), with punctures separated by at most a puncture diameter. Metasomal terga (including T1) with dense microscopical setae pore (3–5 µm). T1–T3 yellow or reddish; pygidial plate 1.2 as wide as metabasitarsus. **Male.** Total body length 4.0–5.0 mm. Head transverse, 1.1–1.2 times as wide as long; tyloids on flagellomeres semioval-shaped, variable in length and extending across 1/2–3/4 of ventral flagellar surfaces. Mesoscutum with punctures (15–30 µm) separated by about a puncture diameter, becoming denser peripherally. Metasomal T1 impunctate, T2–T3 finely (5 µm), but distinctly punctate. T1–T2 red, T3 red basally; gonocoxite dorsally without impression; gonostylus as in Fig. 36.

MATERIAL EXAMINED. **Kazakhstan.** *Kyzylorda:* Basykara env., near Syr Darya River, 15-19.V 2011, 1 ♀, K. Tomkovich [ZMMU]; *Almaty:* near Ili, Ili River, 23.V 1970, 2 ♀, TM [ZISP] (paratypes of *S. turanicus*); Iliysk, 29.V 1953, 1 ♀, LZ [ZMMU] (paratype of *S. turanicus*).

PUBLISHED RECORDS. Astafurova and Proshchalykin (2017b: 275) recorded this species from Almaty Province.

DISTRIBUTION. Kazakhstan (*Kyzylorda, Almaty), Turkmenistan, Uzbekistan, Tajikistan.

Table 1. Records of species of *Sphecodes* Latreille in Kazakhstan organized by administrative regions (numbers refer to those listed in Fig. 1). Symbols: ○ published records; ● current data.

<i>Sphecodes</i> species	Administrative Region													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>S. albilabris</i>	●			●	●	●		●	●	●	●	●	●	●
<i>S. alternatus</i>	●	●		●		●				●	●	●	●	●
<i>S. anatolicus</i>											●			●
<i>S. armeniacus</i>						●								●
<i>S. crassus</i>	●					●		●	●			●	●	●
<i>S. cristatus</i>	●					●						●	●	●
<i>S. ephippius</i>	●					●		○	●	●	●	●	●	●
<i>S. ferruginatus</i>													●	●
<i>S. geoffrellus</i>	●				●			○	●	●	●		●	●
<i>S. gibbus</i>	●	●	●	●		○		○	●	○	●	●	●	●
<i>S. haladai</i>										●	●			
<i>S. hyalinatus</i>														●
<i>S. intermedius</i>	●		●	○		●		●	●		●		●	●
<i>S. longulus</i>	●							●	●	●	●		●	●
<i>S. miniatus</i>	●			●				●	●				●	●
<i>S. monilicornis</i>	●				●			●		●		●	●	●
<i>S. olivieri</i>	●	●	●			●		●	●	○	●		●	●
<i>S. pectoralis</i>						○				●	●			○
<i>S. pellucidus</i>	○			●	●	●		○		●	●	●	●	●
<i>S. pesenkoi</i>						●								
<i>S. pingiculus</i>	●	●		●		○		●	●		●		●	
<i>S. puncticeps</i>	●							●	●		●	●	●	●
<i>S. reticulatus</i>	●									●	●		●	●
<i>S. rufiventris</i>	○			●							●		●	●
<i>S. saxicolus</i>								●	●					
<i>S. scabricollis</i>													●	
<i>S. schwarzi</i>									●					
<i>S. spinulosus</i>	●							●	●	●	●		●	●
<i>S. tadschicus</i>														○
<i>S. trjapitzini</i>														○
<i>S. turanicus</i>						●								○
Totals	18	4	3	8	4	14	0	14	15	12	17	9	20	25

DISCUSSION

In total, 31 species are recorded from Kazakhstan, i.e. almost half of Palaearctic fauna of the genus (Table 1). For comparison, 37 species are known from Russia and 36 from Central Asia (Astafurova & Proshchalykin, 2017a, Astafurova *et al.*, 2018). The core of the *Sphecodes* fauna of the Kazakhstan is formed by 21 widely distributed species: 8 West-Palaearctic and 13 Trans-Palaearctic species, 8 species

are endemic of Central Asia, one species (*S. anatolicus*) is disjunctive distributed from south Europe to Central Asia, and one (*S. schwarzi*) is spread from Central Asia to south Siberia. In addition to these 31 species, 6 species distributed in southern Europe, Turkey and Caucasus could be found in Kazakhstan: *S. croaticus* Meyer, 1922, *S. nomioidis* Pesenko, 1979, *S. dusmeti* Blüthgen, 1924, *S. majalis* Pérez, 1903, *S. niger* Hagens, 1874, and *S. schenckii* Hagens, 1882.

Sphecodes gibbus, *S. pellucidus*, *S. albilabris*, *S. geoffrellus* and *S. monilicornis* are widespread from taiga to desert of Palaearctic Region and have large spectrum of host, the first two species are most abundant among *Sphecodes* species of Kazakhstan, the rest three species are less abundant, but quite common. *Sphecodes alternatus* is abundant in south of Western Palaearctic, is common in Kazakhstan, where occurs in steppe, semi-desert and desert localities.

Some species of the Kazakh fauna are widespread across the temperate zone of Palaearctic Region (*S. miniatus*, *S. crassus*, *S. ephippius*, *S. ferruginatus*, *S. hyalinatus*, *S. reticulatus*) and usually relatively common in cool areas, in southern parts of Kazakhstan this species are rare and principally occurs in the mountains. This phenomena for some species may be explained their host preference. So, *Lasioglossum fulvicorne* (Kirby) recorded as host of *S. ferruginatus* and *S. hyalinatus* (Bogusch & Straka, 2012) in southern Palaearctic also occur in mountain only (Blüthgen, 1924; Ebmer, 1995). At the same time, *S. crassus*, *S. ephippius*, *S. reticulatus* have large spectrum of host and have not biotope specialization (Bogusch & Straka, 2012), so his mountain distribution in southern Palaearctic may explained that these are cooler.

Sphecodes spinulosus, *S. longulus*, *S. rufiventris*, *S. cristatus* and *S. puncticeps* are widespread, but uncommon (at least in cool areas) in Palaearctic Region, occur in steppe localities of Kazakhstan. *Sphecodes saxicolus* and *S. schwarzi* are rare steppe species, the first species occurs only in Central Asia, the second is spread across Central Asia to Mongolia and south Siberia.

Sphecodes olivieri, *S. pinguculus* and *S. intermedius* are quite abundant in desert and semi-desert of Kazakhstan and Central Asia, but rare in Southern Europe. *Sphecodes tadschicus*, *S. pectoralis*, *S. haladai*, and *S. armeniacus* are rare in Kazakhstan and occur in desert and semi-desert of Central Asia. *S. scabricollis* is quite common species in Far East of Russia and Japan, but very rare in Western Palaearctic and there is only one record of this species from Kazakhstan (East Kazakhstan).

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