Three new species of *Docosia* Winnertz (Diptera: Mycetophilidae) from Kazakhstan

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Three new species from Sogety Mountains and Charyn Canyon (Kazakhstan), viz. *Docosia selini* sp. n., *D. agnesiana* sp. n. and *D. sogetensis* sp. n., are described and detailed illustrations of male terminalia presented. Morphological differences especially in male terminalia are discussed. A key to the Central Asian species of *Docosia* is provided.

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1. Introduction

In his monograph, Winnertz (1863) described a new genus, *Docosia*, to distinguish two species: *D. sciarina* (Meigen, 1830) and *D. valida* Winnertz, 1863. The special review of the genus published by Landrock (1916) includes seven species. Hackman (1988) reported 16 species from the Palaearctic region. Descriptions of ten West-Palaearctic species have been published subsequently by Plassmann (1986, 1996), Chandler (1994), Chandler & Ribeiro (1995) and Chandler & Gatt (2000). In addition, the East-Mediterranean fauna includes at least three undescribed species (P. J. Chandler, pers. comm.). Xu *et al.* (2003) reported seven *Docosia* species from southern and eastern China, six of which were described as new. According to Bechev (2000), there are 15 species known in the Nearctic and two in the Neotropical regions. Only *Docosia gilvipes* (Walker, 1856) occurs in Central Asia (Zaitzev 1994).

The genus was particularly studied in the 1970s and 1980s by Dr. P. Laštovka. Hutson *et al.* (1980) noted that the Palaearctic species were being revised in a forthcoming revision by Dr. Laštovka. Unfortunately the synopsis compiled by Dr. Laštovka comprising over 100 Holarctic species, of which ca. 30 were European, still remains unpublished (Chandler & Ribeiro 1995). After Dr. Laštovka recently deceased Jan Ševčik (pers. comm.) will soon finish Laštovka's revision of *Docosia* species of Czech and Slovak Republics.

Docosia belongs to the tribe Leiini and, as suggested by earlier authors, is most closely related to *Tetragoneura* Winnertz, 1846 (e. g. Edwards 1925). However, *Tetragoneura* together with *Ectrepesthoneura* Enderline, 1911 have tentatively been included in Gnoristini by Väisänen (1986) who treated the tribe at the level of subfamily (i.e. Gnoristinae). Evidently, the higher taxonomy and delimitation of Leiini would still require a detailed analysis.

The species of *Docosia* are up to 5 mm in size, mainly blackish with pale hairs and of uniform appearance typical of Leiini. External characters are variable but lateral ocelli are very close to eye margins. All known species are characterized by having male cerci with combs of retinacula. Leg colour especially that of coxae, bristling of laterotergite, and whether vein Sc ends free or in

Fig. 1. Collecting localities. – a. Sogety Mountains. – b. Charyn Canyon.

R allow intrageneric grouping. Nevertheless, study of male terminalia is necessary for determination of the species.

Not much is known about the biology of *Docosia*, but *D. sciarina* and *D. gilvipes* are mycetophagous (Winnertz 1863, Yakovlev 1994), while the latter has also been found in a nest of *Microtus* (Hutson *et al.* 1980). *D. fumosa* Edwards, 1925 has been reared from the nests of various birds (*op. cit.*). According to Landrock (1916), they are common, sometimes numerous, in forest habitats in early spring and late autumn.

In 2004, Mr. Allan Selin (Tallinn, Estonia) sent me Nematocera material picked out from light-trap samples he had collected in Kazakhstan in 2003. The primary aim of the expedition was to collect moths, but besides Lepidoptera a comprehensive material of many other insect groups was collected. *Docosia* specimens were well represented in the small amount of Sciaroids; these catches resulted in this communication. However, light trapping is not an efficient method for collecting fungus gnats, as it works selectively. The finding of *Docosia* specimens in that material was unexpected, as only *D. moravica* Landrock has so far been light-trapped in the boreal region of Sweden (Plassmann 1980).

