A revised checklist and time window based province catalogue of the long-legged flies (Diptera: Dolichopodidae) of Sweden, with six new synonymies in *Dolichopus* Latreille, 1796

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Persson, M., Pollet, M., Struwe, I. & Hedström, L.: A revised checklist and time window based catalogue of the long-legged flies (Diptera: Dolichopodidae) of Sweden, with six new synonymies in *Dolichopus* Latreille, 1796. **[En reviderad taxonomisk förteckning och tidsfönsterbaserad landskapskatalog över svenska styltflugor (Diptera: Dolichopodidae), med sex nya synonymer i släktet *Dolichopus* Latreille, 1796.]** – Entomologisk Tidskrift 140 (1): 27–57. Uppsala, Sweden 2019. ISSN 0013-886x.

We present an updated checklist of the family Dolichopodidae (Diptera) in Sweden based on major Swedish museum collections, private collections, newly acquired material during the Swedish Malaise Trap Project (SMTP), and literature, including a total of about 92,000 specimens. The previous checklist of 2004 included 334 species. Twenty-five of these species were removed, including 12 species without specimens in Swedish or other collections, seven species which have been synonymized since 2004, and the following six species being synonymized in the present paper: *Dolichopus atritibialis* Zetterstedt, 1859 = *D. urbanus* Meigen, 1824 **syn. nov.**; *Dolichopus exiguus* Zetterstedt, 1843 = *D. arbustorum* Stannius, 1831 **syn. nov.**; *Dolichopus fulgidus* Fallén, 1823 = *D. campestris* Meigen, 1824 **syn. nov.**; *Dolichopus inconspicuus* Zetterstedt, 1843 = *D. simplex* Meigen, 1824 **syn. nov.**; *Dolichopus propinquus* Zetterstedt, 1852 = *D. trivialis* Haliday, 1832 **syn. nov.** and *Dolichopus spretus* Loew, 1871 = *D. vitripennis* Meigen, 1824 **syn. nov.** First records of 35 species were added, raising the total number of Swedish species to 345. A time window based Swedish province catalogue is also presented, containing six time windows covering data collected before 1900 and five 25 year periods from 1900 until present. The total number of data entries i.e. unique combinations of species/province/time window is 5,768.

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Long-legged flies (Dolichopodidae) is a large family within Diptera Brachycera with over 7,300 described species in nearly 270 genera worldwide (Pape et al. 2011). They typically have long and slender legs (hence the popular name) and a green or blue-green metallic coloured body, although also mainly black, brownish, and yellow species exist. Males of many species exhibit elaborate Secondary Sexual Characters (MSSC) like modified legs, wings, antennae or other body parts. These characters are important during courtship to aid species recognition (e.g. Lunau

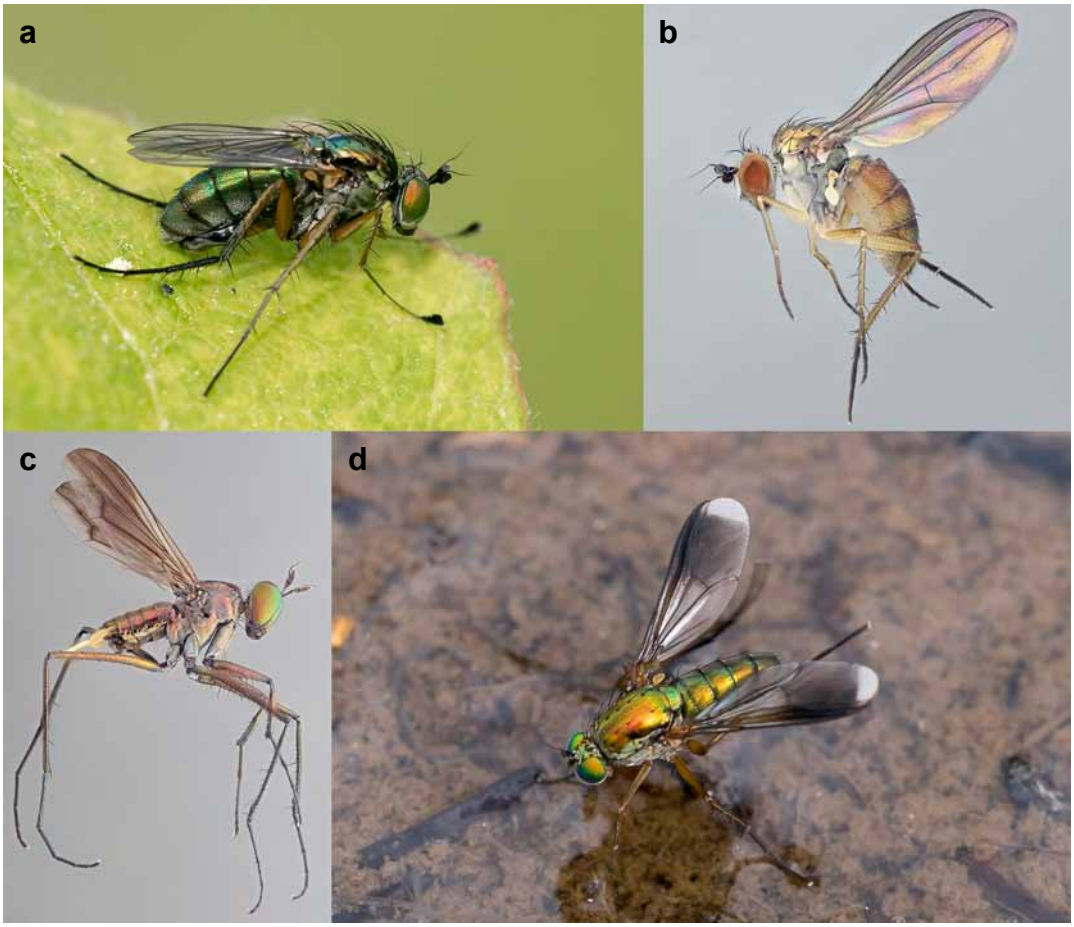

Figure 1. Dolichopodidae or long-legged flies are as diverse as hoverflies, also in Sweden, but far less studied. The family is rather easily recognized and males of many species feature conspicuous male secondary sexual characters. A catalogue of 345 Swedish Dolichopodidae is presented here, including all distribution data available and arranged in time province windows. This serves as a benchmark for future studies on this fly family. – a) *Dolichopus brevipennis* Meigen, 1824, male, photo: Raimo Neergaard; – b) *Syntormon fuscipes* (von Roser, 1840), female, photo: Magnus Persson; – c) *Scellus dolichocerus* Gerstäcker, 1864, male, photo: Magnus Persson; – d) *Poecilobothrus nobilitatus* (Linnaeus, 1767), male, photo: Raimo Neergaard.

Styltflugor (Dolichopodidae) är en flugfamilj en mångfald lika stor som blomflugor, men de är betydligt mindre kända. Familjen känns lätt igen och hanarna av många arter har spektakulära sekundära könskaraktärer. I vår artikel presenterar vi en tidsfönsterbaserad landskapskatalog över Sveriges 345 arter. – a) *Dolichopus brevipennis* Meigen, 1824, hane, foto: Raimo Neergaard; – b) *Syntormon fuscipes* (von Roser, 1840), hona, foto: Magnus Persson; – c) *Scellus dolichocerus* Gerstäcker, 1864, hane, foto: Magnus Persson; – d) *Poecilobothrus nobilitatus* (Linnaeus, 1767), hane, foto: Raimo Neergaard.

1992). Both larvae and adults (except for the leaf-mining larvae of the genus *Thrypticus*) are predators of smaller invertebrates (Ulrich 2004). Dolichopodidae occur in a wide range of habitats, often in association with water bodies and moist soil (Pollet 2000). Some genera like *Medetera*, *Neurigona* and *Sciapus* are often found on tree trunks (Bickel 1985; Pollet et al. 2011). Some representative species of the Swedish fauna are presented in Fig. 1.

Most common species of the southern Swedish fauna can be determined by the key in Parent (1938), which is obviously partly outdated. This work includes a detailed description of most species. Another key that works well for the southern Swedish fauna is that by d'Assis Fonseca (1978), however, as with Parent (1938) many northern species are missing. Also still very useful are the successive papers by von Stackelberg (1930, 1933, 1934, 1941), Negrobov and von Stackelberg (1971, 1972, 1974a, b) and Negrobov (1977, 1978, 1979a, b) treating Palaearctic representatives of the Dolichopodinae, Medeterinae, Hydrophorinae and Rhaphiinae, also from northern Europe. In addition, modern revisions with keys are published for separate genera, e.g. *Gymnopternus* (Pollet 1990), *Achalcus* (Pollet 1996), *Xanthochlorus* (Chandler & Negrobov 2008), *Sciapus* (Meuffels & Grootaert 1990, Grichanov & Negrobov 2014) and *Medetera* (Negrobov & Naglis 2016).

In Sweden, the family Dolichopodidae has gained a fair amount of interest since the mid-19th century. An early work covering the Swedish and Scandinavian fauna was published by Zetterstedt (1843) and included 168 species. During the past century, several checklists of Dolichopodidae of Sweden have been produced, starting with the key and checklist of the Swedish fauna by Wahlgren (1912), listing 193 species. The next checklist was published only 16 years later (Ringdahl, 1928) containing an additional 68 species, with a total number of 261 species. Ringdahl managed a hard copy province catalogue, which he updated regularly at least until the 1950s, but, unfortunately, which was never published. Lars Hedström also built a province catalogue based on Ringdahl's work and other published studies, but, in addition, also examined museum collections and added his own, quite extensive, records. He maintained and updated the catalogue up until around 1995, but it also remained unpublished. At the beginning of the present century, Igor Grichanov checked most dolichopodid specimens in the three main museum collections in Sweden, i.e. the Biological Museum of the Lund University (Lund), the Swedish Museum of Natural History (Stockholm), and the Museum of Evolution (Uppsala), and published two subsequent checklists on the basis of his findings. Grichanov (2002) listed 321 species, and only two years later, an updated version (Grichanov 2004) raised the number to 334 species.

Due to taxonomical changes, however, old checklists become hard to interpret correctly. Furthermore, the focus in new checklists has mostly been on adding new species to the list, and the authors often omitted old records that were thus not checked. In addition, some recent synonymies by Grichanov, also effecting Swedish species, have been proved incorrect (Parvu 2009, Negrobov 2010). As a result, the latest checklist contains invalid species and erroneous information and, hence, is in urgent need of revision, already stressed by Grichanov (2002) himself. Furthermore, despite a checklist's usefulness, it does not always contain detailed information on the distribution of the species in the country. More useful is a province catalogue that also includes information on the regional occurrence of the species and the recording period. One example of such a list was the Syrphidae province catalogue published by Bartsch (2001). Another approach is the combination of distribution maps and calculated trends in time (e.g. Red Lists) (e.g. Pollet 2000).

The objective of the present paper is to provide a comprehensive overview of historical records of Dolichopodidae in Sweden. Data are presented in a similar format as the Syrphidae catalogue of Bartsch (2001), i.e. with records assigned to six time windows. Our checklist thus could serve as a very useful benchmark for further studies of the family Dolichopodidae in Sweden and – by extension – Fennoscandia and Denmark. This study also includes new synonymies as a result of type examination of a number of doubtful *Dolichopus* species.

Methodology

Taxonomy

There has been recent progress in taxonomy which revealed that several species listed in the previous Swedish checklist are invalid and actually synonyms, especially within the genus *Dolichopus*. Kahanpää (2008) and Germann et al. (2010) synonymized several *Dolichopus* species that were described as separate species on the basis of males that in fact were merely demasculinized specimens of known species. This demasculinization is due to nematode infection and leads to reduced primary and secondary sexual characters. As a result, males feature e.g. wider faces, smaller and reduced hypopygia and nearly lack the specific modifications in legs. During the present study, we came across a number of *Dolichopus* species that have previously been disputed by other researchers, but the types of which have never been properly investigated. The types of the following species were examined here: *Dolichopus atritibialis* Zetterstedt, 1859; *Dolichopus exiguus*, Zetterstedt, 1843; *Dolichopus fulgidus*, Fallén, 1823; *Dolichopus inconspicuus*, Zetterstedt, 1843; *Dolichopus propinquus*, Zetterstedt, 1852; and *Dolichopus spretus,* Loew, 1871.

