



## The flat-footed fly genus *Seri* Kessel & Kessel (Diptera: Platypezidae)

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### Abstract

Systematic information on the rarely collected Holarctic platypezid genus *Seri* Kessel & Kessel is reviewed. Two species are included, *S. obscuripennis* (Oldenberg) from the Palaearctic Region and *S. dymka* (Kessel) from the Nearctic Region. The two species are diagnosed and the male of *S. dymka* is described for the first time. New records of *S. dymka*, previously recorded only from western North America, indicate that the species has a transcontinental distribution. The phylogenetic position and generic status of *Seri* is discussed.

**Key words:** Platypezidae, Platypezinae, *Seri*, Nearctic, Palaearctic

### Introduction

The flat-footed fly genus *Seri* was erected by Kessel & Kessel (1966) to include one rarely collected species, *S. dymka*, described earlier (in *Clythia* Meigen) by Kessel (1961) from western North America. Subsequently Chandler (1974) assigned the poorly known Palaearctic species *Clythia* (= *Platypeza*) *obscuripennis* Oldenberg to *Seri* based primarily on similarities in wing venation. Not much more has subsequently been published on the genus, although Chandler (2001) redescribed *Seri* based on *S. obscuripennis* and illustrated the male genitalia of that species (also illustrated in Chandler & Shatalkin 1998).

Additional Nearctic specimens of *Seri* have now been studied, including the first known male of *S. dymka*. The purpose of this paper is to report on these specimens, describe the male of *S. dymka*, diagnose the included species and evaluate the status of the genus.

### Material and methods

This study is based on material borrowed from or deposited in the following institutions and collections: California Academy of Sciences, San Francisco, CA, USA (CAS); Canadian National Collection of Insects, Ottawa, ON, Canada (CNC); Cornell University Insect Collection, Ithaca, NY, USA (CUIC); University of Guelph Insect Collection, Guelph, ON, Canada (DEBU); private collection of P.J. Chandler, Melksham, United Kingdom (PJC).

Morphological terminology for adult structures primarily follows McAlpine (1981) and Cumming and Wood (2009), except for the antenna and wing venation where the terms of Stuckenberg (1999) and Saigusa (2006) are used respectively. In the system outlined by Saigusa (2006), the dipteran wing vein  $A_1$  (as used in McAlpine 1981) is homologized with the mecopteran  $CuP$ , and consequently  $CuA_1$  (of McAlpine) is termed  $M_4$ , whereas  $CuA_2$  is  $CuA$ , the anal cell is cell  $cua$  and the anal vein ( $CuA_2+A_1$ ) is  $CuA+CuP$ . The wing vein homologies as they relate to Platypezidae are shown in Figure 3.

Specimen photographs were taken using a Canon EOS 40D Digital SLR camera with an MP-E 65mm 1–5x macro lens mounted on a Kaiser RS1 copy stand. The male genitalic figure was prepared after macerating the ter-

minalia in 85% lactic acid heated in a microwave oven, and tracing the genitalia in glycerine using a camera lucida attached to a compound microscope. The genitalic figure is oriented with the anatomically dorsal parts directed towards the top of the page and the anatomically ventral parts directed towards the bottom of the page, following the platypezid figures in Sinclair and Cumming (2006, figs. 355–357).

## Systematics

### Genus *Seri* Kessel & Kessel

*Seri* Kessel & Kessel, 1966: 98. Type species: *Clythia dymka* Kessel 1961 [Nearctic], by original designation.

**Included species.** *Seri* currently includes *S. dymka* (Kessel) and *S. obscuripennis* (Oldenberg).

**Diagnosis.** *Seri* is distinguished from other platypezid genera by the following combination of characters: relatively small flies 3–4 mm in length with body (Figs. 1, 2) uniformly colored grey to black (male darker than female), without abdominal markings in female; head with parafacial bare, frons bearing long frontal setae in male (short setae in female); antenna with scape bare, pedicel with circle of preapical setae extended less than half length of postpedicel, postpedicel small and ovate, arista apical; thorax lacking acrostichal setae, with 3 notopleural setae; wing (Fig. 3) tinted brown in male and lighter greyish brown in female, covered with conspicuous microtrichia, crossvein dm-m less than or subequal to its own length from wing margin, vein  $M_{1+2}$  branched with furcation nearer to crossvein dm-m than to wing margin, cell cua about equal in length to apical section of anal vein (CuA+CuP); legs with mid tibia bearing one apical spur (lacking anteroventral spur); female hind tarsus with soles on anteroventral surface of tarsomeres 3 and 4, tarsomeres 1–3 broad, tarsomere 2 distinctly narrowed ventrally, tarsomere 3 longest; female abdomen with terminalia short, mostly retracted into segment 7, sternite 7 with one or two pairs of strong erect setae; hypopygium of male (Fig. 4) with epandrium terminating in short blunt surstylus, hypandrium with paired elongate ventrally curved apical processes, phallapodeme keel-like, postgonite absent, phallus slender and elongate, sperm pump large and sclerotized with small ejaculatory apodeme.