2. Material and methods

The material, consisting of 20 male specimens, was collected using light traps that operated in the Sogety Mountains (Fig. 1a) and at Charyn Canyon (Fig. 1b) east of Alma-Ata, Kazakhstan. Both localities are at an altitude of 1080 m, with habitat of temperate steppe regime mountains. Along the river banks of Charyn Canyon, there is a narrow zone of deciduous trees with a moderate proportion of decaying wood.

The specimens are dry-pinned on micropins. For all specimens, the terminalia were detached and heated in a solution of KOH, followed by neutralization in acetic acid and washing in distilled water. The terminalia were placed into glycerine for detailed study and later preserved as glycerine preparations in small vials on the same pin as the rest of the body. The morphological terminology used follows that of Søli (1997). All measurements are given as the range of measured specimens, followed by the mean value when at least five specimens were measured. The measurements from holotype are given in square brackets.

All holotypes and part of the paratypes are deposited in IZBE – Instutute of Agricultural and Enviromental Sciences, Estonian Agricultural University, Tartu, Estonia [former Institute of Zoology and Botany]. Nearly half of the paratypes are deposited in A. Selin's personal collection (Tallinn, Estonia), indicated "Coll. Selin".

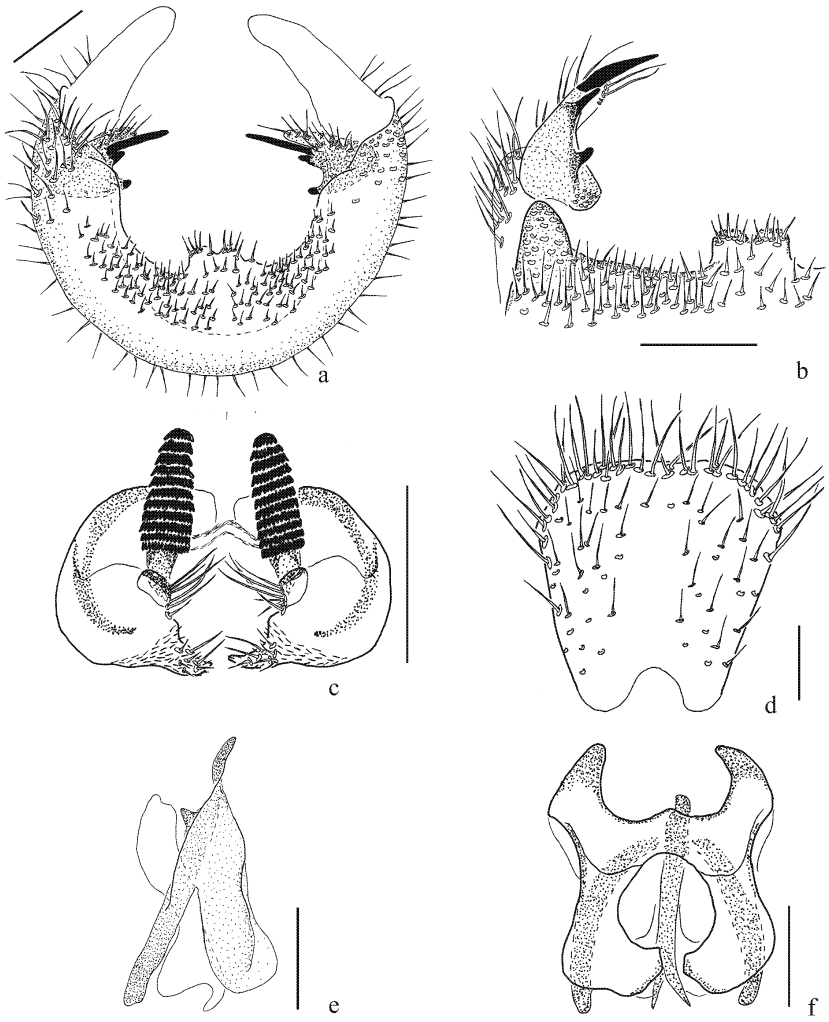

Fig. 2. Male terminalia of *Docosia selini* sp. n. – a. Posterior view of gonocoxites and gonostyli. – b. Ventral view of gonocoxal margin and gonostylus. – c. Cerci. – d. Dorsal view of tergite 9. – e. Lateral view of aedeagal complex. – f. Ventral view of aedeagal complex. Scale bars 0.1 mm.