Label information from the studied type specimens is provided in full with the original spelling. Supplementary information is given between square brackets []. Label information is given from the top downward, with data from each label between quotation marks, data from different lines on the same label are separated by a slash (/). Information from different labels is separated by a semi-colon. The repository of each specimen is given in parentheses.

Checklist and time window based catalogue

When building a catalogue like the one presented in this study, one soon realizes that it is a never-ending process. There are always more old records to double-check, more museum collections to visit, more literature to read, then another collecting season passes and new data need to be included, new taxonomic revisions are published which requires an update of the species names, etc. At one point, however, this continuous process needs to be paused, and the results summarized and published. The present catalogue should be considered as a snapshot of the current knowledge and should guarantee full reliability on past identifications and data. The present effort thus allows the researcher to rely entirely on the "past" and fully focus on the future. The catalogue hereby serves as an indisputable basis for future com-

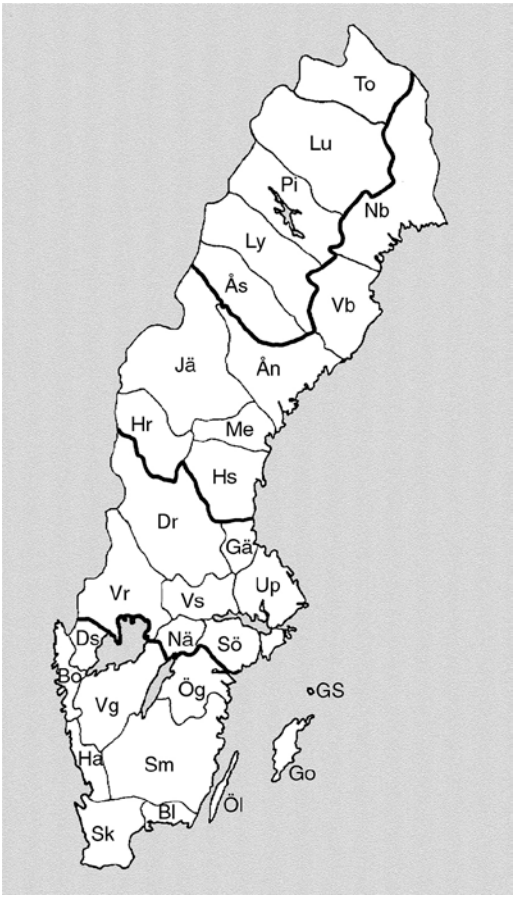

Figure 2. Map of regions and faunistic provinces in Sweden. Götaland; Sk (Skåne), Bl (Blekinge), Ha (Halland), Sm (Småland), Öl (Öland), Go (Gotland), GS (Gotska Sandön), Ög (Östergötland), Vg (Västergötland), Bo (Bohuslän), Ds (Dalsland). Svealand; Nä (Närke), Sö (Söderlmanland), Up (Uppland), Vs (Västmanland), Vr (Värmland), Dr (Dalarna), Gä (Gästrikland). Norrland (except lappmarkerna); Hs (Hälsingland), Me (Medelpad), Hr (Härjedalen), Jä (Jämtland), Ån (Ångermanland), Vb (Västerbotten), Nb (Norrbotten). Lappmarkerna; Ås (Åsele Lappmark), Ly (Lycksele Lappmark), Pi (Pite Lappmark), Lu (Lule Lappmark), To (Torne Lappmark).

Karta över Sverige med gränser och använda förkortningar av faunaprovinserna.

parisons and additions. In the catalogue, also species recorded from Denmark, Norway, and/or Finland but not yet from Sweden are included since these species might be discovered in Sweden in the near future.

The basic structure of the catalogue presented in this study corresponds with that of the Syrphidae catalogue of Bartsch (2001) and other Swedish catalogues. The full time period was divided into six time windows numbered from 0 to 5. The first time window, time window 0, covers data collected before 1900. The oldest records date back from 1836, but there are specimens with a locality label without date that might even be older. The overwhelming majority of the records of this time window, though, were gathered from 1850 onwards. Time windows 1 to 5 represents 25 year periods from 1900 (time window 1 = 1900–1924) until present (time window 5 = 2000-present).

Data are given for each of the 30 Swedish provinces according to a traditional division of the country. These provinces are, in turn, also grouped into four larger regions: Götaland, Svealand, Norrland, and Lappmarkerna (Fig. 2). This division of regions is useful since they more or less correspond with the major ecological zones in Sweden: Götaland covers the nemoral and the boreonemoral zone, Svealand the northernmost part of the boreonemoral zone, the southern boreal zone and southern parts of the middle boreal zone, Norrland the middle and northern boreal zones, and Lappmarkerna parts of the northern boreal zone and the alpine zone (see e.g. Hagen et al. 2013).

A data entry in the catalogue, further also referred to as a time window-province record, is defined as the presence of a species in one time window period in a Swedish province. The electronic version also includes a reference for each time window-province record. This means that the data source of each time window-province record is documented which will help future revisions of the catalogue. The province catalogue was compiled into a spreadsheet file in which each time window-province record refers to the according data source (paper, collection, etc.). During our work, we had a conservative approach, i.e. we only included specimens that have been checked by us, or by other collectors that we consider trustworthy.

Data sources

The province catalogue contains data from various sources jointly encompassing records of about 92,000 specimens collected over more than two centuries to today. In the case of literature records that lacked information on the exact number of specimens involved, the presence of one specimen was assumed. In the list below we also give the abbreviations used as reference for the time window-province records in the electronic version of the province catalogue. The data sources used are:

1. The **Swedish Malaise Trap Project (SMTP)** (see Karlsson et al. 2005). This material was produced by 75 Malaise traps operational over a six-year period (2003–2008) at 54 localities across Sweden; most traps were not operated for the entire period. Though not all samples have yet been processed nor all Dolichopodid fractions examined, 43,148 specimens of 197 species from these samples have already been identified by the second author, except for a few specimens in very poor condition and females of a few genera (e.g. *Rhaphium*, *Medetera*).

2. The **Biological Museum, Lund University (BMLU)**. The main collection contains 17,780 specimens of 287 species, most of which have been determined to species level by Igor Grichanov (2002, 2004). Doubtful determinations were checked (and in most cases confirmed) by the senior author. In addition, some personal collections, e.g. of Johan Wilhelm Zetterstedt (around 1,500 specimens), Einar Wahlgren (around 800 specimens), and Hugo Andersson (around 1,500 specimens), all deposited at BMLU, were also checked the senior author.

3. The **Museum of Evolution, Uppsala (UUZM)**. Contains 10,350 specimens of 270 species determined to species level by Lars Hedström.

4. The **Swedish Museum of Natural History, Stockholm (NHRS)**. Contains 6,010 specimens of 229 species determined to species level by Igor Grichanov (2002, 2004) (not checked by us).

5. The **Gothenburg Museum of Natural History (GMNH)**. Contains 1,000 specimens of 110 species determined to species level by Lars Hedström.

6. **Private collections**. Several private collectors contributed to this study (all mentioned in Acknowledgements). The initials of the collector

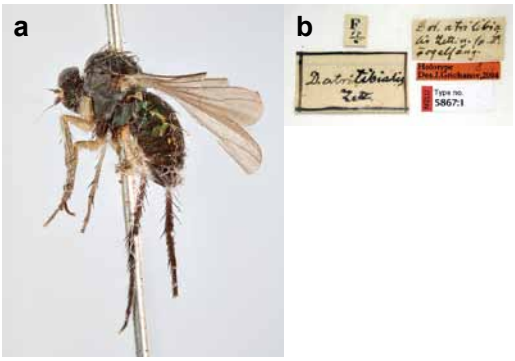

Figure 3. *Dolichopus atritibialis* Zetterstedt, 1859, new synonym of *Dolichopus urbanus* Meigen, 1824: – a) holotype, – b) labels. Photos: Christoffer Fägerström, Biological Museum, Lund University.

Dolichopus atritibialis Zetterstedt, 1859, ny synonym till *Dolichopus urbanus* Meigen, 1824: – a) holotyp, – b) etiketter. Foton: Christoffer Fägerström, Biologiska Museet, Lunds Universitet.

Figure 4. *Dolichopus exiguus* Zetterstedt, 1843, new synonym of *Dolichopus arbustorum* Stannius: 1831, – a) holotype, – b) labels. Photos: Christoffer Fägerström, Biological Museum, Lund University.

Dolichopus exiguus Zetterstedt, 1843, ny synonym till *Dolichopus arbustorum* Stannius, 1831: – a) holotyp, – b) etiketter. Foton: Christoffer Fägerström, Biologiska Museet, Lunds Universitet.

are used to denote the data sources in the province catalogue.

7. **Artportalen (AP)**. The Swedish Species Observation System, available online since 2003 (but the order Diptera was introduced to the system in 2007) at https://artportalen.se. The system comprised 6,849 records of 258 dolichopodid species registered between 1934 and 1/09/2018, but the majority (> 95 %) is reported from 2010 onwards. In this system, each record contains information about the species, number of specimens, locality, and time (or time period), therefore the actual number of specimens is higher than the number of records (total number of specimens is over 10,000). Since this system also allows non-experts to add observations (citizen science), identifications often need to be confirmed by an expert. Therefore only reliable records (e.g. from experienced collectors, or checked records by an expert on the basis of good quality photos) were included. Most of the data provided by private collectors (see above) are actually also reported in AP. In those cases, the collector's initials are used to denote the data sources instead of "AP" to enhance traceability of the records (see also above).

8. **Publications.** These records often overlap with other sources, e.g. when specimens mentioned in old literature records were relocated in museum collections. The author name(s) and publication year are used to denote the data source in the province catalogue.

Results

Taxonomy

Since the previous checklist (Grichanov 2004), seven species recorded from the Swedish checklist have been synonymized by several authors (Table 1). In addition, the types of a number of species were thoroughly examined which led to the following results. The fact that most of them were only known from their type locality and had not been rediscovered ever since despite the extensive sampling efforts in Sweden was also taken into account. In the species descriptions below, I, II and III refer to the fore, mid and hind legs, respectively.

Dolichopus atritibialis Zetterstedt, 1859: 5053 (Fig. 3)

Material examined: Holotype, ♂, labelled: "F" / "17/6"; "D. atritibialis" / "Zett."; "Dol. atritibia" / "lis Zett. n. sp. ♂" / "Fogelsång."; [red] "HOLOTYPE ♂" / "Des. I. Grichanov, 2004"; "MZLU" / "Type no." / "5867:1" (BMLU, type collection).

Distribution: only known from Sweden and the Arkhangelsk region in northern European Russia (Negrobov 1991).

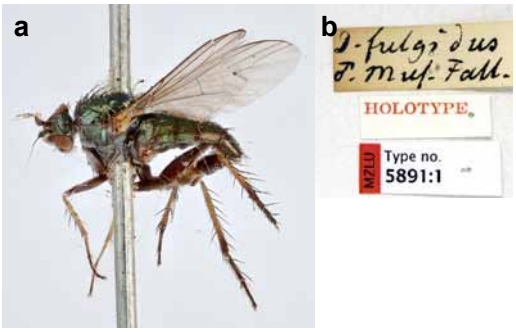

Figure 5. *Dolichopus fulgidus* Fallén, 1823, new synonym of *Dolichopus campestris* Meigen, 1824: – a) holotype, – b) labels. Photos: Christoffer Fägerström, Biological Museum, Lund University.

Dolichopus fulgidus Fallén, 1823, ny synonym till *Dolichopus campestris* Meigen, 1824: – a) holotyp, – b) etiketter. Foton: Christoffer Fägerström, Biologiska Museet, Lunds Universitet.

