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Review of the genus *Stenodera* with a description of the first instar larva of *S. puncticollis* (Coleoptera: Meloidae)

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Abstract. The first instar larva, or triungulin, of *Stenodera puncticollis* (Chevrolat, 1829) is described. Its characters indicate that *Stenodera* is the most primitive member of the subfamily Nemognathinae and support the recognition of the monotypic tribe Stenoderini, as previously proposed on the basis of adult morphology. The bionomic information on this genus is summarized, and an annotated catalogue and key to the species based on adults are presented.

INTRODUCTION

The genus *Stenodera* was described by Eschscholtz (1818) for *Mylabris sexmaculata* Fabricius, 1794, a junior synonym of *Meloe caucasica* Pallas, 1781. Later it was confused by some authors with the Central Asian genus *Megatrachelus* sensu Abeille de Perrin, 1880 (not Motschulsky, 1845). Beauregard (1889), Escherich (1891a, 1891b, 1897a) and Pic (1912a) designated *Stenodera* as a distinct genus. Mařan (1942) revised this genus, described new species and divided it into two subgenera, the nominate, and *Stenoderina* Aksentjev, 1988. Finally, Aksentjev (1978) described a new species from Eastern Siberia, and Bologna (1991) presented a partial review of the taxonomy and bionomics of the genus. This relatively small genus, with eight species, is distributed from the Balkans and Near East through Central Asia to China.

Although the systematic position of *Stenodera* was variously considered in the literature, all specialists treat it as a primitive member of the Nemognathinae. Selander (1964, 1966) proposed a monotypic tribe Stenoderini, based on the plesiotypic state of certain adult characters, which he discussed in great detail in his 1991 paper, and formally described the tribe. Kaszab (1969) and Bologna (1991) preferred to consider *Stenodera* as the most primitive genus of the tribe Nemognathini, and did not divide the subfamily as proposed by Selander (1964).

Recently we obtained the triungulin of *S. puncticollis* (Chevrolat, 1829) from southern Anatolia. The first instar larva of this species is very distinct from those of other Nemognathinae, showing several primitive features in common with the subfamily Meloinae. This larva was utilised in a recent phylogenetic analysis of the family (Bologna & Pinto, 2001), which corroborated the basal position of *Stenodera* in the Nemognathinae. Although few characters support a tribal status, Bologna and Pinto followed Selander (1991) in recognizing the Stenoderini.

The main purposes of this paper are to describe the first instar larva of *Stenodera*, provide a key and synopsis of the genus, and to compare its adult and larval characters with those of other Nemognathinae. The opportunity to examine specimens of *S. foveicollis* (Fairmaire, 1897) and *S. djakonovi* Aksentjev, 1978, two species for which only the original descriptions exist, also permitted us to better define the limits of this genus, and to present an annotated catalogue.

MATERIAL AND METHODS

For this study we examined 339 adults, representing all species of *Stenodera*. This includes 27 (Holotypus and 1 Paratypus included) *S. anatolica* (Frivaldzky, 1884), 125 *S. caucasica* (Pallas, 1781), 40 (Holotypus included) *S. coeruleiceps* (Fairmaire, 1892), 2 *S. djakonovi* Aksentjev, 1978, 12 *S. foveicollis* (Fairmaire, 1897), 30 *S. oculifera* (Abeille de Perrin, 1880), 100 *S. puncticollis* (Chevrolat, 1829), and 3 *S. palaestina* Mařan, 1942.

The specimens examined are in the following collections (associated acronyms reported in the text): BM = Natural History Museum, London; CALAC = California Academy of Sciences, San Francisco; CB = M.A. Bologna coll., Università "Roma Tre", Roma; CBR = S. Bruschi coll., Roma; CG = G. Gobbi coll., Roma; CIZ = Univ. Bornova Izmir; CL = A. Liberto coll., Roma; CP = J. Probst coll., Wien; CPR = Proscia coll., Udine; CS = L. Saltini coll., Modena; FLCA = Florida State Collection of Arthropods, Gainesville (the L.F. and R.B. Selander coll. of Meloidae); JP = J.D. Pinto coll., University of California, Riverside; MG = Museo civico di Storia naturale, Genova; MM = Museo di Storia naturale di Milano; MNM = Museo Nacional de Historia natural, Madrid; MP =Muséum national d'Histoire naturelle, Paris; MST = Staatliches Museum für Naturkunde, Stuttgart; MTR = Museo tridentino di Storia naturale, Trento; MUH = Zoological Museum of the Haifa University; MUN = Museo Zoologico dell'Università di Napoli "Federico II"; MVE = Museo di Storia naturale, Venezia; MVR = Museo di Storia naturale, Verona; MW = Naturhistorisches Museum, Wien; MZR = Museo civico di Zoologia, Roma; MZUR = Museo di Zoologia Università La Sapienza, Roma; NHB = National Museum of Natural History, Budapest; NMP= National Museum, Praha, Department of Entomology; UGX = Entomological collections, Université de Gembloux.

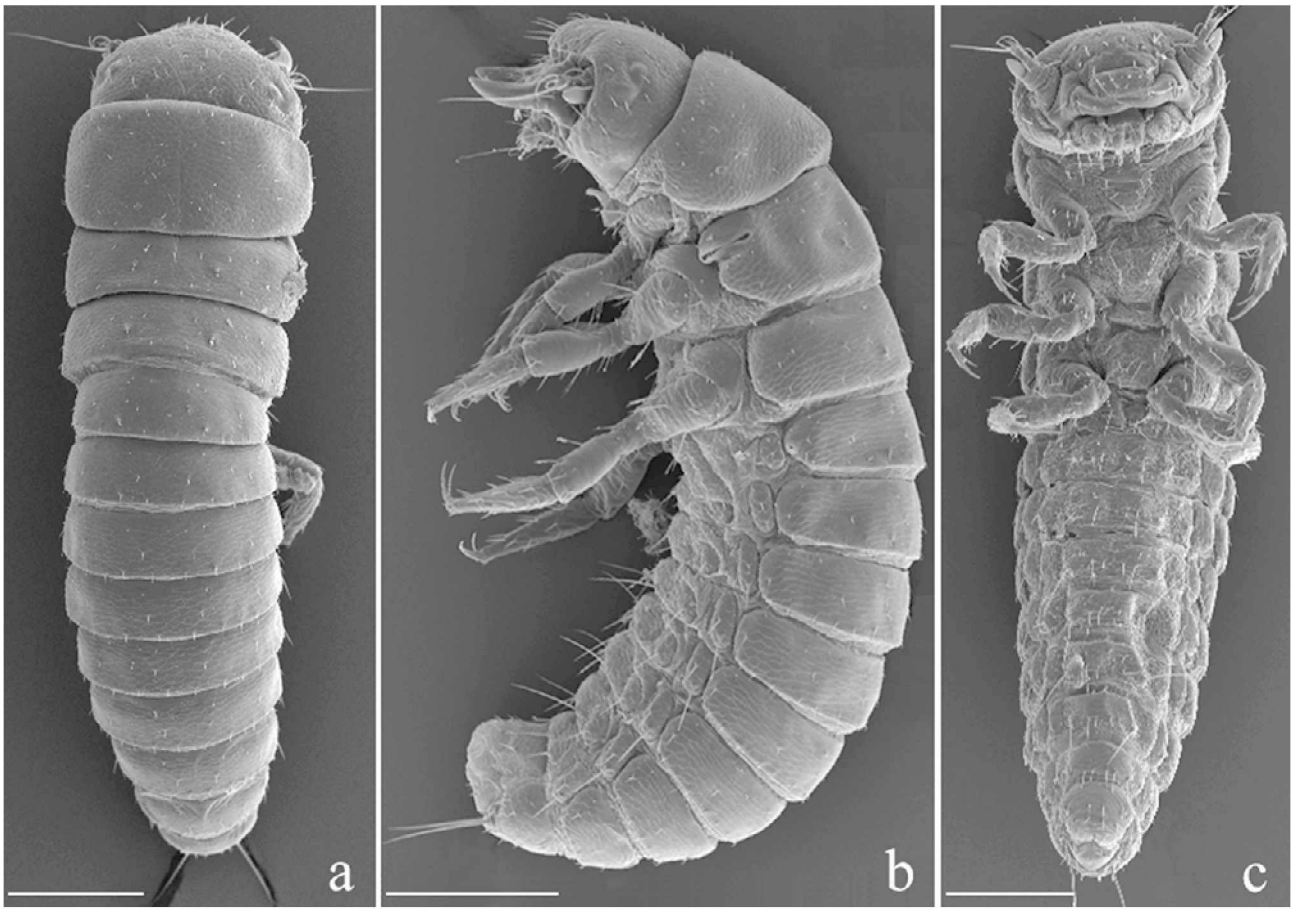

Fig. 1. *Stenodera puncticollis*, SEM photographs of first instar larva. a – habitus in dorsal; b – lateral; and c – ventral view (scale bar = 100 μm).

The description of the triungulin larva of *S. puncticollis* is based on the following material in the CB collection (Dipartimento di Biologia, Università "Roma Tre", Roma, Italy): About 200 specimens in 70% ethanol (vials: 131, 132, 133, 134, 136, 137; a few additional specimens are in the JP collection); 10 specimens mounted on slides (M136, M137, M138, M139, M181, M182; two additional slides with 4 specimens are in the JP collection); 13 specimens mounted on stubs for SEM analysis (n: 47, 49, from vial n.136). The adults were collected at the following locality: Turkey, vilayet Adana, Osmaniye, Gardak, m 150, 1.V.1992, M. Bologna & C. Marangoni leg. Eggs were laid 1/2.V.1992 on an *Onopordon* flower (Asteraceae) placed in the rearing cage; adults and eggs were held at ca. 24–25°C; larvae hatched 12/13.V.1992 and were fixed in ethanol 14.V.1992.

Morphological analyses and illustrations were produced using an Olympus SZX12 stereomicroscope for living and alcohol preserved material, and a Leitz Laborlux S light microscope for material mounted on slides in Canada balsam; both microscopes were equipped with a drawing tube. A Philips XL30 scanning electron microscope for the high magnification study of material mounted on stubs after critical point dehydration and gold sputtering. Measurements reported in the descriptions are based mainly on cleared, slide-mounted larvae. The terminology of larval structures follows Lawrence (1991), MacSwain (1956) and Bologna & Pinto (2001). For the description of larval chaetotaxy we adopted some of the notational conventions suggested by Selander (1990) (see Bologna & Di Giulio, 2002).

