Koleopterologische Rundschau	90	257–290	Wien, September 2020

Contribution to the knowledge of *Entomoscelis adonidis* (PALLAS, 1771) and allied species (Coleoptera: Chrysomelidae: Chrysomelinae)

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Abstract

A review of *Entomoscelis adonidis* (PALLAS, 1771) (Coleoptera: Chrysomelidae: Chrysomelinae) and its close relatives, here designated as the *E. adonidis* species group, is presented. The authors support the traditional usage of the name *E. adonidis*, although it can be supposed that PALLAS (1771) in fact described the species treated herein as *E. dorsalis* (FABRICIUS, 1777). A new subspecies of *E. adonidis*, *E. a. caucasica* KIPPENBERG ssp.n. (Caucasus), is described, and *E. a. goliath* (ABEILLE DE PERRIN, 1897) from southern Turkey is regarded as a distinct subspecies. *Entomoscelis dorsalis* is reinstated as a distinct species, and five subspecies with strikingly disjunct distribution areas are established: *E. dorsalis dorsalis* (eastern Central Europe), *E. d. bashkiriae* KIPPENBERG ssp.n. (Russia: Bashkortostan), *E. d. hammarstroemi* JACOBSON, 1901 (Russia: southern Siberia), *E. d. iranica* KIPPENBERG ssp.n. (Iran) and *E. d. turkestana* MIKHAILOV ssp.n. (Kazakhstan). *Entomoscelis berytensis* (REICHE & SAULCY, 1858) is confirmed as a species propria. The following new synonymies are proposed: *Entomoscelis americana* BROWN, 1942 (= *E. adonidis*), *E. occidentalis occidentalis* ESCALERA, 1914, and *E. o. thalmanni* KOCHER, 1969 (= *E. cornea* ABEILLE DE PERRIN, 1897), *E. suturalis* WEISE, 1882 (= *E. sacra* (LINNAEUS, 1758)). A neotype is designated for *Chrysomela sacra* LINNAEUS, 1758. Lectotypes are designated for *Chrysomela dorsalis* FABRICIUS, 1777, *C. trilineata* FABRICIUS, 1777, *Entomoscelis dorsalis hammarstroemi*, *E. erythrocnema* JACOBSON, 1893, and *E. suturalis* WEISE, 1882. Due to primary homonymy a new replacement name, *C. rumex* KIPPENBERG nom.n., is proposed for *Chrysomela rumicis* FABRICIUS, 1787 (nec *C. rumicis* SCHRANK, 1785). The name *Chrysomela melanostoma* GMELIN, 1790 is regarded as a nomen dubium.

Key words: Coleoptera, Chrysomelidae, Chrysomelinae, *Chrysomela*, *Entomoscelis*, taxonomy, nomenclature.

Introduction

Entomoscelis CHEVROLAT, 1836 (type species: *E. adonidis* (PALLAS, 1771)) is a Holarctic genus with about 10 species. It includes a group of species, defined here as the *E. adonidis* species group, with an aedeagus of rather uniform design.

We present a taxonomic and nomenclatural revision of this interesting species group based on the material examined.

Five species of the genus *Entomoscelis* are not regarded as members of the *E. adonidis* species group: *E. deserticola* LOPATIN, 1967 (China), *E. pilula* LOPATIN, 1967 (Caucasus and Central Asia), *E. nigriventris* DACCORDI & YANG, 2009 (China), *E. orientalis* MOTSCHULSKY, 1860 (East Palearctic), and *E. pulla* DACCORDI & GE, 2009 (China).

Entomoscelis pilula is, however, included in the key and in Table 1, because it fits well with the studied group due to the similar habitus, smooth surface, colour pattern and host plants (see MIKHAILOV 2019: 292).

Material and methods

The material studied is housed in the following collections:

ALC	coll. A. Link, Haid (Austria)
AWC	coll. A. Warchałowski (now housed in the Natural History Museum, London, UK)
EGC	coll. E. & R. Geiser, Salzburg (Austria)
FFC	coll. F. Fritzlar, Jena (Germany)
MEC	coll. M. Egger, Hall in Tirol (Austria)
MFNB	Museum für Naturkunde, Berlin (Germany)
MLC	coll. M. Langer, Freiberg (Germany)
MNCN	Museo Nacional de Ciencias Naturales, Madrid (Spain)
MNHN	Muséum national d'Histoire naturelle, Paris (France)
NMB	Naturhistorisches Museum Basel (Switzerland)
NMW	Naturhistorisches Museum Wien (Österreich)
PJC	coll. P. Jolivet, Paris (France)
SMHT	Steinhardt Museum of Natural History, Tel Aviv (Israel)
TLM	Sammlungs- und Forschungszentrum (SFZ) der Tiroler Landesmuseen, Hall in Tirol (Austria)
TLM/K	coll. H. Kippenberg, Herzogenaurach (Germany) in TLM
UHC	coll. U. Heinig, Berlin (Germany)
WZC	coll. W. Ziegler, Hamburg (Germany)
YMC	coll. Y. Mikhailov, Ekaterinburg (Russia)
ZIN	Zoological Museum of the Russian Academy of Sciences, St. Petersburg (Russia)
ZMUK	Zoologisches Museum der Universität Kiel (Germany)

Within the precisely cited label data a backslash "\" indicates the change of line, a straight line "|" the change of label.

Entomoscelis adonidis species group

The group is characterized by the following features: habitus and colouration as in Figs. 1–19; surface more or less orange-red; labrum and clypeus partly blackish (especially the anterior margin and the preocular patches); frons with a central black macula; pronotum with a broad median dark patch (except *E. rumex*) and usually with two lateral blackish spots, elytra with a dark sutural line abbreviated or at least narrowed anteriorly, and often with a dark (more or less variable) sublateral longitudinal vitta, punctation simple and irregular; internal structures of aedeagus (Figs. 21–43) almost identical (except *E. sacra*).

Remarkably, the members of the *E. adonidis* species group are known to feed on seven quite different plant families: Asteraceae, Brassicaceae, Euphorbiaceae, Papaveraceae, Polygonaceae, Ranunculaceae, and Scrophulariaceae.

According to our studies, the group now includes seven species and several subspecies.

Entomoscelis adonidis (Pallas, 1771)

Diagnosis: ♂♂ 6.5–9.0 mm long, ♀♀ 7.2–10.5 mm. Elytra in males more or less parallel-sided, in females parallel-sided or moderately curved laterally (Figs. 1–4); broad median area of pronotum anteriorly concavely narrowed; external margin of hind tibiae (both sexes) apically distinctly bent outwards (Fig. 45); tarsi of females remarkably slender and loosely arranged, not compact (Fig. 49); aedeagus parallel-sided and distinctly elongated (Figs. 21–32).

Variability: Body length, proportions and colour pattern are very variable (even in the same population). For details see *E. a. adonidis*.

Differential diagnosis: *Entomoscelis adonidis* has the longest aedeagus among all the species treated here. *Entomoscelis dorsalis* can be distinguished by the distinctly shorter aedeagus; hind

tibiae of female apically only slightly bent outwards, and tarsi wider. The remaining species of the group are smaller in size, and also have a significantly smaller aedeagus.

Host plants: Asteraceae, Brassicaceae, Papaveraceae, Ranunculaceae.

In the original description, only *Adonis vernalis* (Ranunculaceae) is mentioned as host plant. However, REDTENBACHER (1874: 479) mentioned only Brassicaceae (*Cochlearia draba*, rape). Moreover, in the recent European literature (VIG 2002: 56, PETITPIERRE & DACCORDI 2013: 65) only Brassicaceae are reported. The list of JOLIVET (1998: 128) includes numerous genera of Brassicaceae: "*Brassica*, *Erysimum*, *Cochlearia*, *Raphanus*, *Diplotaxis*, *Sisymbrium*, *Capsella*, *Lepidium*, *Descurainia*, *Neslia*, *Alyssum*, *Sinapis*, *Thlaspi*, *Cakile*, *Crambe*, *Eruca*, *Berteroa*, *Camelia*, *Armoracia*, *Rorippa*, *Hirschfeldia*". This species was found by M. Kahlen (pers. comm. 2018) in the Western Alps (Alpi Cozie, Italy) at 2600 m a.s.l. on *Alyssum* (Brassicaceae). Observations in Bavaria, Turkey (H. Kippenberg, unpubl.) and China (GE et al. 2009: 417) confirmed this plant family as well. All these observations contradict the original description. Reports of *Adonis* as a host plant in Austria (WEISE 1882: 312, FRANZ 1974: 436) result from confusion with *E. dorsalis*.

On the other hand, SUFFRIAN (1851: 208) recorded only *Adonis* from various localities, and *Delphinum* (a Ranunculaceae, too) from Iran. Also in Russian faunistic publications traditionally *Adonis* or *Adonis* and Brassicaceae are noted as host plants of *E. adonidis*: LOPATIN et al. (2004: 65), BROVDIJ (1977: 76–77), MEDVEDEV & DUBESCHKO (1992: 125), BIEŃKOWSKI (1999: 85). LOPATIN (2010: 270) listed both plant families, and specified that in Central Asia *E. adonidis* "feeds on Brassicaceae, but in the mountains (up to 3500 m) exclusively on *Adonis*".

In laboratory experiments, A.O. Bieńkowski (pers. comm. 2018) confirmed that *E. adonidis* feeds indeed on both plant families, although all investigated specimens were collected on different Brassicaceae in south-western Russia. Samples from Kalmykia fed on Brassicaceae (*Capsella bursa-pastoris* and *Barbarea vulgaris*) and on *Adonis volgensis*; specimens from Astrakhan fed on *Barbarea vulgaris* and *Adonis volgensis* (but not on *Capsella bursa-pastoris*).

Remarks: In the original description, the size of *E. adonidis* was compared with that of *Chrysomela collaris* LINNAEUS, 1758. The latter is, however, on average smaller than *E. adonidis*.

It might be possible that PALLAS (1771) in fact described the species treated herein as *E. dorsalis*. The latter is similar to *E. adonidis* but is on average smaller, feeds usually on *Adonis* and can be probably found in the type region of *E. adonidis*. However, this is only conjecture since it cannot be supported by type material.

Distribution: Holarctic, from Portugal to the north-western part of North America.

Entomoscelis adonidis adonidis (PALLAS, 1771)

Chrysomela adonidis PALLAS 1771: 463; FABRICIUS 1792: 312.
Chrysomela trilineata FABRICIUS 1777: 219.
Phaedon adonidis: KIRBY 1837: 214.
Entomoscelis adonidis (FABRICIUS, 1792 [sic]): SUFFRIAN 1851: 207; MARSEUL 1888: 24 (322); REDTENBACHER 1874: 479; WEISE 1882: 310; 1916: 216; JACOBSON 1893: 241; JACOBSOHN 1894a: 103; 1894b: 158; REITTER 1913: 125; WINKLER 1930: 1301; GRESSIT & KIMOTO 1963: 376; MOHR 1966: 192; LOPATIN 1967: 951, 953; BERTI & RAPILLY 1973: 881; GRUEV & TOMOV 1986: 25; LOPATIN 1984: 251; LOPATIN et al. 2004: 120; 2010: 270; MEDVEDEV & DUBESCHKO 1992: 125; KIPPENBERG 1994: 87; BORUMAND 2000: 33–34; KIPPENBERG 2010: 428; BIEŃKOWSKI 2004: 65; 2011: 333; GE et al. 2009: 413; WINKELMAN & DEBREUIL 2008: 144.
Entomoscelis sacra: JACOBSOHN 1894b: 158; LUNDBERG 1986: 122.
Entomoscelis adonidis var. *varentzowi* JACOBSON 1896a: 546 (infrasubspecific name).
Entomoscelis adonidis var. *spuria* JACOBSON 1896b: 108 (infrasubspecific name); BEDEL (1912: 359).
Entomoscelis abdominalis [sic] NETOLITZKI 1912: 160 (22) (incorrect subsequent spelling of *adonidis*).
Entomoscelis adonidis ab. *spuria*: WEISE 1916: 216; JACOBSON 1925: 30; WINKLER 1930: 1301.

Entomoscelis americana BROWN 1942: 172 (**syn.n.**).
Entomoscelis spuria (syn. of *E. adonidis*): KIPPENBERG 2010: 428 (erroneously listed as available name).
Entomoscelis varentzowi (syn. of *E. adonidis*): KIPPENBERG 2010: 428 (erroneously listed as available name).

Type material: According to HORN et al. (1990: 294) the Coleoptera of the travels of P.S. Pallas (1741–1811) should be deposited in the MFNB and in the ZIN. In the ZIN the material was destroyed by fire, and in the MFNB no type material of *E. adonidis* was found. Therefore, the type material can be regarded as lost.

A neotype of *E. adonidis* is not designated here, because there was no suitable specimen from the type region at our disposal. Only one male was studied from the Volga Delta (Astrakhan), being somewhat smaller than usual, and without the elytral vitta. JACOBSOHN (1894b: 158) obviously recorded similar specimens from Astrakhan under the name *E. sacra*.

Type locality: Russia ("… ad Wolgam" [at the Volga]).

Original description: "*Magnitudo* et *facies* Chrysomelae collaris. *Caput* exsolete rubrum, ore, oculis et punctuo verticis nigro. *Clypeus* [pronotum] medio niger, lateribus obsolete rubris, cum puncto nigro. *Elytra* obsolete rubra, sutura omnibus nigra, plerisque etiam fascia ab humeris per discum elytri longitudinalis, apicem non attingens, attamen acuta. *Aleae* fuscae. Victitat Adonide verna. Maio copiole lecta ad Wolgam" (PALLAS 1771).

Diagnosis: Length variable (♂♂ 6.5–9.0 mm, ♀♀ 7.5–10.0 mm); habitus and colouration as in Fig. 1; elytra in both sexes usually parallel-sided (average ratio length : width = 1 : 0.76); elytra usually with a dark sublateral vitta, dark macula on frons usually not enlarged. Aedeagus (Figs. 21–28) in lateral view narrowed to the top with more or less weakly curved lateral sides.