3. The systematics

3.1. *Docosia selini* sp. n. (Fig. 2)

Type material. Holotype ♂, Charyn Canyon, 43°17'56.3'' N 78°58'42.7'' E, 1080 m a.s.l., A. Selin leg. 18.V.2003 [IZBE]. Paratypes. 2 ♂♂, same as holotype; 1 ♂, Charyn Valley, 43°17'56.4'' N 78°58'42.6'' E, 1080 m a.s.l., A. Pototski & U. Jürivete leg. 18.V.2003. 5 ♂♂, Sogety Mts., 43°29'55.8'' N 78°37'10.3'' E, 1080 m a.s.l., A. Selin leg. 13.V.2003; 2 ♂♂, Sogety Mts., 43°29'55.8'' N 78°37'10.3'' E, 1080 m a.s.l., A. Selin leg. 20.V.2003. [4 paratypes in IZBE, 6 paratypes in "Coll. Selin"].

Description. Male (n = 5, except where otherwise stated). Wing length 3.04–3.46, 3.22 [3.46] mm (n = 10).

Head black with numerous pale setae. Three ocelli, with laterals close to eye margins. Clypeus blackish, with setae pale. Mouthparts light brownish. Palpus with first segment brownish, second yellow and others pale yellow. Scape black, pedicel apically yellowish, first flagellomere yellow, successive segments brown. Flagellum with short pale setae. Flagellomeres cylindrical, median flagellomeres about twice as long as broad, apical flagellomere elongated, 2.78–3.38, 3.12 [3.38] times as long as broad.

Thorax brownish black to black. All bristles and setae yellowish white. Scutum grey dusted. Scutellum with marginal bristles including no

distinct pairs and with numerous setae. Antepronotum and proepisternum with bristles and setae. Upper part of antepronotum with strong bristle crossing the head. Laterotergite and other pleural parts bare. Halteres pale yellow.

Legs. Coxae and femora yellow. Tibiae and basitarsi brownish, successive tarsal segments brown. Mid tibia with 4–5 a, 1 ad (at apical margin), 6 d and 5 pd. Hind tibia with 17–18 a, 18 d, and 1 ad and av (both near apical margin). Ratio of femur to tibia for fore, mid and hind legs: 1.17–1.34, 1.26 [1.17]; 1.00–1.07, 1.05 [1.05]; 0.74–0.86, 0.81 [0.81]. Ratio of tibia to basitarsus for fore, mid and hind legs: 1.04–1.33, 1.20 [1.15]; 1.37–1.48, 1.43 [1.37]; 1.77–2.07, 1.89 [1.77].

Wings hyaline. Radial veins and r-m brown, other veins paler while m-stem and medial fork basally very faint. Sc, R_4, bM-Cu, m-stem, basal half of cu-stem, basal third of A_1 asetose, other veins setose. Costa reaches 0.33–0.44, 0.39 [0.44] from R_5 to M_1. Sc distinctly ends in R, a little before the level of beginning of m-stem. Anterior fork begins at level of R_4. Posterior fork begins before anterior fork at level of middle of r-m. R1 2.19–2.80, 2.47 [2.19] times as long as r-m, which is as long as m-stem.

Abdomen entirely black with pale setae. Terminalia (Fig. 2) brown except lighter gonostyli. Tergite 9 widening apically. Gonocoxite with ventromedial process, which has an apical depression. Gonostylus with long black subapical spine, about half gonostylus length, and with two much shorter black subapical and subbasal spines. Cerci with 11 combs of retinacula.