Feeding and sexual behaviour of two species, *S. puncticollis* and *S. caucasica*, were observed for short periods in the field in Turkey by one of us (MAB) in 1986, 1991 and 1992. *S. puncticollis* was observed near Osmaniye (Adana Province, 1.V.1992); *S. caucasica* at Hülük (Nigde Province, 10.VI.1986), and Ürgüp (Nevsehir Province, 19.VI.1986) near Karaman (Konya Province, 7.V.1991), and 70 km S of Bilecik (Bilecik Province, 4.V.1992). Larval biology and behaviour of reared specimens of *S. puncticollis* was observed in the laboratory (VI. 1992, temperature 18°–20°C).

RESULTS

Description of the triungulin of *S. puncticollis*

Egg. Pale yellow, stout, ovoid, round at both ends, distinctly wider at one apex; chorion of mature eggs smooth, light brown. Length 0.5 mm, width 0.2 mm.

First-instar larva

Habitus. Triungulin campodeiform, slightly fusiform (Fig. 1a); body short, slightly compressed laterally and convex dorsally in lateral view (Fig. 1b). Body length 0.8 mm (from labrum to pygidium); head length 0.14 mm (from clypeolabral suture to occipital foramen), maximum width 0.2 mm, width at base (occipital foramen) 0.14 mm; basal stem of epicranial suture 0.036 mm; antennal length 0.04 mm, terminal seta length 0.09 mm; prothorax

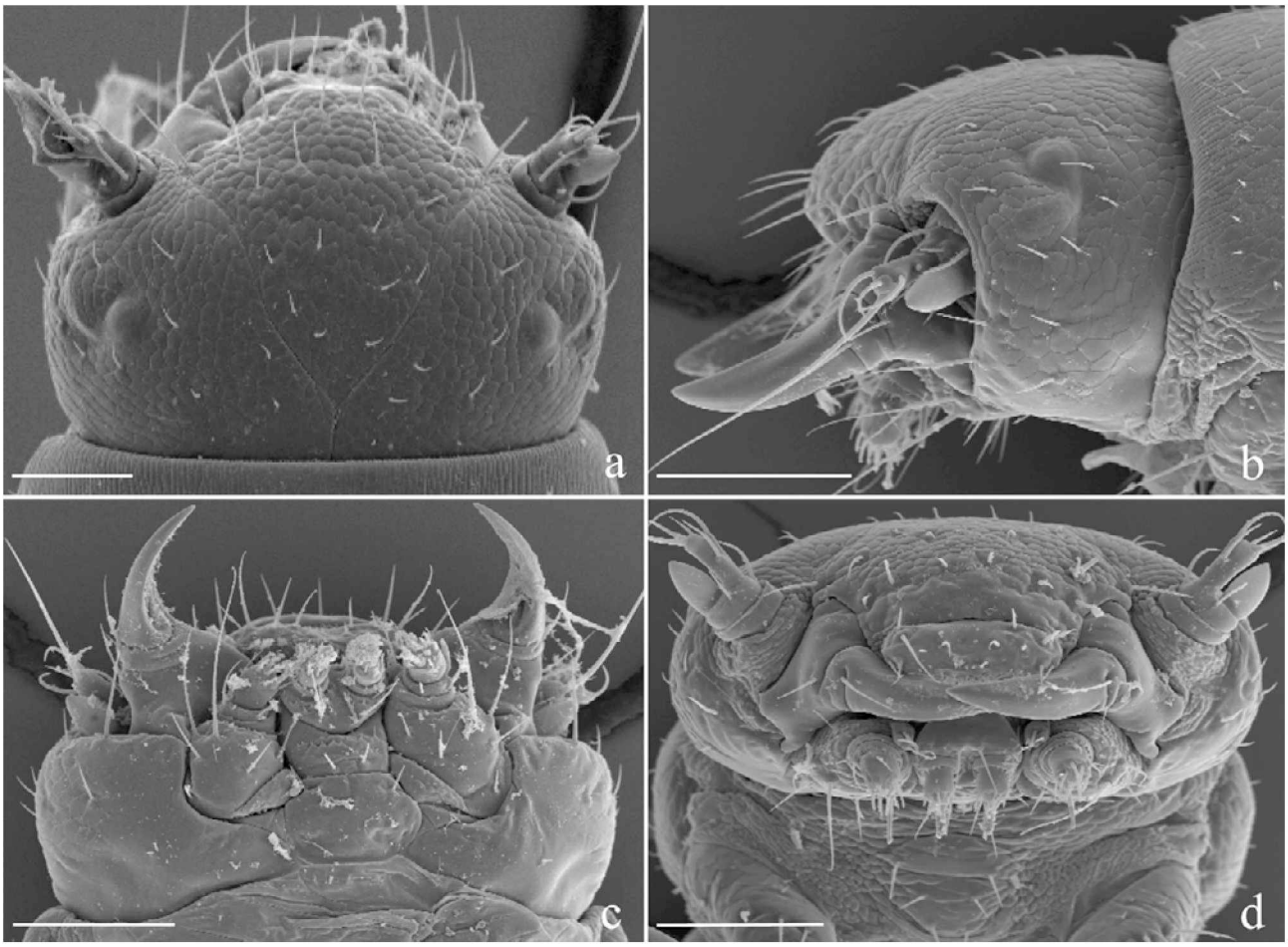

Fig. 2. *Stenodera puncticollis*, SEM photographs of first instar larva. a – head in dorsal; b – lateral; c ventral; and d – frontal view (scale bar = 50 μm).

length 0.12 mm, maximum width 0.22 mm; abdominal length 0.44 mm, terminal setae length 0.08 mm. Colour light brown, head slightly darker around the stemmata; membranous areas and sternites of thorax poorly sclerotised. Cuticle reticulate; reticulae well marked, subrectangular or polygonal (Figs 2a, 3a); pleurites and sternites with imbricate microsculpturing, consisting of scale-like reticulae several of which are multispinose along their apical margin (Figs 3c, 3f). Setae of tergites and most setae on the head are very short (Fig. 1a); pleural and sternal setae and those on legs, antennae, mandibles and frontoclypeal row are longer (Fig. 1b). Caudal setae longer than others.

Head. Strongly transverse (width/length = 1.4) and subglobose (Figs 2a–2d), widest just behind antennal fossae, partially invaginated into prothorax; sides of epicranial halves evenly convergent from antennae to base; basal elevation absent; anterior margin of head (frontoclypeal margin) rounded. Epicranial suture Y shaped (Fig. 2a); frontal sutures oblique, only slightly sinuate distally, complete to antennal fossae. Stemmata unique (Figs 2a, 2b, 3a), appearing comma-shaped under light microscopy, dorsolaterally positioned; each stemma consisting of a smooth, swollen dorsal area (the normal discoid stemma), with a narrow, anteriorly curved, slightly reticulate (probably because of the light sclerotization of the cuticle), and irregularly swollen ventral section (Fig. 3a, arrow). Frontoclypeal region with a total of 16–18 setae (Fig. 2a); frontoclypeal row (FCR) of 3 pairs of setae, setae FCR1 FCR2 and FCR3, sensory pit present between FCR2 and FCR3; 5–6 pairs of setae posterior to FCR arranged in 3 irregular rows. Dorsum of each epicranial half with a basal group of 4 very small setae and 1 pit; 2 medial setae with an intermediate pit along the frontal arms of epicranial suture; 6 setae around the stemma arranged as in Figs 2a–2b; ocular seta subequal in length to adjacent setae, positioned anterior to the stemma and slightly anteriorly displaced to the ocular sensory pit; 4 additional setae and 2 pits positioned lateroventrally. Antennae (Fig. 3b) short, anterolaterally directed; segment I and II very short, ring-like, I with 2 sensory pits dorsally, II slightly longer than I, dorsally with 3 setae, 2 long and 1 short, and 1 intermediate pit; sensory appendix on segment II, ventrolaterally positioned, conical, acute at apex, broader and slightly longer than segment III; segment III slender, slightly wider at apex, as long as segments I and II combined, with an apical seta more than twice length of antenna; III with 3 subapical setae, similar in size and position to those of segment II, and 1 addi-

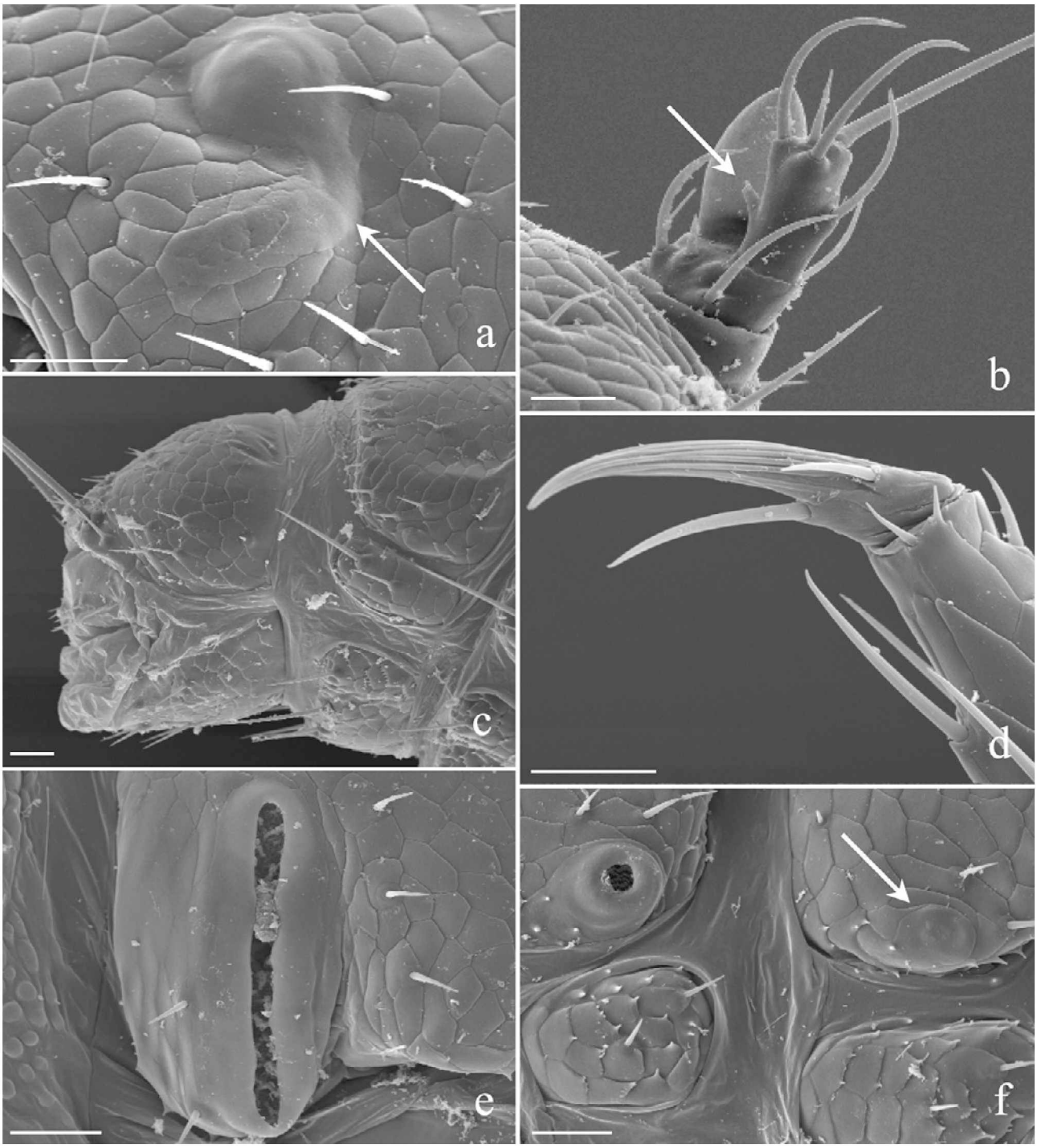

Fig. 3. *Stenodera puncticollis*, SEM photographs of first instar larva. a – lateral view of left stemma (the arrow indicates the ventral section of the stemma); b – dorsal view of left antenna (the arrow indicating the truncate sensory appendix); c – right lateral view of pygopod; d – posterior view of tarsungulus of left mesothoracic leg; e – left mesothoracic spiracle; f – left abdominal spiracles I-II (the arrow indicates the spiracle II closed) (scale bar = 10 μm).