Remarks: the specimen is dusty but otherwise in rather good condition. It matches all characters of *Dolichopus urbanus* Meigen, 1824, in particular the partly yellow antenna, and the largely infuscate wing and hind tibia, which is quite a unique combination in Palaearctic *Dolichopus*. The type specimen is lacking tarsomeres 3–5 of both mid tarsi which are modified in *D. urbanus*. This seems also the main reason why *D. atritibialis* has been treated as a separate species thus far and why it ended up in couplets in keys, separate from *D. urbanus*.

New synonym of *Dolichopus urbanus* Meigen, 1824.

Dolichopus exiguus Zetterstedt, 1843: 556 (Fig. 4)

Material examined: Holotype, ♀, labelled: "D. exiguus" / "♀ Wadstena."; "HOLOTYPE"; "MZLU" / "Type no. 5865:1" (BMLU, type collection).

Distribution: known only from its type locality (Negrobov 1991, Grichanov 2002).

Remarks: the specimen has a dorsal bristle on the mid metatarsus, the antenna mainly pale (with all segments only infuscate dorsally), a pale yellow coxa III, and the bristles on coxa I pale. It keys to *D. arbustorum* with the only exception that is considerably smaller (also noticed by Grichanov 2002). Negrobov (1991) listed this species as dubious.

New synonym of *Dolichopus arbustorum* Stannius, 1831.

Dolichopus fulgidus Fallén, 1823: 15 (Fig. 5)

Material examined: Holotype, ♂, labelled: "D. fulgidus" / "♂ Mus. Fall."; "HOLOTYPE"; "MZLU" / "Type no." / "5891:1" (BMLU, type collection).

Distribution: only known from its type locality (Negrobov 1991, Grichanov 2002, 2006a).

Remarks: this species was listed as doubtful by Negrobov (1991). At least two key characters of *D. fulgidus* match those of *D. campestris*, i.e. the presence of 2 preapical anterodorsal bristles on the mid tibia, and an entirely dark brown cercus, but it further differs from the latter species by the following features: hypopygium considerably smaller, long posteroventral cilia on hind femur lacking, face in middle 1.5–2 times as wide as height of postpedicel, and posterior wing margin evenly convex. The lack of these MSSCs are consistent with nematode infested males (Kahanpää 2008). The latter author and Grichanov (2002) previously suggested that *D. fulgidus* might be synonymous of *D. campestris*, but never synonymized it formally. Grichanov (2002, 2006b) treated this species as valid in his checklists and even included it in the 2006 identification key.

New synonym of *Dolichopus campestris* Meigen, 1824**.**

Dolichopus inconspicuus Zetterstedt, 1843: 554 (Fig. 6).

Material examined: Lectotype, ♀, labelled: [small green square label]; "Forsa"; [pink] "Lectotype" / "des. Grichanov"; "Dolichopus" / "inconspicuus" / "Zett"; "MZLU" / "Type no." / "5866:1" (BMLU, type collection). Paralectotype, ♀, labelled: [small green square label]; "D. inconspi" / "cuus. ♀. Thyn."; [pink] "Paralectotype" / "des. Grichanov"; "MZLU" / "Type no." / "5866:2" (BMLU, type collection)

Distribution: only known from its type locality (Negrobov 1991, Grichanov 2002).

Remarks: the species was listed as doubtful by Negrobov (1991). Both specimens were examined by Grichanov (2002) who concluded that they were "close to the *simplex* group of species, and almost identical to *D. lineatocornis*,

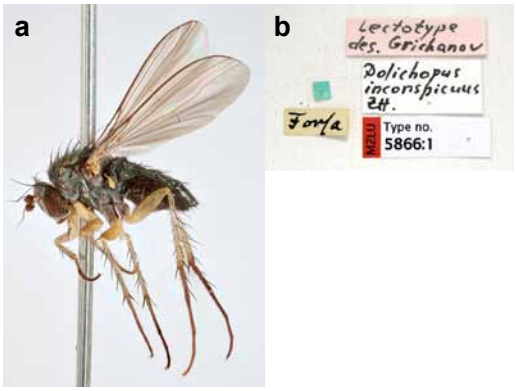

Figure 6. *Dolichopus inconspicuus* Zetterstedt, 1843, new synonym of *Dolichopus simplex* Meigen, 1824: – a) Lectotype, – b) labels. Photos: Christoffer Fägerström, Biological Museum, Lund University.

Dolichopus inconspicuus Zetterstedt, 1843, ny synonym till *Dolichopus simplex* Meigen, 1824: – a) Lectotyp, – b) etiketter. Foton: Christoffer Fägerström, Biologiska Museet, Lunds Universitet.

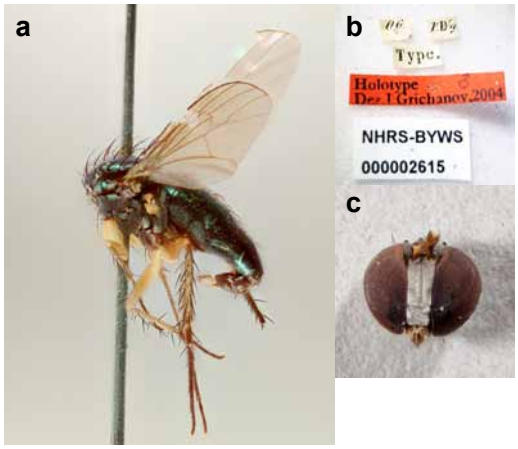

Figure 7. *Dolichopus propinquus* Zetterstedt, 1852, new synonym of *Dolichopus trivialis* Haliday, 1832: – a) holotype, – b) labels, – c) face. Photos: Yngve Brodin, Swedish Museum of Natural History, Stockholm.

Dolichopus propinquus Zetterstedt, 1852, ny synonym till *Dolichopus trivialis* Haliday, 1832: – a) holotyp, – b) etiketter, – c) ansikte. Foton: Yngve Brodin, Naturhistoriska riksmuseet, Stockholm.

differing only in right-angular rather than acute apex of postpedicel". However, the specimens clearly differ from *D. lineatocornis* by having the scape entirely yellow, which Grichanov seems to have overlooked. Both the coloration of the legs and, in particular, the entirely dark postpedicel convince us that both specimens belong to *D. simplex* Meigen, 1824.

New synonym of *Dolichopus simplex* Meigen, 1824.

Dolichopus propinquus Zetterstedt, 1852: 4287 (Fig. 7).

Material examined: Holotype, ♂, labelled: "O.G" [=Östergötland); "PWg" [=Peter Fredrik Wahlberg); "Type."; [red] "Holotype ♂" / "Des. I Grichanov, 2004"; "NHRS-BYWS" / "000002615" (NHRS).

Distribution: recorded from Sweden, Ög (type locality), Finland (Frey 1915) and Germany (Bellstedt et al. 1999, Meyer & Stark 2015). Kahanpää (2011) removed this species from the Finnish checklist and the single German record from Schleswig-Holstein (Kröber 1931) was based on an identification by Parent.

Remarks: characters are largely consistent with those in *D. trivialis*, e.g. regular fringe of minute erect anterior and anteroventral setae on median segments of fore tarsus with short straight bristle on apex of fore metatarsus, typical antennal coloration, presence of a dorsal bristle on the mid metatarsus, and a ventral fringe of cilia on the hind femur. The latter cilia were dark, instead of the more usual pale coloration in *D. trivialis* (although this feature seems variable). Obvious differences with male *D. trivialis*, i.e. a small hypopygium and a wide face further refer to infestation of both males by nematodes (see Kahanpää 2008).

New synonym of *Dolichopus trivialis* Haliday, 1832.

Dolichopus spretus Loew, 1871: 259 (Fig. 8).

Material examined: Lectotype, ♂, labelled: "Suecia"; "tibiellus" / "Zett. Boh*"; [red] "Lectotypus"; "Dolichopus" / "spretus Lw." / "Negrobov det. 1985" (Museum für Naturkunde, Berlin).

Distribution: only known from Sweden (type locality), West Siberia and Russian Far East (Negrobov 1991).

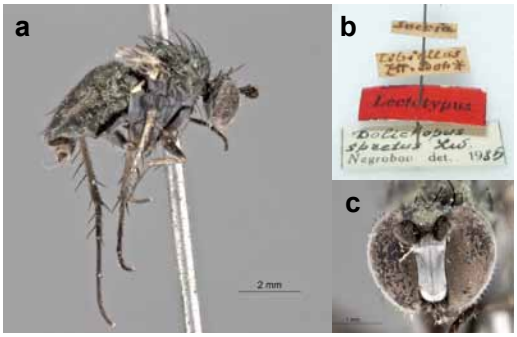

Figure 8. *Dolichopus spretus* Loew, 1871, new synonym of *Dolichopus vitripennis* Meigen, 1824: – a) lectotype, – b) labels, – c) face. Photos: Bernhard Schurian, Museum für Naturkunde, Berlin.

Dolichopus spretus Loew, 1871, ny synonym till *Dolichopus* vitripennis Meigen, 1824: – a) lectotyp, – b) etiketter, – c) ansikte. Foton: Bernhard Schurian, Museum für Naturkunde, Berlin.

Remarks: Parent (1938), Negrobov (1991), and Grichanov (2004) treated it as a valid species. Kahanpää (2008), however, suggested that it was yet another case of a nematode infested male based on the very small male genitalia, the broad face and the absence of MSSCs, but no material was examined. The specimen examined here has white lower postocular setae, all femora black and all tibia fully or largely yellow which only agrees with *D. vitripennis* or *D. fraterculus*. The latter species normally has the mid femur at least partially yellow, but in exceptionally cases it can be fully dark. The specimen investigated has a bright silvery white face, consistent with *D. vitripennis* while *D. fraterculus* has a greyish white face. Genitalia are very small and folded and of no diagnostic value.

New synonym of *Dolichopus vitripennis* Meigen, 1824.

Checklist and time window based catalogue

Overall, confirmed records of 345 species in Sweden were found in the different data sources. The total number of data entries is 5,768. The catalogue itself is added in Appendix.

In comparison to the most recent checklist (Grichanov 2004), 25 species were deleted. Seven of these species have been synonymized ever since (Table 1), and six species were synonymised by us (see above). Of 12 species, no specimens were found to support their presence in Sweden (Table 2). For many of these species, the actual mistake that ultimately led to a Swedish record and the incorporation in a previous checklist could be reconstructed. One special case was *Teuchophorus simplex* Mik, 1881, which was first deleted and later added again to the catalogue. This species was originally added to the Swedish list due to a misinterpretation of an old record mentioned by Ringdahl (1914). In 2013, the species was actually found as new for Sweden (see Hellqvist et al., 2015 for details). Another similar example is *Hydrophorus rogenhoferi*, Mik, 1874, which was reported from Lapland by Becker 1917, however, without specimens in any of the investigated collections. However, it was found during the SMTP project in To.

First records of 35 species for Sweden were added (Table 3), including three species belong to the subfamily *Microphorinae*, which was previously considered a separate family and thus not included in earlier catalogues (see e.g. Pollet & Brooks 2008). Many of the additional species were detected during the SMTP (12 species, see e.g. Pollet et al. 2015). Another important source of first species records for Sweden was Hellqvist et al. (2015) with six species.

The results presented in our catalogue can be used to investigate the distribution of different species in both time and space. As the total number of collectors that contributed to the records is limited, there is a strong bias towards provinces and time periods where and when collectors have been very active. Some important early (before 1900) contributors were based in Sk, like Carl Fredrik Fallén (1764–1830) and Johan Wilhelm Zetterstedt (1785–1874) and mainly collected there, with the exception of a few expeditions to Northern Sweden by Zetterstedt. Others, like Carl Henrik Boheman (1796–1868) and Peter Fredrik Wahlberg (1800–1877), were mainly based in Sö and Up, but also collected in many other parts of Sweden. During the 1900s Einar Wahlgren (1874–1963), Oscar Ringdahl (1885–1966), and Hugo Andersson (1927–2008) were all based in Sk, but especially Ringdahl also collected many Dolichopodidae in Northern Sweden, mainly in Jä and To. Lars Hedström did some extensive

Table 1. List of recently synonymized dolichopodid species of the 2004 Swedish checklist.