**Distribution.** The genus is known from the Palaearctic (*S. obscuripennis*) and Nearctic (*S. dymka*) Regions.

**Remarks.** Adult specimens of *Seri* are most easily recognized by their tinted wings, which are conspicuously covered with microtrichia unlike many other platypezids that have clear glassier wings. The venation is also distinctive in that the furcation of  $M_{1+2}$  is nearer to crossvein dm-m than to the wing margin, rather than the more common condition of having the furcation nearer to the wing margin.

According to Chandler (2001) *Seri* is most similar to the monotypic Palaearctic genus *Bolopus* Enderlein and is also similar to the small Holarctic/Oriental genus *Polyporivora* Kessel & Maggioncalda. Unlike most other genera in the Platypezinae the mid tibia of these three genera ends in a single posteroventral spur, with the anteroventral spur being extremely reduced or absent. The antennal scape and parafacial are also bare in these three genera, and the male genitalia includes a large sclerotized sperm pump. Unlike *Polyporivora* however, *Bolopus* and *Seri* both have the wing covered with conspicuous microtrichia, the furcation of  $M_{1+2}$  nearer to crossvein dm-m than to the wing margin, and females that lack a pattern of abdominal markings. *Bolopus* differs from *Seri* in that crossvein dm-m is more than 1.5X its length from the wing margin and the antenna has a circle of much longer preapical setae on the pedicel and a subdorsal rather than apical arista. In addition, the male genitalia of *Bolopus* have a larger pointed surstylus, a shorter hypandrial process and a short straighter phallus.

Kessel and Kessel (1966) and Chandler (1974) both commented, respectively, on how rarely *S. dymka* and *S. obscuripennis* appear to be collected, suggesting that each species may be overlooked by specialists because when resting they tend to resemble small muscid flies. However, with increased use of passive trapping techniques such as Malaise traps and pan traps during the last 40 years, many more specimens of *Seri* would be expected in collections if these flies were more common.