tional medial elongate seta and 1 opposed short, truncate sensorial appendix (Fig. 3b, arrow). Gulamentum (Fig. 2c) weakly sclerotised with 2 small setae anteriorly. Labrum (Fig. 2d) directed ventrally, transverse, laterally rounded, dorsally with 8 setae of different length, the most lateral one on each side about 4 times as long as the others, with 2 medial pits. Epipharynx coarsely granulate. Mandibles (Figs 2b–2d) without mola, broad at base, distinctly narrowed and falcate in apical half, the two areas separated by 1 dorsal and 2 ventral transverse grooves, ental surface of apical half grooved, smooth; outer margin with 2 setae; 2 large dorsal sensory pits just behind mesal transverse groove. Maxillae (Fig. 2c) with broad stipes, membranous dorsally, with 5 setae, one row of 3 setae,

the lateral two much longer than the middle one, and an apical row of two elongate setae; mala simple, lobiform, slightly protruding, with 6–8 thick setae; maxillary palpi with segments I and II subequal, broad and short, ring-like; segment I with 2 sensory pits; segment II with 2 setae; segment III cylindrical, about 3 times as long as II, slightly swollen apically, with 1 small dorsolateral seta, 1 apical long socketed stick-like sensory appendix, and 10 shorter setae-like papillae; outer surface of segment III with 1 slender digitiform sensillum; cardo not sclerotised, with 1 very small seta. Mentum (Fig. 2c) with 1 or 2 pairs of short setae and 1 pair of sensory pits basally; prementum with 1 pair of medial setae and 1 pair of basal sensory pits, 2 small ligular setae dorsally; labial palpi with segment I short; segment II cylindrical, about 3 times as long as I, with 1 stout, cylindrical, socketed apical sensory appendix, obliquely truncate at apex, nearly as long as segment II and with a crown of 8 shorter setae-like papillae.

Thorax. Segments (Fig. 1a) transverse, subrectangular, wider than head, decreasing in length from pro- to metathorax; prothorax with anterior and posterior margins convex, lateral margins straight; meso- and metanotum slightly rounded laterally. Ecdysial line well marked and complete only on pro- and mesonotum. Pronotum about twice as wide as long, with about 25 small setae plus pits on each side of ecdysial line, arranged symmetrically, most placed on anterior (AR) and posterior rows (PR); prosternum (Fig. 1c) with 3 pairs of setae medially. Meso- and metanotum approximately 2/3 as long as pronotum with about 17 small setae plus pits on each side of ecdysial line, arranged in 3 transverse subparallel rows; meso- and metasternum with 2 medial pairs of setae.

Legs. Coxa (Fig. 1b) short and broad, transversally ridged, with 3 long anterior setae, 2 small setae and 1 pit basally and 1 lateral seta near the joint with trochanter; trochanter with 3 setae and 3–4 pits; femora moderately swollen, with 6 setae (7 on metafemur) and 1 pit, the longest ventral seta inserted near base, shorter than femur; tibiae moderately swollen, distal third tapered to apex, with 4 longitudinal rows of 3–4 thick setae; some small setae and pits at tibial apex; tarsungulus (Fig. 3d) conico-falcate, deeply longitudinally corrugated, with 2 sub-basal setae of different lengths, similar in position.

Spiracles. Only mesothoracic and first abdominal spiracles open and functional, both laterally placed on tergites. Mesothoracic spiracle (Fig. 3e) protruding, elliptical, extremely transverse (width = 38–43 μm; length ca. 10 μm). First abdominal spiracle (Fig. 3f) circular (diameter ca. 7 μm). Abdominal spiracles II-VIII (Fig. 3f, arrow) round, completely closed by a thin layer of cuticle.

Abdomen. Slightly fusiform (Fig. 1a), well sclerotised, with transverse, narrow, rectangular tergites; maximum width at segment III; ecdysial line absent; spiracle-bearing laterotergites (Fig. 1b) well sclerotised, pleurites poorly sclerotised; sternites I-VII poorly sclerotised, more or less divided into plates, sclerotisation increasing from segment I to VII, sternites VIII and IX undivided and well sclerotised. Tergite I (Fig. 1a) with approximately 3 rows of small setae: AR with 3–4 pairs of setae and 1 pair of medial pits; MR with 3 regularly spaced setae; PR with 7 setae and 1 medial pit; tergites II-VIII with the same pattern of setae and pits except for the reduction in size (or loss) of 1 lateral and 1 medial seta on AR and the presence of 1 additional lateral seta on PR; tergite IX with similar setation but 1 pair of setae on PR (caudal setae) elongate, slightly longer than segment IX. Pleurites (Fig. 1b) fused with sternum only on segment IX; epipleurites with 2 setae, the posterior longer; hypopleurites with 1 seta. Sternites (Fig. 1c) with 1 pair of short medial setae on AR, 1 pair of short medial setae on MR and 3 pairs of setae of different lengths on PR. Pygopod (Fig. 3c) moderately produced, membranous, transversely divided into 2 parts: the dorsal one semicircular with 6 small setae, transversally lined, and the ventral one longitudinally divided into 2 lobes.

Larval features and relationships. The first instar larva of *Stenodera* can be distinguished from that of other Meloidae by its unique C- or comma-shaped stemmata (Fig. 3a), the truncate seta-like appendix on antennal segment III (Fig. 3b), the transverse division of the mandibles (Fig. 2d), and the obsolete spiracles on abdominal segments II-VIII. *Stenodera* is also distinguished from all members of its subfamily, the Nemognathinae, by features correlated with non- phoretic behaviour (Bologna & Pinto, 2001).

Major characters distinguishing it from other nemognathines include the following: the labrum (Fig. 2d) is free and visible from above rather than fused to the head capsule and turned under the ventral surface. The stemmata (Fig. 2a) are positioned on the dorsal surface of the head capsule, not laterally. The mandibles (Figs 2b, 2d) are directed forward and move in a plane parallel rather than perpendicular to the frontal plane of the head capsule. The ental surface of the mandibles is smooth, lacking prominent toothlike transverse ridges. The antenna (Figs 2d, 3b) has a distinctly conical sensory appendix and the apical seta of antennal segment III is very long (Figs 2a, 2b). The gula of the head capsule (Fig. 2c) is short and poorly sclerotized. The femora are shorter than the tibiae (Fig. 1b), not subequal, and the tibiae taper noticeably to the apex. Also, the abdominal sterna (Fig. 1c) are poorly rather than well sclerotized, and the general body shape (Figs 1a–1c) is short and robust, not fusiform as in other members of the subfamily. Abdominal spiracles (Fig. 3f) positioned on laterotergites, spiracle VIII unmodified as in the tribe Horiini. A comparison of *Stenodera puncticollis* with other genera of Meloidae based on 101 larval characters is given by Bologna & Pinto (2001).

In agreement with Selander (1991), a recent phylogenetic analysis of Meloidae placed *Stenodera* in its own tribe and the genus at the base of the subfamily Nemognathinae (Bologna & Pinto, 2001). The latter study considered the Nemognathinae as the sister group of the Tetraonycinae, and both as sister taxa of the Meloinae. Because *Stenodera* is almost certainly non-phoretic, this

hypothesis assumes the independent evolution of phoresy in the Tetraonycinae and Nemognathinae.

The taxonomic position of *Stenodera* depends on certain derived features suggesting nemognathine affinity, coupled with the generally primitive, non-nemognathine form of the larva as well as the primitive condition of critical adult features. A summary of these characters follows: derived adult traits of *Stenodera* linking it to nemognathines include the serrate ventral margin of the claws, the unarmed aedeagus (Figs 5a–5g) and the reduced styli on the female gonocoxites (Gupta, 1971; Selander, 1991). The relatively slender filiform antennae, the shape of abdominal sternum IX in males (see review in Gupta, 1971), and general body shape also suggest nemognathine affinity. Larval features characteristic of the Nemognathinae are few (Bologna & Pinto 2001) but include reduced labial palpi and the position of the ocular seta relative to the ocular sensory pit. Adult male features generally considered primitive, and which within the Nemognathinae are unique to *Stenodera*, are the incompletely fused gonostyli (Figs 5a–5g), the undivided sternum VIII, and the partially sclerotized tergum IX. All three features also characterize male Meloinae and Tetraonycinae (see Gupta, 1971).

Tribal status for *Stenodera*, although first proposed by Selander (1964, 1991), is not strongly supported by adult characters, and for this reason was not adopted by Bologna (1991). In fact, with the possible exception of one trait (separation of maxillary palpifer from stipes by a well-marked suture), the features used to justify the Stenoderini by Selander (1991), either also characterize the Meloinae (male gonostyli partially fused, sclerotized male tergum IX) or are present in other Nemognathinae (non-lamellate male sternum IX, single row of teeth on claw). It is the first instar larva of *Stenodera*, which suggests tribal status. First of all, as the only known non-phoretic larva of Nemognathinae, it is phenetically distant and immediately separable from all other members of the subfamily (Bologna & Pinto, 2001). Although these features alone, probably primitive for the family, do not argue for tribal status, they are coupled with several unique traits, which if synapomorphic for the genus do present a case for significant hierarchical ranking. Unique larval features of *S. puncticollis* include the occluded and presumably non-functional abdominal spiracles II-VIII (Fig. 3f), the unique shape of the stemma (Fig. 3a), the transverse division of the mandibles (Fig. 2d), and the truncate appendix at the base of antennal segment III (Fig. 3b).

