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Lacewings (Neuroptera) of the Polish Baltic coast with remarks on *Wesmaelius (Kimminsia) balticus* (Tjeder, 1931) – a new species of Hemerobiidae to the fauna of Poland

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Abstract. The paper summarizes the state-of-the-art on Neuroptera recorded on the Polish Baltic coast. The results of investigations conducted since the eighties of the 20th century against the background of revised original data on the area are presented. The complete list of local neuropteran fauna comprises 6 families and 51 species (ca. 59% of the total Neuroptera known from Poland). Siberian faunal elements are dominating here, but a considerable number of Mediterranean, Holarctic and, to a lesser extent, Extramediterranean-European faunal elements is also present. A group of several species reaches a limit of distribution on the area. The occurrence of supposedly relic within northern part of Central Europe, Holomediterranean: *Acanthaclisis occitanica* (Vill.), *Myrmeleon inconspicuus* Ramb. and *Distoleon tetragrammicus* (Fabr.) must be highlighted, as well probably not transitional in Poland, rare: *Nothochrysa fulviceps* (Steph.) and *N. capitata* (Fabr.), and noted far from the known Central European centres of distribution - *Peyerimhoffina gracilis* (Schn.). First record of *Wesmaelius balticus* (Tjed.) in Poland is given. The general habitus of the sole male specimen is presented, and its genital structures are figured. The occurrence of this rarely reported in Europe species is discussed and all published locality records are plotted on a map. *W. balticus* represents Atlantolittoral faunal element with characteristic coastal distribution pattern. It is a stenotopic species inhabiting a strict zone of white and semi-fixed grey dunes. The new locality in Rowy is the most southeastern record of this species on the shores of continental Europe and the first not insular within the Baltic Sea area.

Key words: Neuroptera, *Wesmaelius balticus*, new record, South Baltic coast, North Poland, faunistics, zoogeography

Introduction

The beginning of investigation on Neuroptera of the southern shore of the Baltic Sea, at present borders of Poland, reaches half of the 19th century. To the end of thirties of 20th century, the research activity was concentrated on the eastern part of the area, in the region of the Gulf of Gdańsk (Fig. 1). The first observations of *Acanthaclisis occitanica* (Vill.) on the Vistula Spit and in the vicinity of Elbląg were given by Hagen (1859, 1873). Since the end of seventies to middle nineties of the 19th century, several short notes and reports were given by Brischke, presenting observational data obtained during short excursions in the region of Gdańsk and Sopot (1879, 1887, 1894), to the Hel Peninsula (1888) and in the vicinity of Stegny (1889, 1891). During the next years, research on Coniopterygidae in the Puck and Karwia environs, and the Hel Peninsula were conducted by Enderlein (1905, 1906, 1908). The last data from the Hel Peninsula and the surroundings of Gdynia were given by Zaćwilichowski (1938a, b, 1939). These latter materials belong to the group of very meagre historical evidences from the area discussed, preserved in the Polish collections (Dobosz 1991). Western part of the coast, not taking into account unclear data from the environs of Szczecin, is known only from a short note by Krüger (1921) about presence of *Euroleon nostras* (Geoff. in Fourc.) on the Uznam Island. The middle part of the coast was investigated by Karl (1937), with better knowledge on the vicinity of Słupsk. During the next 50 years, no methodic studies on Neuroptera were carried out in this part of Poland. On the turn of eighties of the 20th century, during the research on noctuid moths (Lepidoptera, Noctuidae) in the dune belt of the Polish Baltic

coast (Nowacki, 1994) the rich material of Neuroptera was collected in addition. At this time, the collecting activity of Neuroptera increased, which allows enrich the basic materials collected. The results presented below are given against a background of the historical source data. Only a small fraction of the new data, mainly on the rarely collected species in Poland, was previously published (Dobosz, 1993b, 1994, 1999a, 2005; Dobosz & Żyła, 2005; Dobosz *et al.*, 2008).

Area and methods

The research was conducted along the whole Polish Baltic coast from the islands of Uznam and Wolin on the west, to the Hel Peninsula and the Vistula Spit on the east (Fig. 1). According to physico-geographical regionalisation of Poland (Kondracki, 1994) the area belongs to subprovince - South Baltic Coast. For field works and analysis of source data the borders were taken according to standard faunistic region – Baltic Coast (see series of *Catalogus Faunae Poloniae*, published by MIZ PAS, Warsaw). The region is a narrow belt of length 497 km and width from 10 to 40 km. It is covered by UTM squares CF, DF, VV, WA, WV and XA.

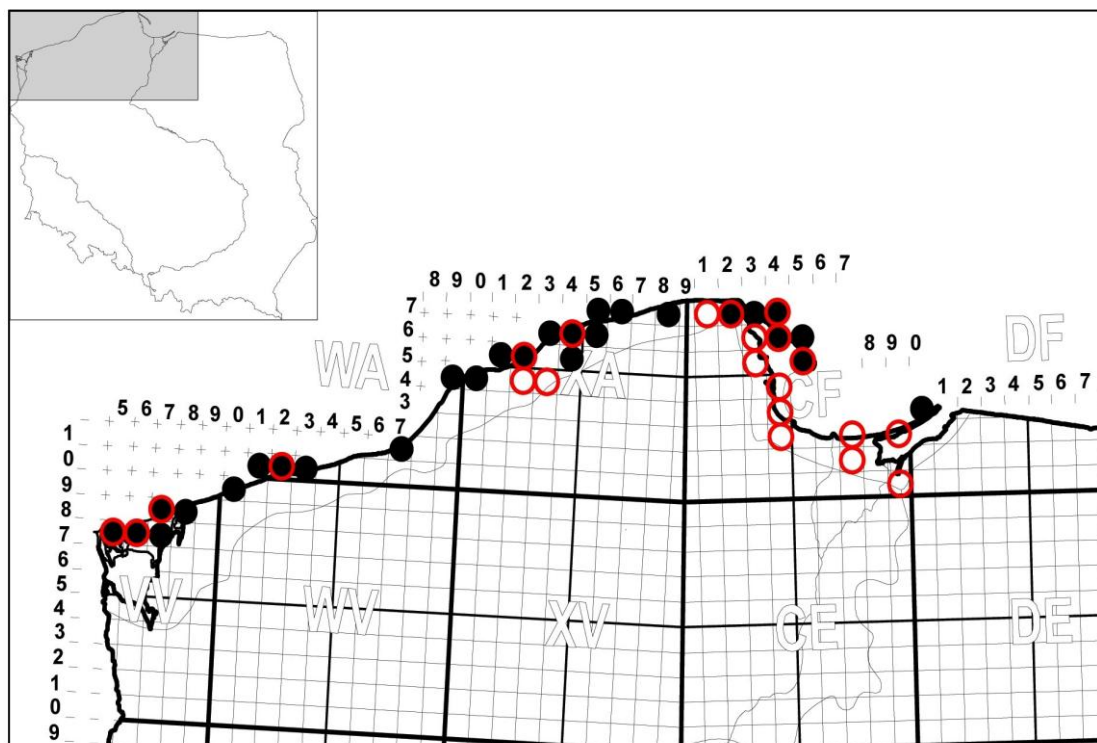


Fig. 1. Study area. New data (black spots), published data (red circles).

