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Window gnats (Diptera: Anisopodidae) from beer traps in various countries across Europe

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Results of catches of Anisopodidae trapped by beer traps in Europe during summer of 2006 and 2007 are presented. During this survey, 2234 specimens belonging to six species were caught. The most commonly found species was *Sylvicola punctatus* (Fabricius, 1787) followed by *S. cinctus* (Fabricius, 1787). *Sylvicola fenestralis* (Scopoli, 1763), *S. fuscatus* (Fabricius, 1775), *S. stackelbergi* Krivosheina & Menzel, 1998 and *S. zetterstedti* (Edwards, 1923) were caught in small numbers. The most interesting records are three males of *S. zetterstedti*, which are the third and the fourth known locality records from the Czech Republic, and one female of *S. stackelbergi*, the first record from Austria.

Key words: *Sylvicola*, bait traps, new record, distribution, Central Europe.

INTRODUCTION

Anisopodidae is a small family of dipteran insects with nine species of the genus *Sylvicola* Harris, 1776 present in continental Europe (De Jong 2004). Adults of all species of the genus *Sylvicola* feed on nectar and similar liquids (Kovář & Barták 2001) and are regularly attracted by traps baited with beer, syrup, mead, etc. This method is very effective for faunistic surveys of Anisopodidae, as examplified in Estonia by Kurina (2006) who obtained most of the material of his study by using light and bait traps and by Dvořák (2014) who evaluated results of beer trapping reaching 3796 specimens.

In this contribution, the results of trapping Anisopodidae using beer traps in various European countries (Austria, Czech Republic, Estonia, Germany, Italy, Poland, Sweden, Switzerland, United Kingdom, see Fig. 1) in 2006 and 2007 are presented.

MATERIAL AND METHODS

Bigger PET bottles filled with 0.5 litre of beer were hung 1.5–2 metres above the ground on a branch of a tree or shrub (Dvořák 2007, Dvořák *et al.* 2008). In both years, the traps were exposed ca from mid July to mid August and material was taken out only once during the whole trapping period. The project was designed to study the usefulness of this method for faunistic research of various insect groups such as social wasps (Dvořák 2007, Dvořák *et al.* 2008), fly families Anispodidae, Drosophilidae, Heleomyzidae, Lauxaniidae, and Scathophagidae, or Mecoptera and Dermaptera (most of this data was not previously published).

Localities are described in the following order: locality code, nearest village or town, coordinates in WGS 84, mapping quadrant code (for the localities in the

Fig. 1. Collecting localities in 2006 and 2007.

Czech Republic), a description of the locality including biotope and date of trap exposure. Localities from 2006 published by Dvořák (2007) are designated as «06» in the text, localities from 2007 published by Dvořák *et al.* (2008) are designated as «07» in the text. Unpublished localities are designated here by their respective years.

The studied localities are shown in Fig. 1.

LIST OF LOCALITIES

AUT 07-08, Austria, Styria, middle Enns valley, Aigen/Ennstal, 47°31'2.6" N 14°7'53.3" E, extensive meadow near a lake, 19.7.–22.8.2007, S. Heinrich.

AUT 07-09, Austria, Styria, middle Enns valley, Aigen/Ennstal, 47°31'33.2" N 14°6'53.8" E, meadow in the floodplain of Enns river, 649 m, 19.7.–22.8.2007, S. Heinrich.