Species	Synonymization
1. *Dolichopus aemulus* Loew, 1859	Synonymy with *D. popularis* Wiedemann, 1817 confirmed by Kahanpää (2008)
2. *Dolichopus atritibialis* Zetterstedt, 1859	Synonymized with *D. urbanus* Meigen, 1824 in the present paper
3. *Dolichopus consimilis* Wahlberg, 1850	Synonymized with *D. lepidus* Staeger, 1842 by Kahanpää (2008)
4. *Dolichopus cruralis* Wahlberg, 1850	Synonymized with *D. lepidus* Staeger, 1842 by Kahanpää (2008) and confirmed by Germann et al. (2010)
5. *Dolichopus exiguus* Zetterstedt, 1843	Synonymized with *D. arbustorum* Stannius, 1831 in the present paper
6. *Dolichopus fulgidus* Fallén, 1823	Synonymized with *D. campestris* Meigen, 1824 in the present paper
7. *Dolichopus inconspicuus* Zetterstedt, 1843	Synonymized with *D. simplex* Meigen, 1824 in the present paper
8. *Dolichopus micropygus* Wahlberg, 1850	Synonymized with *D. fraterculus* Zetterstedt, 1843 by Kahanpää (2008)
9. *Dolichopus parvicaudatus* Zetterstedt, 1843	Synonymized with *D. plumipes* (Scopoli, 1763) by Kahanpää (2008)
10. *Dolichopus pectinitarsis* Stenhammar, 1851	Synonymized with *D. plumipes* (Scopoli, 1763) by Kahanpää (2008)
11. *Dolichopus propinquus* Zetterstedt, 1852	Synonymized with *D. trivialis* Haliday, 1832 in the present paper
12. *Dolichopus spretus* Loew, 1871	Synonymized with *D. vitripennis* Meigen, 1824 in the present paper
13. *Rhaphium viklundi* Grichanov, 2004	Synonymized with *Systenus bipartitus* (Loew, 1850) by Naglis (2009) and Negrobov & Grichanov (2010)

sampling on Dolichopodidae during the 1960s, mainly in Up and Sö, but also travelled all over the country. During the present century, collecting activities have been more evenly spread over the country, largely thanks to the SMTP (which generated almost half of all specimens included in the present study). Another bias could be presented by the species size with bigger and easily recognized species (e.g. most species of the genus *Dolichopus*) more likely to be collected than small inconspicuous species often confined to tree trunks (e.g. *Medetera* species). Therefore, the results must be interpreted with great caution. A more thorough analysis of the data with efforts to remove these biases might be presented in the future.

Regardless of the biases mentioned above, our dataset revealed that the Swedish province with by far the highest species richness is Sk with 267, followed by Sm with 189 and Up with 182. The province with the smallest number of species is Gs, not surprisingly since it is a small and isolated island in the Baltic Sea. Other provinces that are more poorly investigated than others are Gä, Ds, Hr, and Pi, all with 30 or less species. It is our guess that the actual number of species in these (and other) provinces could be easily more than 100 if more thorough investigations were made.

A total of 126 species contained records for all six time windows which implies that they have occurred in Sweden for at least two centuries, whereas 53 species had records from only one time window. Eleven of the latter species only had records from time window 0 suggesting that they might have been extinct before 1900. Twenty six species had only records from time window 5 which might indicate a recent introduction. The three species with most records throughout all time windows were *Dolichopus plumipes*, with 103 data entries from 28 provinces, *Dolichopus nigricornis* with 96 data entries from 29 provinces, and *Dolichopus simplex* with 94 data entries from 29 provinces. In contrast, as many as 38 species had only one data entry.

A more thorough analysis with biases removed (see above) is needed to assess trends in occurrences over time and space for the different species. However, there seem some indications of changes in distribution patterns in some species. One example of a species that is spreading northwards in Sweden is *Poecilobothrus nobilitatus* (Linnaeus, 1767) (Fig. 1). Zetterstedt (1843),

Table 2. List of dolichopodid species with no specimens in any of our investigated collections. These species were subsequently removed from the Swedish checklist.

Species	Comment
1. *Chrysotus melampodius* Loew, 1857	Added to the list by Ringdahl (1928) based on a series of specimens collected in Jä. These specimens have been identified by Grichanov as *C. obscuripes* Zetterstedt, 1838 (confirmed by Magnus Persson). No other specimens were retrieved.
2. *Dolichopus mediicornis* Verrall, 1875	Found in Lu according to Becker (1917).
3. *Dolichopus virgultorum* Haliday, 1851	First mentioned from Sweden by Parent (1938).
4. *Hercostomus fulvicaudis* (Walker, 1851)	Added to the Swedish list by Ringdahl (1928) based on the assumption that the species *Hercostomus praeceps* Loew 1869, *Dolichopus rothi* Zetterstedt 1859, *Dolichopus bicingulatus* Zetterstedt 1859, and *Hercostomus fulvicaudis* (Walker 1851) were synonyms (as suggested by Becker, 1917). However, *Hercostomus fulvicaudis* (Walker 1851) was later restored as a species by Parent (1938). Currently, *H. praeceps* is treated as synonym of *H. rothi* (see Drake et al. 2013). All old specimens labelled as *fulvicaudis* found in the museum collections belonged to *Hercostomus rothi*. In two publications, Ringdahl (1941, 1960) mentioned records of *H. fulvicaudis*, however, these specimens were not found in Ringdahl's collection.
5. *Hydrophorus callostomus* Loew, 1857	Added to the Swedish list by Grichanov (2002).
6. *Hydrophorus freyi* Storå, 1954	First mentioned from Sweden by Negrobov (1991).
7. *Medetera annulitarsus* von Roser, 1840	First mentioned from Sweden by Negrobov (1991).
8. *Medetera glauca* Loew, 1869	Found in Lapland according to Becker (1917).
9. *Ortochile nigrocoerulea* Latreille, 1809	A possible reason for this species to be added by Grichanov (2003) is that Negrobov (1991) erroneously listed *Ortochile coerulea* Zetterstedt 1843, as synonym with type locality Scandinavia. However, Zetterstedt (1843) clearly stated that, in his opinion, this species is not present in Scandinavia ("Nec haec in Scandinavia occurit, quantum novi").
10. *Rhaphium pectinatum* (Loew, 1859)	First mentioned in a Swedish context by Wahlgren (1912). He mentioned that it has been found in Vg, but also added a question mark. No further information was given.
11. *Sympycnus brevimanus* Loew, 1857	First mentioned from Sweden by Negrobov (1991).
12. *Syntormon mikii* Strobl, 1899	First mentioned from Sweden by Negrobov (1991).

Wahlgren (1912), and Ringdahl (1928) all knew this species from Sk, Öl, and Go only. During time window 3 it was also found in Bl, and during time window 4 also in Sm. During time window 5 it was first found during the SMTP in Sö. After 2011 it seems that the species has spread rapidly further north and new records were found in Ha, Ög, Vg, Bo, Ds, Up, Vs, and Vr (see Appendix). The increased number of records could, of course, be the result of an increasing collecting activity, though this conspicuous species is not easily overlooked, and at least Ög, Up, and Sö are very well investigated provinces. Thus, the increasing number of recent records is most likely due to an increasing distribution range.

The number of data entries and species per time window is presented in table 4. Time Window 5 had the most data entries which is mainly due to the SMTP (868 entries), and time window 1 had the smallest number. The number of species found in each of the time windows was strongly correlated to the number of data entries (correlation coefficient r=0.953). The actual number of species occurring in the country during each time window is difficult to interpret due to the varying sampling effort over time (and space). However,

Table 3. List of dolichopodid species newly recorded from Sweden since the 2004 checklist.

Species	Reference/source
1. *Asyndetus latifrons* Loew, 1869	2005, Sk, leg. Mikael Sörensson, confirmed by Magnus Persson (unpubl. data).
2. *Dolichopus laticola* Verall, 1904	2017, Sk, leg. & det. Fredrik Östrand, confirmed by Magnus Persson (unpubl. data).
3. *Gymnopternus silvestris* Pollet, 1990	SMTP (unpubl. data, det. Marc Pollet). Also found 2016, Up and 2017, Sk, leg. & det. Magnus Persson.
4. *Hercostomus conformis* (Loew, 1857)	Found in Sweden during time window 3 (Öl) by Lars Hedström (unpubl. data).
5. *Hercostomus verbekei* Pollet, 1993	2018, Sk, leg. & det. Magnus Persson (unpubl. data).
6. *Medetera belgica* Parent, 1936	Synonymized with *M. muralis* Meigen, 1824 by Grichanov (2002), but reinstated as valid species by Negrobov & Naglis (2016). Several specimens were found during SMTP (unpubl. data, det. Marc Pollet), but more might be in museum collections.
7. *Medetera collarti* Negrobov, 1967	2005, Sk, leg. Fredrik Östrand (unpubl. data), det. Marc Pollet.
8. *Medetera bispinosa* Negrobov, 1967	SMTP (unpubl. data, det. Marc Pollet).
9. *Medetera brevitarsa* Negrobov, 1967	SMTP (unpubl. data, det. Marc Pollet).
10. *Medetera feminina* Negrobov, 1967	2008, Up, leg. Mats Jonsell (unpubl. data), det. Marc Pollet.
11. *Medetera freyi* Thuneberg, 1955	SMTP (unpubl. data, det. Marc Pollet).
12. *Medetera incrassata* Frey, 1909	SMTP (unpubl. data, det. Marc Pollet).
13. *Medetera insignis* Girschner 1888	Hellqvist et al. (2015) (det. Marc Pollet).
14. *Medetera lorea* Negrobov, 1967	SMTP (unpubl. data, det. Marc Pollet).
15. *Medetera mixta* Negrobov, 1967	SMTP (unpubl. data, det. Marc Pollet).
16. *Medetera peloria* Negrobov 1967	Hellqvist et al. (2015) (det. Marc Pollet).
17. *Medetera petrophiloides* Parent, 1925	Synonymized with *M. petrophila* Kowarz, 1877 by Grichanov (2002), but reinstated as valid species by Negrobov (2010). Only a few Swedish specimens are known to the authors, but more might be in museum collections.
18. *Medetera prjachinae* Negrobov, 1974	First Swedish record published by Hedgren (2003), also found in the SMTP (unpubl. data, det. Marc Pollet).
19. *Medetera saxatilis* Collin, 1941	SMTP (unpubl. data, det. Marc Pollet).
20. *Medetera seguyi* Parent, 1926	SMTP (unpubl. data, det. Marc Pollet).
21. *Medetera takagii* Negrobov, 1970	SMTP (unpubl. data, det. Marc Pollet).
22. *Medetera thunebergi* Negrobov, 1967	Synonymized with *M. excellens* Frey, 1909 by Grichanov (2002) but reinstated as valid species by Negrobov & Naglis (2016). Only a few Swedish specimens are known to the authors, but more might be in museum collections.
23. *Medetera unisetosa* Collin, 1941	First found in Sweden during time window 3 (Ög, Sö, Up) by Lars Hedström (unpubl. data); also SMTP (unpubl. data, det. Marc Pollet).
24. *Micromorphus claripennis* (Strobl, 1899)	First found in Sweden during time window 3 (in Sk, Bo) by Lars Hedström (unpubl. data).
25. *Microphor anomalus* Meigen 1824	The genus *Microphor* belongs to the subfamily Microphorinae (Pollet & Brooks 2008) which was previously considered a separate family and thus not included in earlier Swedish catalogues or checklists.
26. *Microphor crassipes* Macquart 1827	See above.