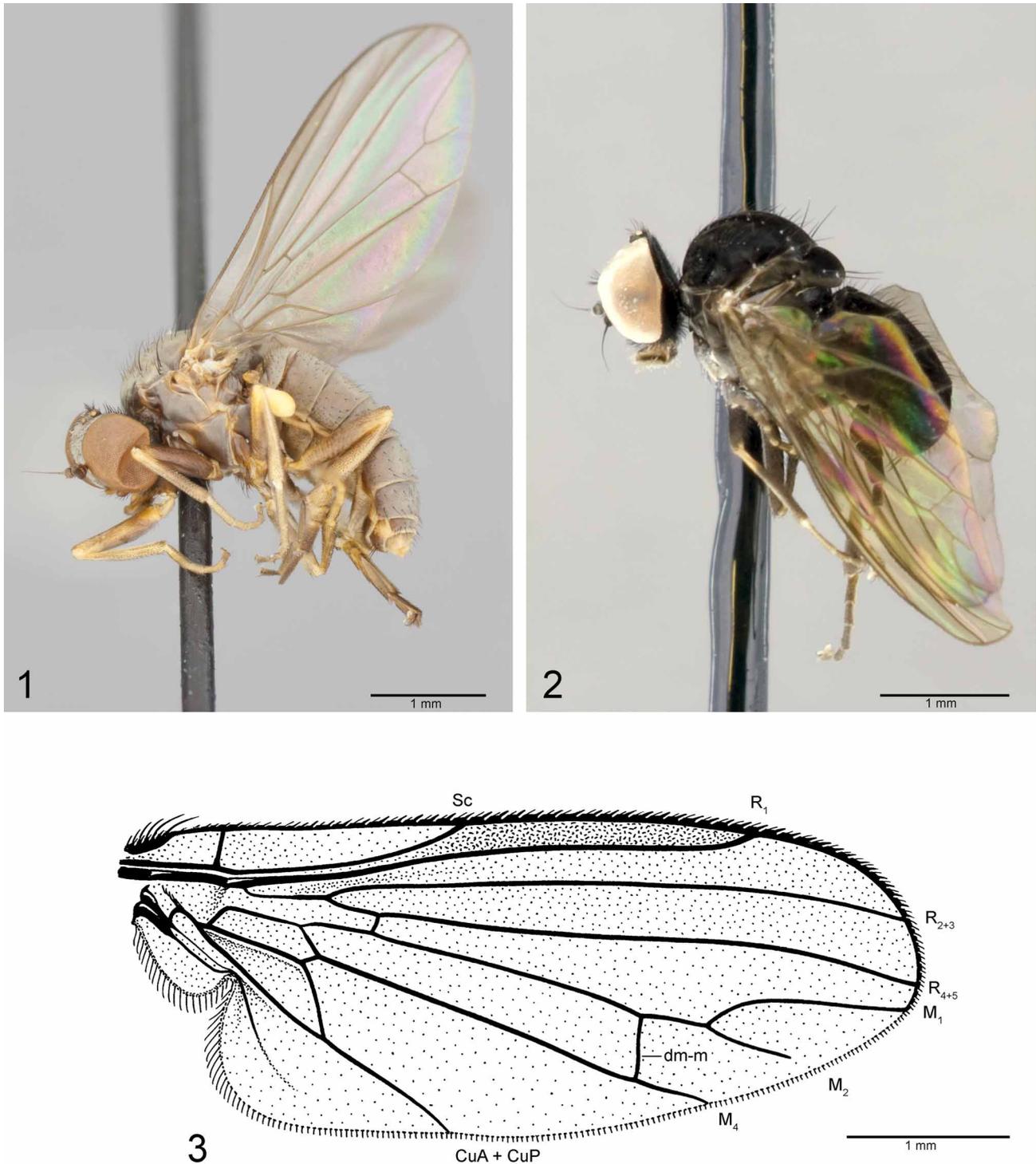
*Seri dymka* (Kessel)

(Figs. 1–5)

*Clythia dymka* Kessel, 1961: 