Variability: The nominotypical subspecies is remarkably variable in shape and colouration. The elytra are usually strictly parallel-sided and relatively flat, sometimes, however, moderately widened and in females enlarged posteriorly; the dark sublateral elytral vitta is sometimes very broad (var. *varentzowi*) or lacking (var. *spuria*); the lateral maculae on the pronotum can be missing; the macula on the frons can be enlarged anteriorly if the elytral vitta is extremely enlarged.

The size is also very variable, both within and between populations. Several relatively small specimens from "Syria" (historical collection of the MFNB) were examined: body length: 6.5–7.5 mm, which is comparable to *E. berytensis*. The aedeagus is similar to that of *E. dorsalis* but the female legs characterize the specimens as *E. adonidis*.

A striking variety of habitually different specimens was found in Turkey. However, to date most of these were singletons, which does not allow to decide whether they are only deviating individuals or whether they represent isolated populations which deserve specific or subspecific status. Genetic studies or investigations of inner sac structures would be very useful.

Host plants: Brassicaceae, *Adonis* (for details see *E. adonidis* above); from Iran also "Composée" (Asteraceae) are reported (BERTI & RAPILLY 1973: 881), and in Turkey (Burdur) *E. adonidis* was collected on *Papaver* (Heinig, pers. comm. 1992).

Remarks: No material labelled as *Entomoscelis adonidis* var. *spuria*, described from Russia (Saratov Oblast), could be found in the ZIN. In the original description this variety is characterized as follows: "elytrorum vittis medianis nigris nullis" (JACOBSON 1896b). However, without material it is impossible to decide to which species this variety really belongs. Following WEISE (1916) and JACOBSON (1925) var. *spuria* is regarded here as a colour variety of *E. adonidis adonidis*. This variety is rather rare but widely distributed. BEDEL (1912) recorded it from France (Pyrénées-Orientales). We have examined specimens from Spain, Turkey (TLM/K), Kazakhstan (ZIN) and Turkmenistan (NMW). We have studied also one male (aedeagus as in Fig. 26) from the Volga Delta.

No material labelled as *E. adonidis* var. *varentzowi*, described from Turkmenistan (Ashgabat), could be found in the ZIN. According to the original description, the sublateral elytral vittae are so strongly broadened that only a small red lateral margin remains ("Nigra, ... elytrorum marginibus laterali et postico rubro-testaceis"). Specimens from the vicinity of Ashgabat show strong variability concerning the dark sublateral elytral vitta (completely reduced to strongly broadened). A significant enlargement of the sublateral vitta is a typical variation of *E. adonidis* and occurs sporadically over the entire distribution area of this species. Thus, *E. adonidis* var. *varentzowi* seems only a rare colour variation. Samples with very broad elytral sublateral vitta are known from Spain, Bulgaria and Turkey; one specimen from Kazakhstan also agrees well with the description of var. *varentzowi*.

Entomoscelis a. adonidis was sometimes reported as a serious pest on cultivated rape in Europe. Meanwhile, many populations have become extinct: in Germany, only one recent locality is known; in Austria there have been no reports in the last 30 years (E. Geiser, pers. comm. 2019). In other areas, however, *E. a. adonidi*s is still quite common.

Distribution: Holarctic, from Portugal to Chukotka, Kamchatka and north-western North America (see KIPPENBERG 2010, MIKHAILOV 2019).

Material examined: Portugal (TLM/K), Spain (MFNB, TLM/K), Italy (TLM, UHC), North Macedonia (MEC), Germany (TLM/K), Austria (TLM/K), Czechia (TLM/K), Slovakia (ALC), Hungary (MFNB, TLM/K), Romania (TLM), Bulgaria (TLM/K), Crimea (MEC), Turkey (TLM/K, ZIN), Iran (TLM/K, ZIN), Afghanistan (TLM/K), Russia (FFC, TLM/K, YMC, ZIN), Kazakhstan (NMW, TLM/K, YMC), Uzbekistan (TLM/K), Kyrgyzstan (NMW), Turkmenistan (NMW, TLM/K, ZIN), Tajikistan (NMW, TLM/K, ZIN), NW China (YMC), USA, incl. Alaska (TLM/K), Canada (TLM/K, YMC).

Synonymy

Entomoscelis americana BROWN, 1942

Type material: Canadian National Collection, Ottawa, Canada.

Type locality: Canada (Saskatchewan Province).

Remarks: *Entomoscelis americana* occurs in western Canada and in the western USA (Alaska, Colorado, Idaho, Minnesota, Montana, North Dakota, Utah, Washington, Wisconsin, Wyoming) (RILEY et al. 2003). BROWN (1942) compared *E. americana* with *E. adonidis* and pointed out the following differences: "The blackish spot of each side of the pronotum rarely as large as in adonidis Pallas, sometimes subobsolete but always evident. The submedian [= sublateral] vitta of each elytron never wider than the interval separating it from the suture and thus nearly always narrower than in adonidis, occasionally greatly reduced or subobsolete. ... Aedeagus with the portion distad the sub-basal arcuation much more elongate than in adonidis; the arcuation at basal third in adonidis, at basal fourth in americana".

In fact, BROWN (1942) had examined only few Palearctic specimens of *Entomoscelis*: two males from NW Iran and one female without a label, which he assumed to be Palearctic. It is possible that the differences mentioned above may be attributed to the fact that not all the three specimens were actually *E. adonidis*. Especially the longer aedeagus of the *E. americana* samples arouses the suspicion that the two males could belong to another species, for instance to *E. dorsalis* or *E. berytensis*. A comparison of *E. adonidis* from Europe and Asia with specimens of *E. americana* (Fig. 28) yielded no significant differences. Therefore, both taxa are here regarded as conspecific.

Host plants of the North American populations are restricted to the Brassicaceae: *Sisymbrium incisum*, *Erysimum parviflorum* (BROWN 1942: 173) and other species (GERBER 1987, 1989,

GERBER & LAMB 1982). GERBER & LAMB (1982) reported successful breeding on *Brassica napus* and *B. campestris*. GERBER & LAMB (1982), LAMB & GERBER (1984, 1985) and GERBER (1987, 1989) published very detailed biological studies.

Chrysomela trilineata FABRICIUS, 1777

Type material: **Lectotype** ♂ (ZMUK), designated here by Kippenberg: "Lectotype \ *Chrysomela* \ *trilineata* FABRICIUS [red label] | *Entomoscelis* \ *adonidis* s.str. (PALLAS) \ det. Kippenberg 2020". **Paralectotype** ♀: "Paralectotype \ *Chrysomela* \ *trilineata* FABRICIUS [red label] | *Entomoscelis* \ *adonidis* s.str. (PALLAS) \ det. Kippenberg 2020".

Chrysomela trilineata was described together with *C. dorsalis*. Both taxa were synonymized with *C. adonidis* by FABRICIUS (1792) and united in his collection (SUFFRIAN 1851: 209). No type material of *C. trilineata* and *C. dorsalis* was indicated by ZIMSEN (1964). However, the collection of Fabricius (ZMUK) contains four specimens under *Chrysomela adonidis* (all without labels). Based on the photographs, two of them belong to *Entomoscelis adonidis*, the other two specimens are *E. dorsalis*. No other specimens of *E. adonidis* were found in the Fabricius collection (M. Kuhlmann, pers. comm.).

Type locality: "Habitat in Austria Dr. Schulz" (FABRICIUS 1777: 219).

Original description: "… thoracis margine flavo puncto nigro, elytris flavis: sutura vittaque nigris" (FABRICIUS 1777).

***Entomoscelis adonidis caucasica* KIPPENBERG ssp.n.**

Type material: **Holotype** ♂ (TLM/K): "GRUZIE, reg.Inner Kartli, \ 4 km NE Gori, 950–1050 m, \ 23.5.2017, lgt M. Šárovec". **Paratypes**: 7 ♂♂, 18 ♀♀, same data as holotype (TLM/K, ALC); 2 ♂♂: Russia, Caucasus, Karachay-Cherkessia, Zelenchuksky District, Aksaut River near Kishket tourist camp, 1400–2000 m, 29.VI.–6.VII.1992, leg. Kriska (TLM/K); 1 ♂, 2 ♀♀: Caucasus (TLM/K); 1 ♂: "Türkei" [Turkey], coll. Küster (TLM/K); 1 ♂: Georgia, "Tiflis" [Tbilisi], "Wagn." [? leg. Wagner] (MFNB); 1 ♀: Armenia, Yerevan, 1898, [leg.] Korb (MFNB); 2 ♀♀: Armenia, SE Yerevan, Khosrov Forest Reserve, ca.1300–1500 m, 39°58.75'N, 44°52.75'E, 16./17.V.2001, leg. Shaverdo & Schillhammer (NMW); 1 ♂: Armenia, Vayots Dzor, Manuk Pass, 1800 m, 13.VI.2017, leg. Ziegler (WZC); 1 ♂: окр. Ахалцыха. бер. Посхов-чай, пр. прит. Куры. Михаловский. нач. V.878 | 99252. [Georgia, env. of Akhaltsikhe, bank of Poskhov-Chai, right tributary of Kura River, Mihalovskij leg., early May 1878] (ZIN); 1 ♂: NW Iran, E Azerbaijan prov. 5 km N Kaleybar [Kalibar, ca. 100 km NE Tabriz], 16.–17.V.2007, A. Klimenko leg. (YMC).

Additional material examined: 1 ♂, 2 ♀♀: Armenia, Sevan Lake, Gegharkunig, Tsovagyugh, 1900 m, 6.VI.2017, leg. Ziegler (TLM/K, WZC); 1 ♀: Armenia, Masis, ca. 840 m, 2.VI.2013, leg. Navrátil (FFC); 4 ♂♂: Armenia, 12.VI.1978, leg. Gachard (MFNB); 3 ♂♂, 2 ♀♀: "Russ. Taur… [handwritten, not clearly legible]" (MFNB).

The four specimens from Armenia without detailed locality data possess a more or less bicoloured clypeus. Specimens without an enlarged frontal macula are not designated as paratypes.

Type locality: Georgia (vicinity of Gori).

Diagnosis: Holotype (Fig. 2) 8.6 mm long. Similar to *E. a. adonidis*, but black frontal macula enlarged anteriorly; broad median blackish area on pronotum rather large; elytra without a dark sublateral vitta. Aedeagus (Figs. 29–30) in dorsal view narrowed to the top with more or less straight sides so that its apex more or less triangular, tip not distinctly curved.

Variability: Body length: 7–9 mm. The colour pattern is rather variable, depending on the locality. In the type population less than 10 % of the samples have a dark sublateral elytral vitta, in Russia and Armenia there are about 50 % with vittae. Sometimes even the frontal maculae are not significantly elongated (specimens from Armenia).

Differential diagnosis: The most important character of *E. a. caucasica* is the triangular apex of the aedeagus, which is apparently not only an individual variation but is present (more or less significantly) in nearly all specimens. Another conspicuous character is the elongated macula on the frons, which surprisingly does not depend on the presence or shape of the dark sublateral

elytral vitta (whereas in *E. a. adonidis* similarly enlarged maculae are usually present only in combination with very broad dark sublateral elytral vitta).

Host plants: No information available.

Distribution: Armenia, Georgia, Iran, Russia, Turkey.

Etymology: The name of the new taxon, a Latin adjective, refers to the Caucasus Mountains.

Entomoscelis adonidis goliath ABEILLE DE PERRIN, 1897

Entomoscelis goliath ABEILLE DE PERRIN 1897: 42; WEISE 1916: 217; WINKLER 1930: 1301.
Entomoscelis adonidis: KIPPENBERG 2010: 428 (syn.).
Entomoscelis adonidis ab. *goliath*: WARCHAŁOWSKI 2003: 324; LOPATIN et al. 2004: 120.

Type material: **Syntypes**: 6 exs. (MNHN, collection number EC9814–19): "AKBÉS \ H^{TE}. SYRIE", "Type \ *Entomoscelis* \ *Goliath* \ Ab. | MUSEUM PARIS \ COLL. \ A. CHOBAUT | Syntype [red label] | SYNTYPE \ *Entomoscelis goliath* Abeille de Perrin \ 1897"; 1 ex. (NMW), same locality label, and "collect. \ Hauser | *Entomoscelis* \ *goliath* Ab. \ Type [blue label, handwritten] | Syntype \ *Entomoscelis* \ *goliath* Ab. \ Kippenberg 2020 [red label] | *Entomoscelis* \ *adonidis* (Pallas) \ ssp. *goliath* Ab. de Perrin \ det. Kippenberg 2020".

Type locality: "Hte-Syrie: Akbès, dans les monts Amanus" [southern Turkey (Hatay Province)].

Original description: "Cette espèce resemble complétement à l'*E. adonidis*; mais elle est un peu plus grande, un peu plus massive; ..." (ABEILLE DE PERRIN 1897).

Diagnosis: ♂♂ 8.0–9.0 mm long, ♀♀ 8.0–10.5 mm. Similar to *E. a. adonidis*, but elytra (also in males) broader (Figs. 3–4): average ratio of length : width of elytra 1 : 0.84 (in *E. a. adonidis* 1 : 0.76). Aedeagus (Figs. 31–32) not as long as in specimens of *E. a. adonidis* of equal size, its apex shaped as in *E. a. adonidis*.

Variability: The ratio of length : width of the elytra varies between 1 : 0.83 and 1 : 0.89, it does not overlap with *E. a. adonidis*. The dark sublateral elytral vitta varies from very broad to nearly obsolete. Specimens without sublateral vittae are not known so far. The apex of the aedeagus is more or less straight-sided laterally.

Differential diagnosis: *Entomoscelis a. goliath* differs from *E. a. adonidis* and *E. a. caucasica* in its remarkably stout habitus (Figs. 3–4) and its comparatively shorter aedeagus (Figs. 31–32).

Host plants: No information available.

Distribution: Southeastern Turkey.