Female. Unknown.

Biology. Unknown.

Etymology. The species is named after Mr. Allan Selin, collector of most of the material dealt with in the present paper: genitive form

Notes. The gonostylus of the new species resembles that of *D. nigra* and *D. agnesiana*, except that it has an additional black subapical spine. *D. selini* differs remarkably in the distal ventral margin of the gonocoxites which has a tapered process in *D. nigra* and a flange in *D. agnesiana* (see also discussion under *D. agnesiana*).

3.2. *Docosia agnesiana* sp. n. (Fig. 3)

Type material. Holotype ♂, Sogety Mts., 43°29'55.8'' N 78°37'10.3'' E, 1080 m a.s.l., A. Selin leg. 13.V.2003 [IZBE]. Paratypes. 4 ♂♂, same as holotype; 1 ♂, Sogety Mts., 43°29'56.2'' N 78°37'10.2'' E, 1080 m a.s.l., A. Selin leg. 13.V.2003; 1 ♂, Sogety Mts., 43°29'55.8'' N 78°37'10.3'' E, 1080 m a.s.l., A. Selin leg. 20.V.2003. [2 paratypes in IZBE, 4 paratypes in "Coll. Selin"].

Description. Male ($n = 5$, except where otherwise stated). Length of wing 2.68–3.25, 3.02 [3.25] mm ($n = 7$).

Head black with numerous pale setae. Three ocelli, with laterals close to eye margins. Clypeus blackish, with setae pale. Mouthparts brownish. Palpus with first segment brownish, second slightly lighter and others yellow. Antenna brown with yellowish hairs not longer than half a segment's width. Flagellomeres cylindrical, median flagellomeres about 1.5 times as long as broad, apical flagellomere slightly conical, 2.38–2.71, 2.59 [2.70] times as long as broad basally.

Thorax entirely black. All bristles and setae yellowish white. Scutum grey dusted. Scutellum with one pair of strong and several much weaker bristles along posterior margin, and with numerous setae. Antepronotum with one strong bristle on upper part crossing the head, and with several weaker bristles and setae. Proepisternum with bristles and setae, laterotergite with setae, other pleural parts bare. Halteres pale yellow.

Legs mainly yellow. Fore coxa somewhat darkened basally, while mid and hind coxae are distinctly brownish basally. Hind femur somewhat darkened apically. All basitarsi yellow, slightly darkened apically, all other tarsal segments brown. Mid tibia with 6–8 a, 1 ad (at apical margin), 4–5 d. Hind tibia with 12–14 a and 14–19 d. Ratio of femur to tibia for fore, mid and hind legs: 1.15–1.47, 1.28 [1.29]; 1.10–1.22, 1.14 [1.10]; 0.77–0.87, 0.82 [0.83]. Ratio of tibia to basitarsus for fore, mid and hind legs: 1.30–1.50, 1.41 [1.50]; 1.35–1.51, 1.43 [1.46]; 1.66–1.90, 1.78 [1.70].

Wings hyaline. Radial veins and r-m brown, other veins paler while m-stem and medial fork are basally very faint. Sc, R4, bM-Cu, m-stem, basal third of cu-stem, basal half of A1 asetose,