191 (female).

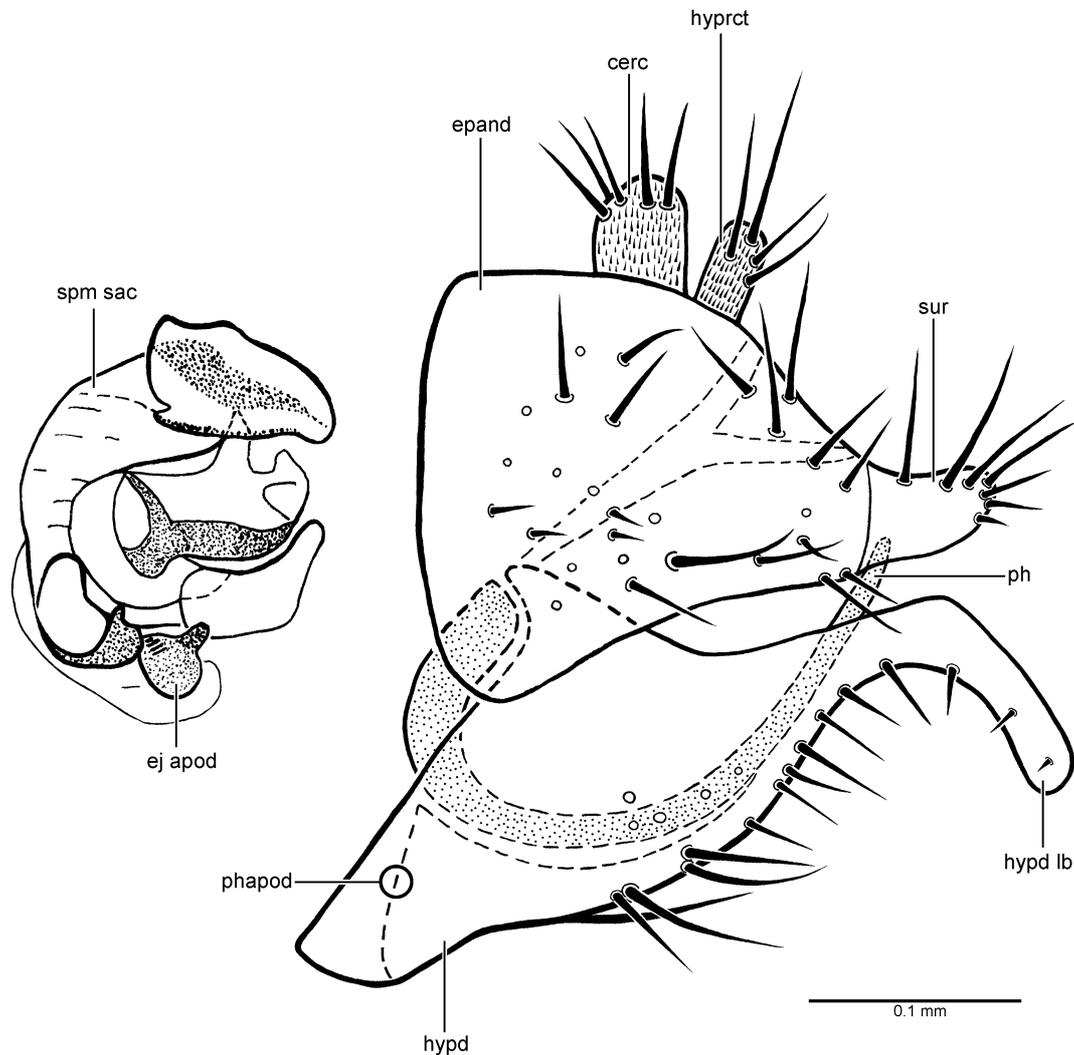
*Platypeza dymka* (Kessel): Kessel, 1965: 549.