The unique comma-shaped stemma of *Stenodera* larvae is interesting in relation to other meloids and deserves comment. In all first instar larvae of Meloinae, there is only a single stemma on each side of the head and it is circular in shape. In most Nemognathinae there are two stemmata on each side and they also are circular. *Stenodera* and, presumably, *Horia* are the only nemognathines with a single stemma, but only in *Stenodera* is this structure so uniquely shaped. The condition in *Stenodera* possibly represents an intermediate state between one stemma, the universal condition in Meloinae, and two which characterizes virtually all Nemognathinae.

Geographical and ecological distribution. *Stenodera* has a fragmented distribution both in the Palaearctic and in the Transitional Chinese regions (see Palestrini et al., 1987) (see Figs 6–9). It is primarily a Central Asiatic-Mediterranean element (see Vigna Taglianti et al., 1999), with two subranges in isolated areas of East Asia. The genus is longitudinally distributed from the W Balkans (Dalmatia: about 15°W) to the Primor'e Territory (about 147°E); and latitudinally from Moldava and Podolia (about 48°N) to Fukien (about 25°S). The nominate subgenus includes four species: *S. caucasica*, widely distributed from the Balkans to Central Asia (Turkmenistan), *S. oculifera* endemic to the Palestinian area, *S. djakonovi* restricted to the Primor'e Territory (Far East Siberia), and *S. foveicollis* endemic to the Eastern Chiang-hsi and Fukien (South East China). The subgenus *Stenoderina*, with four species (*S. anatolica*, *S. coeruleiceps*, *S. palaestina*, *S. puncticollis*), is restricted to the Middle East.

This disjunct distribution is very uncommon in the Palaearctic fauna and it is more or less paralleled by some late Tertiary relict elements such as the Euchiridae scarab beetles of the genus *Propomacrus* Newman, 1837, or the discoglossid toads of the genus *Bombina* Oken, 1816.

From an ecological point of view, *Stenodera* is a genus primarily associated with steppe (*S. anatolica*, *S. caucasica*, *S. coeruleiceps*) or xeric Mediterranean (*S. oculifera*, *S. palaestina*, *S. punticollis*) habitats, or both (e.g. *S. coeruleiceps* and *S. oculifera*), at least the Balkan and western Asiatic species. No specific information is available on the eastern Asian species. The Primor'e Territory is characterised by a mixture of temperate deciduous forest and grassland, while the Kiang hsi and Fukien regions, are characterised by wet evergreen forests and grassland (Tomaselli, 1981).

Records of altitudinal distribution are very scarce. Some data, based on personal collections or museum material, are available for the following species: (a) *S. caucasica* occurs primarily from 100 to 1400 m a.s.l. in western and central Turkey, with records to 2000 m in the Eastern Provinces. Although detailed elevation data are not available from other areas, records from the Caucasus and Kopet dagh (Iran) indicate an occurrence in montane habitats. (b) *S. puncticollis* is distributed from sea level to 700 m a.s.l. in southern Turkey, and to 2000 m a.s.l. in Lebanon. (c) *S. coeruleiceps* an eurizonal species, commonly occurring in the highlands of central Turkey from 1000 to 1400 m a.s.l., with isolated records to 2000 m in the Eastern Provinces, as well as at sea level in southern Turkey. No detailed records are available for other species, but according to the localities of collections, *S. anatolica* is distributed in the high plateau of Anatolia, whereas *S. oculifera* and *S. palaestina* seem to occur from sea level to middle elevations (ca. 1000 m a.s.l.).

Adult activity and plant preferences. Adults are diurnal, thermophilic and primarily active in spring and early summer. Based on examined material and literature

records, adults are active in the following months: for species of the nominate subgenus - *S. caucasica*: May to June in all areas, with single records in March and April (Israel, Lebanon and southern Turkey) and in July (Turkestan, Turkey); *S. djakonovi*: June; *S. foveicollis*: March; *S. oculifera*: March and April. For species of the subgenus *Stenoderina* - *S. anatolica*: April to May; *S. coeruleiceps*: May and June; *S. palaestina*: February and April; *S. punticollis* April and May.

Regarding host plant species, a few personal and literature records are available. *S. caucasica* was personally (MAB) collected in Turkey on *Carduus* and *Matricaria* (Asteraceae), on *Cardaria* [*C. draba* (L.) Desv.] and *Sinapis* (Brassicaceae), on *Reseda* (Resedaceae), and on *Daucus* (Apiaceae). The same species is also recorded in the literature on *Rubus* (Rosaceae) in Turkey (Bologna, 1979), and on *Syrenia* (*S. ucrainica*) (Brassicaceae) in the Crimea (Medvedev & Levtshinskaja, 1962). *S. punctipollis* was personally (MAB) collected in southern Turkey on yellow Asteraceae of the genus *Crepis*.

Behaviour. Sexual behaviour is important in the higher classification of the Meloidae (Selander 1964). Characters of the subfamily Nemognathinae include a very short courtship, which lacks significant display (as well as sexually dimorphic morphological features correlated with such display), and a dorsally mounted copulatory position. By contrast in the Meloinae courtship generally is prolonged and characterized by overt tactual display. This behaviour is commonly correlated with various structural modifications of the male (see Bologna & Pinto, 2001 for a review). Males of four species of *Stenodera*, representing both subgenera, have modifications that suggest a somewhat complex courtship. In *S. djakonovi* and *S. foveicollis* the first segment of the fore tarsi is ventrally enlarged, rounded and laterally compressed depressed. *S. anatolica* and *S. coeruleiceps* have the same tarsus modified, but it is less enlarged and not compressed, and the first segment of metatarsi is also enlarged. Courtship has never been observed in these species. Brief field observations (MAB) on two *Stenodera* species with unmodified tarsi (*S. caucasica* and *S. punctipollis*) suggest that male courtship is restricted to brief sequences of dorsal courtship as is typical for most Nemognathinae. Copula was not observed, but the presence of an unarmed aedeagus suggest only a dorsal copulation as in other Nemognathinae. The only known cases of male dimorphism in Nemognathinae, other than *Stenodera*, is in primitive genera of the tribe Horiini (*Cissites* Latreille, 1804, *Synhoria* Kolbe, 1897, *Horia* Fabricius, 1787) and in Australian taxa (*Palaestra* Laporte de Castelnau, 1840, *Palaestrida* White, 1846, one undescribed genus).

Antennal cleaning was observed in *S. puncticollis*: the fore legs are used simultaneously to stroke each antenna.

As concerns larval behaviour, data on development are noted in the paragraph "Material and methods". The triungulins, observed in the rearing box, use both legs and pygopod to climb on the box wall and to walk on the ground. Although this behaviour is typical of phoretic larvae, it is known in certain meloine taxa lacking phoresy (Bologna & Pinto, 2001).

KEY TO THE ADULTS OF THE SPECIES OF *STENODERA*

1 Integument not metallic, elytra orange-brown with or without black spots. Species attaining relatively large size (length ca. 7–20 mm) (subg. *Stenodera*) 2
– Integument partially metallic, elytra metallic green or blue. Species not attaining such a large size (length ca. 7–12 mm) (subg. *Stenoderina*) 5
2 Head black with red spot on frons. Pronotum red with two black spots. Elytra uniformly brown. Male genitalia as in Fig. 5d ..... *S. oculifera*
– Head and pronotum uniformly black. Elytra orange-brown with or, rarely, without black spots 3
3 Male segment I of protarsi elongate and cylindrical. Pronotum slightly narrowed anteriorly, with shallow impressions at middle of disk. Humeri rounded. Male genitalia as in Fig. 5a ..... *S. caucasica*
– Male segment I of protarsi ventrally enlarged and curved, laterally compressed and slightly depressed on inner side (Figs 4a–4b). Pronotum greatly narrowed in front, disk with five deep impressions, a large basal transverse impression and four smaller ones arranged in two rows at middle. Humeri prominent 4
4 In lateral view head with mouthparts almost as long as head capsule (ratio ca. 0.9). Pronotum narrower at middle (ratio width/length: ca. 0.80); surface shiny with few, highly dispersed punctures; surface surrounding foveae not depressed. Male genitalia as in Fig. 5c ..... *S. foveicollis*
– In lateral view head with mouthparts distinctly shorter than head capsule (ratio ca. 0.6). Pronotum wider at middle (ratio width/length ca. 0.90), surface subopaque with numerous punctures; foveae positioned in a broad depression. Male genitalia as in Fig. 5b ..... *S. djakonovi*
5 Pronotum uniformly orange. Segment I of male fore tarsi ventrally slightly enlarged and rounded (Figs 4c–4d); segment I of hind tarsi apically slightly enlarged and laterally subcompressed (4e–4f) 6
– Pronotum orange with a large green-blue metallic subrectangular spot, spot extensive in one species where it almost completely covers the surface; segment I of male fore and hind tarsi subcylindrical 7
6 Legs orange, only tarsi black. Head green-blue; antennae black except segment I and base of II orange. Male genitalia as in Fig. 5f ..... *S. coeruleiceps*
– Legs entirely black. Head violet; antennae entirely black. Male genitalia as in Fig. 5e ..... *S. anatolica*
7 Pronotum with metallic spot extending over much of disk, red only on sides. Abdomen with last abdominal segment orange, orange colouration on the penultimate segment restricted to its posterior margin. Elytra olive green. Femora primarily metallic black, but each pair varying somewhat in colouration: middle of profemora spotted red, middle of mesofemora red, metafemora red at base and black at apex ..... *S. palaestina*
– Pronotum with metallic spot restricted to middle of disk. Abdomen with last two abdominal segments orange. Elytra blue green. All femora red with black at base and apex. Male genitalia as in Fig. 5g ..... *S. puncticollis*

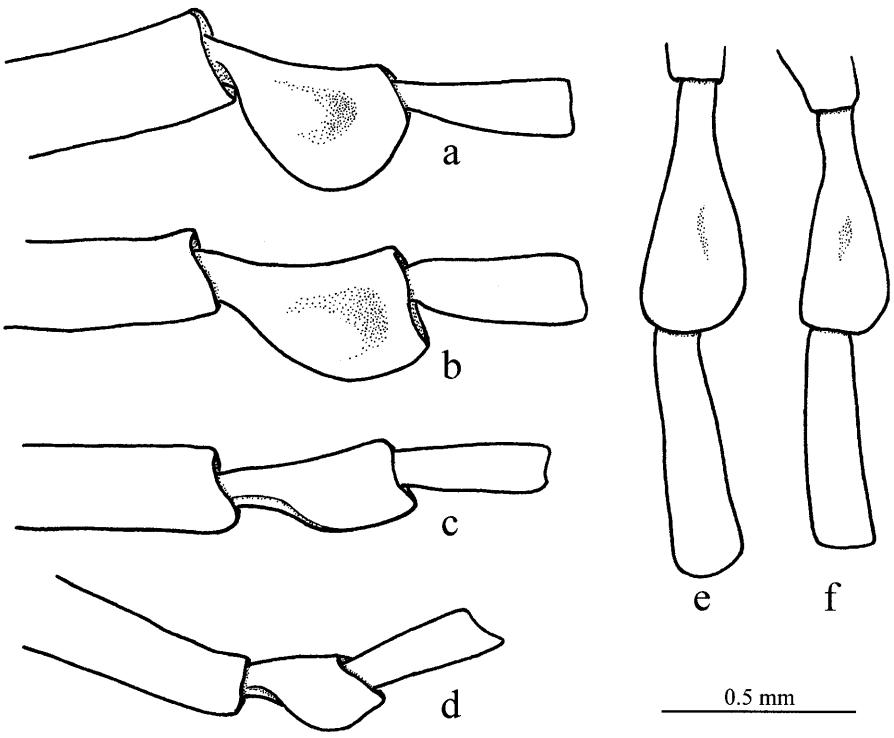

Fig. 4. Segment I of fore tarsi of male of: a – *Stenodera djakonovi*; b – *S. foveicollis*; c – *S. anatolica*; d – *S. coeruleiceps*. Segment I of hind tarsi of male of: e – *S. anatolica*; f – *S. coeruleiceps*.