The main portion of the materials was gathered by J. Nowacki in the years 1989, 1991 and 1992 (Nowacki, 1994). The light traps with mercury vapour bulbs of 250 W were used. The collecting points were localized in most cases on the crests of the white dunes in the plant community of *Elymo-Ammophiletum*, or in the transition zone with grey dune with psammophilous plant community of *Helichryso-Jasionetum*, and exceptionally in the ecotone of the grey dune and coastal pine forest (*Empetro nigri-Pinetum*). Anthropogenic habitats in the rural and urban periferial areas, including military training grounds were sporadically explored at this time. Supplementary research on the Neuroptera was carried out in the years 1995–1999 and 2004–2007 in dune and coastal pine forest habitats, with use of entomological net during the day. Additionally, the preimaginal stages of Myrmeleontidae were looked for and collected for breeding purposes and some night catches with mercury incandescent lamp were conducted.

The insects were collected from 35 sites named after the nearest village or city and arranged according to UTM squares co-ordinates (Fig. 1). There were: CF27: Jastrzębia Góra, Karwia, Sulicice; CF37: Cetniewo, Władysławowo; CF46 Jastarnia; CF47 Chałupy; CF55 Hel-Bór; CF56 Jurata; DF03 Piaski; VV67 Międzyzdroje; VV77 Sierosław; VV78: Kołczewo, Międzywodzie, Świętousć, Wiselka; VV88 Buniewice; WA10 Mrzeżyno;

WA20 Dźwirzyno; WA30 Kołobrzeg; WA71 Łazy; WA94: Jarosławiec, Wicie; WV09 Niechorze; VV57 Świnoujście; XA04 Łącko; XA15 Ustka; XA25 Orzechowo; XA36 Rowy; XA45 Smołdzino; XA46 Czołpino; XA56 Kluki; XA57 Rąbka; XA67 Łeba; XA87 Białogóra. Moreover, a few records from no precise sites on the Hel Peninsula and from the Słowiński National Park have been added.

The vouchers, as alcohol preparations and dry specimens, are deposited in the collection of the Department of Natural History, Upper Silesian Museum in Bytom and a small portion at the Department of Biosystematics of Opole University.

Classification, nomenclature and zoogeographical categories follow Aspöck *et al.* (2001).

Results

During the research 47 species of Neuroptera were recorded, including one being a new to the fauna of Poland. In the same time, presence of the 4 species given in the historical papers was not confirmed. Altogether 6 families and 51 species are reported from the Polish Baltic coast, which constitutes ca. 59% of the total Neuroptera known from Poland (Czechowska, 2007).

Review of species

New data are listed according to the UTM-code order. The original data are ordered chronologically. Selected species are provided with short distributional characteristics in Poland. If not stated otherwise, the material was collected by J. Nowacki.

OSMYLIDAE

Osmylus fulvicephalus (Scopoli, 1763)

Orzechowo, 10 VIII 1995, 1♀, leg. R. Królik.

Lit.: Brischke (1887): Sopot CF43.

CHRYSOPIDAE

Nothochrysa fulviceps (Stephens, 1836)

Lit.: Dobosz (2005): Międzyzdroje VV67.

A rarely collected species, very local. Known from a few localities in South and Northwestern Poland. Reported from Silesia in general by Schneider (1845). Nowadays, beside the Baltic coast, it is known from the Tuchola Forest (Berndt 1984), the Świętokrzyskie Mts (Czechowska, 2002) and the Sudetes (Dobosz, 2005; Blaik, 2007). In the latter region it could be more widely distributed.

Nothochrysa capitata (Fabricius, 1793)

Karwia, 18 VI 1996, 1♀, leg. R. Dobosz; Jastarnia, 22 VI 1996, 1♀, leg. R. Dobosz; Dźwirzyno, 14 VI 1989, 1♂, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Kołobrzeg, 14 VI 1989, 1♀, leg. R. Dobosz; Białogóra, dune, 6-17 VII 1991, 1♂.

Up to now, this species has only been found in South and Central Poland. Distributed mainly in montane and submontane regions. Since the end of 19th century it was recorded from a few localities in the Carpathians (Zaćwilichowski, 1938a; Czechowska, 2002; Dobosz, 2003), the Roztocze region (Zaćwilichowski, 1938a; Czechowska, 1997), the Świętokrzyskie Mts and the vicinities of Łódź (Czechowska, 2002).

Nineta flava (Scopoli, 1763)

Jastarnia, 1-9 VII 1991, 1♂; Hel-Bór, coastal pine forest, 21 VI 1998, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Międzyzdroje, 11-20 VII 1992, 1♂; Mrzeżyno, military training area, 20-21 VIII 1989, 2♀♀; Świnoujście, dune, 7-16 VIII 1991, 2♀♀; Ustka, 5 VI 1992, 1♀.

Lit.: Zaćwilichowski (1938a), Dobosz (1991): Gdynia-Orłowo CF44.

Nineta vittata (Wesmael, 1841)

Międzyzdroje, 29 VI – 1 VII 1992, 1♀; Międzyzdroje, 11-20 VII 1992, 3♀♀; Mrzeżyno, military training area, 15 VIII 1989, 1♀; Ustka, 2 VIII 1992, 1♀; Rowy, 4-20 VI 1992, 1 ex.; Rowy, 25 VII 1992, 1♀; Łeba, 20 VIII 1992, 1♀; Słowiński National Park, 4 VII 1999, 2♀♀, on the beach, transported by the sea waters, leg. E. Boklak.

Lit.: Brischke (1887): Sopot CF43; Brischke (1889): Stegna CF72; Zaćwilichowski (1938a): Gdynia-Orłowo CF44.

Chrysotropia ciliata (Wesmael, 1841)

Jastarnia, dune, 22 VI 1996, 4♂♂, 2♀♀, leg. R. Dobosz.