AUT 07-11, Austria, Enns valley, Reichraming, 47°53'51.1" N 14°28'4.9" E, south-facing cattle pasture, 20.7.–23.8.2007, S. Heinrich.
AUT 07-12, Austria, Enns valley, Reichraming, 47°53'55" N 14°29'45.9" E, south-facing cattle pasture, 20.7.–23.8.2007, S. Heinrich.
CZE 06-04, Czech Republic, Borkovice, 6753, 49°13'46" N, 14°37'35" E, Borkovická blata, peat-bog, 14.7.–15.8.2006, J. Máca.
CZE 06-14, Czech Republic, Ostrava-Zábřeh, 6275, oak-elm forest in Polanský les forest, 14.7.–14.8.2006, M. Roháčová.
CZE 06-33, Czech Republic, Hradec Králové, Nový Hradec Králové, 5861, 50°10'44" N, 15°52'11" E, town park forests, oak-hornbeam forest, 14.7.–14.8.2006, Š. + M. Mikátovi.
CZE 06-37, Czech Republic, Štěměchy-Dašov, 6860, 49°11'50" N, 15°42'56" E, secondary spruce forest, 11.7.–12.8.2006, V. Křivan.
CZE 07-01, Czech Republic, Benešova Hora, 6848, 49°07'32.7" N, 13°42'15.3" E, pasture E of a village, 7.7.–7.8.2007, L. Dvořák.
CZE 07-04, Czech Republic, Rovina, 6846, 49°09'31" N, 13°24'32.5" E, wet meadow in W part of an ancient village Rovina, 895 m, 10.7.–14.8.2007, L. Dvořák.
CZE 07-05, Czech Republic, Nová Hůrka, 6845, 49°08'45.9" N, 13°19'11.6" E, mire W of a village, 895 m, 11.7.–15.8.2007, L. Dvořák.
CZE 07-07, Czech Republic, Spálenec, 7049, 48°55'38" N, 13°58'00.9" E, wet meadow NW of a settlement, 11.7.–15.8.2007, L. Dvořák.
CZE 07-08, Czech Republic, Sviadnov, 6375, 49°40'53.9" N, 18°19'29.1" E, crop field, 10.7.–9.8.2007, V. Ďurinová.
CZE 07-22, Czech Republic, Prameny, 5942, 50°2'29.2" N, 12°44'18.1" E, Mokřady pod Vlčkem Nature Reserve, wet meadow, 10.7.–9.8.2007, P. Tájek.
CZE 07-30, Czech Republic, Krásno, 5842, 50°6'22.5" N, 12°45'31.01" E, Krásenské rašelinš tě mire, dry exploited peat-bog W of a village, 714 m, 19.6.–10.7.2007, P. Tájek.
CZE 07-31, Czech Republic, Bečov nad Teplou, 5942, 50°5'0.4" N, 12°49'23.63" E, Bečovské stráně slopes, dry meadow W of a town, 11.7.–9.8.2007, P. Tájek.
CZE 07-35, Czech Republic, Lazy, 5941, 50°3'1.23" N, 12°38'5" E, submontane meadow W of a village, 802 m, 10.7.–9.8.2007, P. Tájek.
CZE 07-37, Czech Republic, Mnichov, 5942, 50°3'23.01" N, 12°46'6.34" E, meadow under Pluhův bor site N of a village, 724 m, 10.7.–9.8.2007, P. Tájek.
CZE 07-42, Czech Republic, Hamrníky, 6042, 49°57'16.7" N, 12°41'27.6" E, gardener's colony, 10.7.–10.8.2007, P. Tájek.
EST 06-02, Estonia, Järvamaa, Koeru, 58°59'25" N, 26°0'35.3" E, spruce forest with several ash and maple trees, 19.7.–22.8.2006, K. Püssa.
EST 06-03, Estonia, Järvamaa,Väike-Maarja, 59°10'31.9" N, 26°17'54.9" E, spruce forest with several ash and maple trees, 19.7.–22.8.2006, K. Püssa.
EST 06-04, Estonia, Järvamaa,Väike-Maarja, 59°8'51.8" N, 26°18'34.3" E, spruce forest with several ash and maple trees, 19.7.–22.8.2006, K. Püssa.
GER 06-02, Germany, Oberbayern, Traunstein, Reit im Winkl, spruce-beech forest, 900 m, 10.7.–10.8.2006, K. Wieser.
GER 06-04, Germany, Oberbayern, Traunstein, Reit im Winkl, light spruce forest on stony debris, 1380 m.a.s.l., 10.7.–10.8.2006, K. Wieser.
GER 06-05, Germany, Lackenberg, 49°6'16" N, 13°18'37.9" E, sunny spruce forest, 10.7.–10.8.2006, J. Müller.
GER 06-07, Germany, Mittelsteighütte, 49°05'43.4" N 13°14'59.2" E, beech-fir virgin forest, 10.7.–10.8.2006, J. Müller.
GER 06-09, Germany, Lower Saxony, Barterode, Kattenbühl, 51°24'30.786" N, 9°39'30.878" E, pine forest, 10.7.–14.8.2006, M. Irskens.
GER 06-12, Germany, Hesse, Rossbach, Pfaffenberg, 51°18'31.955" N, 9°47'13.325" E, beech forest, 10.7.–14.8.2006, M. Irskens.
ITA 07-01, Italy, Livenza (Pordenone), 46°1'17.8" N 12°28'42.8" E, plane-maple forest, 25.7.–7.9.2007, L. Patrizia.
POL 07-01, Poland, Malopolska Upland, Piekary, Góra Grodzisko, 50°00'27" N, 19°48'20" E, semi-natural broadleaf forest, 12.7.–14.8.2007, H. Szentgyörgyi.
SWE 06-01, Sweden, Uppsala, Lapland, Abisko, 68°21'10.7" N 18°49'4.9" E, birch forest, 12.7.–15.8.2006, O. Bohuslavová.
SWE 1, Sweden, Uppsala, Forkarby, Skörkulla, 59°54'15" N, 17°33'47" E, spruce forest, 13.7.–12.8.2007, E. Sjödin.
SWE 5, Sweden, Uppsala, Hagby, Myrängen, 59°48'36" N, 17°23'18" E, moraine spruce-pine forest, 13.7.–12.8.2007, E. Sjödin.