TAXONOMY AND CATALOGUE

Stenodera Eschscholtz, 1818

Stenodera Eschscholtz, 1818: 469.
Type species. *Mylabris sexpunctata* Eschscholtz, 1818: 469 [= *Meloe caucasica* (Pallas, 1781: 94)], by monotypy.

Subg. *Stenodera* Eschscholtz, 1818

Stenodera Eschscholtz, 1818: 469.
Zonitides Abeille de Perrin, 1880: 253.
Type species. *Zonitides oculifer* Abeille de Perrin, 1880: 253, by monotypy.

Stenodera caucasica (Pallas, 1781)

(Figs 5a, 6)
Meloe caucasica Pallas, 1781: 94.
Mylabris sexmaculata Fabricius, 1794: 120.
Stenodera sexpunctata Eschscholtz, 1818: 469.
Megatrachelus caucasicus: Motschulsky, 1845: 84; Mulsant & Rey, 1858: 189.
Stenodera caucasica: Abeille de Perrin, 1880: 253; Escherich, 1897a: 101; Kaszab, 1956: 36; Aksentjev, 1978: 124.
Stenodera (*Stenodera*) *caucasica*: Mařan, 1942: 18, 20; Bologna, 1991: 444.

Type locality. "In arboretis circa Caucasum".

Type material. Types not examined. One possible syntype of this species, labelled "Zon. caucasica Pall. Rus. mer." is in the historical collections of Berlin Museum., as well as a possible syntype of the synonym *M. sexmaculata* Fabricius, labelled "Sexmaculata n., Mylabris 6-ma. Fab., Zonitis 6-punct. Böb. x, Crimm. Böber".

Distribution (Fig. 6). Hungary: Hungary (Mařan, 1942). The presence of this species in Hungary must be confirmed as the numerous localities cited by Kaszab (1942) are actually in Romania. Croatia: Croatia (Mařan, 1942; Kaszab, 1967; Bologna, 1991, 1994); Dalmatia (Mařan, 1942; Bologna, 1991). Yugoslavia: (Serbia) Serbia (NHP; Mařan, 1942; Kaszab, 1967; Bologna, 1991); Vojvodina (Kuthy, 1896; Conev, 1958); southern Serbia (Mařan, 1942); Beograd (Kosanin, 1904; Mařan, 1942); Pirot (Mařan, 1942); Po □arevac; Kragujevac; Radoševac (Conev, 1958). (Crna Gora): Montenegro (Kaszab, 1967); Podgorica (NHB); Lovčen (Conev, 1958). Albania: Albania (MVE; Kaszab, 1967; Bologna, 1991); Lushnje, Berat (CB; Schatzmayr, 1943). Macedonia: Macedonia (Mařan, 1942; Bologna, 1991); Ohrid (Mařan, 1942; Bologna, 1994). Greece: Greece (Mařan, 1942; Kaszab, 1967; Bologna, 1986, 1991, 1994); (Florina): Pissodéri (BM; Bologna, 1994); (Ipiros) Ipiros (Mařan, 1942; Bologna, 1994); (Ioánnina) Ioánnina (Stierlin, 1861; Bologna, 1994); Polìdoro (CL; Bologna, 1994); (Tríkala): Pindos between Kranéa and Melèa (CG; Bologna, 1994). Bulgaria: Bulgaria (Mařan, 1942; Kaszab, 1967; Bologna, 1991). (Vraca) Vraca (Kantardjeva, 1929); (Samokov) Svoge (Kantardjeva, 1929); (Sofia) Sofia; Lorenzka Planina (German Monastery) (Kantardjeva, 1929); (Kjustendil) Kjustendil (Kantardjeva, 1929); (Stara Zagora) Stara- Zagora; Kazanluk (Kantardjeva, 1929); (Haskovo) Haskovo (Kantardjeva, 1929); (Razgrad) Razgrad (Kantardjeva, 1929); (Kolarovgrad) Kolarovgrad (Kantardjeva, 1929). Generic or unidentified localities: Rumelia (NHP); Külefte Bir (FLCA); southern Bulgaria Kresnensko Defilé (Mařan, 1942). Romania: Romania (Mařan, 1942; Kaszab, 1967; Bologna, 1991, 1994); Transilvania (Seidlitz, 1891; Kaszab, 1967); (Timisoara) Banat (Kaszab, 1967); Bazias; Grebenac (Kaszab, 1942; Toth, 1973); (Cluj) Aiud (Kaszab, 1942; Toth, 1973); (Brasov) Sibiu; Brasov (Kaszab, 1942; Toth, 1973); (Tirgu-Mures) Reghin; Marosvasarhely (Kaszab, 1942; Toth, 1973); (Costanta) Dobrudja (MG, NHB);

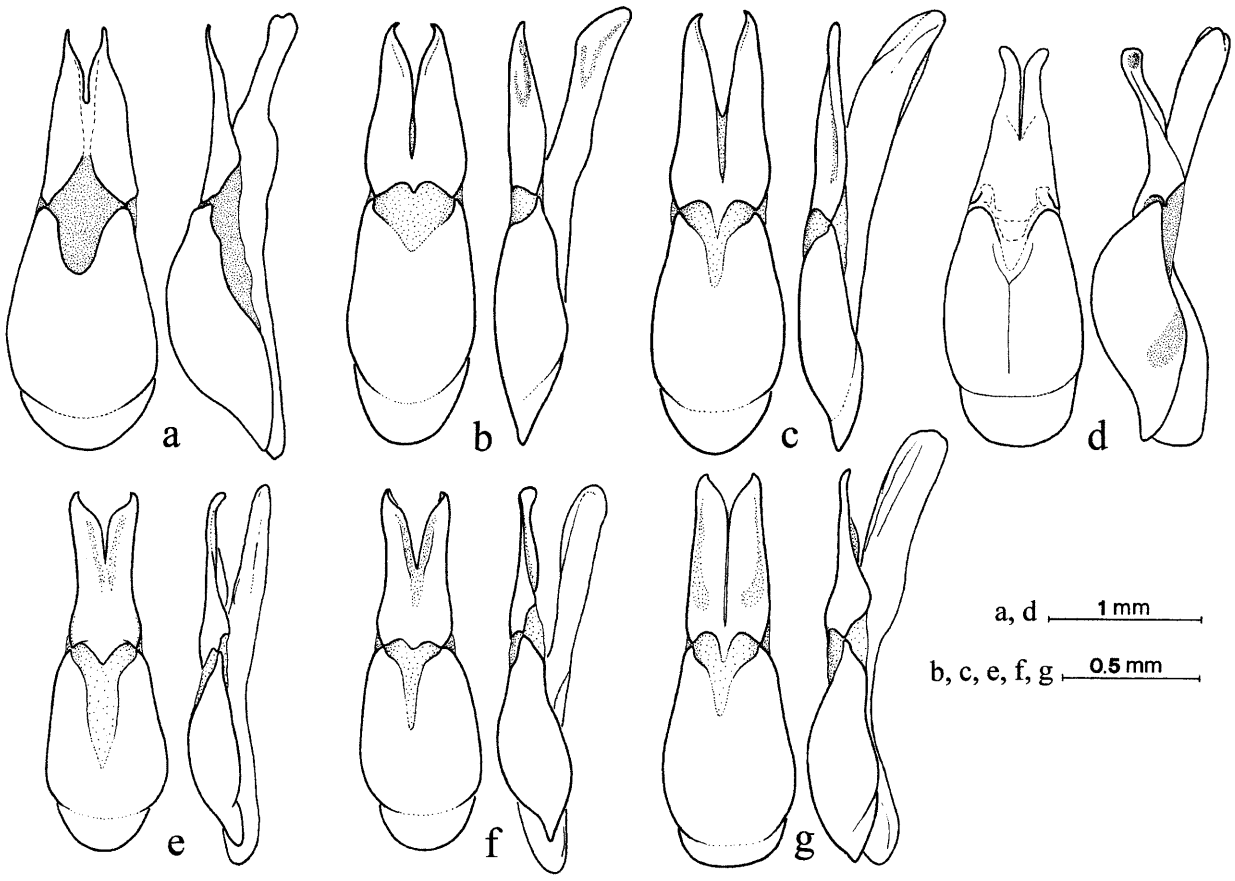

Fig. 5. Ventral and lateral views of male genitalia of: a – *Stenodera caucasica*; b – *S. djakonovi*; c – *S. foveicollis*; d – *S. oculifera*; e – *S. anatolica*; f – *S. coeruleiceps*; g – *S. puncticollis*.