Lit.: Zaćwilichowski (1938a): Gdynia-Orłowo CF44

Chrysopa perla (Linnaeus, 1758)

Jastrzębia Góra, 21 VI 1993, 1♀, leg. R. Dobosz; Karwia, dune, 17 VI 1996, 1♂, 1♀, leg. R. Dobosz; Władysławowo, 13-18 VI 1993, 2♀♀, leg. R. Dobosz; Jastarnia, pine forest, 20 VI 1998, 1♂, ex *Pinus sylvestris* L., leg. R. Dobosz; Międzyzdroje, 29 VI – 1 VII 1992, 3♂♂; Międzywodzie, dune, 2-12 VII 1991, 1♀; Wiselka, 17-25 VII 1997, 1♀, leg. R. Dobosz; Mrzeżyno, military training area, 7 VII 1989, 1♀; Łazy, dune, 10-14 VI 1991, 1♂, 1♀; Łazy, dune, 1-8 VII 1991, 1♂; Świnoujście, dune, 30 VI – 10 VII 1991, 3♂♂; Łacko, 28 VII 2005, 1♀, from the herbaceous vegetation, leg. W. Żyła; Ustka, 1-2 VII 1992, 1♀; Ustka, 2-3 VIII 1992, 3♂♂, 1♀; Rowy, 19 VII 1992, 1♀; Łeba, 2 VII 1992, 1♂; Łeba, 11 VII 1992, 1♀.

Lit.: Brischke (1887): no accurate data available; Brischke (1888), Zaćwilichowski (1939): Hel CF55; Brischke (1889): Stegna CF72; Brischke (1894): Gdańsk-Brzeźno CF43; Zaćwilichowski (1938a), Dobosz (1991): Gdynia-Orłowo CF44; Dobosz (1999a): Hel-Bór CF55.

Chrysopa dorsalis Burmeister, 1839

Władysławowo, 7-18 VI 1993, 4♂♂, 1♀, leg. R. Dobosz; Jastarnia, dune, 22 VI 1996, 2♀♀, 2 exx. leg. R. Dobosz; Jastarnia, pine forest, 20 VI 1998, 4♀♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Hel-Bór, coastal pine forest, 21 VI 1998, 3♀♀, ex *P. sylvestris* L., leg. R. Dobosz; Międzyzdroje, 11-20 VII 1992, 1♀; Międzyzdroje, 27 VII 1992, 2♀♀; Mrzeżyno, military training area, 2-9 VII 1989, 2♂♂, 3♀♀; Mrzeżyno, military training area, 27 VII 1989, 3♀♀; Mrzeżyno, military training area, 29 VII 1989, 1♀; Mrzeżyno, military training area, 20 VIII 1989, 1♀; Rowy, grey dune, 31 VII 2004, 1 ex., leg. W. Żyła; Czolpino, Czolpino Dune, 21-30 VI 1991, 1♂.

Chrysopa abbreviata Curtis, 1834

Karwia, dune, 17 VI 1996, 1♂, leg. R. Dobosz; Jastarnia, pine forest, 20 VI 1998, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Hel-Bór, coastal pine forest, 21 VI 1998, 1♀, ex *P. sylvestris* L., leg. R. Dobosz; Międzyzdroje, 27 VII 1992, 1♀; Międzyzdroje, 3 VI 1998, 1♀, leg. H. Sołtys; Międzywodzie, 30 VII - 4 VIII 1991, 1♀; Mrzeżyno, military training area, 2-9 VII 1989, 1♂; Wicie, dune overgrowing with pine *P. sylvestris* L., 28 VII 2004, 1♂, leg. W. Żyła; Świnoujście, 16-25 VI 1991, 1♂; Świnoujście, 30 VI – 10 VII 1991, 1♂, 1♀; Rowy, 21 VII 1992, 1♀; Czolpino, dune, 7 VIII 2006, 1♀, leg. W. Żyła.

Lit.: Brischke (1888): Hel CF55; Enderlein (1908): Karwia CF27, Rozewie Cape CF27.

Chrysopa formosa Brauer, 1850

Międzyzdroje, 29 VI – 1 VII 1992, 1♀; Międzyzdroje, 27 VII 1992, 1♂; Mrzeżyno, military training area, 2-9 VII 1989, 3♀♀; Mrzeżyno, military training area, 15 VIII 1989, 1♀; Ustka, 2 VIII 1992, 1♀.

Lit.: Brischke (1888): Hel CF55.

Chrysopa phyllochroma Wesmael, 1841

Sulicice, meadow, 27 VI 1996, 1♀, leg. R. Dobosz; Międzyzdroje, 29 VI – 1 VII 1992, 1♀; Międzyzdroje, 18 VII 1992, 1♀; Międzyzdroje, 27 VII 1992, 2♂♂; Międzyzdroje, 15 VIII 1992, 2♂♂; Międzyzdroje, 21-23 VIII 1992, 1 ex.; Międzywodzie, 6-8 VIII 1991, 2♀♀; Buniewice, 20 VIII 1993, 1♀, leg. J. A. Lis; Mrzeżyno, military training area, 2-9 VII 1989, 1♂, 1♀; Mrzeżyno, military training area, 29 VII 1989, 1♀; Mrzeżyno, military training area, 15-20 VIII 1989, 4♂♂, 11♀♀; Świnoujście, dune, 16-25 VI 1991, 2♂♂; Świnoujście, dune, 21-31 VIII 1991, 1♂; Ustka, 2 VIII 1992, 4♂♂, 10♀♀; Rowy, 3 VIII 1992, 1♀; Łeba, 15 VIII 1992, 1♀; Białogóra, dune, 6-17 VII 1991, 1♀.

Lit.: Brischke (1889): Stegna CF72; Brischke (1894): Gdańsk-Brzeźno CF43; Enderlein (1908): Karwia CF27, Rozewie Cape CF27, Mrzeżyno CF35, Hel Peninsula, between Chałupy CF46 and Kuźnica CF47; Zaćwilichowski (1938a): Gdynia-Orłowo CF44, Gdynia-Oksywie CF44; Zaćwilichowski (1939): Hel CF55.

Chrysopa pallens (Rambur, 1838)

Karwia, dune, 15-17 VI 1996, 2♂♂, 3♀♀, leg. R. Dobosz; Jastarnia, dune, 22 VI 1996, 1♂, 2♀♀, leg. R. Dobosz; Jastarnia, pine forest, 20 VI 1998, 1♂, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Sulicice, meadow, 27 VI 1996, 1♀, leg. R. Dobosz; Hel-Bór, coastal pine forest, 21 VI 1998, 1♂, 1♀, ex *P. sylvestris* L., leg. R. Dobosz; Międzyzdroje, 11-20 VII 1992, 1♀; Wiselka, 17-25 VII 1997, 2♂♂, 4♀♀, leg. R.

Dobosz; Mrzeżyno, military training area, 2-9 VII 1989, 2♂♂, 3♀♀; Mrzeżyno, military training area, 26-27 VII 1989, 2♂♂, 10♀♀; Mrzeżyno, military training area, 15 VIII 1989, 1♀; Świnoujście, dune, 7-16 VIII 1991, 1♀; Rowy, 19 VII 1992, 1♀; Czółpino, Czółpino Dune, 1-10 VII 1991, 1♀; Czółpino, Czółpino Dune, 11-20 VII 1991, 1♂; Czółpino, Czółpino Dune, 1-10 IX 1991, 2♀♀; Łeba, 2-3 VII 1992, 2♀♀; Łeba, 6 VIII 1992, 1♀.