27. *Microphor holocericeus* Meigen 1804	See above.
28. *Neurigona uralensis* Becker, 1918	SMTP (unpubl. data, det. Marc Pollet).
29. *Rhaphium antennatum* (Carlier, 1835)	2018, Sk, Magnus Persson (unpubl. data).
30. *Rhaphium latimanum* Kahanpää, 2007	Hellqvist et al. (2015). Specimens of this species in old collections might be erroneously identified as *Rhaphium crassipes* (Meigen, 1824).
31. *Sybistroma sciophilum* (Loew, 1869)	Hellqvist et al. (2015) (det. Magnus Persson and Marc Pollet).
32. *Sympycnus septentrionalis* Pollet, 2016	Described from type locality in Sweden (Pollet et al., 2015).
33. *Syntormon pseudospicatum* Strobl, 1899	Synonymized with *S. pallipes* (Fabricius, 1794) by Grichanov (2002), but differs consistently from latter species and must be reinstated as valid species (Marc Pollet, pers. comm.); SMTP (unpubl. data, det. Marc Pollet), but more specimens might be in museum collections. Also found during time window 5, Sk, leg. & det. Magnus Persson.
34. *Teuchophorus calcaratus* (Macquart, 1827)	Hellqvist et al. (2015) (det. Magnus Persson and Marc Pollet).
35. *Xanthochlorus galbanus* Chandler & Negrobov, 2008	Recently separated from *X. tenellus*. Found in Sk during time window 3, 4, and 5 (unpubl. data, det. Magnus Persson).

our data do not suggest any major trend of the total number of species over time.

Species richness apparently decreases from southern to northern Sweden based on the number of species found in the four regions. The number of species found in Götaland was 303, 230 in Svealand, 186 in Norrland, and 108 in Lappmarkerna. However, one has to bear in mind that the collecting activity is far from evenly distributed over the country. Overall the southern parts are better investigated compared to northern Sweden. Ringdahl (1928) presented a zoogeographical analysis of the Swedish Dolichopodidae. He divided the fauna into three different groups: group I with species found in the whole country (50 species), group II with species only found in northern Sweden (44 species) and group III with species with a predominately southern distribution with scattered populations in northern Sweden, mainly along the coast (167 species). Using our catalogue we can confirm his zoogeographical concept. But thanks to an increased number of records, we suggest here a slightly different division of the zoogeographical groups with more clear definitions: group I with species found in all four regions, group II with species found only in the two northern regions (Norrland and Lappmarkerna), group III with species found only in the two southernmost regions (Götaland and Svealand), with a subgroup, group IIIa, with species found only in the southernmost region (Götaland), and group IV, the remaining species with more scattered distributions. Using these group definitions, group I contains 81 species, group II 29 species, group III 152 species of which 75 species in subgroup IIIa, and group IV 83 species. Again, a more thorough analysis including e.g., a multivariate analysis will be part of a separate paper.

Discussion

Some of the newly added species have probably been part of the Swedish fauna for a very long time. For example, checking more than 500 specimens labelled as *Sympycnus pulicarius* (Fallén, 1823) in BMLU resulted in more than 20 specimens of the recently described *Sympycnus septentrionalis* Pollet, 2015 (Pollet et al. 2015) from time window 1, 3, and 4. Other species, on the contrary, might have entered southernmost Sweden only very recently, like e.g. *Dolichopus laticola* Verall, 1904, *Hercostomus verbekei*, Pollet, 1993, *Sybistroma sciophilum* (Loew, 1869), *Teuchophorus simplex* Mik, 1881, and *Teuchophorus calcaratus* (Macquart, 1827). All of these were found for the first time in the southernmost province, Sk, during 2013 or later. Since this is by far the best investigated province, and since some of the species were found at localities that have been frequently visited by numerous

Table 4. Number of data entries and species for 5 defined successive time windows. A data entry in the catalogue is defined as the presence of a species in one time window in one Swedish province.

Time window	Period	No. of data entries	No. of species
0	<1900	739	208
1	1900–1924	577	217
2	1925–1949	902	238
3	1950–1974	1,240	268
4	1975–1999	616	205
5	2000–present	1,694	282
0–5	total	5,768	345

dipterologists over the last centuries, it is likely that they would have been found earlier if they had been present for a longer period. Other species, like *Gymnopternus silvestris* (Pollet, 1990) and *Neurigona uralensis* Becker, 1918, on the contrary, have probably been present in Sweden for a longer time, and they might just have been overlooked since they are very rare and/or have a limited distribution in Sweden. These patterns will be analysed more profoundly in a separate paper.

We assume that some of the 11 species with no records after 1900 might have become extinct in Sweden. But possibly, some are still present in less investigated areas of the country and perhaps even in the sites where they have been recorded before. For example, *Acropsilus niger, Hydrophorus oceanus*, and *Poecilobothrus ducalis* are all species found along the west coast of Sweden, an area that has received little attention by collectors during the last century. An example of a species likely to be extinct is *Dolichopus litorellus*. This species was described based on specimens collected along the west coast of Sk. Several additional specimens were collected by different collectors during the mid 19th century in the same area. Despite quite intensive collecting activities in this particular area during the last 150 years, no more specimens have been found. At the same time, the area has become heavily urbanised, which has altered the biotopes where the species used to occur.

Our conservative approach, in which we only included species with specimens that have been seen by us, or by other collectors/Diptera workers that we consider trustworthy, led to the removal of many species from the previous catalogue. We believe that it is easier to add species to the list rather than deleting species. Old errors in catalogues tend to be persistent, and therefore the current catalogue should be viewed as a fresh start of the knowledge about the distribution of species in Sweden, at present as well as in the past. This being said, we do acknowledge a number of issues in our catalogue. For example, a revised key was recently published for the genus *Medetera* (Negrobov & Naglis 2016) which calls for a re-examination of the museum collections of this genus. Indeed, the incorrect synonymies by Grichanov (2002) of a number of *Medetera* species suggest that specimens might have been misidentified. Otherwise, there is also still undetermined material in the museum collections, e.g., the BMLU alone has thousands of undetermined specimens, both wet and dry mounted, and a major part of the SMTP samples is yet to be processed and dolichopodid fractions to be examined.

We considered it relevant to compare the results of our study with the *Syrphidae* catalogue by Bartsch (2001), since both catalogues are based on the same principles, and both families have a comparable number of species in Sweden. The *Syrphidae* catalogue contains 370 species with a total of 9,800 records. Compared to our study, not only the number of records was higher in Bartsch's study, but also the number of contributing collectors was significantly higher. As this was published in 2001, time window 5 obviously had very few records. The time window with the most records was time window 4, which had the second lowest number of records in our study. This time window represents a period when the interest for Syrphidae gained a lot of attention, much thanks to Hans Bartsch, who was the central figure in the Swedish Diptera community at that time. Much of the recent attention for the family Syrphidae can probably also be explained by the publication of a number of good and easily accessible keys, i.e. the two volumes in the series Nationalnyckeln (Bartsch et al. 2009a, b). Similar publications covering the Dolichopodidae fauna could hopefully lead to a similar boost in the public interest

for this family. It is our hope that our study can increase the popularity of this fascinating family leading to more records for the present and future time windows, and ultimately the protection of the most threatened species and their habitats.

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Sammanfattning

Familjen styltflugor (Dolichopodidae) är en flugfamilj som i Sverige rönt ganska stor uppmärksamhet under de senaste tvåhundra åren. Ett flertal checklistor har publicerats, den senaste 2004. Trots detta har ingen regelrätt landskapskatalog upprättats. En landskapskatalog visar inte bara vilka arter som finns i landet utan också i vilken del av landet de olika arterna förekommer. En tidsfönsterbaserad landskapskatalog visar också förändringar i faunan över tid, vilket är till stor hjälp för faunavårdsarbete.

Det senaste decenniet har det skett flera taxonomiska ändringar relevanta för den svenska faunan, dessutom har ett flertal nya arter upptäckts, dels genom svenska Malaisefälleprojektet (SMTP), och dels genom en ökad samlingsfrekvens. Detta har gjort att den svenska checklistan var i stort behov av en uppdatering.

Vi presenterar här en uppdaterad checklista och en tidsfönsterbaserad landskapskatalog för familjen styltflugor baserad på museisamlingar, privata samlingar, SMTP och publikationer. Totalt inkluderar materialet runt 92 000 individer. Jämfört med checklistan publicerad 2004, som innehöll 334 arter, togs 25 arter bort. Av dessa togs 12 arter bort eftersom inga dokumenterade fynd kunde lokaliseras i någon källa, sju arter hade synonymiserats med andra kända arter. Vi studerade typexemplaren av ytterligare sex arter som vi härmed synonymiserar enligt följande: *Dolichopus atritibialis* Zetterstedt, 1859 = *D. urbanus* Meigen, 1824 **syn. nov.**; *Dolichopus exiguus* Zetterstedt, 1843 = *D. arbustorum* Stannius, 1831 **syn. nov.**; *Dolichopus fulgidus* Fallén, 1823 = *D. campestris* Meigen, 1824 **syn. nov.**; *Dolichopus inconspicuus* Zetterstedt, 1843 = *D. simplex* Meigen, 1824 **syn. nov.**; *Dolichopus propinquus* Zetterstedt, 1852 = *D. trivialis* Haliday, 1832 **syn. nov.**; *Dolichopus spretus* Loew, 1871 = *D. vitripennis* Meigen, 1824 **syn. nov.** Vi presenterar de första dokumenterade fynden av 35 arter, vilket gör att det totala antalet arter i den nya checklistan är 345.

Vi presenterar också resultat som en tidsfönsterbaserad landskapskatalog med sex tidsfönster som representerar fynd innan år 1900 och fem 25-årsperioder från 1900 till idag. Totalt innehåller landskapskatalogen 5 768 unika kombinationer och art/landskap/tidsfönster. Vi hoppas att vår katalog kommer utgöra inspiration för framtida studier av denna fascinerande familj.

Appendix. Catalogue with province records of Swedish Dolichopodidae. Numbers indicate time window. Time window 0 covers data collected before 1900. Time windows 1 to 5 represent 25 year periods from 1900 (time window 1 = 1900–1924) until present (time window 5 = 2000–present). Provinces are grouped in geographical regions from south to north (see Figure 2).

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
Achalcus Loew, 1857														
bimaculatus Pollet, 1996					53									
cinereus (Haliday, 1851)	532	4	5	520	54	4		5					5	540
flavicollis (Meigen, 1824)	43210		5	54	3	0		53	0	0			50	50
nigropunctatus Pollet & Brunhes, 1996				5										5
thalhammeri Lichtwardt, 1913													3	53
vaillanti Brunhes, 1987		3											3	5
Acropsilus Loew, 1869														
niger (Loew, 1869)			0											
Anepsiomyia Bezzi, 1902														
flaviventris (Meigen, 1824)														
Aphrosylus Haliday in Walker, 1851														
ferox Haliday, 1851														
Argyra Macquart, 1834														
argentina (Meigen, 1824)	543210		54	21	20	3		54	5				54	520
argyria (Meigen, 1824)	410		43	530	50	10		0					3	20
auricollis (Meigen, 1824)	543210			532				54	3			4	4	520
diaphana (Fabricius, 1775)	543210	53	53	5432	3	10		540	530	20			543	530
elongata (Zetterstedt, 1843)	3			5	5			0					5	5
ilonae Gosseries, 1988	53210		3	4				5	3				5	52
leucocephala (Meigen, 1824)	543210	53	53	423	530	5310		540	52	30	3	42	543	5320
loewi Kowarz, 1879													3	5
magnicornis (Zetterstedt, 1838)	32			5				0					5	50
setimana Loew, 1859										3				5
setulipes Becker 1918														
spoliata Kowarz, 1879														
subarctica Ringdahl, 1920														
vestita (Wiedemann, 1817)	543210	3		4	540	310		50	0				5	50
Asyndetus Loew, 1869														
latifrons Loew, 1869	5													
Australachalcus Pollet, 2005														
melanotrichus (Mik, 1878)	5430			5	5			5	4				5	5
Campsicnemus Haliday in Walker, 1851														
alpinus (Haliday, 1833)	50		5	20						5				3
armatus (Zetterstedt, 1849)	543210	4	4	40	540	410				30				
compeditus Loew, 1857	521		3	532					2				3	
curvipes (Fallén, 1823)	543210	543	543	5420	54321	21		5420	52	5210	3	2	54	543210
dasycnemus Loew, 1857	321			30	53	542		30						3
femoratus Ringdahl, 1949	0													
loripes (Haliday, 1832)	54321	5	543	5431		5		0	3			3	53	532
lumbatus Loew, 1857	3					1								
marginatus Loew, 1857	5320					3								3
paradoxus (Wahlberg, 1844)														
picticornis (Zetterstedt, 1843)	543210		53	4	54321	5420		0					53	530
pumilio (Zetterstedt, 1843)	43210	43		520	54	310		0	0	3			3	
pusillus (Meigen, 1824)	54310			32	42	210		0	2				3	520
scambus (Fallén, 1823)	543210	543	543	54210	5421	54		0	52	53	3	2	542	54320
Chrysotimus Loew, 1857														
flaviventris (von Roser, 1840)	5431	5	5	54	540	3		0	5	53			5	
molliculus (Fallén, 1823)	50		4	5	50	310		5	5	3				5
Chrysotus Meigen, 1824														
angulicornis Kowarz 1874	41					5		5				3	3	5
arcticus Frey, 1915								3						
blepharosceles Kowarz, 1874	543							5						
cilipes Meigen, 1824	53210	3	50	521	5	31		3	53	52	5	3	53	52
cupreus (Macquart, 1827)	54321	52	3	5	42	5		54				5	5	5
femoratus Zetterstedt, 1843	5321		5		5	521		50						