North Dobrodgea (Rosca, 1976); Macin (MP); Mangalia; Iortmac (Negru & Rosca, 1967). Unidentified Rumanian localities cited by Kaszab (1942) and Toth (1973) with Hungarian names: Bethlen (Kis); Deliblat; Discoszentmarton; Duplaj; Hahnenbach (Szeben-m.); Kezd; Koronka; Mezozah; Nagycég; Nagyszeg; Szenterzsébet; Szentgotthard. Moldova: Moldova (Bologna, 1991). Ukraina: Ukraina (Bologna, 1994); Podolia (Bologna, 1991); Crimea (NHB; Bologna, 1991); Sebastopol; Alma; Simferopol; Kerc; Evpatorja and two other localities not found (Levtshinskaja, 1964); left Bank: Peski (Medvedev & Levshinkaja, 1962). Russia: South Russia, east to the Urals (Kaszab, 1956). Southern Russia (MM, MTR; Laporte de Castelnau, 1840; Bologna, 1991, 1994). Rostov (Mařan, 1942). Caucasus (Not detailed): Caucasus and Transcaucasia (Bologna, 1991); Caucasus (FLCA, MG, MST, MZR, NHP; Pallas, 1781; Mulsant & Rey, 1858; Abeille de Perrin, 1880; Escherich, 1891a, 1897a; Mařan, 1942; Kaszab, 1967; Bologna, 1994); Caucasus, Gambor (Mařan, 1942). Georgia: Tbilisi (MVE). Armenia: Armenia (Mařan, 1942). Armenian Caucasus (Mařan, 1942); Araks valley (MST, MVE, MZR; Fleischer, 1921; Mařan, 1942); Erevan (1 NHB); Sevan (Schneider & Leder, 1878). Unidentified Armenian locality: Kasikoporan (Mařan, 1942). Nakhicevan: Dzulfa (Eichler, 1923). Azerbajdzan: Kirovabad (Schneider & Leder, 1878). Turkey: Turkey (Pic, 1909; Bologna, 1979, 1991, 1994). Asia Minor (Escherich, 1897a; Mařan, 1942; Kaszab, 1967). Anatolia (FLCA; Mařan, 1942). (Thrace) Thrace (MTR; Mařan, 1942; Kaszab, 1967); (Bilecik) 7 km S Bilecik (CB); (Kütahya) Simav (CIZ, MZUR; Bologna, 1979); (Ankara) Ankara (MVE; Escherich, 1897a, 1897b; Mařan, 1942); 5–30 km S of Kirikkale (CB); (Cankiri): Cerkes (CS); (Sivas) Vassibel geç. N slope (CB); (Sinop) Dranaz dag (CBR; Bologna, 1979); (Samsun) Kavac (CPR); (Konya) Aksehir (Mařan, 1942); Konya (MP, NHB; Mařan, 1942); (Nevsehir) between Ürgüp and Avanos (CB); (Nidge) Hülük, between Nigde and Yesilmur (CB); Ulukisla (MVE); (Karaman Maras) 10 km S of Karaman (CB); (Erzurum) Pazaryolu-Golyurt geçidi (CS); between Erzurum and Pasinler (CB); (Van) Van (NHB); (Diyarbakir) Kup (Mařan, 1942). (Hakkari): between Yüksekova and Semdinli (Kaszab, 1968). Syria: Syria (Escherich, 1891a, 1897a; Mařan, 1942; Kaszab, 1967; Bologna, 1979, 1991, 1994). Lebanon: Haouchab (FLCA). Israel: (Nazrat) Teverya (Abeille de Perrin, 1880; Mařan, 1942; Bologna, 1991); (Be'er Sheva) Arad junct. 5 Km S Devita (MUH). Palaestine: Palaestine (NHB; Kaszab, 1967; Bologna, 1979, 1991, 1994). Turkmenistan: Turkmenistan (Dokhtouroff, 1889; Bologna, 1991); Kara Kala (Reichardt, 1934); 6 km NW Kara Kala (FLCA), 32 Km East Kara Kala (FLCA); Askhabad (Reichardt, 1934); Gaudan (?) (Reichardt, 1934); Zakaspiiskaja (?) (Reichardt, 1934). These records have been generically indicated also as Soviet Middle Asia (Bologna, 1979) and Turkestan (Bologna, 1994). Iran: Iran (MVE, NHB; Mařan, 1942; Kaszab, 1967; Bologna, 1979, 1994); (Gorgan) Gorgan (Bologna, 1991); Gonbad-kavaous; Gollidagh (Mirzayans, 1970); (Khorasan) Kopet Dagh, Descht (CB; Mařan, 1942; Bologna, 1991); (Luristan) Luristan (Mařan, 1942);

The record from Siberia (Escherich, 1891a, 1897a) probably refers to the Central Asian steppe regions.

Remarks. This species is phenetically very similar to the two eastern Asian species of *Stenodera* (*S. djakonovi*,

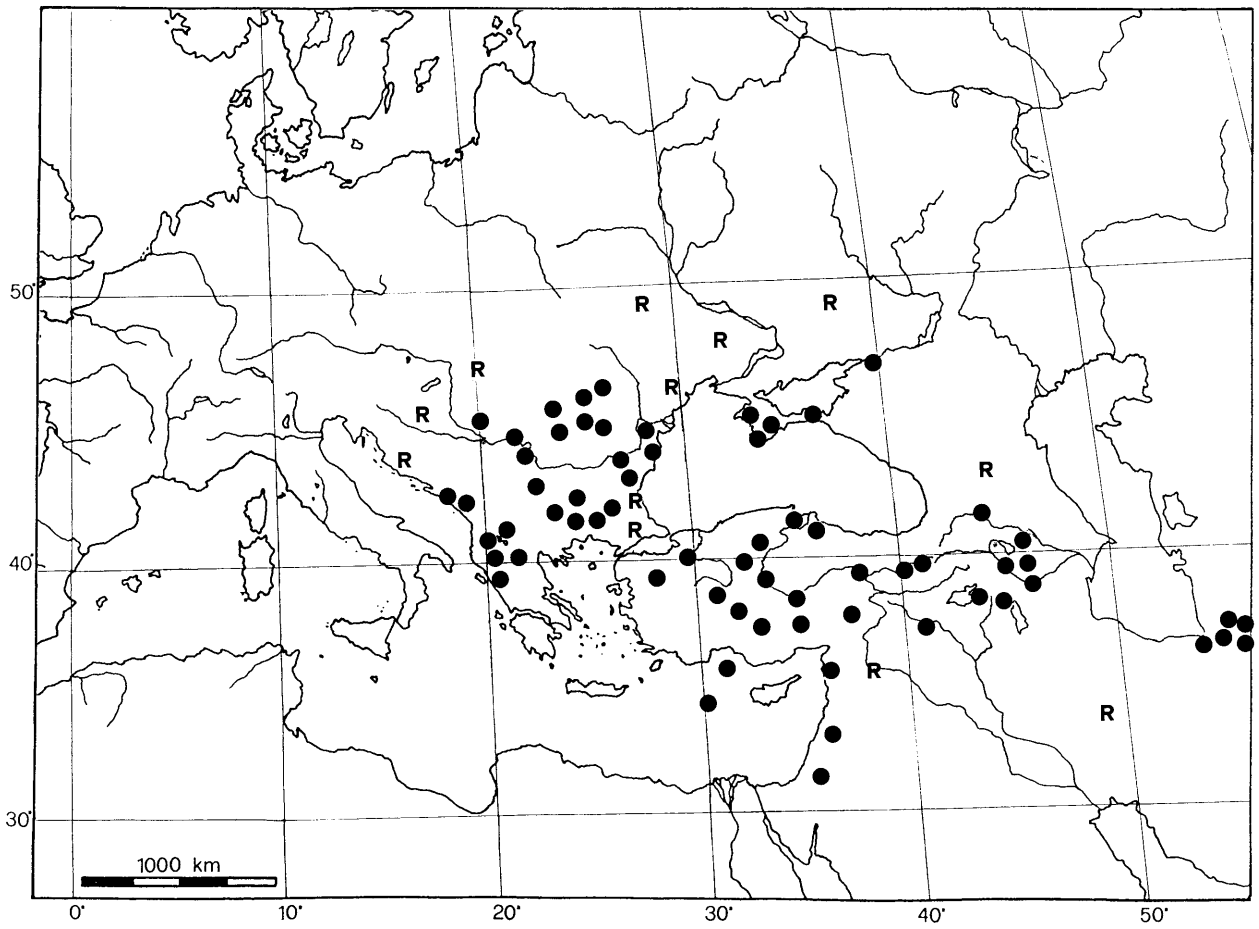

Fig. 6. Distribution of *Stenodera caucasica*.

S. foveicollis). Similarities include the presence of white setation on the inferior part of body, and the anteriorly narrowed pronotum. It differs primarily by the unmodified foretarsi. Elytral colouration is highly variable in this species. It typically is orange brown with 3 black spots (2 anterior and 1 posterior) but these spots can be variously reduced in number and size. Abeille de Perrin (1880), Escherich (1897a), Mařan (1942) and Bologna (1991) described and figured several variations.

Male genitalia are represented in Fig. 5a.

Stenodera djakonovi Aksentjev, 1978

(Figs 4a, 5b, 7)

Stenodera djakonovi Aksentjev, 1978: 124.

Type locality. "Primorskij Kraj, Vinogradovka" (Russia, Primor'e Territory).

Type material. The male Holotype, not examined, is in the Academy of Sciences of Sanct Petersburg.

Distribution (Fig. 7). Russia: (Primor'e Territory) Vinogradovka (Aksentjev, 1978); Bass. Ussuri, Bikin m. Birskoe (NHB).

Remarks. Bologna (1991), following Kaszab (in verbis, 1980), considered this species as a possible synonym of *S. caucasica*. The examination of two specimens (1 male, 1 female, the only material known other than the type) in the NHB collections, supports the distinction of *S. djakonovi* and its inclusion into the nominate subgenus of *Stenodera*.

This species is extremely close to *S. foveicollis* from southeastern China. It is treated as distinct but the small number of specimens examined (2 *S. djakonovi*, 12 *S. foveicollis*), from a single population, do not permit an adequate evaluation of variability. Some characters listed in the key (e.g. shape of head, shape of pronotal foveae, pronotum dimensions) are tentatively used to distinguish these species.

The main differences of *S. djakonovi* vs. *S. foveicollis* can be summarised as follows: (a) head in lateral view shorter (ratio mouthparts/head capsule = 0.60 vs. 0.95); (b) shiny frontal area less extensive, head punctures larger, interpunctal surfaces more opaque; (c) antennae shorter - in female not attaining the first black spot of elytra, and, in male, barely attaining posterior border of black spot (vs. clearly attaining the basal black spot in both sexes); (d) pronotum wider in the middle (ratio width/length = 0.88 vs. 0.78); (e) punctures of pronotum denser with interpunctal surface more opaque due to presence of more numerous micropunctures (vs. punctures sparse and surface shiny); (f) pronotal foveae positioned in a surrounding wide depression (vs. foveae well delimited, not positioned in a wider depression).

Male fore tarsi and genitalia are respectively represented in Fig. 4a and 5b.