Lit.: Dobosz (1991): Gdynia-Orłowo CF44.

Dichochrysa prasina (Burmeister, 1839)

Jastarnia, 1-9 VII 1991, 1♂; Jastarnia, 20 VI 1998, 2♀♀, ex *Quercus* sp., leg. R. Dobosz; Międzyzdroje, 29 VI – 1 VII 1992, 1♂, 1♀; Międzyzdroje, 11-20 VII 1992, 1♂, 1♀; Międzyzdroje, 27 VII 1992, 3♀♀; Wiselka, 17-25 VII 1997, 1♀, leg. R. Dobosz; Mrzeżyno, military training area, 8 VII 1989, 1♂; Świnoujście, dune, 21-27 VII 1991, 1♀; Świnoujście, dune, 7-16 VIII 1991, 2♂♂, 3♀♀; Świnoujście, dune, 21-31 VIII 1991, 2♀♀; Ustka, 2 VIII 1992, 1♂, 1♀; Czółpino, Czółpino Dune, 1-10 VII 1991, 1♂.

Lit.: Zaćwilichowski (1938a): Gdynia-Orłowo CF44.

Dichochrysa ventralis (Curtis, 1834)

Karwia, dune, 17 VI 1996, 1♀, leg. R. Dobosz; Karwia, dune, 26 VI 1996, 1♂, leg. R. Dobosz; Międzyzdroje, 29 VI – 1 VII 1992, 1♀; Międzyzdroje, 11-20 VII 1992, 1♂, 2♀♀; Mrzeżyno, military training area, 2-9 VII 1989, 1♀; Świnoujście, dune, 11-18 VII 1991, 1♀; Świnoujście, dune, 21-31 VIII 1991, 1♀.

Lit.: Karl (1937): Niewierowo XA34; Zaćwilichowski (1938a), Dobosz (1991): Gdynia-Orłowo CF44.

Cunctochrysa albolineata (Killington, 1935)

Jastarnia, 1-9 VII 1991, 2♀♀; Międzyzdroje, 29 VI – 1 VII 1992, 3♀♀; Międzyzdroje, 11-20 VII 1992, 6♀♀; Międzyzdroje, 25 VII 1992, 1♂, 3♀♀; Międzyzdroje, 27 VII 1992, 10♀♀; Międzyzdroje, 15 VIII 1992, 1♀; Mrzeżyno, military training area, 2-9 VII 1989, 8♂♂, 40♀♀; Mrzeżyno, military training area, 26 VII 1989, 1♀; Mrzeżyno, military training area, 27 VII 1989, 2♀♀; Mrzeżyno, military training area, 29 VII 1989, 2♂♂, 5♀♀; Niechorze, sea shore, 7 VII 1989, 1♀; Świnoujście, dune, 30 VI – 10 VII 1991, 1♂, 1♀; Świnoujście, dune, 11-18 VII 1991, 2♀♀; Świnoujście, dune, 21-27 VII 1991, 2♀♀; Świnoujście, dune, 7-16 VIII 1991, 3♀♀; Czółpino, Czółpino Dune, 21-30 VI 1991, 1♂.

Peyerimhoffina gracilis (Schneider, 1851)

Lit.: Brischke (1894): Gdańsk-Brzeźno CF43.

A locally distributed species in South and Central Poland, mainly in the montane and submontane regions. Most data come from the 19th and the first half of the 20th century (Zaćwilichowski, 1938a; Blaik *et al.*, 2007). The historical record from the Baltic coast is the only one from Northern Poland, remote from the main distribution area (Aspöck *et al.*, 1980). During the last 20 years the species has been reported from the Karkonosze Mts (Dobosz, 1998), the Beskid Śląski Mts, the Świętokrzyskie Mts and in the vicinities of Łódź (Czechowska, 2002). It was recently collected in the Śnieżnik Massif (Blaik *et al.*, 2007).

Chrysoperla carnea (Stephens, 1836) s. l.