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
																53			
	54	2		53	5			5	5		5					54320	X	X	X
	5															543210	X	X	X
	5			3				5	5							53			X
																53			X
																53		X	
																0	X		
																	X		
																		X	
			5						5							543210	X	X	X
																543210	X	X	X
5	53		5	5	5	2	521	5	5							543210	X	X	X
5	2	2			5											543210	X	X	X
																530	X	X	X
	53	5			5				5						1	543210	X	X	X
	43	2														543210	X	X	X
																53	X		
						2	2									5320	X	X	X
	53							5	5							53			
																			X
							2	5	5							52		X	X
							3					2			1	321		X	X
																543210	X	X	X
																5		X	X
	5															5430		X	
	3			53					5					3		5320	X	X	X
	4															543210	X	X	X
	3	3		3		5	521	3	5	421	5	52	5		21	54321		X	X
	4	542		3	5		2	51	53	3						543210	X	X	X
		0		3			0		3	430						543210		X	X
							2	5	5	0						520			X
5	54			53	5		21	5	5							543210	X	X	X
																31			X
	3			3			521		5	3						53210		X	X
												5	5		3	53		X	X
	3															543210	X		X
																543210	X		X
	53			53	5				5	2					21	543210			X
	54	54320		53	5		21	5	53	54320	54	532		52	51	543210	X	X	X
																54310	X	X	
	5															54310	X	X	X
																5431			X
																3			
																543	X	X	
5	54	52		5	5			5	5		5					543210	X	X	X
	5															54321	X	X	X
	5	32			5		2	5	5	4						543210	X	X	X

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
gramineus (Fallén, 1823)	543210	543	53	5432	543210	543210		5430	50	5432	2	532	53	53210
laesus (Wiedemann, 1817)	543210	0	0	5410				0	3	20		3		10
neglectus (Wiedemann, 1817)	543210	431	5430	54320		54320		5	53	32		532	53	5310
obscuripes Zetterstedt, 1838	510		530	542					2	2			3	
palustris Verrall, 1876	1	3				1			2					
pulchellus Kowarz, 1874	543210	4	30	542	4321	52		50		0			54	3
ringdahli Parent, 1929				4										
suavis Loew, 1857	543					53				5			53	
Cryptophlebs Lichtwardt, 1898														
kerteszi Lichtwardt, 1898	43													
Diaphorus Meigen, 1824														
exunguiculatus Parent 1925														
hoffmannseggi Meigen, 1830	21	3												
nigricans Meigen, 1824	53210		32	54210	32	10		10	2	20			3	
oculatus (Fallén, 1823)	5410		5	520	5430	210		0	50	50	5			50
Dolichophorus Lichtwardt, 1902														
kerteszi Lichtwardt 1902														
Dolichopus Latreille, 1796														
acuticornis Wiedemann, 1817	3210		30	43										
agilis Meigen, 1824	4310			5	5	51			20					
albifrons Loew, 1859	0				0			0						
annulitarsis Ringdahl, 1920														
apicalis Zetterstedt, 1849	54				53									5
arbustorum Stannius, 1831	1		3	4	54310	5								
argyrotarsis Wahlberg, 1850				20										0
armillatus Wahlberg, 1850				0					0					
atratus Meigen, 1824														
atripes Meigen, 1824	54210		530	321	0			0	53	52				
austriacus Parent, 1927	210			4	530	3								5
bonsdorfii Frey, 1915														
brevipennis Meigen, 1824	543210	4	32	54210	5321	3210		20	5432	521		2	53	5320
caligatus Wahlberg, 1850	10			1				0		0			5	
calinotus Loew, 1871	532					3								
campestris Meigen, 1824	543210		3	4	32	31		30	42	510		5	53	520
cilifemoratus Macquart, 1827	53210		3		54320	310		5	53		53	32	5	52
cinctipes Wahlberg, 1850														
claviger Stannius, 1831	543210	3	3	5210	32	53210	21		2	3			5	5420
clavipes Haliday, 1832	54321		30		50	10		3		530				
costalis Frey, 1915														
diadema Haliday, 1832	5321	3		4	5321	31		0		0			5	532
discimanus Wahlberg, 1851														
excisus Loew, 1859														
festivus Haliday, 1832	53210		3	5	53	0			5		5		5	50
fraterculus Zetterstedt, 1843	2												3	
grandicornis Wahlberg, 1850									0					
griseipennis Stannius, 1831	54321	3	3	43	543210	543210			3	20	53		53	3
gubernator Mik, 1878														
hilaris Loew, 1862	31													
lancearius Hedström, 1966														
laticola Verall, 1904	5													
latilimbatus Macquart, 1827	51			5	5	5							5	52
latipennis Fallén, 1823	53210	53	3	421	5420	3210			3	0			53	
lepidus Staeger, 1842	543210	5	530	543210	54321			40	54	52	53	5	543	5310
linearis Meigen, 1824	54321	30	3	5432	5			5		3			5	5320
lineatocornis Zetterstedt, 1843	3				5410									53
litorellus Zetterstedt, 1852	0													
longicornis Stannius, 1831	543210	43	430	543210	532	53210		50	542	5		4	532	50
longitarsis Stannius, 1831	53210		0	1	532	5310		50	5	21			53	5210
maculicornis Verrall, 1875	0													
maculipennis Zetterstedt, 1843	50			0										
mannerheimi Zetterstedt, 1838														
meigeni Loew, 1857	1													
melanopus Meigen, 1824	510				53	1							5	

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
54	543	4320		3	54		521	5	5	30		3				543210	X	X	X
4					4					3						543210	X	X	X
5	52	532		3	5		2	5	53	30	3	3			3	543210	X	X	X
5		20		3	5	2	321	5	5	32	3			1		543210	X	X	X
																321		X	
	542	432		3			21	5	5	53	3	3				543210	X	X	X
							21		3							4321			
	53			3				5	5	2						5432		X	X
																43			
																		X	
																321	X		X
	5432	3		3	5		2	5	5	432	5	3			3	543210	X	X	X
	5	31			5											543210	X	X	X
																			X
	5				5			5								543210	X	X	X
	5															543210	X		
																0			X
															521	521			X
5																543	X		X
		3														54310	X		
	4								5							5420		X	X
		0					21			3	2			320	5321	53210		X	X
																	X		
5		2					5				5				4	543210	X	X	X
																543210			X
							2				3	3			2	32			X
53	52	543210	3	3			3210	321	53	5321		321	3	32	321	543210	X	X	X
									5			5			321	53210	X	X	X
																532	X		X
4				5	5											543210	X	X	X
54	54	32	2													543210	X	X	X
							0							30		30		X	X
	532	54321		3	5			5	52	43		5				543210	X	X	X
																543210	X	X	X
															321	321			X
						2	3			3						543210	X	X	X
										3		3		30	5321	53210			X
																	X		
5																53210	X	X	
	3	5432		53			5320	5	53	43	5	3	5	320	4321	543210		X	X
																0			
4	4															543210	X	X	X
																			X
																31			X
				3						3						3		X	X
																5	X		
5																521	X		X
																543210	X	X	X
54	53	54320		53	5	5	5321	53	53	5432	53	53	5321	3210	321	543210	X	X	X
	54	32			5			5	5							543210	X	X	X
		4														54310	X		X
																0	X		
4	5432	5421		321	5		30	5	53	54321	43	3	21	320	3	543210	X	X	X
4					5		52	5	52	21						543210	X	X	X
																0			
		30		53			5210		53		52	53	21	321	54321	543210	X	X	X
							2			3		20		0	4321	43210		X	X
																1	X		
																5310	X		

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
migrans Zetterstedt, 1843	543210		432	0	54320	5210	31	0		0				50
nigricornis Meigen, 1824	543210	53	5432	543210	54	5		5430	5432	54320	543	5	5431	53210
nigripes Fallén, 1823	0				4									50
nitidus Fallén, 1823	53210			532	540	5210	3	50	3	3			53	53
notatus Staeger, 1842	543210	3	3	5321	42	3210		0	4					
nubilus Meigen, 1824	543210	53	30	541	543210	543210		0	5	320			53	5320
pennatus Meigen, 1824	543210	5	3	421	4321	310		0	5	2			5	53210
picipes Meigen, 1824	54310	0	3	3210	2	310		40	50	20			53	5310
planitarsis Fallén, 1823	543210		3	310	5431	0		20		3				30
plumipes (Scopoli, 1763)	543210	54321	53210	54210	54321	54210		530	532	5320	543	32	5321	53210
plumitarsis Fallén, 1823	50		4		2									
popularis Wiedemann, 1817	543210	53		54320	20	310		540	5430	5320	53	53	5432	53210
pseudomigrans Ringdahl, 1928														
punctum Meigen, 1824	1		0	0										
remipes Wahlberg, 1839					0			0					3	
rupestris Haliday, 1833	53210		20	54321								5	3	
ruthei Loew, 1847								0	0					
sabinus Haliday, 1838	53210	53	0	4	21	51		3		0				52
setiger Negrobov, 1973														
signatus Meigen, 1824	54321	3	3	54					5					
signifer Haliday, 1838	2		53			4320								
simplex Meigen, 1824	543210	4310	5432	543210	5421	54210	3	540	5432	5320	4321	532	5421	53210
stenhammari Zetterstedt, 1843	3			5431	4								54	43
subpennatus d'Assis-Fonseca, 1976	54321	3	3	3	32	31		0	2	5			5	3
tanythrix Loew, 1869	521		53	2										
trivialis Haliday, 1832	543210		54	43	54321	543210		530	53	52	3	2	532	53210
ungulatus (Linnaeus, 1758)	543210	5430	5432	543210	543210	53210		5430	530	5210	3	30	53	53210
urbanus Meigen, 1824	21		0					5						
wahlbergi Zetterstedt, 1843	543210	5		50	543	310		0	5	20	5	2	532	54320
vitripennis Meigen, 1824	54210	43	30	43210				0	50	310				
zetterstedti Stenhammar, 1852														
Ethiromyia Brooks & Wheeler, 2005														
chalybea (Wiedemann, 1817)	53210			2	52								3	521
Gymnopternus Loew, 1857														
aerosus (Fallén, 1823)	543210	5430	543	543210	5420	430		5430	542	52	53	532	5432	53210
angustifrons (Staeger, 1842)	4321			542	54310	0		0					53	5310
assimilis (Staeger, 1842)	54321				5432	310								5
blankaartensis (Pollet, 1990)	510				4									
brevicornis (Staeger, 1842)	54321	3	432	4					532	542		2	3	5
celer (Meigen, 1824)	54321	3	3	53	53	2		4	42	521		52	31	53210
cupreus (Fallén, 1823)	543210	3	54320	5320	320			0	5420	2				
metallicus (Stannius, 1831)	543210	43	4320	54320	540			40	52	43			543	54320
silvestris (Pollet, 1990)														5
Hercostomus Loew, 1857														
argentifrons Oldenberg, 1916			5	5	4			5	52				543	5
chetifer (Walker, 1849)	432													
conformis (Loew, 1857)					3									
fulvicaudis (Walker, 1851)														
germanus (Wiedemann, 1817)	543210		530	520	421			0	521	10				3210
gracilis (Stannius, 1831)	54210	3												
nanus (Macquart, 1827)	542			1	5									
nigrilamellatus (Macquart, 1827)	5420			1										2
nigripennis (Fallén, 1823)	543210	3	543	51	21					1				
nigriplantis (Stannius, 1831)	520			0		54			2					5
rothi (Zetterstedt, 1859)	5320		5	5	5									
ruficauda (Zetterstedt, 1859)	0													
sahlbergi (Zetterstedt, 1838)	0			0					0				4	520
verbekei Pollet, 1993	5													
vivax (Loew, 1857)														
Hydrophorus Fallen, 1823														
albiceps Frey, 1915	51		3	521		1		0		0			3	
albosignatus Ringdahl, 1919														
alpinus Wahlberg, 1844														