SWE 7, Sweden, Uppsala, Forkarby, Marsta, 59°56'2" N, 17°34'52" E, mixed forest, 13.7.–12.8.2007, E. Sjödin.
SWI 06-01, Switzerland, Jura, Delémont, 47°24'69" N, 7°19'39" E, mixed forest, 10.7.–15.8.2006, Ch. Péré.
UK 06-10, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°29'19" N, 1°26'28" W, oak, sycamore, young plantation, 11.7.–10.8.2006, E.G. Chambers.
UK 06-11, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°28'43" N, 1°25'36" W, beech, oak, ash, mature wood, 11.7.–10.8.2006, E.G. Chambers.
UK 06-12, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°27'52" N, 1°27'46" W, sycamore, oak, ash, beech, mature wood, 11.7.–10.8.2006, E.G. Chambers.
UK 06-13, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°27'36" N, 1°26'44" W, beech, elder, ash, field maple, mature wood, 11.7.–10.8.2006, E.G. Chambers.
UK 06-14, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°27v32" N, 1°25'06" W, beech, ash, sycamore, mature wood, 11.7.–10.8.2006, E.G. Chambers.
UK 06-15, United Kingdom, Berkshire, Newbury, Lambourn Downs, 51°29'19" N, 1°25'31" W, oak, ash, sycamore, mature wood, 11.7.–10.8.2006, E.G. Chambers.
UK 06-17, United Kingdom, Berkshire, Reading, Chilterns, 51°31'24" N, 1°05'35" W, beech, oak, mature wood, 11.7.–11.8.2006, E.G. Chambers.
UK 06-18, United Kingdom, Berkshire, Reading, Chilterns, 51°31'08" N, 1°05'20" W, silver birch, oak, silver fir, mature wood, 11.7.–11.8.2006, E.G. Chambers.
UK 06-19, United Kingdom, Berkshire, Reading, Chilterns, 51°30'39" N, 1°06'49" W, ash, beech, yew, mature wood, 12.7.–11.8.2006, E.G. Chambers.
UK 06-20, United Kingdom, Berkshire, Reading, Chilterns, 51°30'48" N, 1°05'15" W, beech, mature wood, 12.7.–11.8.2006, E.G. Chambers.
UK 06-21, United Kingdom, Berkshire, Reading, Chilterns, 51°30'19" N, 1°05'16" W, beech, sycamore, holly, mature wood, 12.7.–11.8.2006, E.G. Chambers.

The material was identified based on the papers of Haenni (1997), Krivosheina & Menzel (1998), and Michelsen (1999). The nomenclature follows De Jong (2004). Voucher specimens (pinned or preserved in small vials with ethanol) are deposited in the collection of the Municipal museum Mariánské Lázně, Czech Republic.

LIST OF SPECIES

Altogether 2234 specimens of Anisopodidae belonging to six species of the genus *Sylvicola* have been trapped using 46 traps and identified.

Sylvicola cinctus (Fabricius, 1787)

AUT 07-11, 1 ♂, 2 ♀♀. CZE 06-04, 1 ♂. CZE 06-14, 2 ♀♀. CZE 06-33, 3 ♀♀. CZE 06-37, 1 ♀. CZE 07-04, 7 ♂♂, 17 ♀♀. CZE 07-05, 21 ♂♂, 41 ♀♀. CZE 07-22, 1 ♀. CZE 07-31, 1 ♀. CZE 07-35, 2 ♂♂, 1 ♀. CZE 07-37, 7 ♀♀. CZE 07-42, 3 ♀♀. EST 06-02, 3 ♀♀. EST 06-03, 1 ♂. EST 06-04, 2 ♂♂, 2 ♀♀. GER 06-02, 1 ♀. GER 06-04, 4 ♀♀. GER 06-05, 7 ♀♀. GER 06-07, 1 ♀. GER 06-09, 1 ♀. GER 06-12, 1 ♀. ITA 07-01, 1 ♂, 4 ♀♀. POL 07-01, 1 ♀. SWE 06-01, 2 ♂♂. SWE 1, 1 ♂. SWE 5, 3 ♀♀. SWE 7, 3 ♂♂, 22 ♀♀. UK 06-10, 1 ♂, 4 ♀♀. UK 06-11, 14 ♀♀. UK 06-12, 1 ♂, 5 ♀♀. UK 06-13, 1 ♀. UK 06-14, 2 ♀♀. UK 06-15, 2 ♀♀. UK 06-17, 7 ♂♂, 60 ♀♀. UK 06-18, 1 ♂, 22 ♀♀. UK 06-19, 1 ♂, 7 ♀♀. UK 06-20, 63 ♀♀. UK 06-21, 5 ♀♀.