Material examined: Kahramanmaraş (Ahır Dağı) (TLM/K), Kahramanmaraş or Adıyaman ("Marash – Gölbaşı") (NMB), Gaziantep (NMB, TLM/K).

All these localities are situated in a relatively small area near the Turkish Nur Mountains, close to the Syrian border. Some other Turkish specimens with a similarly stout or enlarged body were studied, e.g., from Ayvalıpınar/Isparta (NMB), Güzeloluk/Içel, Konya, Niğde, Kayseri (TLM/K) west of the Nur Mountains or from Buğlan Geçidi (FFC) and Gümüşhane (TLM/K) in north-eastern Turkey. These were usually singletons and it could not be decided whether they also belong to *E. a. goliath* or whether they are intermediate forms of *E. a. adonidis* and *E. a. goliath*.

Entomoscelis berytensis (REICHE & SAULCY, 1858)

Chrysomela (*Entomoscelis*) *berytensis* REICHE & SAULCY 1858: 36.
Entomoscelis sacra (OL. [sic]): MARSEUL 1888: 25 (323).
Entomoscelis sacra var. *berytensis*: BEDEL 1915: 206.
Entomoscelis berytensis: WEISE 1882: 312; WINKLER 1930: 1301.
Entomoscelis sacra: MADER 1943: 45; ALFIERI 1976: 232; KATHBEH & MEDVEDEV 2000: 257; BORUMAND 2000: 34; LOPATIN et al. 2004: 121; FRIEDMAN et al. 2005: 108; GE et al. 2009: 413, 416; KIPPENBERG 2010: 428.

Entomoscelis sacra ab. *berytensis*: BERTI & RAPILLY 1973: 881.

Type material: **Syntype** ♀ (MNHN, Reiche collection): "*Entomoscelis* \ *berytensis*. Reiche \ Soc. ent.1858.36 \ Syria [handwritten] | EX MUSAEO \ L.REICHE | MUSÉUM PARIS \ 1952 \ COLL. OBERTHUR \ EX REICHE | SYNTYPE [red label] | SYNTYPE \ *Entomoscelis* \ *berytensis* (Reiche, 1858)".

Type locality: "environs de Beyrouth" [Beirut, Lebanon].

Original description: "Thorax ... disco medio vittato; vitta antica posticeque attenuata ... Elytra ... sutura ... vittaque longitudinali ... nigris. 6.25–8 mm" and as a difference to "*adonidis* FABRICIUS [sic]": "plus courte, plus renflée; …", "… et par la fascie médiane noire du méme organe [corselet], toujour atténuée postérieurement avant d'atteindre la base." (REICHE & SAULCY 1858).

Diagnosis: ♂♂ 5.5–7.0 mm long, ♀♀ 6.0–8.0 mm. Habitus and colouration as in Figs. 13–14. Labrum blackish, anterior margin often pale; clypeus red, anterior margin blackish (at the most centrally); elytra slightly bulgy, sutural vitta anteriorly wider than apically, sublateral vitta present; surface slightly shining, punctation fine and sparse; external margin of hind tibiae in both sexes at the apex distinctly bent outwards (Fig. 48); tarsi of female remarkably slender (Fig. 51); aedeagus relatively short (Fig. 38).

Variability: Size, punctation, and aedeagus of *E. berytensis* are somewhat variable, depending on the locality, but the colour pattern is quite stable. Predominantly the dark median area on the pronotum in the anterior and apical part is convexly narrowed, it is rarely elongated apically and enlarged laterally at base. The vitta on the elytron is very rarely obsolete (only one of 85 specimens examined). Tarsi sometimes brownish.

Remarkably dark specimens occur in southern Turkey (Tarsus Province) in the vicinity of Namrun (= Çamlıyayla): the dark median area on the pronotum is strongly enlarged, in the anterior part indistinctly narrowed with a concave shape, also the dark sublateral elytral vitta is enlarged, and the frontal macula is enlarged and spur-like. Moreover, the punctation is coarser. More material is needed to evaluate the taxonomic status of this population.

Differential diagnosis: *Entomoscelis berytensis* can be distinguished from *E. adonidis* by its usually significantly smaller size and the short aedeagus; from *E. dorsalis* by the slender female tarsi, and from *E. sacra* by the simple apex of the aedeagus and elytral vitta nearly always present. Sometimes it is difficult to distinguish *E. berytensis* from the related and rather variable *E. cornea*, especially specimens with dark legs and elytral vittae and with an anteriorly significantly narrowed pronotal macula.

Entomoscelis berytensis is usually easy to recognize, especially because of the combination of pronotal dark macula (narrowed anteriorly and posteriorly) and the dark sublateral elytral vitta. The differences in size possibly depend on the availability of host plants because the biotopes can be rather arid.

Host plants: In Israel, *Sinapis* and *Malcomia* (Brassicaceae) (FRIEDMAN et al. 2005: 108) and *Adonis* and other Ranunculaceae (A.-L.-L. Friedman, pers. comm. 2018); in Iran, *Euphorbia* (BERTI & RAPILLY 1973: 881) and possibly spiny Brassicaceae in the Bushehr Province, where *Adonis* and *Glaucium* could not be observed (H. Mühle, pers. comm. 2018).

Remarks: The nomenclatural status of *E. berytensis* has been uncertain until now, because this species was often identified as *E. sacra* and therefore mixed with *E. dorsalis*.

Distribution: Armenia (first record), Turkey, Syria, Lebanon, Israel, Jordan, Iraq (first record), Iran, Egypt (?).

Material examined: Armenia (NMW), Turkey (TLM/K), Syria (MFNB, TLM/K), Israel (MFNB, NMW, SMHT, TLM/K, ZIN), Jordan (TLM/K, UHC), Iran (NMW, TLM/K, YMC, ZIN), Iraq (NMB, NMW, TLM/K).

One female specimen was recorded from Egypt (ALFIERI 1976: 232), but males are necessary to confirm the record.

Entomoscelis cornea ABEILLE DE PERRIN, 1897

Entomoscelis cornea ABEILLE DE PERRIN 1897: 43; BEDEL 1915: 207; WEISE 1916: 217; WINKLER 1930: 1301; ALFIERI 1976: 232; KIPPENBERG 2010: 428.
Entomoscelis occidentalis ESCALERA 1914: 526 (**syn.n.**).
Entomoscelis cornea var. *viberti* BEDEL 1915: 207 (infrasubspecific name).
Entomoscelis occidentalis: BEDEL 1915: 207; WINKLER 1930: 1301; KOCHER 1953: 100; 1958: 106; KIPPENBERG 2010: 428.
Entomoscelis rumicis var. *mediojuncta* PIC 1939: 284 (infrasubspecific name).
Entomoscelis occidentalis ssp. *thalmanni* KOCHER 1969: 113 (**syn.n.**); KIPPENBERG 2010: 428.
? *Entomoscelis occidentalis* ssp. *thalmanni* ab. *multipunctata* KOCHER 1969: 113 (infrasubspecific name).
Entomoscelis viberti (syn. of *E. cornea*): KIPPENBERG 2010: 428 (erroneously listed as available name).
Entomoscelis mediojuncta (syn. of *E. cornea*): KIPPENBERG 2010: 428 (erroneously listed as available name).

Type material: **Syntypes**: 1 ex. (MNHN, collection number EC 9820): "Biskra \ Mai 1894 \ D^{r}. A. Chobaut | *Entomoscelis* \ *cornea* \ Ab. (Bed.) [handwritten] | Type [in red letters] | MUSEUM PARIS \ COLL \ A. CHOBAUT | SYNTYPE [red label | SYNTYPE \ *Entomoscelis* \ *cornea* Abeille de Perrin", 1 ex. (MNHN, collection number EC 9821): "Biskra \ Mai 1894 \ D^{r}. A. Chobaut | *cornea* \ ab. \ typ. [handwritten] | Muséum Paris \ 1922 \ coll. L. Bedel | SYNTYPE [red label] | SYNTYPE \ *Entomoscelis* \ *cornea* Abeille de Perrin", 2 exs. (MNHN, collection numbers EC 9822, EC 9823): "Biskra \ Grilat [M. Grilat] [handwritten] | Muséum Paris \ 1922 \ coll. L. Bedel | SYNTYPE [red label | SYNTYPE \ *Entomoscelis* \ *cornea* Abeille de Perrin".

Type locality: Algeria (Biskra).

Original description: "Corselet ... roux avec une tache noir médiane diffuse et à bords mal limités, élargie dans le bas ... Élytres ... d'un blond jaunâtre à suture très étroitement foncée sur presque toute sa longeur ... Pattes jaune clair, cuisses à peine plus foncées ... 6–7.5 mm" (ABEILLE DE PERRIN 1897).

Diagnosis: Body length 5.7–8.0 mm (according to KOCHER (1969) up to 9.0 mm). Habitus and colouration as in Figs. 18–19. Elytra in both sexes more or less parallel-sided, usually without sublateral vittae; dark median pronotal area slightly narrowed and concave anteriorly; surface, especially pronotum, somewhat roughly punctate; external margin of hind tibiae (in both sexes) apically distinctly bent outwards; female tarsi remarkably slender; femora and tibiae yellowish; antennae yellowish-red; aedeagus (Fig. 41) relatively short.

Variability: The colouration of the legs, antennae and elytra varies remarkably. Specimens from Algeria (MNCN, NMW) and Tunisia (NMW) usually have red legs and antennae, and there are no dark sublateral elytral vittae. Some Algerian specimens (AWC), however, have a distinct sublateral elytral vitta and dark antennae (except the first antennomere). In addition, a variety with dark elytral vittae was described from Tunisia (*E. cornea* var. *viberti*). Specimens with more or less dark legs and antennae are predominant in some localities in Morocco, however, mixed populations are also present there (specimens with dark legs and with red legs were collected in the vicinity of Marrakesh, AWC). The only specimen known from Libya has red legs, a dark sublateral elytral vitta and the pronotal dark area anteriorly narrowed convexly. The punctation is also variable.

Differential diagnosis: *Entomoscelis cornea* is one of two species of *Entomoscelis* living in north-western Africa. The second one, *E. rumex*, is easy to distinguish due to its pronotal colour pattern of four separate (or cojoined) dark points. Individuals of *E. cornea* with entirely or partly red legs are very similar to *E. erythrocnema* from Central Asia, and sometimes it is rather

difficult to distinguish them. The shape of the dark median area on the pronotum of *E. cornea* is different, it is not as strongly narrowed anteriorly as in *E. erythrocnema*. The same character distinguishes specimens of *E. cornea* with dark legs from *E. sacra* and *E. berytensis*. The aedeagus of *E. cornea* is distinctly smaller than in *E. adonidis* and *E. dorsalis*.

Host plants: *Rumex* sp. (J.M. Vela, pers. comm. 2018).

Remarks: No material labelled as *Entomoscelis cornea* var. *viberti*, described from Tunisia (Gafsa), could be found in the MNHN. According to the original description, legs and antennae are completely brownish red as in *E. cornea*, elytra with sublateral vitta. BEDEL (1915) suspected that his *E. cornea* var. *viberti* could be a hybrid form: "*cornea* × *rumicis*".

One female of *Entomoscelis rumicis* var. *mediojuncta*, described from Libya (Tripoli), was found in the NMB (Frey collection) (Fig. 19). Original description: "Garian (leg. Kuhlemann). – Das einzige in Libyen aufgefundene Exemplar der Gattung *Entomoscelis* ...", "... Long. 7 mm.", " ... ist leicht zu erkennen durch das Vorhandensein einer großen dunklen Makel auf der Mitte des Halsschilds, welche die ganze Basis einnimmt, ohne den Vorderrand zu erreichen." (PIC 1939). Diagnosis: Legs (except tarsi) red; the broad dark median area on the pronotum anteriorly distinctly narrowed and in the apical part laterally enlarged (however, in contrast to the original description it does not cover the entire width of the base).

PIC (1939) regarded the single known specimen as a variety of *E. rumex* because of the elytral sublateral vitta and the red legs. However, the shape of the dark median area on the pronotum is the same as in many species of *Entomoscelis* but differs from the exceptional pattern of *E. rumex*. Moreover, the sublateral elytral vitta is not notched anteriorly.

Distribution: North Africa from Morocco to Libya.

Material examined: Morocco (AWC, TLM/K), Algeria (AWC, MNCN, NMW), Tunisia (NMW), Libya (NMB).

The record from Egypt (ALFIERI 1976) probably refers to *E. berytensis* (see above).

Synonymy

Entomoscelis occidentalis ESCALERA, 1914

Type material: **Syntypes**: 2 exs. (MNCN, coll. Escalera): "Marruecos, Marrakesh, I.1907, Escalera".

Type locality: Morocco (Marrakesh Province, Meskala, 31°23'36"N 9°24'47"W).

Remarks: The description of *E. occidentalis* includes the following details: 7–8 mm, colouration as in *E. cornea* (i.e., sublateral elytral vittae lacking), but legs and antennae predominantly dark, apex of tibiae and tarsi red. However, even around Marrakesh these characters are not constant (see above). KOCHER (1958: 106) notes: "N'est peut-être qu'une forme occidentale de *E. cornea* Ab.".

Entomoscelis occidentalis thalmanni KOCHER, 1969

Type material: A photograph (provided by J. Bezděk) of one female **syntype** (PJC) was examined: "Karia Ba-MΩ THALM. 5/68 [handwritten] | E. occident. thalmanni [handwritten] Kocher det. [typewritten] nov. [handwritten] T Y P E [handwritten, in red colour] | TYPE [framed]".

According to the original description, *E. o. thalmanni* is based on four syntypes. The remaining three syntypes are most probably also deposited in the PJC (where most of the Chrysomelidae of the Kocher collection seem to be deposited), but they are not accessible at present.

Type locality: Northern Morocco (Karia Ba Mohammed).

Original description: "Taille nettement plus grande (8 1/2 à 9 mm); teinte générale d'un jaune sale (au lieu d'un beau jaune orangé) plus ou moins lavé de grisâtre.".