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
	2	532		51	5											543210	X	X	X
54	5431	543210	532	53	5	53	5321	53	542	5432	53	5321	53	5431	4321	543210	X	X	X
																540	X	X	X
5	53	3		5					5	5				3		543210	X	X	X
	5	2		2			2		5	43		3			3	543210	X	X	X
				32	53			5	5	3						543210	X	X	X
5	53	5432		3	5		5210	5	5	5320	5	53				543210	X	X	X
5	4	52		53	5		53210	53	5	5320	5	53	1	30	5321	543210	X	X	X
		20				2	1			3	5	53			5321	543210	X	X	X
53	541	543210	32	531	54		5321	53	53	5432	543	5431	5321	321	54321	543210	X	X	X
					5					0						5420		X	
5	5432	2		3	5			53	5	3	53	5		0	3	543210	X	X	X
															210	210			X
				3			0									310			X
				5												530	X	X	X
	53	54320		5	5		521	53	532	543	5	53	51	5321	54321	543210	X	X	X
																0			X
		4														543210	X	X	X
																			X
5																54321	X	X	X
																54320	X	X	X
542	5432	543210	3	32	5		321	53	532	54321	43	53	32	3	3	543210	X	X	X
	54	4320		53		5	5321	53	5	43	52	532	5	31	54321	543210	X	X	X
	53	2														543210	X	X	X
																5321	X	X	
54	543	432		3				5								543210	X	X	X
542	5210	5432	52	20	54		53210	53	532	543	53	32	3		3	543210	X	X	X
		542			5	2	53210	5	530	543	53	53	521	20	31	543210	X	X	X
54	5432															543210	X	X	X
																543210	X	X	X
							1			3	5		1	32	21	5321		X	X
								5	5							53210	X	X	X
54	543	3210		531	5		3210	5	5	3	3	52				543210	X	X	X
5	52	2						5	5	3			2	2		543210	X	X	X
																543210	X		
																5410			
	5432	5432		3	54	5	21	5	5	53		3		3	3	54321	X	X	X
5	53	2		3	5		32	5	53	543						543210	X	X	X
																543210	X	X	
5	53	52							5							543210	X	X	X
																5			
																5432			
																432		X	
																3			
																	X		
		2					2					3				543210	X	X	X
																543210	X		
																5421	X		
																54210		X	X
										0						543210	X		
																5420		X	X
	5															5320	X		
																0			
		5320		5	5	53	53210	5	5	3	5	543	521	5321	4321	543210	X	X	X
																5			
																	X		
	3			30		5	510	5	5	4321	5	53	1	1	531	543210	X	X	X
										3				1		31			
							5				5	5	5	10	5321	53210		X	X

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
altivagus Aldrich, 1911														
balticus (Meigen, 1824)	210				54320	421								
bipunctatus (Lehmann, 1822)	543210	53	53	521	53	310		30	5		3	0	53	20
borealis Loew, 1857	1	5		21				4	5					2
brunnicosus Loew, 1857														
callostomus Loew, 1857														
freyi Storå, 1954														
geminus Frey, 1915				0		0								
litoreus Fallén, 1823	54310	3		10	2	21	3	0		0	3		3	5320
nebulosus Fallén, 1823	3210		0	4310				0					3	3
norvegicus Ringdahl, 1928														
oceanus (Macquart, 1838)										0				
pectinatus Gerstäcker, 1864	1				2				1					
pilipes Frey, 1915														
praecox (Lehmann, 1822)	54321	3	3	421	5321	4210		3		10			3	52
rogenhoferi Mik, 1874														
rufibarbis Gerstäcker, 1864														
signifer Coquillett, 1899														
viridis (Meigen, 1824)	1			21		1			2					
Lamprochromus Mik, 1878														
bifasciatus (Macquart, 1827)	3				4			50						0
Liancalus Loew, 1857														
virens (Scopoli, 1763)	321	32	4	53		51		0	5			2	5	53
Machaerium Haliday, 1832														
maritimae Haliday, 1832														
Medetera Fischer von Waldheim, 1819														
abstrusa Thuneberg, 1955	5432		53	532	543	3		5	5				53	52
acanthura Negrobov & Thuneberg, 1970	5			5				50					53	5
adjaniae Gosseries, 1988														5
ambigua (Zetterstedt, 1843)	5			52	30	53							5	52
annulitarsus von Roser, 1840														
apicalis (Zetterstedt, 1843)	321			32				0					53	3
belgica Parent, 1936	5	5	5	5	5	5		5	5	5			5	5
betulae Ringdahl, 1949	52		5	5									53	53
bispinosa Negrobov, 1967					5									
borealis Thuneberg, 1955	2		3	5				3					53	53
brevitarsa Negrobov, 1967	5		5		5									
cuspidata Collin, 1941	54			5	3	5							5	53
collarti Negrobov, 1967	5													
diadema (Linnaeus, 1767)	3210		0		3210	310								10
dichrocera Kowarz, 1877				4				5						
excellens Frey, 1909	2			5					5				4	5
fasciata Frey, 1915								5						2
feminina Negrobov, 1967														5
freyi Thuneberg, 1955								3					53	5
fumida Negrobov,1967														
gracilicauda Parent, 1927										2				
impigra Collin, 1941	54321		5	5	5			53					3	5
incrassata Frey, 1909			5		5								3	5
infumata Loew, 1857	54210		5430	532	54	5		0				2	543	530
insignis Girschner 1888	5													
inspissata Collin, 1952				5										5
jacula (Fallén, 1823)	543210	430	543	54320	543210	53210		50	52	520	5	2	53	53210
jugalis Collin, 1941													543	53
lorea Negrobov, 1967	5		5	5	5	5		5		5			5	5
melancholica Lundbeck, 1912	2			52		5			5				543	53
micacea Loew, 1857	543210	4	40	5	54210									0
mixta Negrobov, 1967	5													
muralis Meigen, 1824	5321		30	54	54	5		4		52			4	532
nitida (Macquart, 1834)	32		3	52		3		53	5				3	2
obscura (Zetterstedt, 1838)	210	0		421	3	510		0					53	50
pallipes (Zetterstedt, 1843)	54321		5430	5	543	531		50	0	5			53	530
parenti Stackelberg, 1925			5	53	5								3	53

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
					5			5	53							53		X	X
																543210	X	X	
	3	32						5	5						5	543210	X	X	X
	3	2		3	5		521	51	5432	31	52	3		321	321	54321	X	X	X
									5	3						53			X
																			X
																			X
		2								0		3		3210	32	3210		X	X
	3	0		2		2		5	5							543210	X		X
	54	420		53			521	5	5	0		3	5	10	0	543210	X	X	X
										32						32		X	X
																0	X		
		0								3			2		3	3210			X
							5210				2	5	5	31	521	53210		X	X
	3	0		32			2		5	32	2				3	543210	X	X	X
															5	5			
										30				1		310		X	X
		0					5421			3	5	53	5	31	321	543210		X	X
																21			X
																5430		X	
5	53	2	5	30			21	5	5							543210	X	X	X
																	X		
5	52	52		53		5	2	53	53	5	52	532			521	54321	X	X	X
	5			3	5		3		5		5	5				530		X	X
	5			5												5			X
5																5320	X		X
																	X	X	
	3			3			2				5				2	53210	X	X	X
	5			5				5	5	5	5				5	5		X	X
		3		3		2	2	5	5	3						532		X	X
																5			
	3			3		2	2	53	5		5				2	532		X	X
																5			
	5				5				5	0	2					54320		X	X
																5			
												3				3210	X		
									5		5			52		542	X	X	X
	54			3	5	2		5	5	3						5432		X	X
			2				0				5					520		X	X
																5			
	5	3									5					53			X
																			X
																2			
	5							5							1	54321		X	X
	5							5	5		5					53			X
5	52	432	2	53		5	2	5	5	5	52			5	2	543210	X	X	X
																5			
	5															5		X	X
5	532	432	2	53				5	53	432		3				543210	X	X	X
	5															543	X	X	X
	5															5			
				5		2	21	5	5	5	52			52		54321	X	X	X
										0						543210	X	X	
																5			
4				5												543210	X	X	X
	5	4						5								5432		X	X
	53	30				52	21	5	5	5310	52			10	52	543210		X	X
5	5			3					5							543210	X	X	X
	52				5				5							532		X	X

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
peloria Negrobov 1967	5													
petrophila Kowarz, 1877	41	3	3		54321	543210				5				
petrophiloides Parent, 1925					3	3								
pinicola Kowarz, 1877	1				3								5	53
plumbella Meigen, 1824	543210		20		532	5320								
prjachinae Negrobov, 1974														
protuberans Negrobov, 1967														
pseudoapicalis Thuneberg, 1955	1			54	3								53	53
saxatilis Collin, 1941	5													
seguyi Parent, 1926				5										5
senicula Kowarz, 1877	54													
setiventris Thuneberg, 1955	521		5	52		3		3	5				543	532
signaticornis Loew, 1857				54				0					54	0
striata Parent, 1927	1					3								53
takagii Negrobov, 1970	5			5	5	5		5					5	5
tenuicauda Loew, 1857	21				1	2								
thunebergi Negrobov, 1967														
tristis (Zetterstedt, 1838)	54321	5	3	530	5			30	5	0			543	53
truncorum Meigen, 1824	543210		5	54	54320	543210		5	5	52			5	5
unisetosa Collin, 1941	5			5	5			3	5				53	3
vagans Becker, 1917													543	5
veles Loew, 1861	4		4	42									4	
zinovjevi Negrobov, 1967														2
Melanostolus Kowarz, 1884														
melancholicus (Loew, 1869)	51												3	
Micromorphus Mik, 1878														
albipes (Zetterstedt, 1843)	3													3
claripennis (Strobl, 1899)	3									3				
mesasiaticus Negrobov, 2000	4													
Microphor Macquart, 1827														
anomalus Meigen 1824	543210	4		52	52	210								
crassipes Macquart 1827	5					0								
holosericeus Meigen 1804	54321			542	5430			5				5	4	0
Microphorella Becker, 1909														
praecox Loew 1864														
Neurigona Rondani, 1856														
abdominalis (Fallén, 1823)	50			5420	54	520		540		0			5	521
erichsoni (Zetterstedt, 1843)	520			5	5	0		50						0
pallida (Fallén, 1823)	543210		53	543210	53	530	1	530	542	50	5	5	54	543210
quadrifasciata (Fabricius, 1781)	543210	30	543	543210	5432	521		50	520	52		5	5	520
suturalis (Fallén, 1823)	54210	0		5210	520			50	420				5	5210
uralensis Becker 1918														
Orthoceratium Schrank, 1803														
sabulosum (Becker, 1907)														
Peodes Loew, 1857														
forcipatus Loew, 1857														
petsamoensis Frey, 1930														
Poecilobothrus Mik, 1878														
chrysozygos Wiedemann, 1817	543	3		4	5									
ducalis (Loew, 1857)										0				
nobilitatus (Linnaeus, 1767)	543210	53	5	54	543210	53210		5	5	5	5		5	5
Rhaphium Meigen, 1803														
albifrons Zetterstedt, 1843														
albomaculatum (Becker, 1891)														
antennatum (Carlier, 1835)	5													
appendiculatum Zetterstedt, 1849	543210	3		54	54				54	0			54	50
auctum Loew, 1857	54210													2
basale Loew, 1850				1				2						
caliginosum (Zetterstedt, 1843)	543210			5	5			0					5	510
commune (Meigen, 1824)	4321			3				5	5				54	52
confine Zetterstedt, 1843														
consobrinum Zetterstedt, 1843	53210	5	30	4	420	10		0		50				2
crassipes (Meigen, 1824)	543210	0	3	52	4			0	53	0			51	5210