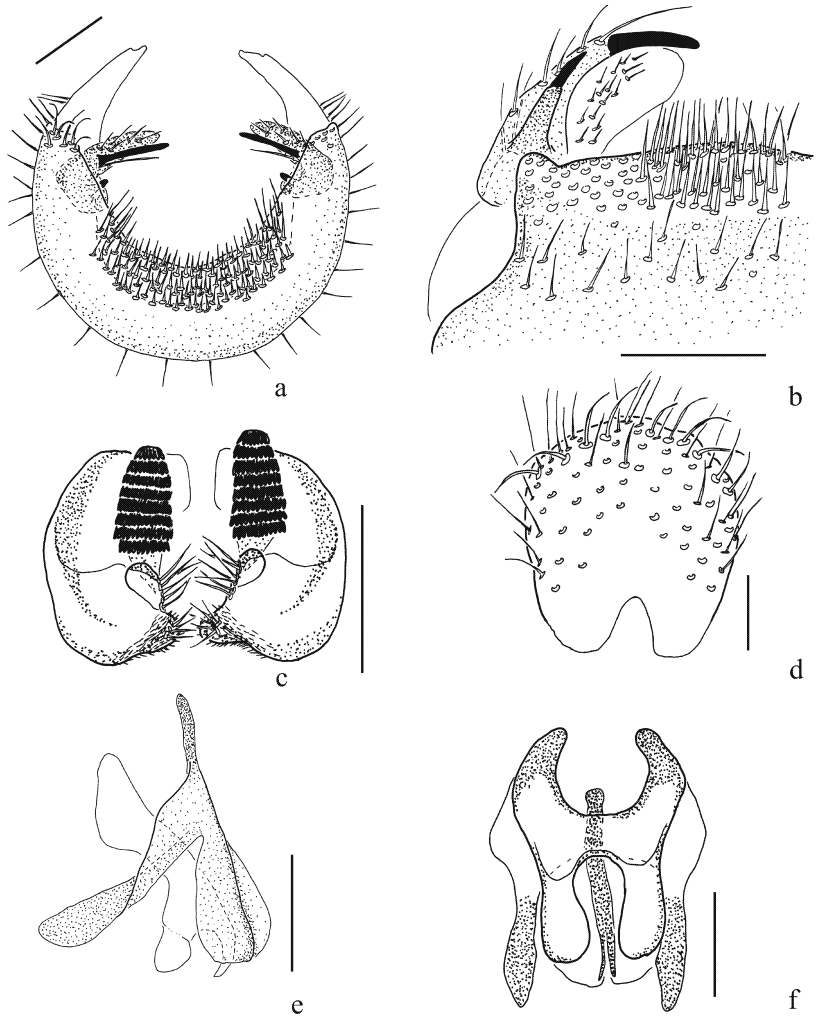

Fig. 3. Male terminalia of *Docosia agnesiana* sp. n. – a. Posterior view of gonocoxites and gonostyli. – b. Ventral view of gonocoxal margin and gonostylus. – c. Cerci. – d. Dorsal view of tergite 9. – e. Lateral view of aedeagal complex. – f. Ventral view of aedeagal complex. Scale bars 0.1 mm.

other veins setose. Costa reaches quarter distance from R_5 to M_1. Sc distinctly ends in R, at level of beginning of m-stem. Anterior fork begins at level of middle of r-m. Posterior fork begins a little before anterior fork. R1 2.08–2.67, 2.46 [2.08] times as long as r-m, which is 1.13–1.61, 1.42 [1.57] times as long as m-stem.

Abdomen entirely black. Terminalia (Fig. 3) brown except yellow gonostyli. Tergite 9 rounded apically. Gonocoxites ventrally with somewhat emarginated distal flange which bears numerous short, strong setae. Gonostylus apically rounded, with subapical black long spine about one third of gonostylus length, and with subbasal additional lobe bearing short black spine. Cerci with 8 combs of retinacula.

Female. Unknown.

Biology. Unknown.

Etymology. According to the collector's wish, the species is named in honour of his wife Agnes to appreciate her understanding attitude toward several long-time collecting expeditions around the world: adjective.

Notes. The terminalia of the new species resemble *D. nigra* Landrock, 1928, while they have very similar structure of the gonostyli [for *D. nigra* see Landrock (1928): figure 3, and Zaitzev (1994): plate 81, figure 10]. However, *D. nigra* has laterotergite bare, gonocoxites with tapered ventromedial process and cerci with 10 combs of retinacula.