*Seri dymka* (Kessel): Kessel & Kessel, 1966: 99.



**FIGURES 1–3.** Habitus photographs and wing of *Seri dymka* Kessel. **1.** female, lateral view. **2.** male, lateral view. **3.** wing of female (after Kessel 1987). Abbreviations: CuA+CuP—anterior + posterior branch of cubital vein, dm-m—discal medial cross-vein, M<sub>1</sub>—1<sup>st</sup> medial vein, M<sub>2</sub>—2<sup>nd</sup> medial vein, M<sub>4</sub>—4<sup>th</sup> medial vein, R<sub>1</sub>—1<sup>st</sup> radial vein, R<sub>2+3</sub>—2<sup>nd</sup> + 3<sup>rd</sup> radial vein, R<sub>4+5</sub>—4<sup>th</sup> + 5<sup>th</sup> radial vein, Sc—subcostal vein. Scale in mm.

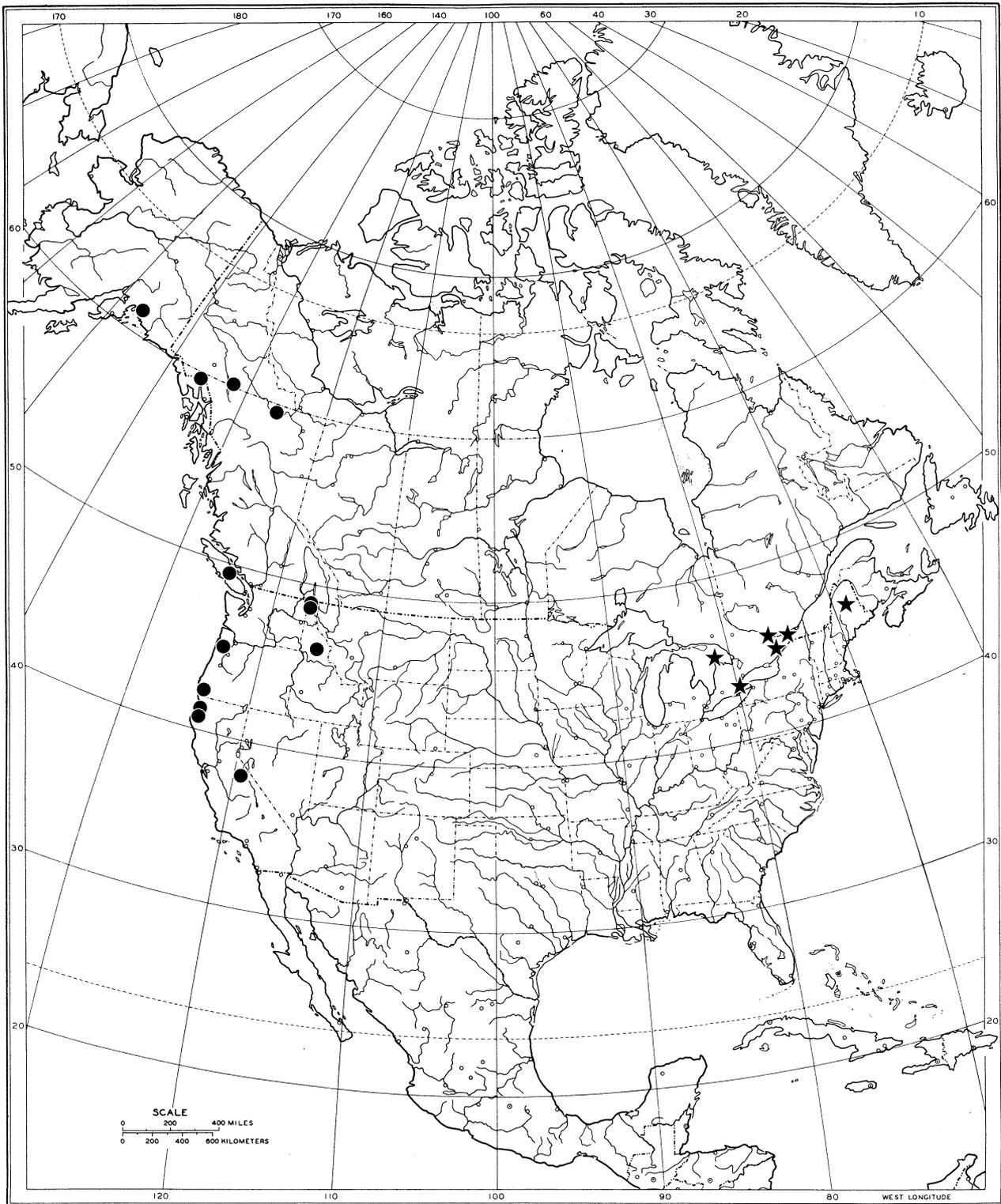
**Diagnosis.** Body color (Figs. 1, 2) grey in female with slight bluish hue in some specimens (without bluish hue in female *S. obscuripennis*), legs yellowish brown with tarsi more yellow (legs slightly darker in *S. obscuripennis*), male black with darker legs than female; wing of female (Fig. 3) with  $M_2$  longer than apical section of  $M_{1+2}$  (length of  $M_2$  slightly shorter in female *S. obscuripennis*); hind tarsomere 2 of female with one long anterior seta at apex; male genitalia with phallus projected only slightly beyond hypandrium (Fig. 4).



**FIGURE 4.** Male genitalia of *Seri dymka* (Kessel), left lateral view. Abbreviations: cerc—cercus, epand—epandrium, ej apod—ejaculatory apodeme, hypd—hypandrium, hypd lb—hypandrial lobe, hyprct—hypoproct, phapod—phallopodeme, ph—phallus, spm sac—sperm sac, sur—surstylus. Scale in mm.

**Description (male).** Body length 3.0 mm. Body (Fig. 2) black except reddish brown eyes; antenna dark brown to black; scutum and scutellum with bluish reflections; legs dark brown with paler tibial bases and tarsi; wing tinted brown with cell sc darker. Head with setae of occiput extended on to and covering gena; frons with 7 pairs of frontal setae; ocellar tubercle with 5 pairs of ocellar setae; antenna with postpedicel bearing long apical and ventral microtrichia, lacking seta on dorsal margin. Thorax with 3 postpronotal setae, patch of posthumeral and presutural intra-alar setae, pluriserial row of postsutural intra-alar setae, row of uniserial dorsocentral setae becoming longer posteriorly, 1 supra-alar seta, 2 strong postalar setae, 2 scutellar setae on each side. Wing venation similar to female but with  $M_2$  shorter than apical section of  $M_{1+2}$ . Hind tarsus expanded and laterally compressed, tarsomeres 1–3 broadest, tarsomeres 1 and 2 subequal in length, tarsomere 3 narrower and longer. Abdominal segments narrowed gradually towards apex with scattered setae on tergites (longest laterally); tergite 6 with row of erect setae on apical margin. Hypopygium (Fig. 4) dark brown to black with long setae on epandrium and hypandrium, surstylus with short stout setae on inner surface, hypandrium incised medioapically, phallus slender and projected slightly beyond

hypandrium, sclerotized sperm pump large and multichambered with small ejaculatory apodeme, cercus and hypoproct fleshy and thinly sclerotized.