Remarks: According to the original description, *E. occidentalis thalmanni* is relatively large, deviating from *E. occidentalis occidentalis* in the grey yellow colour (instead of the usual orange). However, the photograph of the syntype shows the usual orange colour, with the characteristic dark pronotal patch and a dark elytral suture, and partly reddish tibiae. No significant subspecific differences could be recognized. Therefore, *E. o. thalmanni* is regarded here as a synonym of *E. cornea*.

According to KOCHER (1969), two of the syntypes deviate in the presence of many dark spots on the elytra, especially posteriorly (ab. *multipunctata*). Such a pattern is unknown in the genus *Entomoscelis*, and based on the description no definitive assessment is possible at present.

Entomoscelis dorsalis (FABRICIUS, 1777)

Diagnosis: Body length 4.9–9.2 mm. Habitus and colouration as in Figs. 5–10. Similar to *E. adonidis* but on average somewhat smaller and often without an elytral vitta; broad median pronotal patch anteriorly concavely narrowed; preocular patches usually red; in females, external apical margin of hind tibiae only slightly or not bent outwards and tarsi slender and compact (Fig. 50); aedeagus similar to that of *E. adonidis* but on average smaller (Figs. 33–37).

Variability: Colour pattern, habitus and punctation are variable (see subspecies for details).

Differential diagnosis: Females of *E. dorsalis* can be distinguished from all other species treated here by their tarsi and hind tibiae (see above); males of *E. dorsalis* are usually distinguished from *E. adonidis* by the aedeagus, which is on average shorter, of specific shape, and the external margin of the hind tibiae is normally less outwardly bent than in *E. adonidis* (see Figs. 45–47). All other species of the group have a distinctly shorter aedeagus.

Host plants: Various species of *Adonis*.

Remarks: WEISE (1882: 312) synonymized *E. dorsalis* with *E. sacra*, which he regarded as being distributed in "Wien, Ungarn östlich bis Sarepta und Baku", disregarding the type locality ("Palaestina"). SEIDLITZ (1891: 782) failed to correct the obvious error of WEISE (1882). MADER (1943: 45) doubted the Central European distribution of *E. sacra*, assuming a confusion with "adonidis a. dorsalis F. (= spuria Jac.)". JAKOB (1954: 13) rejected (resp. misunderstood) the arguments of MADER (1943) and continued to use the name *E. sacra* for Central European specimens. Also MOHR (1966: 192) maintained the name *E. sacra*, as did KIPPENBERG (1994: 87, 2010: 428). WARCHAŁOWSKI (2003: 325), however, followed MADER (1943).

The distribution of *E. dorsalis* is strikingly discontinuous, and it is apparently divided into five widely separated areas (Fig. 52): one in eastern Central Europe, two in Russia: Bashkortostan and southern central Siberia, one in southern Kazakhstan and one in northern Iran. These populations show some significant differences, obviously warranting their subspecific (or possibly even specific) status.

Distribution: Eastern Central Europe, Russia (Bashkortostan and southern Siberia), Kazakhstan, Iran.

Entomoscelis dorsalis dorsalis (FABRICIUS, 1777)

Chrysomela dorsalis FABRICIUS 1777: 220; SUFFRIAN 1851: 208.
Chrysomela adonidis: FABRICIUS 1792: 312.
Entomoscelis dorsalis: REDTENBACHER 1874: 479; MARSEUL 1888: 25 (323); SEIDLITZ 1891: 782.
Entomoscelis sacra: WEISE 1882: 312; 1916: 217; REITTER 1913: 125; WINKLER 1930: 1301; MADER 1943: 45; KIPPENBERG 1994: 87; 2010: 428.
Entomoscelis melanostoma: MARSEUL 1888: 25 (323).
Entomoscelis adonidis var. *dorsalis*: BEDEL 1915: 206.
Entomoscelis adonidis ab. *dorsalis*: WARCHAŁOWSKI 2003: 324.

Type material: **Lectotype** ♂ (ZMUK), designated here by Kippenberg: "Lectotype \ *Chrysomela* \ *dorsalis* FABRICIUS [red label] | *Entomoscelis* \ *dorsalis* s.str. (FABR.) \ det. Kippenberg 2020". **Paralectotype** ♀: "Paralectotype \ *Chrysomela* \ *dorsalis* FABRICIUS [red label] | *Entomoscelis* \ *dorsalis* s.str. (FABR.) \ det. Kippenberg 2020".

As commented above (under *Chrysomela trilineata*) the collection of Fabricius (ZMUK) contains four specimens under *Chrysomela adonidis*. Based on the photographs, two of them belong to *Entomoscelis dorsalis*, and two specimens are *E. adonidis*. This is in accordance with SUFFRIAN (1851: 209), who found both taxa united in the Fabricius collection. Therefore, the two specimens of *E. dorsalis* are regarded as original type material.

The entry 1607 in ZIMSEN (1964): "*Chrysomela dorsalis* (1 spec. Banks, 1 spec. Kiel)" refers to *Chrysomela dorsalis* FABRICIUS, 1781 (now *Longitarsus dorsalis*) not *Chrysomela dorsalis* FABRICIUS, 1777. Since *C. dorsalis* FABRICIUS, 1781 is a junior primary homonym of *C. dorsalis* FABRICIUS, 1777 and since there is no junior synonym, it must be renamed, which should preferably be done in the next volume of the "Palaearctic Catalogue".

Type locality: "Habitat in Austria Dr. Schulz" (FABRICIUS 1777: 220).

Original description: "... thoracis margine testaceo puncto nigro, elytris testaceis: sutura ... atra. Affinis videtur praecedenti [*trilineata*] at minor." (FABRICIUS 1777).

Diagnosis: Body length 4.9–9.0 mm. Habitus and colouration as in Fig. 5. Elytra in males and females laterally more or less evenly curved, predominantly without a dark sublateral vitta; dark lateral pronotal maculae often faint or absent; average ratio elytral length : width about 1 : 0.82, surface moderately shining, punctation simple, fine, sparse and inconspicuous; aedeagus as in Fig. 33.

Variability: A dark sublateral elytral vitta can be distinct or faint. The antennae are sometimes partly reddish.

Differential diagnosis: *Entomoscelis d. dorsalis* is characterized mainly by the simple and fine elytral punctation, whereas the other subspecies have a more or less jagged or serrate punctation. Elytra usually without dark sublateral longitudinal vitta.

Host plant: *Adonis vernalis* (REDTENBACHER 1874: 479, JAKOB 1954: 13, FRANZ 1974: 436, GRUEV & TOMOV 1986: 25, VIG 2002: 56; M. Kahlen, pers. comm. 2018).

Distribution: Austria, Slovakia, Hungary, Greece (?), see Fig. 52.

Material examined: Austria (EGC, TLM, TLM/K), Slovakia (FFC, TLM/K, YMC), Hungary (YMC).

One male (MFNB, coll. Weise) from Greece ("Theodosia") might represent *E. d. dorsalis*.

The distribution is not well documented so far. This subspecies was previously often confused with *E. adonidis* resp. *E. sacra*. The western limit seems to be the eastern part of Austria. Records from Romania, Bulgaria and Ukraine are questionable.

Entomoscelis dorsalis bashkiriae KIPPENBERG ssp.n.

Type material: **Holotype** ♂ (TLM/K): "Baschkirien [Bashkortostan], N: 12 \ 30 km sw Ufa:Leka- \ revka, 16.6.1991 \ F. Fritzlar leg.". **Paratypes**: 1 ♀ (TLM/K), same data as holotype; 1 ♂, same data data as holotype except: 21.VI.1991 (FFC); 1 ♂, 1 ♀, same data as holotype except: 23.6.1991 (FFC, TLM/K); 2 ♂♂, 3 ♀♀, Baschkirische ASSR [Bashkortostan], Pavlovka – Stausee [reservoir] Maginsk, W-Ufer [shore], 27.VI.1987, leg. Fritzlar (FFC); 3 ♂♂, 2 ♀♀, Baschkirische ASSR [Bashkortostan], Pavlovka – Stausee [reservoir] Maginsk, Jagdstation [hunting station] W-Ufer [shore], 6.VII.1987, leg. Fritzlar (FFC, TLM/K); 2 ♀♀, BASSR [Bashkortostan], Westbaschk. [western Bashkortostan], Tschekmagusch, Steppenrelikte [steppe relics], 11.–12.VII.1979, leg. Tietze (FFC, TLM/K); 1 ♂, "Белебеевскій у. Уфимск. губ., Скосаревскій и Пескова" [Belebeyevsky uezd Ufimskoi gubernii, Skosarevsky and Peskova, date not indicated] (ZIN); 1 ♂, "Аксеново, Уфимск. губ., VI. 900, Круликовский" [Aksenovo, Ufimsk. gub., VI.1900, Krulikovsky] (ZIN); 1 ♂, "д. Александровск. Белебеев. у. Уфим. И. Соколов VII и VIII 07" [d. Alexandrovsk, Belebeyevsky uezd Ufimsk. gub., I. Sokolov, VII.–VIII.1907] (ZIN); 1 ♂, "Уфа [Ufa], 3–10/VII–54" (YMC).

Type locality: Russia (Bashkortostan).

Diagnosis: Body length 6.5–9.2 mm. Habitus and colouration as in Fig. 6. Elytra in males subparallel-sided, in females moderately curved; average ratio length : width about 1 : 0.81; sublateral elytral vitta present in the holotype; lateral pronotal maculae usually present but small; dorsum moderately shining or dull because of the strong microsculpture or moderately shining, punctation as fine as in the nominotypical subspecies but jagged; aedeagus as in Fig. 34.

Variability: Sublateral elytral vitta often absent. Sometimes also the lateral pronotal maculae absent (a specimen with one lateral macula only was observed).

Differential diagnosis: In comparison with *E. d. dorsalis*, males are oblong and parallel-sided, and the elytral punctation is somewhat jagged but not wrinkled as in *E. d. iranica* or serrate as in *E. d. hammarstroemi*. In most specimens the elytra possess a dark sublateral longitudinal vitta, while in *E. d. dorsalis* this is rare. The sublateral elytral vitta is usually reduced, while it is wide in *E. d. hammarstroemi* and *E. d. turkestana*.

Host plant: *Adonis vernalis*.

Remarks: It appears that the existence of *E. dorsalis* in the South Urals has not been confirmed until now (BIEŃKOWSKI 2011).

Distribution: Russia (Bashkortostan), see Fig. 52.

Etymology: The name of the new taxon, a Latinized adjective, refers to Bashkortostan.

Entomoscelis dorsalis hammarstroemi JACOBSON, 1901

Entomoscelis adonidis ssp. *hammarstroemi* JACOBSON 1901a: 118; 1901b: 78.
Entomoscelis adonidis ab. *hammarstroemi*: WEISE 1916: 216; WINKLER 1930: 1301.
Entomoscelis sacra ab. *hammarstroemi*: JACOBSON 1925: 30.
Entomoscelis hammarstroemi JACOBSON (syn. of *Entomoscelis adonidis*): LOPATIN et al. 2004: 120; KIPPENBERG 2010: 428.

Type material: **Lectotype** ♂ (ZIN), here designated by Mikhailov: "V. Sujetuk | Hammarstr. | 2433 [yellow] | J. Sahlberg 900 | subsp. hammarstroemi m." [handwritten with pencil]. **Paralectotype** ♀: "V. Sujetuk | Hammarstr. | 2431 [yellow] | J. Sahlberg 900" (ZIN).

Type locality: Russia (Krasnoyarsk Krai: Verkhniy Suetuk, 53º27'37"N 92º31'44"E).

Original description: "Minor (5.7–6.7 mm), pronoti punctis nigris semper nullis, vitta elytrorum plerumque valde ampliata; superficir superna subopaca vel opaca, sculptura fortiore …" (JACOBSON 1901a).

Diagnosis: Body length 4.3–6.7 mm. Habitus and colouration as in Figs. 9–10. Dorsum more or less dull due to the coarse and serrate punctation. Coarse punctures especially pronounced in the posterior third of the pronotum, which lacks lateral dark maculae (Figs. 11–12). Preocular patches dark. Average ratio length : width of elytra about 1 : 0.82. Males relatively small, narrow and oblong with parallel-sided elytra (Fig. 9). In females, elytra laterally distinctly curved (Fig. 10). Both sexes, but especially some males, with broad elytral vittae. Aedeagus as in Fig. 35.

Variability: The available material is limited and shows no remarkable variations.

Differential diagnosis: The combination of coarse dorsal punctation, the wide sublateral elytral vittae and the absence of lateral dark pronotal maculae distinguish *Entomoscelis d. hammarstroemi* from all other subspecies. However, dark pronotal maculae may also be absent in *E. adonidis* and *E. d. dorsalis*.

Host plants: Unknown.

Remarks: This taxon was described as a subspecies of *E. adonidis* (JACOBSON 1901a). Due to the aedeagal shape, the female habitus and the compact tarsi this subspecies is here transferred to *E. dorsalis*.

Distribution: Russia (southern Siberia), see Fig. 52.

Material examined: Krasnoyarsk (TLM/K, ZIN), Khakassia (ZIN), Irkutsk (ZIN).

Entomoscelis dorsalis iranica KIPPENBERG ssp.n.

? *Entomoscelis adonidis* ab. *dorsalis*: BERTI & RAPILLY 1973: 881.

Type material: **Holotype** ♂ (TLM/K): "N-IRAN, Prov. Tehran, \ Najmaabad [Najm Abad], W, 1200m NN \ salt desert, damp area \ 35°55'04"N, 50°33'18"E \ 7.V.2012, leg. D. Frenzel".

Type locality: Northern Iran (Tehran Province).

Diagnosis: Body length 7.3 mm. Habitus and colouration as in Fig. 7. Elytra slightly curved, ratio length : width = 1 : 0.83; pronotum as in the nominotypical subspecies, elytra without dark sublateral vitta, surface dull, punctation wrinkled; hind tibiae apically moderately bent outwards; tarsi less stout than in the nominotypical subspecies, aedeagus as in Fig. 36.