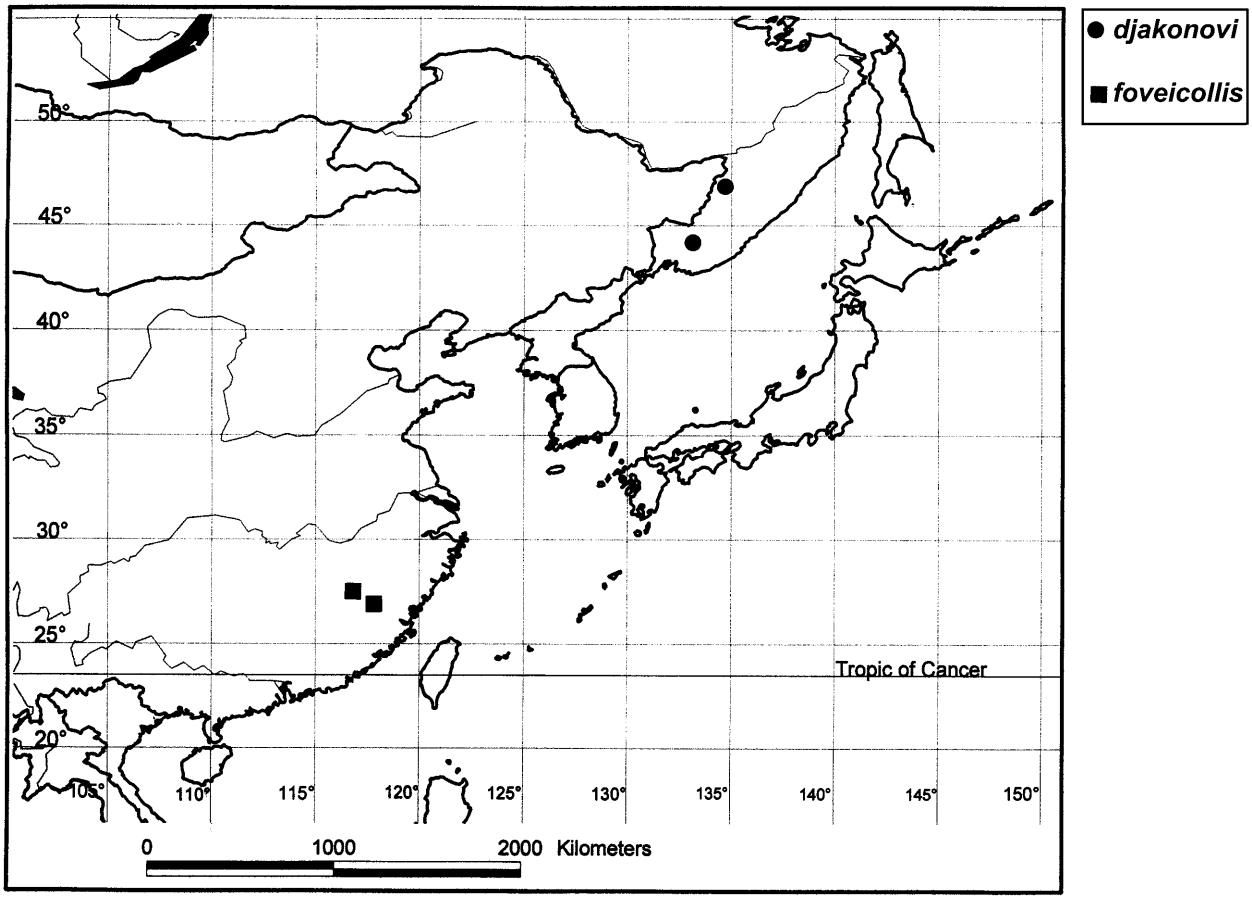

Fig. 7. Distribution of *Stenodera djakonovi* and *S. foveicollis*.

Stenodera foveicollis (Fairmaire, 1897)

(Figs 4b, 5c, 7)

Megatrachelus foveicollis Fairmaire, 1897: 231.

Stenodera (Stenodera) foveicollis: Mařan, 1942: 19, 23.

Type locality. "Kiangsi oriental" (China).

Type material. The Holotype, in the Leiden Museum, was not examined.

Distribution (Fig. 7). China: (Fukien): Shaowu Shuipeichieh (CB, CALAC); Shaowu Yumping (CALAC). (Kiang-hsi): Eastern Kiang-hsi (Fairmaire, 1897; Mařan, 1942).

Remarks. Fairmaire (1897) compared *S. foveicollis* to *S. caucasica*. Mařan (1942) transferred this species from *Megatrachelus* Motschulsky, 1845 to *Stenodera* without examining the type. Bologna (1991) discussed this assignment and proposed its possible inclusion in the genus *Zonitoschema* Péringuey, 1909. The generic and subgeneric assignment proposed by Mařan (1942) is confirmed after examining the Fukien specimens, the only material known other than the type. These additional specimens were collected in a region close to the type locality, and are in complete agreement with the Fairmaire's description. Assignment to *Stenodera*, is supported primarily by the structure of male genitalia (Fig. 5c), last abdominal sternite and maxillary palpi.

As shown by Mařan (1942), this species is distinctly isolated from the primary geographic range of the genus. The recent description of a second eastern and similarly isolated species (*S. djakonovi*, from Primor'e Territory), close to *S. foveicollis*, supports the hypothesis of a relatively recent fragmentation in the range of the genus. The extreme similarity of these two nominal species and their possible conspecificity were previously discussed.

Stenodera oculifera (Abeille de Perrin, 1880)

(Figs 5d, 8)

Zonitides oculifer Abeille de Perrin, 1880: 253; Abeille de Perrin, 1882: CXXV; Marseul, 1882: 171.

Zonitis bipunctata Dejean, 1837: 248 (*nomen nudum*); Chevrolat, 1882: V.

Zonitis Chevrolati Ragusa, 1882: 251.

Stenodera impressicollis Escherich, 1891a: 54; Escherich, 1897a: 102; Mařan, 1942: 19, 23 (not Motschulsky, 1872: 53).

Stenodera oculifer: Escherich, 1897a: 102.

Stenodera (Stenodera) oculifera: Bologna, 1991: 448.

Type locality. "Nazareth, Jaffa, Beyrouth" (Near East).

Type material. Types of this species are preserved in the Abeille de Perrin collection (MP) and were examined. Two possible types of *S. bipunctata* Chevrolat from "Syrie" were examined in the MP collections.

Distribution (Fig. 8). Syria: Syria (MP; NHB; Escherich, 1891a, 1897a); North Syria (MP); Damaskus (Bologna, 1991); Golan (MW; Bologna, 1991). Lebanon: Central Lebanon (Bologna, 1991); Beyrut (MP; Abeille de Perrin, 1880; Bologna, 1991); Saida (MP). Israel: (Haifa) Haifa (NHB); Hebonim (CB, MVR); (Nazrat) Nazrat (NHB; Abeille de Perrin, 1880;

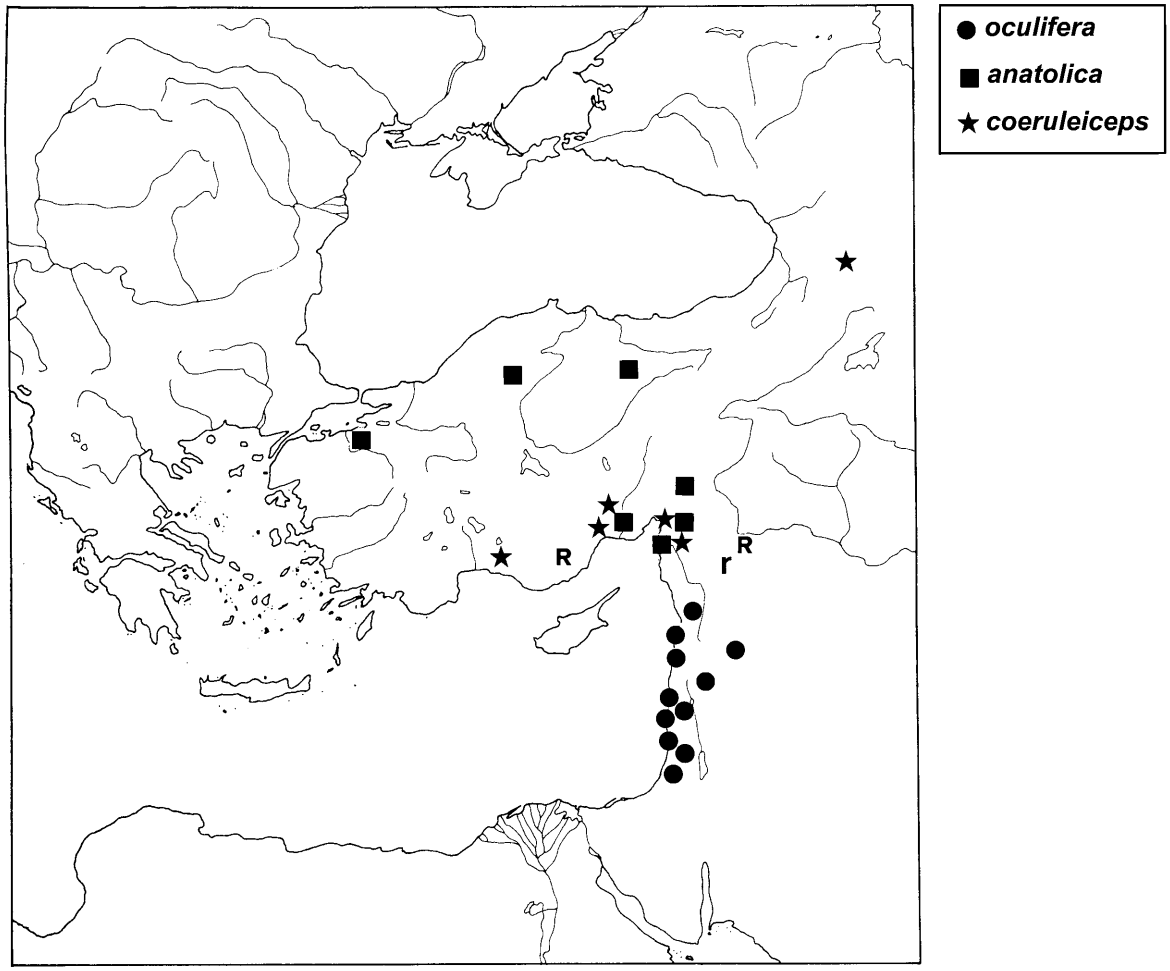

Fig. 8. Distribution of *Stenodera oculifera* ("r" for regional record), *S. anatolica* ("R" for regional records) and *S. coeruleiceps*.

Bologna, 1991); (Tel Aviv) Yafo (MP; Abeille de Perrin, 1880; Bologna, 1991); (Ramla) Ben Shemen (CB); (Yerushalayim) Latrun (MUH); (Be'er Sheva) Beit Neiz (CB, MVR); Nahal Arugot (MUH).

Erroneously recorded from Asia Minor and Sicily by some authors (see Bologna, 1991).

Remarks. This species is phenetically isolated within its subgenus from both *S. caucasica* and the Eastern Asian complex as indicated by the rounded shape of its pronotum, colour of its elytra, and the unmodified tarsi.