Overall this is the most common species known from almost all of the European countries. This was the second most common species found during this research. It is one of two most commonly found species in forests, while it seems rather rare in open stands.

Sylvicola fenestralis (Scopoli, 1763)

UK 06-13, 1 ♀.

Species distributed in almost all of Europe, but it is rarely encountered.

Sylvicola fuscatus (Fabricius, 1775)

AUT 07-09, 18 ♂♂, 9 ♀♀. AUT 07-11, 1 ♂. AUT 07-12, 1 ♂. CZE 06-33, 2 ♀♀. CZE 06-37, 1 ♀. CZE 07-35, 1 ♂, 1 ♀. CZE 07-37, 1 ♀. CZE 07-42, 1 ♂, 7 ♀♀. EST 06-04, 12 ♀♀. POL 07-01, 2 ♂♂, 2 ♀♀. SWI 06-01, 1 ♀.

This is a common species known from northern, central, and western Europe. It is a surprisingly rare species in both forest and open stands.

Sylvicola punctatus (Fabricius, 1787)

AUT 07-09, 134 ♂♂, 111 ♀♀. AUT 07-08, 10 ♂♂, 16 ♀♀. AUT 07-11, 10 ♂♂, 6 ♀♀. AUT 07-12, 16 ♂♂, 18 ♀♀. CZE 06-04, 11 ♂♂, 9 ♀♀. CZE 06-33, 1 ♀. CZE 06-37, 7 ♀♀. CZE 07-01, 76 ♂♂, 114 ♀♀. CZE 07-04, 6 ♂♂, 10 ♀♀. CZE 07-05, 1 ♀. CZE 07-07, 3 ♂♂, 8 ♀♀. CZE 07-08, 1 ♀. CZE 07-22, 100 ♂♂, 61 ♀♀. CZE 07-30, 141 ♂♂, 232 ♀♀. CZE 07-31, 20 ♂♂, 20 ♀♀. CZE 07-35, 41 ♂♂, 269 ♀♀. CZE 07-37, 28 ♂♂, 34 ♀♀. EST 06-03, 4 ♀♀. EST 06-04, 4 ♂♂, 2 ♀♀. GER 06-02, 1 ♂. GER 06-04, 1 ♂. GER 06-09, 1 ♀. ITA 07-01, 1 ♀. SWE 1, 6 ♀♀. SWE 5, 2 ♀♀. SWE 7, 14 ♂♂, 48 ♀♀. SWI 06-01, 1 ♂, 1 ♀. UK 06-10, 12 ♂♂, 28 ♀♀. UK 06-11, 10 ♀♀. UK 06-12, 13 ♂♂, 17 ♀♀. UK 06-13, 4 ♀♀. UK 06-14, 5 ♂♂, 17 ♀♀. UK 06-15, 2 ♂♂, 8 ♀♀. UK 06-17, 3 ♂♂, 19 ♀♀. UK 06-18, 2 ♂♂, 2 ♀♀. UK 06-19, 1 ♂, 13 ♀♀. UK 06-20, 19 ♀♀. UK 06-21, 2 ♀♀.

Overall this is a common species known from almost all European countries except in the southeast. It was the most collected species found within this research, being predominant in forests and very commonly found (more than 90%) in open stands.

Sylvicola stackelbergi Krivosheina & Menzel, 1998

AUT 07-09, 1 ♀. EST 06-02, 2 ♂♂. EST 06-03, 1 ♂, 1 ♀. EST 06-04, 13 ♂♂, 3 ♀♀. SWE 06-01, 1 ♀. SWE 5, 1 ♂, 2 ♀♀.

The most interesting finding in this paper is the capture of one female of *S. stackelbergi* from Austria (Figs 2–4). *S. stackelbergi* was described from NW Russia (Krivosheina & Menzel 1998) and was later found in Finland, Sweden, the Netherlands, and Estonia (Krivosheina & Menzel 2002, Kurina 2006, Haarto 2011). The only published record from central Europe is from Slovakia (Ševčík 2011). This is the second record from central Europe and it is a new species for Austria.