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
																5			
																543210	X		
																3			
	4					2			2							54321		X	X
	5	2								0						543210	X	X	X
	4															4			X
																			X
	5			5			21		53		5	2				54321		X	X
																5			
																5		X	X
								5		43						543	X		X
	542	4		5		2	21	5		5	52	2		3		54321		X	X
	4	4														540	X	X	X
								5								531		X	X
	5			5		5						5				5			
																21			
										3						3			
5	532	432		53	5	5	21		53	30	5	5		20	1	543210	X	X	X
	3															543210	X	X	X
																53			
	5			5										0		5430		X	X
	3	0		3				5		30				30	31	543210		X	X
	4	4			5											542		X	X
																531			X
																3	X		
																3			X
																4			
																543210	X		X
																50	X		X
5		2			5		20	5	5							543210	X	X	X
																			X
	5								5							54210	X	X	X
																520	X	X	
5	54	21		3	5		2	5	5		5					543210	X	X	X
5	543	53	5	53	5			5	5							543210	X	X	X
																54210	X	X	X
								5								5			
																	X		
							2									2		X	
																			X
																543	X		
																0	X		
5	5															543210	X		X
							2					3			3	32		X	X
							0								4	40		X	
																5			
	5				5											543210	X	X	X
																54210	X		
	4									32						4321			X
	5									3		3				543210	X	X	X
	5	2			5			5								54321	X	X	X
							1							32	521	5321		X	X
					5		2	5	5	32						543210	X	X	X
5	5	0		3	5	5	521	53	532	43	52	531		320	5321	543210	X	X	X

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
discigerum Stenhammar, 1851									0					3
elegantulum (Meigen, 1824)	543210		3	53210		1		0	2	2			30	3210
fasciatum Meigen, 1824	543210		3	5430				50	4				30	50
fascipes (Meigen, 1824)	310		0	1	1	0		0						
fissum Loew, 1850	54													
glaciale (Ringdahl, 1920)														
gravipes Haliday, 1851														
holmgreni (Mik, 1878)				1										
lanceolatum Loew, 1850	1		3	420	5			0						5
laticorne (Fallén, 1823)	54210		0			31		0	2				3	3
latimanum Kahanpää, 2007														
longicorne (Fallén, 1823)	54210		530	53210		0		0					50	5
micans (Meigen, 1824)	21		3	52		3			2				53	53
monotrichum Loew, 1850	543210		3	532		0		0		3			53	5210
nasutum (Fallén, 1823)	10					1		0	20					0
nigribarbatum (Becker, 1900)														
obscuripes Zetterstedt, 1849														
patulum (Raddatz, 1873)	21													3
penicillatum Loew, 1850	21		0	2		32								
riparium (Meigen, 1824)	54321	3	3		3	1							3	3
rivale (Loew, 1869)														
tridactylum (Frey, 1915)	10													
umbripenne (Frey, 1915)	3													3
Scellus Loew, 1857														
dolichocerus Gerstäcker, 1864					543210	21								
notatus (Fabricius, 1781)	410					210		0	0	3				0
spinimanus (Zetterstedt, 1843)					4									2
Schoenophilus Mik, 1878														
versutus (Haliday, 1851)	420				4	3								
Sciapus Zeller, 1842														
basilicus Meuffels & Grootaert, 1990	521		0		20	0		0						
flavicinctus (Loew, 1857)														
heteropygus Parent, 1926														
lobipes (Meigen, 1824)														
longulus (Fallén, 1823)	543210		3	50	540	50		50	50				5	10
maritimus Becker, 1918	3210		3		3									
platypterus (Fabricius, 1805)	543210	0	5430	54210	5420			540	5430	52	5		540	5210
spiniger (Zetterstedt, 1859)	0													
wiedemanni (Fallén, 1823)	543210	42	43	54210	520	5210		0	2	510		5	43	510
zonatulus (Zetterstedt, 1843)	543210		3	1	2	2								
Sybistroma Meigen, 1824														
crinipes Staeger, 1842	54321													
discipes (Germar, 1817)	5420		3											
obscurellum (Fallén, 1823)	54321	5	54		54	543								5
sciophilum (Loew 1869)	5													
Sympycnus Loew, 1857														
aeneicoxa (Meigen, 1824)	543210	4	3	540	52				5	5			53	520
brevimanus Loew, 1857														
pulicarius (Fallén, 1823)	543210	4	543	543210	54210	54210		50	54210	521		432	5	5210
septentrionalis Pollet, 2015	5431	3		4		41							5	
spiculatus Gerstäcker, 1864	2													
Syntormon Loew, 1857														
aulicum (Meigen, 1824)	5210				3	3		0						
bicolorellum (Zetterstedt, 1843)	543210	5	54	0	542	40		50	50	2			53	530
denticulatum (Zetterstedt, 1843)	5			5	5								5	50
filiger Verrall, 1912	31													
freymuthae Loew, 1823														
fuscipes (von Roser, 1840)	543													
metathesis (Loew, 1850)	5			0				0					53	5420
monile (Haliday, 1851)	5							4						
pallipes (Fabricius, 1794)	543210	4	30	541	5420	54210		30		210			5	5420
pennatum Ringdahl, 1920														
pseudospicatum Strobl 1899	5									5				

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
																30			
5	30	420		3			521	52	53	432	5	53	32	3210	321	543210	X	X	X
	5	520						5	5	5						543210	X	X	X
	5						21									53210	X	X	X
	54						21		5							5421	X	X	X
							21					5		1	5321	5321		X	X
							2									2		X	
		1					5								531	531		X	X
		0		3	5				5	53						543210	X	X	X
					5		2	5		32						543210	X	X	X
										5						5			X
	53	320		53		3	521	5	5	3	5	532	52	31	1	543210	X	X	X
54	53	1		3	5			5	5							54321		X	X
5	53	32		3		3	521	53	5	5430	4	532		320	32	543210	X	X	X
	30	10		3			2	5	53	3	5	52	2	3	2	53210	X	X	X
		0				2	21		5			53		320	1	53210		X	X
																	X		
				3			21	3	5					2	2	5321	X	X	X
	3															3210	X		X
		2		3	5		2	5	5		3					54321	X	X	X
		21		3	5	2	21	53	53	5		53				5321		X	X
										3		53		21	21	53210		X	X
		3		3			21		5	32	52	53	2	3	321	5321		X	X
																543210			
	2															43210	X		
		0					521				5	3	21	30	321	543210		X	X
																4320	X		
					5			4								54210	X	X	X
																	X		
																	X		
																	X		X
5																543210	X	X	X
									5							53210	X		X
	5															543210	X	X	X
																0			
	5432	52	5	53	5			5		51						543210	X	X	X
																543210	X		X
																54321	X		
																54320	X		X
																54321	X	X	X
																5			
	4	42	5	3	5											543210	X	X	X
																		X	
5	543	432		5	54		521	5	5	5432		3				543210	X	X	X
					5				5							5431	X	X	X
																2		X	
																53210	X		
5																543210	X	X	X
																50	X	X	
																31	X		X
																			X
																543	X		
																54320			X
																54	X		
				3	5			5	5	5						543210	X	X	X
																		X	
																5			

Species	Sk	Bl	Ha	Sm	Öl	Go	GS	Ög	Vg	Bo	Ds	Nä	Sö	Up
pumilum (Meigen, 1824)	543210	3	3	40	542	31		0	3	2			53	520
punctatum (Zetterstedt, 1843)	1							0						
subinermis (Loew, 1869)	53							0						
tarsatum (Fallén, 1823)	543210		3	43				430	4	1			4	30
Systenus Loew, 1857														
bipartitus (Loew, 1850)	54321	5	5	5	50			50	5				53	5
leucurus Loew, 1859	5432			5				5					3	5
pallipes (von Roser, 1840)	5432	5		53	5			5			4		5	
scholtzii (Loew, 1850)	542	5	5	5	5			50					3	5
tener Loew, 1859	4	5							4				3	
Tachytrechus Haliday, 1851														
ammobates (Haliday, 1851)	54310		310	43210	321	3210		0	2	20				
consobrinus (Haliday, 1851)	1		3	1										
hamatus Loew, 1871														
insignis (Stannius, 1831)	21													
notatus (Stannius, 1831)	53210	3	30	310	32	321		0	2	0			53	532
ocior Loew, 1869	5					1								
ripicola Loew, 1857										0				
Telmaturgus Mik, 1874														
tumidulus (Raddatz, 1873)	51							0						
Teuchophorus Loew, 1857														
calcaratus (Macquart, 1827)	5													
monacanthus Loew, 1859	5321				3	3		4					3	53
nigricosta (von Roser, 1840)	543210		3			3		4		52			3	5
simplex Mik, 1880	5													
spinigerellus (Zetterstedt, 1843)	5432			5	5	31		5					5	
Thinophilus Wahlberg, 1844														
flavipalpis (Zetterstedt, 1843)	5		3		3	21		0		0			0	2
ruficornis (Haliday, 1838)	5310	53	3	4	42	31		0	3	0			0	52
Thrypticus Gerstacker, 1864														
atomus Frey, 1915													3	
bellus Loew, 1869	5321			5	3	3		30					3	40
cuneatus (Becker, 1917)	521			1	3			3						3
divisus (Strobl, 1880)				2										
intercedens Negrobov, 1967	3	3		432	43			3		2			5	30
laetus Verrall, 1912	432				3									
nigricauda Wood, 1913	5			51	43			3					3	
pollinosus Verrall, 1912	42	3			4	3		3						3
pruinosus Parent, 1932	3			3	3			3						
smaragdinus Gerstäcker, 1864				2									5	
tarsalis Parent, 1932	42			5	53								5	5
Xanthochlorus Loew, 1857														
galbanus Chandler & Negrobov, 2008	543													
ornatus (Haliday, 1832)	543210	40	40	5410	540	5210	31	0	40	50		5	543	5210
tenellus (Wiedemann, 1817)	543210	3		5420	540	420	1	0	50	3			540	520
Number of species	**267**	**87**	**137**	**189**	**167**	**142**	**8**	**158**	**109**	**99**	**25**	**37**	**158**	**182**

Vs	Vr	Dr	Gä	Hs	Me	Hr	Jä	Ån	Vb	Nb	Ås	Ly	Pi	Lu	To	SE	DK	NO	SF
	3	54			5		2	5	5	532						543210	X	X	X
																10	X	X	
																530			
	43	310		53			531	5	5	3	5	53	52	0	3	543210	X	X	X
5	5			5				5	5		5					543210	X	X	X
																5432	X		
5	5							5	5			5		2		5432	X	X	X
																54320	X	X	X
																543		X	
	3			5	5		32	5	5	432				10		543210	X	X	X
																31			
																			X
																21	X		
	5			3												53210	X	X	X
																51			
																0			
	3			3					5							5310		X	X
																5			
	3															54321	X	X	X
	53	3														543210	X	X	X
																5			
																54321	X	X	X
																53210	X		X
				3						2						543210	X	X	X
	3			3						43						43		X	X
										43						543210	X		X
																5321		X	X
																2			X
										5						54320		X	X
																432			X
																5431		X	X
																432	X		X
										3						3			X
																52			X
	53															5432		X	X
																543	X		
		5														543210	X	X	X
4	3				5			5								543210	X	X	X
56	**134**	**99**	**15**	**95**	**68**	**30**	**96**	**94**	**111**	**101**	**62**	**65**	**30**	**57**	**72**	**345**	**210**	**224**	**264**