The complex synonymy of this species was discussed by Bologna (1988, 1991), who clarified that *S. impressicollis* Motschulsky is a junior synonym of *Zonitis flava* Fabricius, 1775.

Male genitalia are represented in Fig. 5d.

Subg. *Stenoderina* Aksentjev, 1988

Stenoderina Aksentjev, 1988: 579.

Type species. *Zonitis puncticollis* Chevrolat, 1829–1844: 135 by original designation. Aksentjev (1988), pointed out that *Stenoderina* Mařan, 1942: 17 is unavailable because it was proposed without fixation of type species (Selander, 1991).

Two groups of species are recognizable in the subgenus *Stenoderina*: the *S. anatolica* group, and the *S. puncticollis* group. The former, including *S. anatolica* and *S. coeruleiceps*, is characterised by two synapomorphies, the modified fore and hind tarsi. The second group, including *S. puncticollis* and *S. palaestina*, is not cladistically defined, but the two species are quite similar in shape and colouration, and seem to represent a natural group.

Stenodera anatolica (Frivaldszky, 1884)

(Figs 4c, 4e, 5e, 8)

Zonitis anatolica Frivaldszky, 1884: 1; Fairmaire, 1892: 156.

Stenodera (Stenoderina) anatolica: Mařan, 1942: 20, 26.

Type locality. "Asia minore ad Brussam". This locality is presently named Bursa, and it is located in western Turkey.

Type material. Holotypus and 1 Paratypus labelled "Brussa 1846 Frivaldsky" were examined (NHB).

Distribution (Fig. 8). Turkey: Anatolia (Escherich, 1891a). Asia Minor (MP; Escherich, 1897a; Mařan, 1942). (Bursa) Bursa (NHB; Pic, 1912b); (Ankara) Kizilcahaman (CB, MM, NHB); Kizilcahaman Soguksu (NHB); (Tokat) Tokat (MP; Pic, 1912b; Mařan, 1942); (Içel) Cilician Taurus (Escherich, 1897b); Goluk (MP); (Adana) Misis (Kaszab, 1968); (Hatay) Akbès (MP; Fairmaire, 1892; Pic, 1912b; Mařan, 1942); Amanus Mts. (NHB); (Karaman Maras) Zeitoon (FLCA, NHB). Syria: Syria (MP); (Haleb) Ikbis near Akbès (CP).

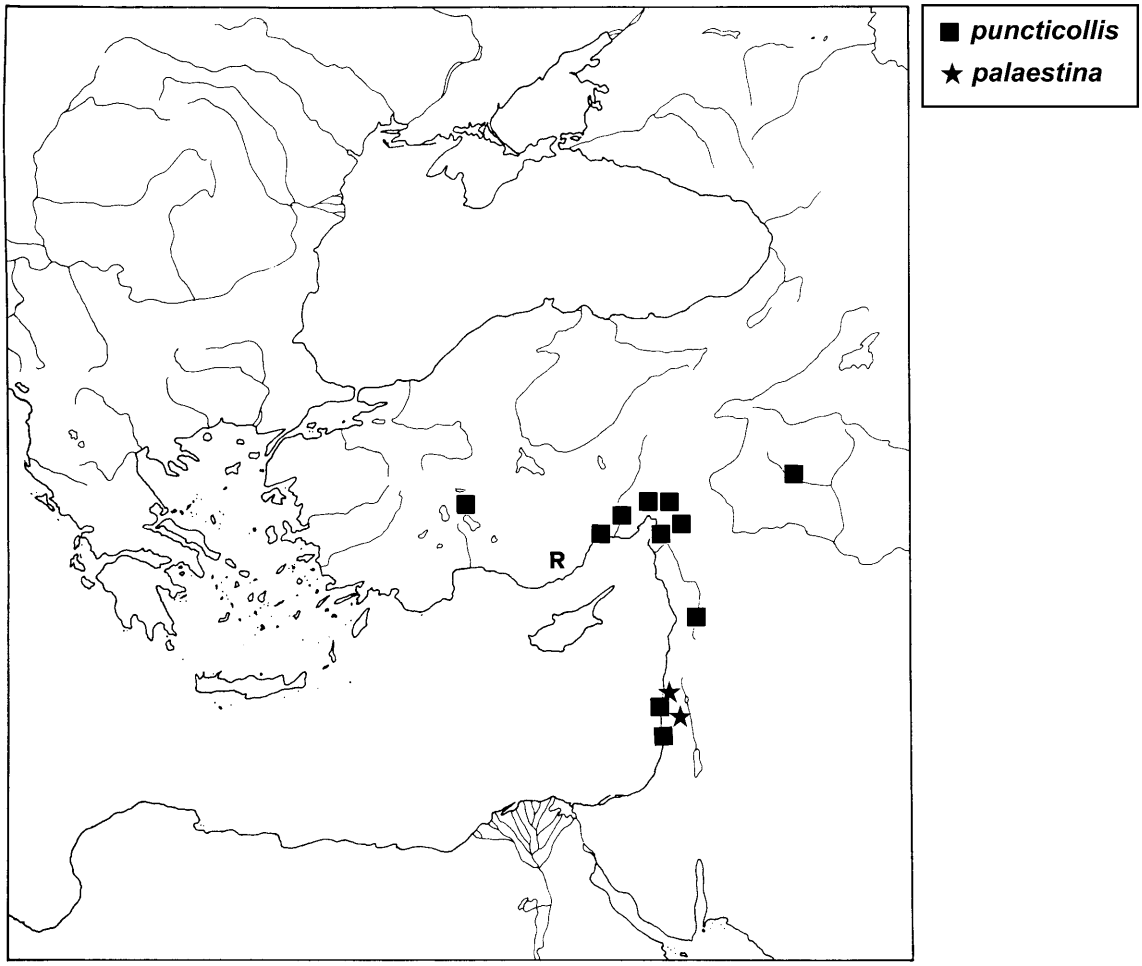

Fig. 9. Distribution of *Stenodera palaestina* and *S. puncticollis* ("R" for regional record).

Remarks. The modified pro- and metatarsi of a male are respectively represented in Figs 4c and 4e; the male genitalia in Fig. 5e.

***Stenodera coeruleiceps* (Fairmaire, 1892)**

(Figs 4d, 4f, 5f, 8)

Zonitis coeruleiceps Fairmaire, 1892: 157.

Stenodera (Stenoderina) coeruleiceps: Mařan, 1942: 20, 25.

Type locality. "Akbès (Syrie)". Akbès is a small village on the eastern slope of the Amanus Mts., presently in the Turkish Hatay province, close to the Syrian border. During the Ottoman Empire this part of southeastern Turkey was a part of Syria. The Antakia region (= Hatay) was included in the Turkish Republic in 1939.

Type material. The Holotype, labelled "Syrie Akbès", preserved in the MP collections, was examined.

Distribution (Fig. 8).Turkey: Asia Minor (MP, NHB). (Kars) Göle (MST); (Antalya) Akseki (CB); (Içel) Tarsus Ciliciensis, Karsanti (Pic, 1912b; Mařan, 1942); Namrun Çamliyayla (CB, MVR); Namrun (NHB; Kaszab, 1968); Gülek (MVR); (Adana) Ali-Hotscha valley, near Pozanti (Bodemeyr, 1900); (Hatay) Amanus Mts.V (MNM); Akbès (MP; Fairmaire, 1892; Escherich, 1897a; Mařan, 1942);

Remarks. The affinities of this species were previously discussed. The modified pro- and metatarsi of the male are respectively represented in Figs 4d and 4f; the male genitalia in Fig. 5f.

Mařan (1942) erroneously indicated that the abdomen of *S. coeruleiceps* is completely orange. In actuality, as in *S. anatolica*, only the last two segments are orange.

***Stenodera palaestina* Mařan, 1942**

(Fig. 9)

Stenodera (Stenoderina) palaestina Mařan, 1942: 19, 25.

Type locality. "Palaestina, Mt. Gilboa". This mountain is on the border between Israel and the Palestinian Territories.

Type material. The male Holotype of this species, labelled "Palaestina, Mt. Gilboa, 10.IV.1925, Petrbok leg.", in the NMP collections, was briefly examined.

Distribution (Fig. 9). Israel: (Haifa) Haifa (NHB); (Nazrat) Mt. Gilboa (NMP; Mařan, 1942). Unidentified Israeli locality: Alonim (NHB).

Remarks. The affinities of this species were previously discussed.

***Stenodera puncticollis* (Chevrolat, 1829)**

(Figs 1–3, 5g, 9)

Zonitis puncticollis Chevrolat, 1829, in Guérin Iconographie du Règne animal: 135.

Stenodera puncticollis Escherich, 1897a: 102.

Stenodera (Stenoderina) puncticollis: Mařan, 1942: 19, 24.

Zonitis abdominalis Laporte de Castelnau, 1840: 276; Beauregard, 1889: CCXII

Type locality. "Caramanie". This old regional name indicates southern Turkey, near Adana and Tarsus.

Type material. Types of this species were not found in the MP collections, which include part of the Chevrolat's collection.

Distribution (Fig. 9). Turkey: Asiatic Turkey (Mulsant & Rey, 1858). Anatolia (MP); Asia minor (Escherich, 1897a; Mařan, 1942); (Konya) Aksehir (NHB); (Içel) Cilician Taurus (CB, MP, MVE; Escherich, 1897a, 1897b; Bologna, 1979); Içel (MP); Tarsus (CS, MP, NHB); near Tarsus (CS); Missis Cilician (NHB); (Adana) Karats (UGX); Adana (FLCA, MP, NHB; Mařan, 1942); 10 km W Osmaniye (CB, CS); Toprakkale (NHB); (Hatay) Islahyie (NHB); 10 Km E Hassa (NHB); Akbès (FLCA, MP, NHB); Amanus Mts. (FLCA); Hatay (MP); (Diyarbakir) Diyarbakir (NHB). Syria: Syria (MP, NHB; Motschulsky, 1872; Escherich, 1897a; Mařan, 1942); Basalth rock 6 km N Galhad (NHB). Lebanon: 5 km W of Harar (CALAC); Bekaa Valley (FLCA; JP). Israel: Haifa (FLCA); Jaffa (NHB).

Remarks. The type of *Zonitis abdominalis* Laporte de Castelnau appears to be lost, but the description (1840) supports the synonymy with *S. puncticollis*.

Beauregard (1889) erroneously inverted the synonymy of *S. puncticollis* and *S. abdominalis*. He considered *S. puncticollis* Chevrolat as a *nomen nudum*, and assumed that Mulsant & Wachanru regularly described *S. puncticollis* in 1852. Actually, this species was described by Chevrolat in 1829, and consequently *S. punticollis* has priority over *S. abdominalis*.

The affinities of this species were previously discussed. Male genitalia are represented in Fig. 5g.

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