Sylvicola zetterstedti (Edwards, 1923)

CZE 07-04, 2 ♂♂. CZE 07-05, 1 ♂.

This species was published as a new member of the fauna of the Czech Republic by Dvořák (2014), who has summarized the at present known species' distribution in Europe. All previous records of *S. zetterstedti* from the Czech Republic originate from the vicinity of Mariánské Lázně, New records are from the Bohe-

Fig. 2. *Sylvicola stackelbergi* from Austria, top view. Photo: Zbyněk Kejval.

Fig. 3. Frons of *Sylvicola stackelbergi* from Austria. Photo: Zbyněk Kejval.

Fig. 4. *Sylvicola stackelbergi* from Austria, genital fork. Photo: Zbyněk Kejval.

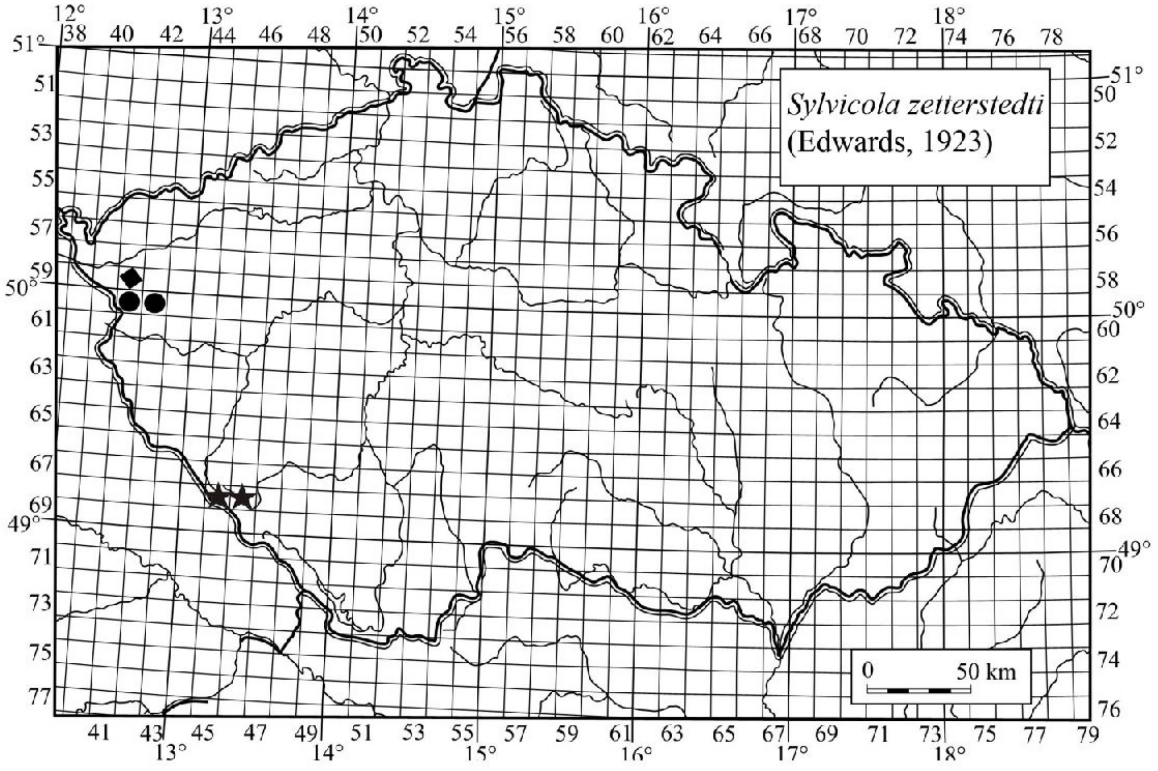

Fig. 5. Known distribution of *Sylvicola zetterstedti* in the Czech Republic. Circles: localities published by Dvořák (2014). Stars: localities presented in this paper. Square: unpublished localities found in 2014.

mian Forest (= the Šumava Mts.); one new locality of *S. zetterstedti* was discovered in the vicinity of Mariánské Lázně, (see Fig. 5). The new localities as well as published records clearly show that *S. zetterstedti* inhabits forests or shrubby damp localties in the Czech Republic.

Sylvicola sp.

CZE 07-35, 1 ♀.

Unidentified female with genital plate different from all known species. It is similar to *S. cinctus* and *S. zetterstedti*.

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