Differential diagnosis: Habitus and colouration as in *E. d. dorsalis* (without a dark sublateral vitta) but elytra with a distinctly wrinkled punctation. Punctation of the pronotum simple, not coarsely serrate as in *E. d. hammarstroemi*.

Host plants: Unknown.

Remarks: The elytral sculpture as well as the slightly more slender tarsi justify the description of a new subspecies. The other available *Entomoscelis* specimens from northern Iran (Māzandarān Province and Azerbaijan Province) proved to be *E. adonidis adonidis* and *E. adonidis caucasica* respectively.

Distribution: Known only from the type locality, see Fig. 52.

BERTI & RAPILLY (1973: 881) mentioned *E. adonidis* ab. *dorsalis* from southern Iran; this specimen could not be found in the MNHN.

Etymology: The name of the new taxon, a Latinized adjective, refers to Iran.

Entomoscelis dorsalis turkestana MIKHAILOV ssp.n.

Type material: **Holotype** ♂ (ZIN): "Юж. КАЗАХСТАН, 40 км \ СЗ Туркестана, пос. \ Сауран, 43º26'50"N, \ 67º55'05"E \ 8.05.2005 \ В. Козлов leg." [South Kazakhstan, 40 km NW Turkestan, Sauran village, 43º26'50"N, 67º55'05"E, 8.05.2005, V. Kozlov leg.]. **Paratypes**: 2 ♂♂, 2 ♀♀, from the same locality and with the same locality data as holotype (YMC).

Type locality: South Kazakhstan.

Diagnosis: ♂♂ 6.8–7.2 mm long, ♀♀ 7.9–8.0 mm long. Habitus and colouration as in Fig. 8. Average ratio length : width of elytra about 1 : 0.87; both sexes, but especially males stout and slightly oblong, females with compact tarsi. Dorsum shining, punctation of pronotum fine and sparse, with large and deep punctures concentrated only at hind angles. Elytral punctation larger than on pronotum, in some specimens jagged and serrate due to numerous fine wrinkles. Dark sublateral elytral vitta always present, well developed and wide. Lateral maculae on pronotum quite large and always present. Aedeagus (Fig. 37) robust and with apex much more truncate.

Variability: No conspicuous variability was observed in the type material.

Differential diagnosis: This subspecies is characterized by its relatively broad and short body, the presence of wide and well developed dark sublateral elytral vittae and the quite large lateral

pronotal maculae. The habitus is similar to the nominotypical subspecies but readily differs in having dark wide sublateral elytral vittae in all known specimens. The stout body of the males differs from the narrow and oblong *E. d. bashkiriae* and especially *E. d. hammarstroemi.*

Host plants: Unknown.

Distribution: Kazakhstan, see Fig. 52.

It should be noted that JACOBSOHN (1894a: 103) and JACOBSON (1901a: 119) recorded *E. sacra* from Kazakhstan (Kastek (Almaty Region) and Merke (Jambyl Region)). We could not find these specimens in the ZIN, although some others, indicated in the same publications, are preserved there. Therefore, it could not be confirmed that these specimens refer to the new subspecies.

Furthermore, *E. sacra* was recorded by JACOBSON (1901a: 119) from Merv (Turkmenistan), but the series of *Entomoscelis* from "Transcaspien, Dortkuju [railroad station Dort-Kuyu, west of Merv], 4.1900 and 5.1900" (NMW, coll. Hauser) proved to be *E. adonidis adonidis*.

In addition, *E. sacra* was recorded by BECHYNÉ (1961: 255) from Herat (western Afghanistan).

Etymology: The name of the new taxon, a Latinized adjective, refers to Turkestan, a historical region in Central Asia.

Entomoscelis erythrocnema JACOBSON, 1893

Entomoscelis erythrocnema JACOBSON 1893: 241.
Entomoscelis erythrocnema: BEDEL 1915: 207; WEISE 1916: 217; WINKLER 1930: 1301; LOPATIN 1984: 251; LOPATIN et al. 2004: 121; 2010: 270; GE et al. 2009: 413, 416; KIPPENBERG 2010: 428.

Type material: **Lectotype** ♂ (ZIN), designated here by Mikhailov: "SERAVSCHAN \ SERBENT \ Glasunov 1892. | 7/V" [handwritten on the reverse side] | *Entomoscelis* \ *erythrocnema* \ ♂ G. Jacobs. [handwritten] | к. Г. Якобсона". **Paralectotype** ♀, same label data except: "♀ G. Jacobs." (ZIN).

Type locality: Uzbekistan (Zerafshan River valley, Zerbent).

Original description: "Forma corporis *Ent. suturalis* Weise ♂ haud dissimilis, sed ab omnibus speciebus palaearcticis jam colore pedum characteribusque externis sexualibus facillime dignoscenda. ... Prothorax ... vitta media basi angustata. Elytra … limbo suturali ... vitta media angustata. ... Pedes nigri, trochanteribus, femorum basibus, tibiis (basibus nigris exceptis) tarsique rufis. ... ♂ abdomen segmento ultimo apice bisinuato, medio laevi, convexo, postice impressione transversa signato, 6 mm. ♀ 7–7.5 mm. Variat femoribus tarsique totis nigris, vitta elytrorum sat lata." (JACOBSON 1893).

Diagnosis: ♂♂ 6.0–6.1 mm long, ♀♀ 7.0–7.5 mm. Habitus and colouration as in Fig. 16. Both sexes laterally indistinctly curved (in the description compared with *E. suturalis* [= *E. sacra*]). Elytra with a dark sublateral vitta; the broad median dark patch on the pronotum anteriorly strongly and concavely narrowed, broadened basally (Fig. 16). Legs partly red; first antennomere yellowish-red. External margin of hind tibiae apically distinctly bent outwards, tarsi of females slender and loose, not compact. Aedeagus short (Fig. 42).

Variability: The extension of the red colouration of the legs varies as well as the width of the elytral vittae.

Differential diagnosis: Because of its red legs *E. erythrocnema* can be confused only with *E. cornea* from north-western Africa. Both species are also very similar in other details. However, the broad median dark patch on the pronotum of *E. cornea* is anteriorly much broader than in *E. erythrocnema.*

Host plant: *Adonis* sp. (LOPATIN 2010: 269).

Distribution: Uzbekistan, Tajikistan, northern Afghanistan.

Material examined: Uzbekistan (TLM/K, ZIN), Tajikistan (TLM/K, ZIN), Afghanistan (ZIN); for details see MIKHAILOV (2019: 292).

Entomoscelis rumex KIPPENBERG nom.n.

Chrysomela rumicis FABRICIUS 1787: 70 (junior primary homonym of *Chrysomela rumicis* SCHRANK, 1785); SUFFRIAN 1851: 205.

Entomoscelis rumicis: ESCALERA 1914: 526; BEDEL 1915: 207; WEISE 1916: 217; WINKLER 1930: 1301; KOCHER 1953: 100; 1958: 106; KIPPENBERG 2010: 428.

Entomoscelis rumicis ab. *detersa* BEDEL 1915: 207 (infrasubspecific name).

Type material: **Syntypes**: 2 exs. (ZMUK): "Rumicis / e Barb: Vahl". These specimens obviously refer to entry 1494 in ZIMSEN (1964).

Type locality: "Barb" [= Barbary, Berber lands] refers to North Africa, where M.H. Vahl (1749–1804) collected animals and plants between 1783 and 1788. Although the original description (see below) refers to Spain ("Hispaniae") the label data of the syntypes clearly indicate that the type locality is in North Africa.

Original description: "... thorace fulvo: punctis quatuor nigris, elytris fulvis: sutura vittaque media nigris. Pedes fulvi. Habitat in Rumice spinosa Hispaniae." (FABRICIUS 1787).

Nomenclature: Since *Chrysomela rumicis* FABRICIUS, 1787 is a junior primary homonym of *Chrysomela rumicis* SCHRANK, 1785 (= *Gastrophysa viridula* DEGEER, 1775), a new replacement name is proposed here: *Chrysomela rumex* KIPPENBERG nom.n. The new name is a noun in apposition and refers to the host plant genus *Rumex* (= dock, sorrel).

Diagnosis: Body length 5.5–7.5 mm. Labrum and clypeus orange-red; pronotum orange-red with four dark spots; elytra orange-red with a dark sutural stripe and a dark sublateral elytral vitta (Fig. 17); legs and basal antennomeres more or less red. Aedeagus as in Fig. 43.

Variability: Labrum sometimes bicoloured; the two inner spots on the pronotum sometimes fused to form a transverse band (BEDEL 1915); width of the dark sublateral elytral vitta variable, often slightly notched anteriorly (Fig. 17), sometimes lacking (ab. *detersa*).

Differential diagnosis: *Entomoscelis rumex* differs from all other species studied here in having four pronotal maculae (or, rarely, two lateral maculae with a median horizontal band notched anteriorly). Besides this, its dark sublateral elytral vitta is often slightly notched anteriorly (see Fig. 17).

Host plants: *Rumex spinosa*, Polygonaceae (FABRICIUS 1787; J.M. Vela, pers. comm. 2018), *Eruca sativa*, Brassicaceae (PEYERIMHOFF 1915: 32).

Remarks: With regard to its aedeagus, *E. rumex* clearly belongs to the *E. adonidis* species group, although the colour pattern of pronotum and elytra is quite deviating.

Distribution: North Africa (Maghreb), Spain (?). Material studied: Algeria (MNCN, YMC), Morocco (MEC, NMW, TLM/K), Tunisia (UHC).

There is no real evidence for the occurrence of *E. rumex* in the Iberian Peninsula (J.M. Vela, pers. comm. 2018). According to PETITPIERRE (2019: 137) there is only one old questionable record of this species from Málaga.

Entomoscelis sacra (LINNAEUS, 1758)

Chrysomela sacra LINNAEUS 1758: 372; LINNAEUS 1764: 40; 1767: 593.
Entomoscelis suturalis WEISE 1882: 312 (**syn.n.**); BEDEL 1915: 207; WEISE 1916: 218; WINKLER 1930: 1301; GRUEV & TOMOV 1986: 25; BORUMAND 2000: 34–35; BIEŃKOWSKI 2004: 65; 2011: 333; LOPATIN et al. 2004: 121; FRIEDMAN et al. 2005: 108; GE et al. 2009: 413; KIPPENBERG 2010: 428.
Entomoscelis sacra: SEIDLITZ 1891: 782; WARCHAŁOWSKI 2003: 325.

Type material: **Neotype** ♂ (TLM/K), here designated by Kippenberg: "Israel, Har Hermon [Mt. Hermon], Dolinat Galgal 2000 m, 23.7.2015, on *Glaucium leiocarpum*, leg. Friedman".

No type specimens were found in the collections of Linnaeus, neither in London (Linnean Society of London) nor in Stockholm (Swedish Museum of Natural History) nor in Uppsala (Museum of Evolution, Uppsala University, coll. Hasselquist), and therefore the original type material must be regarded as lost. In order to maintain taxonomic stability, a neotype is designated here.

Type locality: "Palæstina".

Description acc. to LINNAEUS (1758, 1764): "C. ovata supra rufa, thoracis linea punctis duobus elytrorumque sutura nigris. Habitat in Palæstina. Hasselquist. Linea extima basi coiens cum intima; intermedia parum flexuosa ante apicem desinit; ramulus ruber in medio lineæ marginalis antrorsum spectans. Alæ sanguineæ." (LINNAEUS 1758). "… Magnitudo & facies Chrysomelæ politæ. Corpus totum subtus cum pedibus nigrum. … Antennæ nigræ. … Elytra rufa, glabra, sutura elytrorum fusca, lineata: Linea extima ..." (LINNAEUS 1764).

Diagnosis: Body length 5.5–9.0 mm. Habitus and colouration as in Fig. 15, dark patch on the pronotum anteriorly convexly narrowed (in contrast to the original description), regularly separated from the anterior margin; in males, elytra subparallel-sided, in females slightly widened posterior to middle, without elytral vittae; external margin of hind tibiae apically distinctly bent outwards, female tarsi slender and loosely arranged. Aedeagus (Figs. 39–40) short, often with a small lobe apically, slightly curved in lateral view; inner structures visible in dorsal view deviating from the other treated species, the two lateral structures are strongly bent inwards.

Variability: Variable in size. The dark median area on the pronotum is basally either narrowed or enlarged, its anterior part sometimes reaching the anterior margin. The sutural vitta is sometimes nearly obsolete. Antenna black or with basal segment reddish. Tarsi sometimes brownish. We found no specimens with sublateral elytral vittae. The aedeagal shape is somewhat variable (Figs. 39–40).

Differential diagnosis: *Entomoscelis sacra* can be distinguished from all species considered here by its aedeagus curved upwards and by its two inner lateral structures strongly bent inwards (Figs. 39–40). The dark pattern of the median area of the pronotum is convexly narrowed anteriorly, which is also very typical; only *E. berytensis* and some specimens of *E. erythrocnema* have the same pattern. *Entomoscelis berytensis*, occurring sympatrically with *E. sacra*, nearly almost always has a dark elytral sublateral vitta in contrast to *E. sacra*, which hardly ever has such a vitta; the sutural vitta of *E. berytensis* is on average distinctly broader than the sutural vitta of *E. sacra*, especially anteriorly. *Entomoscelis erythrocnema* has at least partly reddish legs.

Host plants: In Bulgaria *Glaucium* and *Papaver* (GRUEV & TOMOV 1986: 26); in the Ukraine *Glaucium corniculatum* (BROVDIJ 1977: 80); in Turkey Papaveraceae (Burdur, leg. Heinig 1992, TLM/K); in Israel *Glaucium oxylobum* and *G. leiocarpus*, *Adonis dentata* and *Scrophularia* sp. (FRIEDMAN et al. 2005: 109); and in Iran *Glaucium corniculatum* (Fars, ca. 2000 m, leg. Mühle, TLM/K).