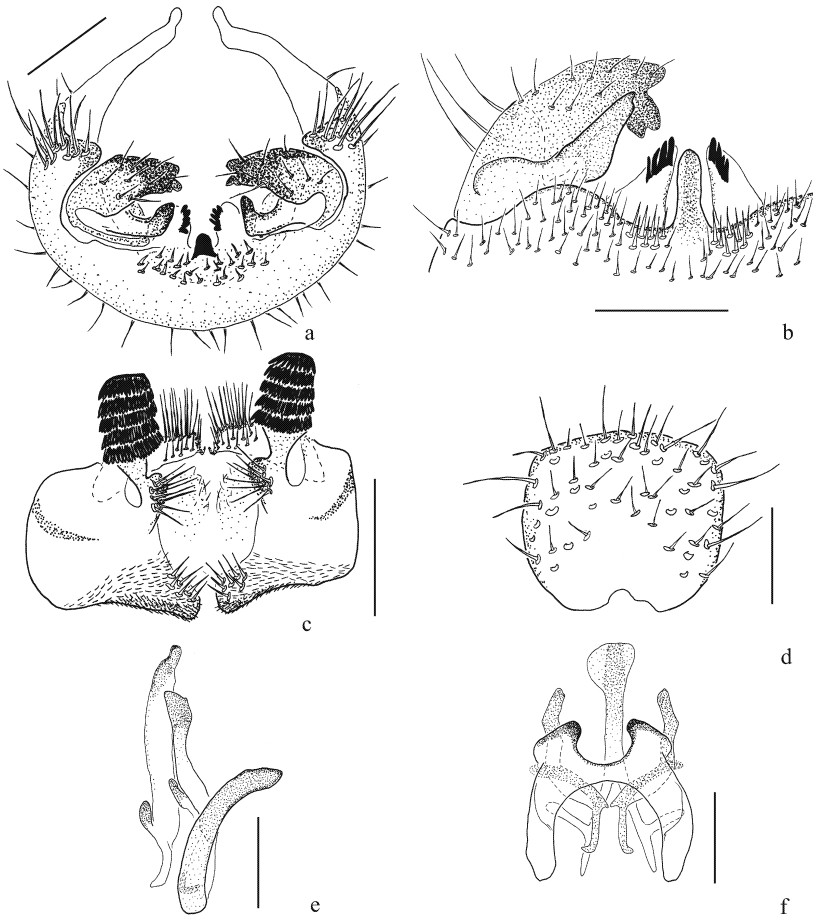

Fig. 4. Male terminalia of *Docosia sogetensis* sp. n. – a. Posterior view of gonocoxites and gonostyli. – b. Ventral view of gonocoxal margin and gonostylus. – c. cerci. – d. Dorsal view of tergite 9. – e. Lateral view of aedeagal complex. – f. Ventral view of aedeagal complex. Scale bars 0.1 mm.

3.3. *Docosia sogetensis* sp. n. (Fig. 4)

Type material. Holotype ♂, Sogety Mts., 43°29'55.8''N 78°37'10.3''E, alt. 1,080 m, A. Selin leg. 13. V. 2003 [IZBE]; Paratype. ♂, as holotype except 20. V. 2003 ["Coll. Selin"].

Description. Male (n = 2). Wing length 2.73–2.86 [2.86] mm.

Head black with numerous pale setae. Three ocelli, with laterals close to eye margins. Clypeus blackish, with setae pale. Mouthparts yellowish-brown. Palpus coloured as mouthparts, except apical segment lighter. Antenna brown with short yellowish setae. Flagellomeres cylindrical, median flagellomeres about 1.8 times as long as broad, apical flagellomere slightly elongated, two times as long as broad.

Thorax entirely black. All bristles and setae yellowish white. Scutum grey dusted. Scutellum with one pair of strong and several much weaker marginal bristles, and with numerous setae. Antepronotum with one strong bristle on upper part, across the head and with several much weaker bristles and setae. Proepisternum with bristles and setae, laterotergite with setae, other pleural parts bare. Halteres yellow.