Jastrzębia Góra, 16 VI 1996, 1♂, 4♀♀, leg. R. Dobosz; Jastrzębia Góra, 21 VI 1993, 6♂♂, leg. R. Dobosz; Karwia, dune, 17-26 VI 1996, 3♂♂, 3♀♀, leg. R. Dobosz; Sulicice, meadow, 27 VI 1996, 1♂, leg. R. Dobosz; Cetniewo, 22 VI 1993, 1♀, leg. R. Dobosz; Władysławowo, 6-21 VI 1993, 4♂♂, 8♀♀, leg. R. Dobosz; Jastarnia, 15-30 VI 1991, 1♂, 1♀; Jastarnia, 1-9 VII 1991, 1♂, 1♀; Jastarnia, 13-21 VII 1991, 4♂♂, 9♀♀; Jastarnia, 20-30 VIII 1991, 1♂, 1♀; Jastarnia, dune, 22 VI 1996, 2♂♂, leg. R. Dobosz; Chalupy, heathland over the Gulf of Puck, 19 VIII 2007, 1♀, ex *Pinus sylvestris* L., leg. T. Blaik; Hel-Bór, coastal pine forest, 21 VI 1998, 1♂, ex *P. sylvestris* L., leg. R. Dobosz; Hel-Bór, coastal pine forest, 15 VIII 2007, 3♂♂, 4♀♀, leg. T. Blaik; Jurata, 19 VIII 2007, 1♀, ex *P. sylvestris* L., leg. T. Blaik; Piaski, dune, 21-30 IX 1991, 2♂♂; Piaski, 11 X 1991, 2♂♂, 5♀♀; Piaski, 22-26 VII 1992, 2♂♂, 17♀♀; Piaski, dune, 10-20 IX 1992, 1♂, 4♀♀; Piaski, dune, 21-27 IX 1992, 35♂♂, 29♀♀; Międzyzdroje, meadow, 1 VIII 1989, 1♂, 1♀, leg. J. A. Lis; Międzyzdroje, 3 VIII 1989, 2♀♀, ex *Alnus glutinosa* (L.), leg. J. A. Lis; Międzyzdroje, dune, 8 VIII 1989, 1♂, leg. J. A. Lis; Międzyzdroje, dune, 21-30 V 1992, 6♂♂, 7♀♀; Międzyzdroje, 29 VI – 1 VII 1992, 10♂♂, 26♀♀; Międzyzdroje, 4 VII 1992, 6♂♂, 10♀♀; Międzyzdroje, 11-20 VII 1992, 6♂♂, 53♀♀; Międzyzdroje, 25 VII 1992, 1♂, 4♀♀; Międzyzdroje, 27 VII 1992, 7♂♂, 11♀♀; Międzyzdroje, 4 VIII 1992, 1♀; Międzyzdroje, 7 VIII 1992, 1♂, 2♀♀; Międzyzdroje, 15 VIII 1992, 8♂♂, 17♀♀; Międzyzdroje, 21-23 VIII 1992, 1♂, 2♀♀; Międzyzdroje, 28-30 VIII 1992, 1♀; Sierosław, meadow, 22 VIII 1993, 1♂, 1♀, leg. J. A. Lis; Kołczewo, 19 VIII 1993, 1♀, leg. J. A. Lis; Międzywodzie, 10-15 VI 1991, 4♀♀; Międzywodzie, 21-25 VI 1991, 5♀♀; Międzywodzie, dune, 2-12 VII 1991, 14♀♀; Świętousć, forest clearing, 8 VIII 1989, 1♀, leg. J. A. Lis; Wiselka, 18 VIII 1993, 1♀, leg. J. A. Lis; Wiselka, 17-25 VII 1997, 1♂, 3♀♀, leg. R. Dobosz; Wiselka, 18 VIII 2007, 2♂♂, 1♀, at light, leg. R. Dobosz; Mrzeżyno, military training area, 2-9 VII 1989, 32♂♂, 183♀♀; Mrzeżyno, military training area, 26 VII 1989, 36♂♂, 51♀♀; Mrzeżyno, military training area, 27 VII 1989, 35♂♂, 53♀♀; Mrzeżyno, military training area, 29 VII 1989, 3♂♂, 36♀♀; Mrzeżyno, military training area, 9 VIII 1989, 3♂♂, 4♀♀; Mrzeżyno, military training area, 15 VIII 1989, 7♂♂, 45♀♀; Mrzeżyno, military training area, 20 VIII 1989, 30♂♂, 50♀♀; Mrzeżyno, military training area, 21 VIII 1989, 11♂♂, 8♀♀; Łazy, 5 IX 1990, 1♂, 2♀♀, leg. R. Dobosz; Łazy, dune, 10-14 VI 1991, 3♂♂, 5♀♀; Łazy, dune, 15-18 VI 1991, 1♂; Łazy, dune, 24-30 VI 1991, 2♀♀; Łazy, dune, 1-8 VII 1991, 1♂, 3♀♀; Łazy, dune, 10-20 VIII 1991, 2♀♀; Łazy, dune, 22-29 IX 1991, 1♀; Jarosławiec, dune, 20-30 VI 1991, 2♀♀; Niechorze, sea shore, 27 V 1989, 2♀♀; Niechorze, sea shore, 7 VII 1989, 2♀♀; Niechorze, military training area, 7 VIII 1989, 14♂♂, 39♀♀; Niechorze, military training area, 21 IX 1989, 3♂♂, 4♀♀; Świnoujście, dune, 5-15 VI 1991, 3♂♂; Świnoujście, dune, 16-25 VI 1991, 4♀♀; Świnoujście, dune,

21-31 VIII 1991, 2♂♂, 4♀♀; Świnoujście, dune, 1-11 IX 1991, 1♀; Ustka, 5 VI 1992, 4♀♀; Ustka, 13-14 VII 1992, 25♀♀; Ustka, 17-20 VII 1992, 2♂♂, 10♀♀; Ustka, 2 VIII 1992, 2♂♂, 20♀♀; Ustka, 3 VIII 1992, 8♂♂, 17♀♀; Ustka, 28 VIII 1992, 1♂, 3♀♀; Rowy, 4-20 VI 1992, 1♀; Rowy, 19 VII 1992, 18♂♂, 29♀♀; Rowy, 21 VII 1992, 4♀♀; Rowy, 24 VII 1992, 1♂, 1♀; Rowy, 25 VII 1992, 7♂♂, 21♀♀; Rowy, 26 VII 1992, 1♀; Rowy, 3 VIII 1992, 4♂♂, 5♀♀; Rowy, 9 VIII 1992, 2♂♂, 5♀♀; Rowy, 25-28 IX 1992, 7♂♂; Czołpino, Czołpino Dune, 21-30 VI 1991, 1♂, 48♀♀; Czołpino, Czołpino Dune, 1-10 VII 1991, 1♂, 9♀♀; Czołpino, Czołpino Dune, 11-20 VII 1991, 4♀♀; Czołpino, Czołpino Dune, 21-31 VIII 1991, 1♂, 6♀♀; Czołpino, Czołpino Dune, 1-10 IX 1991, 5♂♂, 2♀♀; Czołpino, Czołpino Dune, 15-17 IX 1991, 30♂♂, 33♀♀; Kluki, grey dune, 26 VII 2005, 2exx., leg. W. Żyła; Łeba, 18 VI 1992, 3♀♀; Łeba, 2 VII 1992, 3♂♂, 50♀♀; Łeba, 3 VII 1992, 2♂♂, 10♀♀; Łeba, 11 VII 1992, 26♀♀; Łeba, 28 VII 1992, 4♂♂, 6♀♀; Łeba, 29 VII 1992, 2♂♂, 8♀♀; Łeba, 4 VIII 1992, 1♂, 5♀♀; Łeba, 5 VIII 1992, 1♂, 14♀♀; Łeba, 6 VIII 1992, 1♂, 6♀♀; Łeba, 15 VIII 1992, 8♂♂, 16♀♀; Łeba, 20 VIII 1992, 5♂♂, 20♀♀; Łeba, 23-25 VIII 1992, 12♂♂, 24♀♀; Łeba, 3 IX 1992, 6♂♂, 13♀♀; Białogóra, dune, 4-15 IV 1991, 1♂; Białogóra, dune, 15-30 VI 1991, 8♀♀; Białogóra, dune, 6-17 VII 1991, 1♂, 4♀♀; Białogóra, dune, 23-29 IX 1991, 5♂♂, 6♀♀.

Lit.: Brischke (1887): no accurate data available; Brischke (1888), Zaćwilichowski (1939): Hel CF55; Brischke (1894): Gdańsk-Brzeźno CF43; Enderlein (1908): Karwia CF27; Zaćwilichowski (1938a), Dobosz (1991): Gdynia-Orłowo CF44, Gdynia-Oksywie CF44; Kaczmarek (1981): in general from Słowiński National Park; Thierry *et al.* (1998): Rybina CF71.