Remarks: The descriptions of LINNAEUS (1758, 1764) portray a pronotal colour pattern, which is typical for *Entomoscelis*, and mention a dark elytral suture. A dark elytral sublateral longitudinal vitta is not mentioned. Furthermore, the descriptions detail the presence of some "lines" on the elytra: a lateral one, an inner one and an intermediate one, the latter ending before

the apex. Apparently, these "lines" refer to those thin rib-like lines (veins), which are well visible (see photograph of *E. suturalis* at http://israel-nature-site.com/?page_id=299) or at least vaguely visible (Figs. 2, 14, 16) in certain specimens of *Entomoscelis*.

In the type region ("Palæstina"), two species of *Entomoscelis* occur: *E. berytensis*, nearly always with a sublateral elytral vitta, the other one, in the literature hitherto usually identified as *E. suturalis*, nearly always without. Therefore, we suppose that the species without sublateral elytral vittae is the "true" *E. sacra*.

In the past, *E. sacra* has often been published under the names of other species, at least one of which, *E. dorsalis* (e.g., MADER 1943: 45), does not even occur in or near the type region of *E. sacra*.

Distribution: Romania, Moldova, North Macedonia, Bulgaria, Greece, Ukraine, Crimea, Russia (Udmurtia Republic), Georgia, Armenia, Turkey, Syria, Israel, Jordan, Iraq (first record), Iran.

Material examined: Romania (TLM/K), Moldova (ZIN), North Macedonia (MFNB, TLM/K), Greece (MFNB, TLM/K), Ukraine (YMC), Crimea (TLM/K), Russia (MFNB, NMW, ZIN), Georgia (ZIN), Armenia (MFNB, TLM/K), Turkey (MFNB, TLM/K), Syria (MLC, MFNB), Israel (MFNB, SMHT, TLM/K), Jordan (YMC), Iraq (NMW: "Mesopotamia \ Mosul \ coll. Hauser 5. 09"), Iran (TLM/K).

Synonymy

Entomoscelis suturalis WEISE, 1882

Type material: **Lectotype** ♂ (MFNB), designated here by Kippenberg: "322 | Saloniki | Entomoscelis \ suturalis Wse. \ 3. Ex. \ Coll. J. Weise | SYNTYPE, Entomoscelis \ suturalis WEISE 1882 \ labelled by MFNB 2018".

Type locality: Greece (Thessaloniki).

Original description: "... supra rufa, ... elytra ... limbo suturalis nigro. 6–7.5 mm", "... schwarze Binde des Halsschilds ... [hat] concave, dem Seitenrand zugebogene Seiten ..." (WEISE 1882). No dark sublateral elytral vitta is specified.

Remarks: WEISE (1882) mentions two Greek localities: Thessaloniki and Theodosia. One specimen from each locality was found in the Weise collection (MFNB). The specimen from Thessaloniki (here designated as lectotype) has an aedeagus with the characteristic features of *E. sacra*: apex in lateral view slightly upturned, the two lateral inner structures in dorsal view strongly bent inwards. The specimen from Theodosia (MFNB: coll. number 4002) has dark sublateral elytral vittae, which is not in accordance with the original description of *E. suturalis*, Therefore, this specimen may actually not be a syntype. The specimen from Theodosia mentioned in the original description is perhaps lost or Weise knew it from another collection.

Entomoscelis melanostoma (GMELIN, 1790) nomen dubium

Chrysomela melanostoma GMELIN 1790: 1673.
Entomoscelis melanostoma: MARSEUL 1888: 25 (323).

Original description: "... thorace elytrisque rubris: illo posterius puncto oreque, isto utrinque puncto, dorso scutelloque, his sutura nigris." [elytra with dark suture only] (GMELIN 1790).

Remarks: J.F. Gmelin described many new species from the collection of Nathanael Gottfried Leske (now in the Natural History Museum, Dublin). According to J. Bezděk (pers. comm., 2020), there are no specimens of *Chrysomela melanostoma* in that museum.

Because of the lacking sublateral elytral vittae, this taxon was usually regarded as a synonym of *E. sacra* (e.g., LOPATIN et al. 2004, KIPPENBERG 2010) or of *E. dorsalis* (MARSEUL 1888). The lack of type material and the very brief description (no locality is mentioned) does not enable

this taxon definitely to be attributed to one of the known species of *Entomoscelis*. Therefore, it should be regarded as a nomen dubium.

Host plants and life cycles

The studied species were reported from seven different host plant families (see Table 1).

Table 1: Reported host plant families of the *Entomoscelis adonidis* species group and *E. pilula* (preferred plants in bold).

	adonidis	*berytensis*	*cornea*	*dorsalis*	*erythrocnema*	*pilula*	*rumex*	*sacra*
Asteraceae	x							
Brassicaceae	**x**	**x**				**x**	x	
Euphorbiaceae		x						
Papaveraceae	x							**x**
Polygonaceae			**x**				**x**	
Ranunculaceae	x	x		**x**	**x**			x
Scrophulariaceae								x

Observations in Israel seem to confirm temporary host plant switch. Adults and larvae of *E. berytensis* were found abundantly on *Adonis* and other Ranunculaceae, but later on they had to change to Brassicaceae, because all Ranunculaceae became desiccated (A.-L.-L. Friedman, pers. comm. 2018). In Iran (Bushehr Province), spiny Brassicaceae were apparently the host plants of *E. berytensis* (H. Mühle, pers. comm. 2018).

Concerning the life cycles of *Entomoscelis*, only limited information is available. *Entomoscelis adonidis* is an exception because of its (former) importance as a pest species. Most likely, *E. adonidis* was the first species of Chrysomelinae whose diapause was documented in detail (SAJÓ 1911). In spite of abundant food sources in spring or in early summer, the beetles creep into a hiding place and re-appear only in autumn – probably together with their offspring. Similar behaviour can also be observed in other species of Chrysomelinae (see KIPPENBERG 2017: 143).

Key to the species of the *Entomoscelis adonidis* species group, incl. *E. pilula*

1 Pronotum with four dark transverse maculae (or sometimes with a median horizontal band notched anteriorly and two lateral maculae), clypeus and legs for the most part pale. Body 5.5–7.5 mm long. NW Africa, Spain (?). On *Rumex* and *Eruca*. Aedeagus as in Fig. 43 ..... ***rumex***

– Pronotum with a broad dark longitudinal median patch (not notched anteriorly) and normally with two lateral maculae, clypeus black or bicoloured..... 2

2 Legs completely red or bicoloured 3

– Legs completely black 4

3 Pronotal longitudinal median patch strongly narrowed anteriorly, elytron with a dark sublateral longitudinal vitta, slightly reduced in size (Fig. 16). Central Asia (Uzbekistan, Tajikistan, N Afghanistan). On *Adonis*. Body 6.0–7.5 mm long. Aedeagus as in Fig. 42…… ..... ***erythrocnema***

– Pronotal longitudinal median patch moderately narrowed anteriorly, elytron with or without a dark sublateral longitudinal vitta, colouration very variable (Figs. 18–19). NW Africa (Morocco to Libya). On *Rumex*. Body 5.7–7.5 mm long. Aedeagus as in Fig. 41..... ***cornea*** (partim)

4 Aedeagus larger (Figs. 21–37). Clypeus black or predominantly black with red apical margin..... 5

– Aedeagus (Figs. 38–44) shorter or at least significantly smaller. Clypeus red or bicoloured, except black in *E. pilula* 6

5 On average larger, 6.5–10.5 mm long. Habitus varies from elongate and narrower to stout and broad (Figs. 1–4). In females, tarsi loosely arranged, hind tibiae distinctly bent outward apically, 3rd tarsomere elongate cordiform (Fig. 49), male tarsi as in Fig. 45. Aedeagus long and subparallel-sided (Figs. 21–32). On various Brassicaceae, in the mountains of Central Asia on *Adonis*, reported also from *Papaver* and Asteraceae..... ***adonidis***

a Average ratio of length:width of elytra 1:0.76 (Fig. 1). Elytron usually with a dark sublateral longitudinal vitta. Apex of the aedeagus slightly and convexly curved in dorsal view (Figs. 21–28). Europe, Turkey, northern Asia, Central Asia to NW China and W Mongolia, N America ..... ***a. adonidis***

b Size and proportions as in *E. a. adonidis* (Fig. 2). Apex of the aedeagus triangular in dorsal view (Figs. 29–30). Black frontal macula enlarged anteriorly. Elytra mostly without a dark sublateral vitta. Caucasus, Iran..... ***a. caucasica***

c Colouration as in *E. a. adonidis*, but body dimensions remarkably different. Average ratio of length:width of elytra 1:0.84 (Figs. 3–4). Aedeagus (Figs. 31–32) not as long as in *E. a. adonidis* of equal size, its apex as in *E. a. adonidis*. SE Turkey ..... ***a. goliath***

– On average smaller, 4.9–9.0 mm long. Habitus: males more or less parallel-sided and somewhat stout, females laterally usually evenly curved, elytra broadest at or behind middle (Figs. 5–12). In females tarsi compact, hind tibiae apically only slightly bent outward, 3rd tarsomere short and rounded (Fig. 50), in male tarsi as in Figs. 46–47. Aedeagus (Figs. 33–37) similar to *E. adonidis*, on average shorter. Elytron with a dark sublateral longitudinal vitta, or vitta reduced or obsolete. For distribution, see Fig. 52. On *Adonis*..... ***dorsalis***

a Males less parallel-sided, laterally usually slightly curved (Fig. 5). Elytral punctation fine, separated and regular, not jagged or wrinkled. Elytron mostly without a dark sublateral longitudinal vitta or with a reduced vitta only. Eastern Central Europe. ***d. dorsalis***

b Habitus and colouration as in nominotypical subspecies (Fig. 7). Elytral punctation fine but strongly wrinkled. Iran..... ***d. iranica***

c Body relatively broad and short with wide and well developed dark sublateral elytral vittae and quite large lateral pronotal maculae (Fig. 8). Elytral punctation larger than on pronotum, in some specimens jagged and serrate. South Kazakhstan ..... ***d. turkestana***

d Males oblong and parallel-sided (Fig. 6). Elytral punctation somewhat jagged, but not wrinkled. Elytra mostly with dark sublateral longitudinal vitta more or less reduced. Southern Urals..... ***d. bashkiriae***

e Males relatively small, narrow and oblong (Fig. 9). Dorsum dull due to coarse punctation, which is especially pronounced in the posterior third of the pronotum. Dorsal punctation coarse, sublateral elytral vittae wide, lateral dark pronotal maculae absent. Southern Siberia..... ***d. hammarstroemi***

6 Clypeus black. Small: body 5.0–6.0 mm (males), 6.0–6.3 mm (females) long. Body oval, convex, elytra with darkened suture only (Fig. 20). Antennae stout, apical antennomere about two times as long as broad. In females tarsi slender, 3rd tarsomere not cordiform. Aedeagus (Fig. 44) short, with elongate narrow lobe apically. Caucasus: Georgia, Azerbaijan, Russia (Dagestan only), W Kazakhstan. On Brassicaceae..... ***pilula***

– Clypeus red or bicoloured. Antennae not extremely stout, last antennomere about 2.5–3.0 times as long as broad. In females tarsi slender, 3rd tarsomere more or less cordiform 7

7 Apex of aedeagus in lateral view upturned, the two lateral inner structures visible in dorsal view strongly bent inwards (deviating from all other studied species) (Figs. 39–40). Pronotal longitudinal patch medially convexly narrowed anteriorly and usually not reaching anterior margin (Fig. 15). Elytron without a dark sublateral longitudinal vitta (at the most with an indistinct marking). Body 5.0–9.0 mm long. Romania, North Macedonia, Greece to Russia (Udmurtia Republic), Crimea, Georgia, Armenia, Turkey, Syria, Israel, Jordan, Iraq, Iran. On *Glaucium* and *Papaver* ..... ***sacra***

– Apex of aedeagus in lateral view not upturned, the two lateral inner structures in dorsal view straight, not bent inwards..... 8

8 Species from NW Africa (Morocco to Libya). Habitus and colouration as in Figs. 18–19. Pronotal longitudinal patch usually slightly and concavely narrowed anteriorly. Elytron with or without a dark sublateral longitudinal vitta. Legs dark or (partly) red. Body 5.7–7.5 mm long. Aedeagus as in Fig. 41. On *Rumex* ..... ***cornea*** (partim)

– Species from Armenia, Turkey, Syria, Lebanon, Israel, Jordan, Iraq, Iran, Egypt (?). Habitus and colouration as in Figs. 13–14. Pronotal longitudinal dark patch in the anterior and predominantly in the apical part convexly narrowed, elytron nearly almost with a dark sublateral longitudinal vitta. Legs dark. Body 5.5–8.0 mm long. Aedeagus as in Fig. 38. On Brassicaceae, Ranunculaceae and *Euphorbia*..... ***berytensis***

Checklist of the species of the *Entomoscelis adonidis* species group

***Entomoscelis adonidis adonidis* (PALLAS, 1771)**
Chrysomela adonidis PALLAS, 1771: 463
Chrysomela trilineata FABRICIUS, 1777: 219
Entomoscelis americana BROWN, 1942: 172 **syn.n.**

***Entomoscelis adonidis caucasica* ssp.n.**

***Entomoscelis adonidis goliath* ABEILLE DE PERRIN, 1897**
Entomoscelis goliath ABEILLE DE PERRIN, 1897: 42

***Entomoscelis berytensis* (REICHE & SAULCY, 1858)**
Chrysomela (*Entomoscelis*) *berytensis* REICHE & SAULCY, 1858: 36 (the authorship was erroneously corrected to REICHE, 1858 by the editors in KIPPENBERG (2010))

***Entomoscelis cornea* ABEILLE DE PERRIN, 1897**
Entomoscelis cornea ABEILLE DE PERRIN, 1897: 43
Entomoscelis occidentalis occidentalis ESCALERA, 1914: 526 **syn.n.**
Entomoscelis occidentalis thalmanni KOCHER, 1969: 113 **syn.n.**