**FIGURE 5.** Known distribution of *Seri dymka* (Kessel). New records indicated with stars.

**Known material.** This species has been rarely, but widely, collected in North America (Fig. 5). Specimens deposited in CAS were not examined. Label information for CAS specimens was taken from Kessel and Kessel (1966) and all CAS specimens were collected by them. Specimens have been collected from the following locali-

ties: **CANADA: British Columbia:** Stamp Falls, Vancouver Island, 13.X.1961, E.L. Kessel (2♀♀, CAS, CNC); Liard Hot Springs, Mile Post 496, Alaskan Highway, 2.IX.1957 (paratype ♀, CAS) and 8.VIII.1959 (1♀, CAS). **Ontario:** Ottawa, swept over bare path in Acer wood, 18.IX.1989, J.R. Vockeroth (1♀, CNC) and 1.X.1989, J.R. Vockeroth (1♀, CNC); Ottawa, lower Beachwood Cemetery Acer wood, aerial sweep, 23.IX.1993, J.R. Vockeroth (1♀, CNC); Renfrew, Shaw Forest, ex. old maple forest, 27.VIII.1994, P.J. Chandler (1♀, PJC); Lanark Co., Murphy's Point Provincial Park, 44°46.05'N 76°16.31'W, ex. hardwood forest, 9.X.2010, J.M. Cumming (1♂, CNC); Bruce Co., Dunks Bay, 45°14.98N 81°38.45W, malaise, 10–22.IX.1996, debu 00075053, S.A. Marshall (1♀, DEBU); Hamilton-Wentworth Co., Dundas Valley, Sherman Falls, ex. deciduous woodland, 12.IX.1994, P.J. Chandler (1♀, PJC). **Yukon Territory:** Alaska Highway and Morley River, 24.VII.1962 (1♀, CAS). **USA: Alaska:** 9 miles E of Valdez, 11–12.VII.1962, (4♀, CAS); Mosquito Lake, 27 mi N of Haines, 12.VIII.1959 (1♀, CAS) and 16.VII.1962 (1♀, CAS). **California:** Prairie Creek State Park, Humboldt Co., 4.XI.1960 (holotype ♀, paratype ♀, CAS); Yosemite Valley, Mariposa Co., 22.X.1960 (paratype ♀, CAS); Grizzly Creek Redwoods State Park, Humboldt Co., 21.X.1961 (1♀, CAS). **Idaho:** Reeder Bay, Bonner Co., 3.IX.1962 (1♀, CAS); Indian Creek State Park, 11 mi N of Coolin, Bonner Co., 3.IX.1962 (1♀, CAS); 3 mi W of Lowell, Idaho Co., 30.VIII.1962 (1♀, CAS). **Maine:** Mount Katahdin, Chimney Pd. trail, 25–3000', 2.VII.1958, H.C. Hockett (1♀, CUIC). **Oregon:** Van Duzer Corridor, Tillamook Co., 13.IV.1963 (1♀, CAS); Loeb State Park, Curry Co., 23.IV.1962 (1♀, CAS).

**Distribution.** This species appears to be widely distributed in temperate forests of western North America and in northern hardwood forests of eastern North America (Fig. 5). Although it is possible that the eastern and western records represent disjunct populations of *S. dymka*, it seems more probable that this species has a transcontinental distribution and because of its rarity has yet to be collected in intervening forested areas.

**Remarks.** Chandler (1974) indicated that  $M_2$  is longer in the wing of *S. dymka* than in *S. obscuripennis* when compared with the length of the preceding section of  $M_{1+2}$ , but this feature is apparently only diagnostic for females of each species.

A comparison of male specimens from western and eastern North America is not currently possible, because males have not yet been collected in the west and only a single male is currently known from the east. Although future comparison with western males may reveal that the eastern Nearctic specimens of *Seri* represent a new species, no appreciable differences have been found between female specimens from eastern and western North America.

### *Seri obscuripennis* (Oldenberg)

*Clythia obscuripennis* Oldenberg, 1916: 123 (male and female).

*Platypeza obscuripennis* (Oldenberg): Chandler, 1974: 22.

*Seri obscuripennis* (Oldenberg): Chandler, 1974: 22.