HEMEROBIIDAE

Hemerobius (Hemerobius) humulinus Linnaeus, 1758

Karwia, dune, 15-26 VI 1996, 15♂♂, 12♀♀, leg. R. Dobosz; Władysławowo, 6-7 VI 1993, 4♂♂, 2♀♀, 2 exx., leg. R. Dobosz; Władysławowo, 18 VI 1993, 1♂, 1 ex., leg. R. Dobosz; Międzyzdroje, dune, 21-30 V 1992, 3♂♂; Międzyzdroje, 29 VI – 1 VII 1992, 1♂, 2♀♀; Międzyzdroje, 11-20 VII 1992, 1♀; Międzyzdroje, 10-16 IX 1992, 1♀; Wiselka, 17-25 VII 1997, 9♂♂, 13♀♀, leg. R. Dobosz; Mrzeżyno, military training area, 8 VII 1989, 1♂; Mrzeżyno, military training area, 27 VII 1989, 1♀; Mrzeżyno, military training area, 20 VIII 1989, 1♂, 1♀; Dźwirzyno, 14 VI 1989, 1♂; Świnoujście, dune, 21-31 VIII 1991, 1♂, 1♀; Ustka, 5 VI 1992, 1♂, 1♀; Ustka, 2 VIII 1992, 3♀♀; Rowy, 21 VII 1992, 1♂; Łeba, 2 VII 1992, 1♀; Łeba, 23-25 VIII 1992, 1♀; Hel Peninsula, 28 VII 1985, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz.

Lit.: Brischke (1887): Gdańsk CF42; Brischke (1888): Hel CF55; Karl (1937): Charnowo XA24, Orzechowo XA25, Niewierowo XA34; Zaćwilichowski (1938a): Gdynia-Orłowo CF44.

Hemerobius (Hemerobius) perelegans Stephens, 1836

Rowy, 4-20 VI 1992, 1♀.

A very rare and local species in Poland, has so far only been known from the southeastern part of the country. There are single recent records from the Carpathians: the Babia Góra Massif (Dobosz, 1988), Wetlina in the Bieszczady Mts (Dobosz, 2000) and the Roztocze region (Dobosz & Blaik, 2008), and also historical data from the Carpathian Foothills – the vicinity of Wadowice (Dobosz, 1991).

Hemerobius (Hemerobius) simulans Walker, 1853

Międzyzdroje, 29 VI – 1 VII 1992, 2♀♀; Międzyzdroje, 4 VIII 1992, 1♂; Mrzeżyno, military training area, 8 VII 1989, 1♀.

Hemerobius (Hemerobius) stigma Stephens, 1836

Karwia, dune, 17-26 VI 1996, 3♀♀, leg. R. Dobosz; Władysławowo, 13 VI 1993, 1♀, leg. R. Dobosz; Jastarnia, 1-9 VII 1991, 1♀; Międzyzdroje, dune, 21-30 V 1992, 1♂; Międzyzdroje, 4 VII 1992, 1♂; Międzyzdroje, 11-20 VII 1992, 2♀♀; Międzyzdroje, 25 VII 1992, 1♀; Międzyzdroje, 27 VII 1992, 5♀♀; Międzyzdroje, 15 VIII 1992, 1♂, 1♀; Wiselka, 17-25 VII 1997, 1♂, 7♀♀, 1 ex., leg. R. Dobosz; Mrzeżyno, military training area, 25 VI 1989, 1♀; Mrzeżyno, military training area, 2-9 VII 1989, 16♂♂, 37♀♀; Mrzeżyno, military training area, 26-29 VII 1989, 8♂♂, 34♀♀; Mrzeżyno, military training area, 15-21 VIII 1989, 11♀♀; Dźwirzyno, 11-14 VI 1989, 1♂, 6♀♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Jarosławiec, 20-30 VI 1991, 1♀; Niechorze, sea shore, 14 IV 1989, 1♂; Niechorze, sea shore, 7 VII 1989, 2♀♀; Niechorze, military training area, 7 VIII 1989, 1♀; Świnoujście, dune, 7-16 VIII 1991, 2♀♀; Ustka, 5 VI 1992, 1♀; Ustka, 1-2 VII 1992, 1♀; Ustka, 2 VIII 1992, 2♀♀; Rowy, 21-25 VII 1992, 1♂, 4♀♀; Rowy, 3 VIII 1992, 1♀; Czołpino, Czołpino Dune, 21-31 VIII 1991, 2♀♀; Czołpino, Czołpino Dune, 1-10 IX 1991, 1♀; Łeba, 2-3 VII 1992, 1♂, 1♀; Łeba, 28-29 VII 1992, 1♂, 2♀♀; Łeba, 4 VIII 1992, 1♀; Hel Peninsula, 27-28 VII 1985, 1♂, 2♀♀, ex *P. sylvestris* L., leg. R. Dobosz.

Lit.: Brischke (1887): Gdańsk CF42; Brischke (1891): Stegna CF72

Hemerobius (Hemerobius) pini Stephens, 1836

Karwia, dune, 17 VI 1996, 1♂, 1♀, leg. R. Dobosz.

Hemerobius (Hemerobius) fenestratus Tjeder, 1932

Ustka, 2 VIII 1992, 1♂.

A locally distributed and rarely collected species in Poland, mainly in the montane and highland regions. It was recorded from three localities in the Carpathians: Mt Równica in the Beskid Śląski Mts, Baligród in the Bieszczady Mts (Dobosz, 1989) and the Babia Góra Massif (Dobosz, 2003), also in the Sudetes - the Karkonosze Mts (Dobosz, 1998), and the Roztocze National Park (Czechowska, 1997). In Northern Poland it has hitherto only been reported from the Białowieża Primeval Forest (Czechowska, 1994, 1997; Dobosz, 1999b).

Hemerobius (Hemerobius) atrifrons McLachlan, 1868

Niechorze, military training area, 7 VIII 1989, 1♀.

Lit.: Brischke (1887): Gdańsk CF42.