***Entomoscelis dorsalis bashkiriae* ssp.n.**

***Entomoscelis dorsalis dorsalis* (FABRICIUS, 1777)**
Chrysomela dorsalis FABRICIUS, 1777: 220

***Entomoscelis dorsalis hammarstroemi* JACOBSON, 1901**
Entomoscelis adonidis hammarstroemi JACOBSON, 1901a: 118

***Entomoscelis dorsalis iranica* ssp.n.**

***Entomoscelis dorsalis turkestana* ssp.n.**

***Entomoscelis erythrocnema* JACOBSON, 1893**
Entomoscelis erythrocnema JACOBSON, 1893: 241

***Entomoscelis rumex* (KIPPENBERG, 2020) nom.n.**
Chrysomela rumicis FABRICIUS, 1787: 70 (nec *Chrysomela rumicis* SCHRANK, 1785)

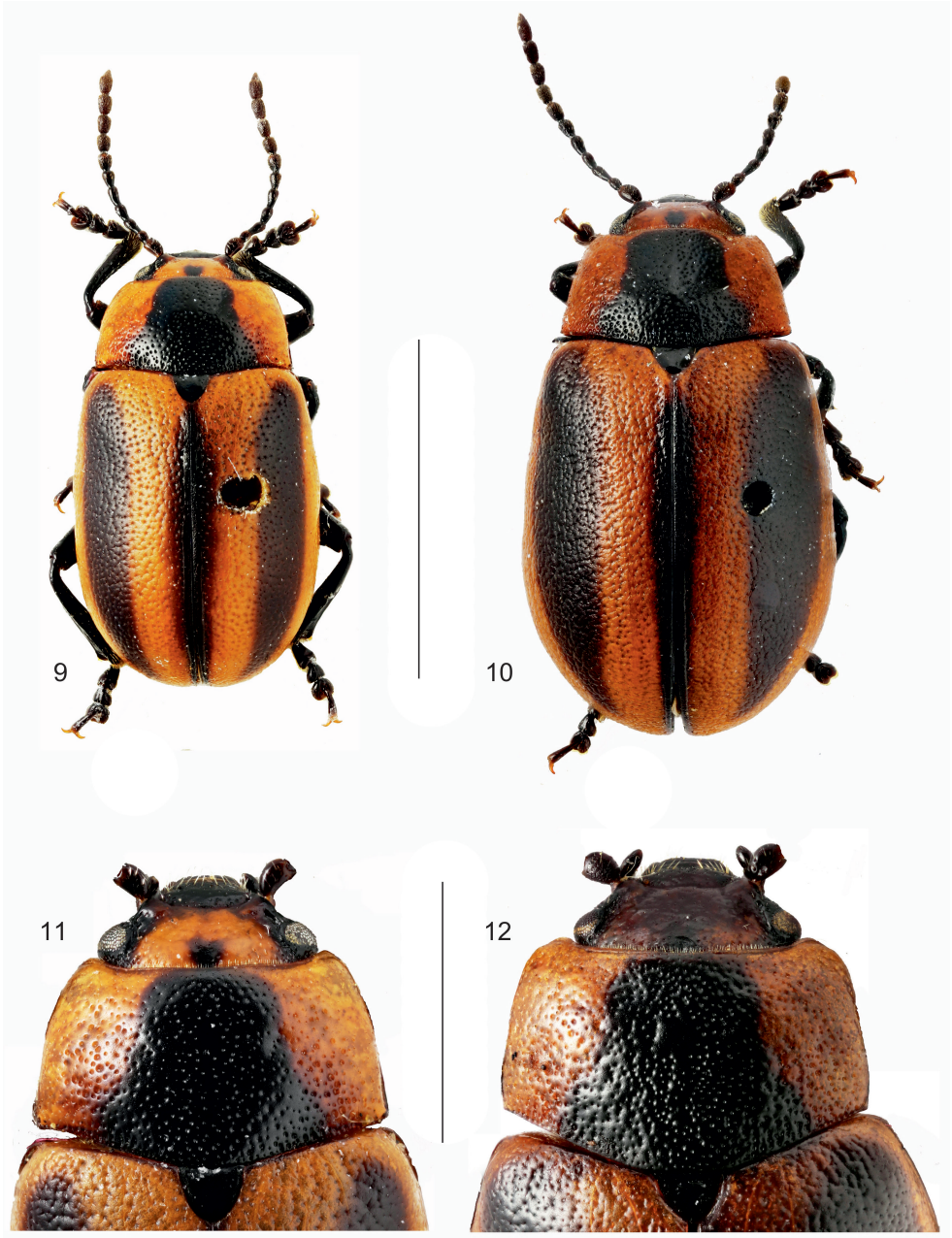
***Entomoscelis sacra* (LINNAEUS, 1758)**
Chrysomela sacra LINNAEUS, 1758: 372
Entomoscelis suturalis WEISE, 1882: 312 **syn.n.**



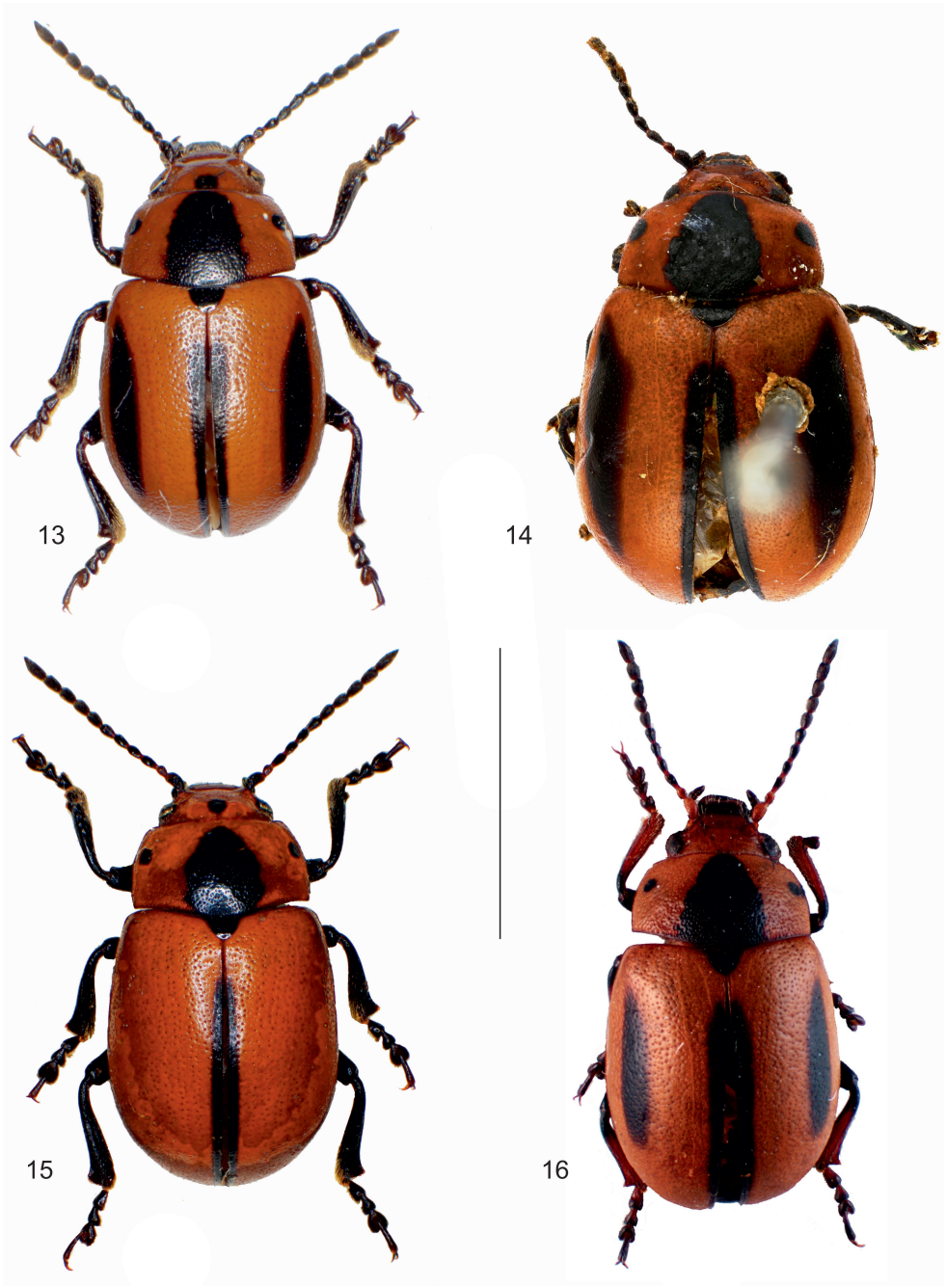
Figs. 1–4: Habitus, dorsal view; 1) *Entomoscelis adonidis adonidis* ♂, Hungary, 2) *E. a. caucasica* ♂, holotype, Georgia, 3) *E. a. goliath* ♂, SE Turkey, 4) *E. a. goliath* ♀, syntype, SE Turkey. Photographs by J. Schmidl (1–3) and A. Mantilleri (4). Scale 5 mm.



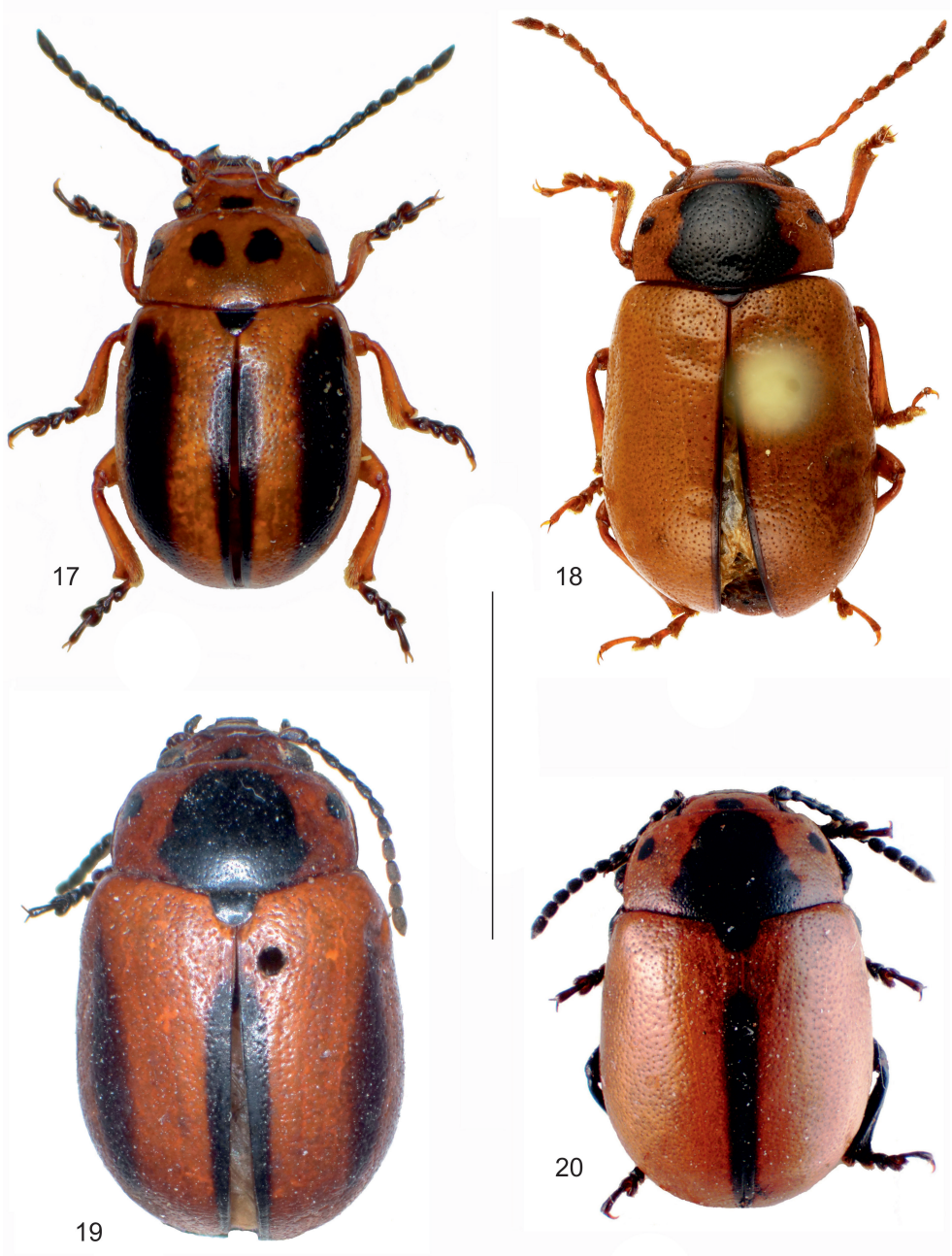
Figs. 5–8: Habitus, dorsal view; 5) *Entomoscelis dorsalis dorsalis* ♂, Austria, 6) *E. d. bashkiriae* ♂, holotype, Russia, S Urals, 7) *E. d. iranica* ♂, holotype, N Iran, 8) *E. d. turkestana* ♂, holotype, S Kazakhstan. Photographs by J. Schmidl (5–7) and K. Makarov (8). Scale 5 mm.