Legs. All coxae blackish brown, only mid coxa slightly lighter apically. Femora yellow with underside somewhat darkened and hind femur brownish apically. Tibiae and spurs yellow. Tarsi brown with basitarsi yellowish basally. Mid tibia with 5 a, 5 d, 3 p (at apical margin), 5 pv. Hind tibia with 13 a, 16 d and 4 av. Ratio of femur to tibia for fore, mid and hind legs: 1.24–1.35 [1.35]; 1.11–1.32 [1.32]; 0.81–0.87 [0.81]. Ratio of tibia to first tarsomere for fore, mid and hind legs: 1.36 [1.36]; 1.22–1.44 [1.22]; 1.74–1.77 [1.74].

Wings hyaline. Radial veins brown, r-m somewhat lighter, other veins paler. Sc, R_4, bM-Cu, m-stem, basal third of cu-stem bare, other veins setose. Costa reaches a quarter distance from R5 to M1. Sc distinctly ends in R, at level of beginning of apical third of bM-Cu. Anterior fork begins at level of R_4. Posterior fork begins opposite level of anterior fork. R_1 2.64–2.95 [2.95] times as long as r-m, which is equal to length of m-stem.

Abdomen entirely black. Terminalia (Fig. 4) mainly brownish. Distal margin of gonocoxites ventrally wavy, with sclerotized finger-like median process and yellowish lateral processes bearing four spines. Gonostylus bifid, narrower ventral lobe yellowish while wider dorsal lobe is brownish and with three-pronged sclerotized apex. Tergite 9 about as long as wide, slightly angular apically. Cerci with 5 combs of retinacula.

Female. Unknown.

Biology. Unknown.

Etymology. The name refers to the occurrence of the species in the Sogety Mountains: adjective.

Notes. The new species resembles *D. lastovkai* Chandler, 1994 and *D. melita* Chandler & Gatt, 2000 in the bifid gonostylus. The dorsal lobe of the gonostylus is apically rounded in the described species while it is apically three-pronged in *D. sogetensis* [see Chandler (1994): figure 84 for *D. lastovkai* and Chandler & Gatt (2000): figure 8 for *D. melita*]. The male cerci are with 5 combs of retinacula in *D. sogetensis*, while they are with 6 and 8 combs in *D. lastovkai* and *D. melita*, respectively. The new species has three processes on the distal margin of the gonocoxites ventrally, while other species have only lateral processes.

3.4. Key to males of *Docosia* species known in Central Asia

1. Sc setose and ending free; terminalia as figured by Hutson et al. (1980: figure 278) and Zaitzev (1994: plate 81, figure 2) *D. gilvipes* (Haliday)
– Sc bare, ending in R_1 2
2. Laterotergite setose; coxae blackish brown; terminalia as in Fig. 4a–f *D. sogetensis* sp. n.
– Laterotergite bare; coxae yellow or only slightly darkened basally 3
3. Terminalia as in Fig. 2a–f; gonocoxites with ventromedial apically depressed projection; gonostylus with three spines; cerci with 11 combs *D. selini* sp. n.
– Terminalia as in Fig. 3a–f; gonocoxites without ventromedial projection but flange bearing short strong setae; gonostylus with two spines; cerci with 8 combs *D. agnesiana* sp. n.

Acknowledgements. I thank Mr. Allan Selin (Tallinn, Estonia) for putting the material of Nematocera he collected in Kazakhstan at my disposal, and Jan Sevcik (Opava, Czech Republic) for loan of *D. nigra* material. I also thank Peter Chandler (Melksham, United Kingdom), who allowed me to take a look at his review (with Dimitar Bechev and Norbert Caspers) of the East Mediterranean fungus gnats prior to publication, and for critical perusal of the manuscript. The study was financially supported by Grant 4990 of the Estonian Science Foundation.

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