Hemerobius (Hemerobius) nitidulus Fabricius, 1777

Jastarnia, dune, 22 VI 1996, 1♂, 1♀, leg. R. Dobosz; Hel-Bór, coastal pine forest, 15 VIII 2007, 1♂, ex *Pinus sylvestris* L., leg. T. Blaik; Międzyzdroje, dune, 21-30 V 1992, 4♂♂; Międzyzdroje, 29 VI – 1 VII 1992, 1♂; Międzyzdroje, 4 VII 1992, 2♂♂; Międzyzdroje, 11-20 VII 1992, 2♂♂, 4♀♀; Międzyzdroje, 25 VII 1992, 1♂; Międzyzdroje, 27 VII 1992, 4♂♂, 4♀♀; Międzyzdroje, 15-30 VIII 1992, 3♀♀; Międzywodzie, 10-15 VI 1991, 1♀; Wiselka, 17-25 VII 1997, 1♂, leg. R. Dobosz; Mrzeżyno, military training area, 2-9 VII 1989, 4♂♂, 14♀♀; Mrzeżyno, military training area, 26 VII 1989, 6♂♂, 15♀♀; Mrzeżyno, military training area, 27 VII 1989, 10♂♂, 10♀♀; Mrzeżyno, military training area, 15 VIII 1989, 2♂♂, 2♀♀; Mrzeżyno, military training area, 20-21 VIII 1989, 6♀♀; Dźwirzyno, dune, 7 VI 1989, 1♀, leg. R. Dobosz; Dźwirzyno, 11 VI 1989, 1♀, ex *P. sylvestris* L., leg. R. Dobosz; Kołobrzeg, 14 VI 1989, 1♂, ex *P. sylvestris* L., leg. R. Dobosz; Łazy, 5 IX 1990, 1♂, leg. R. Dobosz; Łazy, dune, 1-8 VII 1991, 2♀♀; Niechorze, military training area, 7 VIII 1989, 1♀; Świnoujście, wydma, 16-25 VI 1991, 1♂; Świnoujście, wydma, 21-31 VIII 1991, 4♂♂, 1♀; Ustka, 2 VIII 1992, 3♂♂, 24♀♀; Ustka, 3 VIII 1992, 1♀; Rowy, 19-21 VII 1992, 15♂♂, 24♀♀; Rowy, 24-30 VII 1992, 4♂♂, 10♀♀; Rowy, 3 VIII 1992, 2♂♂, 4♀♀; Rowy, 9 VIII 1992, 1♀; Czołpino, Czołpino Dune, 21-31 VIII 1991, 1♂; Czołpino, Czołpino Dune, 15-17 IX 1991, 1♀; Łeba, 6 VI 1992, 1♂; Łeba, 2 VII 1992, 1♂, 1♀; Łeba, 4 VIII 1992, 1♂, 1♀; Łeba, 20-22 VIII 1992, 6♂♂, 5♀♀; Białogóra, dune, 6-17 VII 1991, 1♂.

Hemerobius (Hemerobius) micans Olivier, 1792

Międzyzdroje, 29 VI – 1 VII 1992, 1♂, 2♀♀; Międzyzdroje, 27 VII 1992, 1♂; Międzyzdroje, 21-23 VIII 1992, 1♂, 2♀♀; Wiselka, 17-25 VII 1997, 3♂♂, 5♀♀, 1 ex., leg. R. Dobosz; Łeba, 2 VII 1992, 1♂.

Lit.: Brischke (1887): Sopot CF43; Karl (1937): Strzelinko XA24; Zaćwilichowski (1938a): Gdynia-Orłowo CF44.

Hemerobius (Hemerobius) lutescens Fabricius, 1793

Władysławowo, 7 VI 1993, 1♀, leg. R. Dobosz; Międzyzdroje, 4 VII 1992, 1♀; Międzyzdroje, 4 VIII 1992, 1♂; Międzyzdroje, 15 VIII 1992, 1♀; Międzyzdroje, 21-23 VIII 1992, 1♂, 2♀♀; Międzyzdroje, 28-30 VIII 1992, 1♂; Mrzeżyno, military training area, 20 VIII 1989, 1♀; Mrzeżyno, military training area, 21 VIII 1989, 2♀♀; Dźwirzyno, 11 VI 1989, 1♂, ex *Betula* sp., leg. R. Dobosz; Świnoujście, dune, 7-16 VIII 1991, 2♂♂, 1♀; Świnoujście, dune, 21-31 VIII 1991, 2♂♂; Świnoujście, dune, 1-11 IX 1991, 2♂♂, 2♀♀; Świnoujście, dune, 15 IX 1991, 1♂, 1♀; Ustka, 5 VI 1992, 1♂; Łeba, 23-25 VIII 1992, 1♂.

Wesmaelius (Wesmaelius) concinnus (Stephens, 1836)

Karwia, dune, 17 VI 1996, 5♂♂, leg. R. Dobosz; Władysławowo, 7-8 VI 1993, 2♂♂, 1♀, leg. R. Dobosz; Władysławowo, 13 VI 1993, 11♂♂, 7♀♀, 2 exx. (abdomen lacking), leg. R. Dobosz; Władysławowo, 18-21 VI 1993, 2♂♂, leg. R. Dobosz; Jastarnia, 1-9 VII 1991, 1♂; Jastarnia, pine forest, 20 VI 1998, 1♀, ex *Pinus sylvestris* L., leg. R. Dobosz; Mrzeżyno, military training area, 7 VII 1989, 1♀; Mrzeżyno, military training area, 29 VII 1989, 1♀; Dźwirzyno, 11-14 VI 1989, 7♂♂, 10♀♀, 2 exx., ex *P. sylvestris* L., leg. R. Dobosz; Hel Peninsula, 28 VII 1985, 1♀, ex *P. sylvestris* L., leg. R. Dobosz.

Lit.: Brischke (1887): Sopot CF43; Brischke (1888): Hel CF55; Brischke (1889): Stegna CF72.

Wesmaelius (Kimminsia) nervosus (Fabricius, 1793)

Jastarnia, dune, 13-21 VII 1991, 1♀; Międzyzdroje, dune, 21-30 V 1992, 5♂♂, 1♀; Mrzeżyno, military training area, 8 VII 1989, 1♂; Mrzeżyno, military training area, 26 VII 1989, 1♀; Mrzeżyno, military training area, 20 VIII 1989, 1♂, 1♀; Łazy, dune, 15-18 VI 1991, 1♀; Łazy, dune, 1-8 VII 1991, 1♀; Niechorze, sea shore, 7 VII 1989, 1♂, 1♀; Świnoujście, dune, 5-15 VI 1991, 3♀♀; Świnoujście, dune, 30 VI – 10 VII 1991, 1♀; Świnoujście, dune, 7-16 VIII 1991, 1♂; Świnoujście, dune, 1-11 IX 1991, 1♀; Świnoujście, dune, 15 IX 1991, 1♂; Ustka, 5 VI 1992, 1♂, 2♀♀; Ustka, 7 VII 1992, 1♀; Ustka, 13-14 VII 1992, 1♀; Ustka, 2 VIII 1992, 1♀; Rowy, 25 VII 1992, 1♀; Rowy, 30 VII 1992, 1♂; Rowy, 25-28 IX 1992, 1♀; Czołpino, Czołpino Dune, 15-17 IX 1991, 1♀; Łeba, 2 VII 1992, 1♀; Łeba, 23-25 VIII 1992, 1♀.

Lit.: Brischke (1887): Gdańsk CF42; Brischke (1888): Hel CF55.

Wesmaelius (Kimminsia) subnebulosus (Stephens, 1836)

Międzyzdroje, dune, 21-30 V 1992, 1♂; Międzyzdroje, 4 VII 1992, 1♂; Międzyzdroje, 11-20 VII 1992, 2♀♀; Mrzeżyno, military training area, 21 VIII 1989, 1♂; Świnoujście, dune, 21-31 VIII 1991, 1♂; Ustka, 17-20 VII 1992, 1♀; Ustka, 2 VIII 1992, 1♂; Rowy, 4-20 VI 1992, 1♀; Rowy, 21 VII 1992, 1♀.



Fig. 2. Male of *Wesmaelius balticus* (Tjed.). Poland, Rowy.