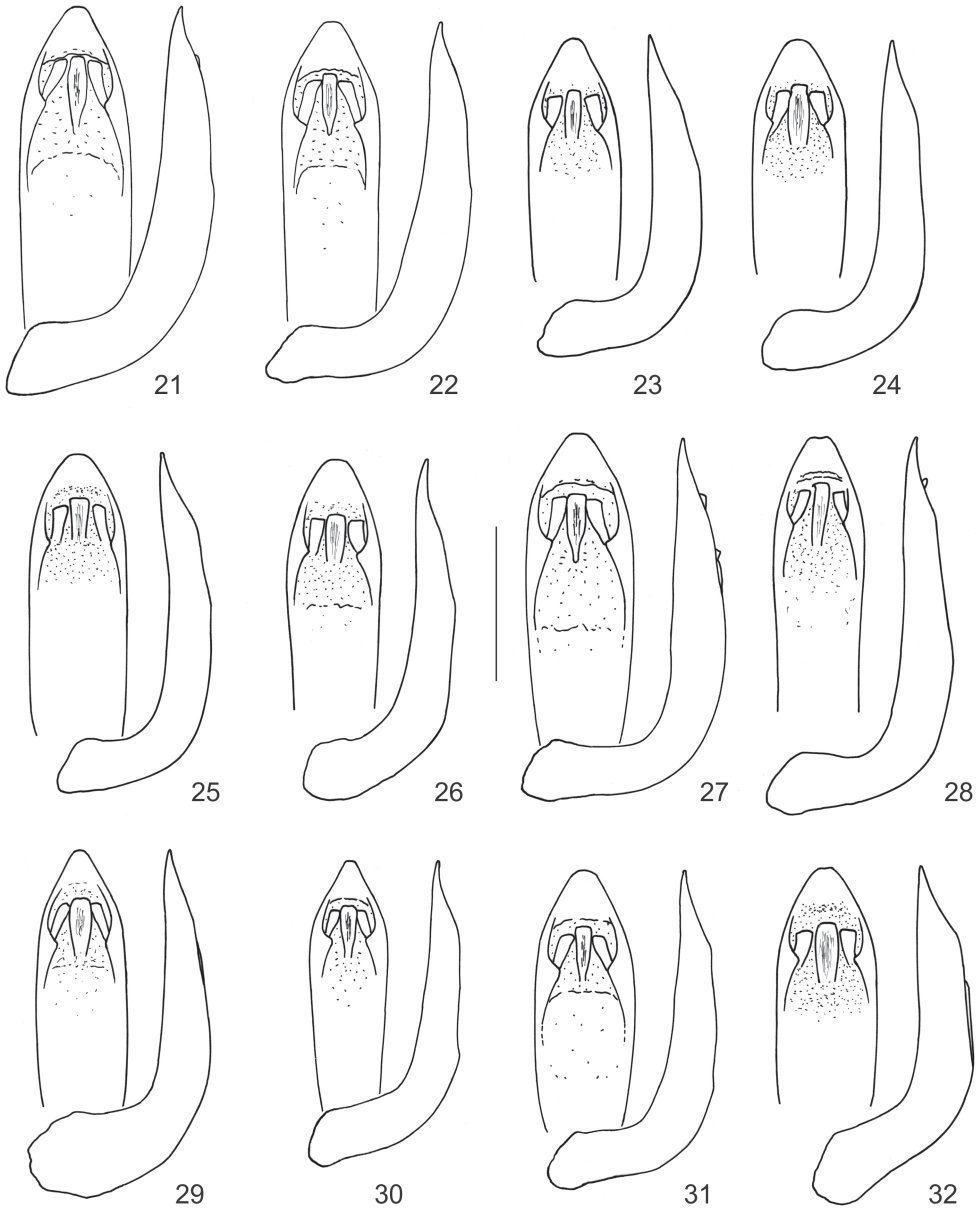
Figs. 9–12: *Entomoscelis dorsalis hammarstroemi*; 9–10: habitus, dorsal view, 9) ♂, lectotype, Russia, S Siberia, 10) ♀, paralectotype, Russia, S Siberia, 11–12: pronotum, 11) ♂, lectotype, 12) ♂, Russia, Khakassia: Tashtyp. All photographs by K. Makarov. Scale 5 mm.



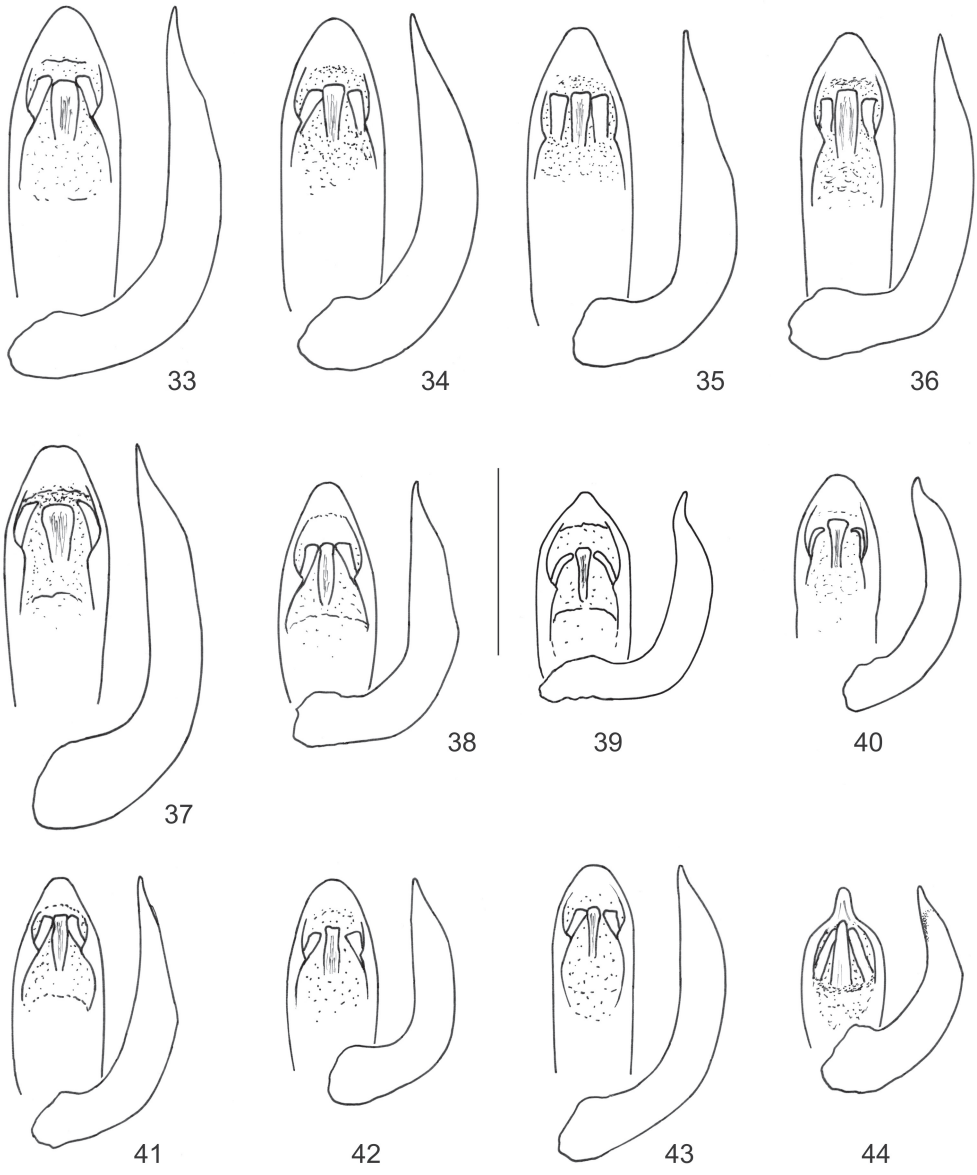
Figs. 13–16: Habitus, dorsal view; 13) *Entomoscelis berytensis* ♂, SE Turkey, 14) *E. berytensis* ♀, syntype, Lebanon, 15) *E. sacra* ♂, Turkey, 16) *E. erythrocnema* ♂, Tajikistan. Photographs by J. Schmidl (13, 15), A. Mantilleri (14), and K. Makarov (16). Scale 5 mm.



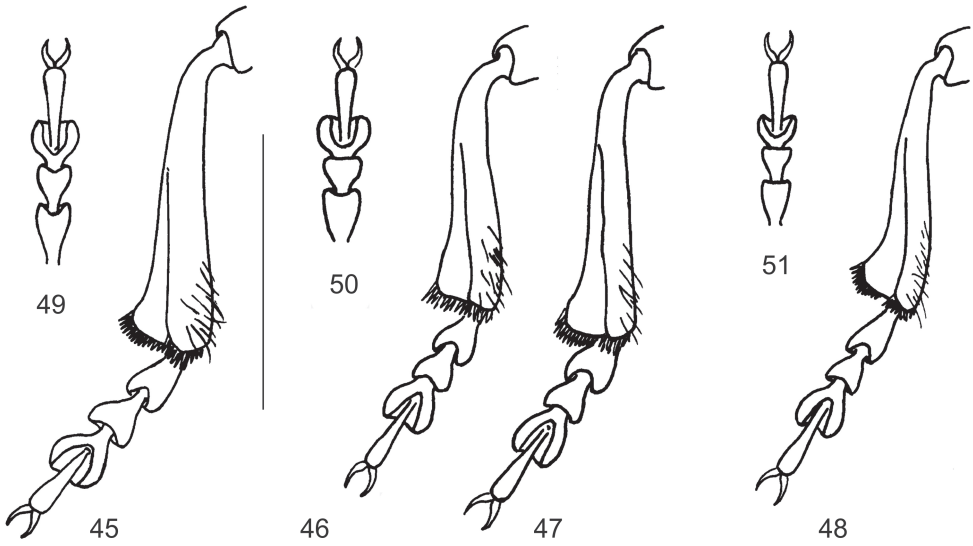
Figs. 17–20: Habitus, dorsal view; 17) *Entomoscelis rumex* ♂, Morocco, 18) *E. cornea* ♀, syntype, Algeria, 19) *E. cornea* ♀ (var. *mediojuncta*), Libya, 20) *E. pilula* ♀, paratype, Azerbaijan. Photographs by J. Schmidl (17), A. Mantilleri (18), M. Borer (19), and A.G. Moseyko (20). Scale 5 mm.



Figs. 21–32: Aedeagus; 21–28: *Entomoscelis adonidis adonidis*, 21) Portugal, 22) Germany, 23) NE Turkey, 24) SW Turkey, 25) N Iran, 26) Russia, Astrakhan, 27) Kazakhstan, 28) Canada, 29–30: *E. a. caucasica*, 29) holotype, Georgia, 30) paratype, "Caucasus", 31–32: *E. a. goliath*, SE Turkey. Scale 1 mm.



Figs. 33–44: Aedeagus; 33) *Entomoscelis dorsalis dorsalis*, Austria, 34) *E. d. bashkiriae*, holotype, S Urals, 35) *E. d. hammarstroemi*, Russia, S Siberia, 36) *E. d. iranica*, holotype, N Iran, 37) *E. d. turkestana*, holotype, S Kazakhstan, 38) *E. berytensis*, Turkey, 39–40: *E. sacra*, 39) Turkey, 40) Iran, 41) *E. cornea*, Algeria, 42) *E. erythrocnema*, Uzbekistan, 43) *E. rumex*, Morocco, 44) *E. pilula*, Georgia. Scale 1 mm.



Figs. 45–51: Legs; 45–48: ♂, left hind tibiae and tarsi, 45) *Entomoscelis adonidis adonidis*, Germany, 46) *E. dorsalis dorsalis*, Austria, 47) *E. d. dorsalis*, Slovakia, 48) *E. berytensis*, Turkey, 49–51: ♀, left fore tarsi, 49) *E. a. adonidis*, Germany, 50) *E. d. dorsalis*, Austria, 51) *E. berytensis*, Turkey. Scale 1 mm.



Fig. 52: Distribution of the subspecies of *Entomoscelis dorsalis*.

Acknowledgements

This study could have not been carried out without the help of numerous colleagues. A lot of information about biology, distribution and type specimens was made available by Dr. Jan Bezděk (Brno, Czechia), Dr. Andrzej O. Bieńkowski (Moscow, Russia), Dr. Ariel-Leib-Leonid Friedman (Tel Aviv, Israel), Dr. Vladimir Gusarov (Oslo, Norway), Manfred Kahlen (Hall in Tirol, Austria), Dr. Michael Kuhlmann (Kiel, Germany), Dr. Hans Meljon (Uppsala, Sweden), Milan Šárovec (Prague, Czechia), Dr. Alexey Solodovnikov (Copenhagen, Denmark), Dr. Kvamme Torstein (Oslo, Norway), and Dr. José Miguel Vela (Málaga, Spain).

Loan material was provided by Dr. Miguel A. Alonso-Zarazaga (MNCN), Dr. Matthias Borer (NMB), Dr. Johannes Frisch and Bernd Jaeger (MFNB), Dr. Manfred A. Jäch (NMW), Michael Langer (MLC) and Dr. Alexey G. Moseyko (ZIN).

Specimens donated by Dr. Mauro Daccordi (Verona, Italy), Manfred Egger (Hall in Tirol, Austria), Dr. Ariel-Leib-Leonid Friedman, Dr. Frank Fritzlar (Jena, Germany), Dr. Elisabeth Geiser (Salzburg, Austria), Uwe Heinig (Berlin, Germany), Walter Heinz (Schwanfeld, Germany), Dr. Ernst Heiss (Innsbruck, Austria), Andreas Link (Haid, Austria), Hans Mühle (Nußdorf am Inn, Germany), Gerhard Rößler † (Wunsiedel, Germany), Dr. Andrzej Warchałowski † (Wrocław, Poland) and Wolfgang Ziegler (Hamburg, Germany) were especially important and welcome.

Photographs of specimens and/or label data were kindly contributed by Dr. Jan Bezděk with permission of Dr. Pierre Jolivet † (Paris, France), by Dr. Matthias Borer (NMB), Dr. Michael Kuhlmann (ZMUK), Dr. Kirill Makarov (Moscow, Russia), Dr. Antoine Mantilleri (MNHN), Dr. Alexey G. Moseyko (ZIN), and Dr. Jürgen Schmidl (Erlangen, Germany).

Dr. Michael L. Cox (Grays, United Kingdom) amiably checked the manuscript linguistically. Dr. Jan Bezděk and Dr. Manfred A. Jäch proof-read the manuscript and suggested a lot of valuable improvements.

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