**Diagnosis.** Body color grey in female without bluish hue, legs greyish brown with tarsi more yellowish brown, male black with darker legs than female; wing of female with  $M_2$  equal to apical section of  $M_{1+2}$  (see Chandler 1974, fig. 22); hind tarsomere 2 of female with two long anterior setae at apex (see Chandler 2001, fig. 277); male genitalia with phallus projected well beyond hypandrium (see Chandler & Shatalkin 1998, fig. 29; Chandler 2001, fig. 278).

Larva and puparium described by Chandler (2001) and Rotheray et al. (2004): larva cylindrical, slightly dorsoventrally flattened, lateral and dorsal processes of body segments inconspicuous and hair-like, anal segment with small pair of caudal wart-like protuberances; puparium with dehiscence lines of operculum along lateral margins of segments 2–4 and posteriorly along basal two thirds of tergite 5.

**Distribution.** Although rarely collected, this species is widespread in the Palaearctic Region having been recorded from Europe (Britain, Norway, Sweden, Finland, Netherlands, Poland, Czech Republic, Switzerland, Austria, Hungary, Romania, Central Russia) and the Russian Far East (Amur Region) (Chandler 1991, 2001). Shatalkin (1985) indicated that *S. obscuripennis* was more commonly collected in the Amur Region than in Central Russia. Ševčík (2001) and Webb (2004) were also able to obtain series of adult specimens by rearing larvae from *Polyporus* fungi in the Czech Republic and Britain, respectively.

**Remarks.** Despite lack of males, Chandler (1974) considered it best to maintain *S. obscuripennis* and *S. dymka* as separate species, because closely related Palaearctic and Nearctic platypezid taxa have generally been found to be specifically distinct. Comparison of the different phallus lengths in both species now supports Chandler's deci-

sion. Chandler (2001, fig. 277) also illustrated the female hind tarsus of *S. obscuripennis* with two long anterior setae at the apex of tarsomere 2, whereas females of *S. dymka* consistently have only one long anterior seta. This may be an additional diagnostic feature that distinguishes females of the two species.

Vaňhara (1986) recorded a single adult of *S. obscuripennis* from a light trap set in a hardwood forest in the Czech Republic. Ševčík (2001) and Webb (2004) reared larvae *S. obscuripennis* from tough textured *Polyporus* fungi species, namely *P. durus* (= *P. badius*) and *P. varius*. The host association with the softer textured *Polyporus squamosus* fungus suggested by Chandler (2001) appears to have been incorrect (Webb 2004).

## Discussion

*Seri* appears related to the Holarctic/Oriental genus *Polyporivora* and the Palearctic genus *Bolopus* on the basis of a bare scape and parafacial, extreme reduction or loss of the anteroventral mid tibial spur, and a similar larva (not known for *S. dymka*) that is cylindrical in form with reduced (except for a median anal pair) marginal processes (Chandler 2001). In addition, all three genera share an enlarged sclerotized sperm pump of the male genitalia. As stated by Chandler (2001) the lineage appears adapted to feeding on polypore fungi, which is probably facilitated by the smooth cylindrical shape of the larva (Rotheray et al. 2004). The three genera may also be related to the Chilean species *Platypeza brunnescens* Collin. According to Chandler (2001, 2010) this species, which resembles *Seri* in many respects (e.g. wing venation), retains two mid tibial spurs and probably represents a new undescribed genus near the base of this lineage.

*Polyporivora* is distinct from both *Seri* and *Bolopus* in terms of several apomorphic features including in the venation, male genitalia, female terminalia, and on the larva, whereas *Seri* and *Bolopus* appear to share the plesiomorphic condition in these features (Chandler 2001). Therefore although appearing similar, *Seri* and *Bolopus* together probably do not form a monophyletic group. As a result synonymizing *Seri* with *Bolopus* does not seem feasible based on current evidence. In addition, *Bolopus* and *Seri* are quite distinct in terms of their antennae, male frontal setae and additional features of the male genitalia (i.e. shape of the surstylus and phallus, as well as length of the hypandrial process).

Additional sampling for Nearctic specimens of *Seri* is needed to obtain males from western localities. Comparison of eastern and western male specimens will assist in determining whether eastern and western populations represent distinct species. Increased sampling effort should also provide specimens that are appropriate for future studies employing molecular techniques. Unfortunately only one of the specimens reported on in this paper (i.e. the unique male of *S. dymka*) was collected in the last 15 years. Sequence data extracted from more recently collected specimens of *Seri* should also help determine species status in these rarely collected flies.

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