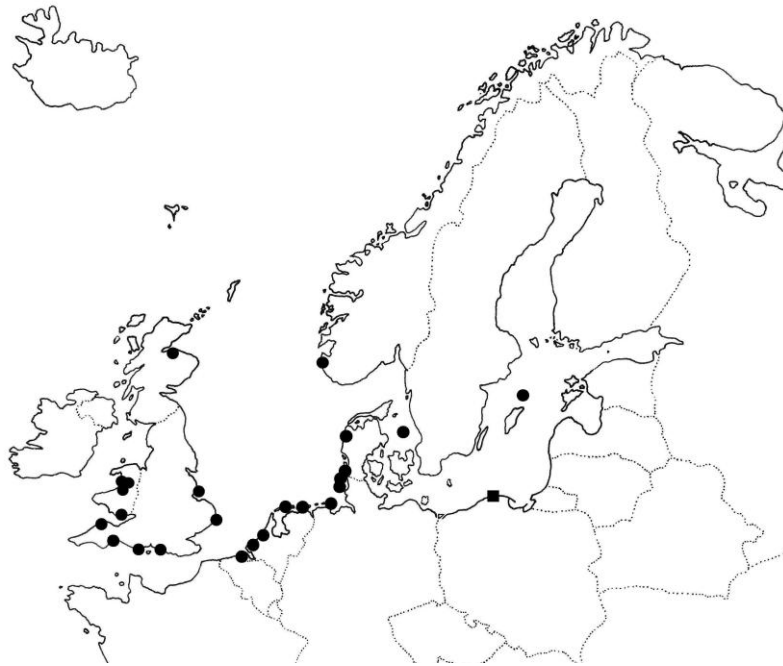


Fig. 3. Distribution of *Wesmaelius balticus* (Tjed.). A new locality in Rowy (*square*), localities from literature (*spots*).

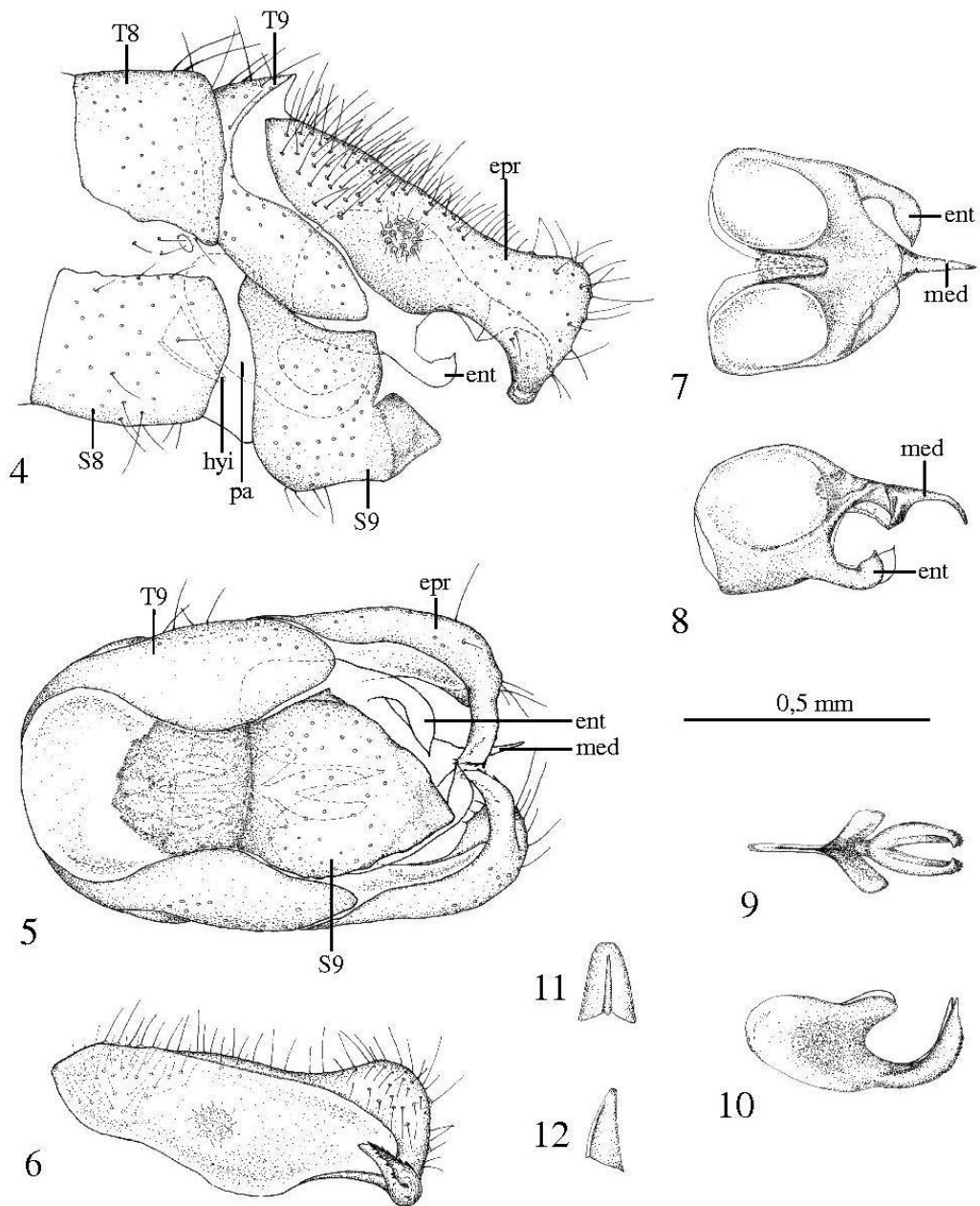
Wesmaelius (Kimminsia) balticus (Tjeder, 1931)

Rowy, 21 VII 1992, 1♂.
A species new to Poland.

Wesmaelius (Kimminsia) mortoni (McLachlan, 1899)

Mrzeżyno, military training area, 2-9 VII 1989, 1♂; Świnoujście, dune, 21-31 VIII 1991, 1♂.

A rarely collected species, known from a few localities in Poland. Recently recorded from the Kampinos Forest (Czechowska, 1985, 1997), the Białowieża Primeval Forest and the Tuchola Forest (Czechowska, 1994, 1997; Dobosz, 1999b), the Beskid Sądecki Mts (Czechowska, 2002) and the Roztocze region (Dobosz & Błaik 2008). Moreover, the old data from the Tatras are available (Zaćwilichowski, 1939).



Figs. 4–12. *Wesmaelius balticus* (Tjed.) male abdominal structures. Fig. 4. Segments 8 and 9 (lateral view); Fig. 5. Segment 9 (ventral view); Fig. 6. Ectoproct (epr) (lateral view, internal); Fig. 7. Gonarcus (dorsal view); Fig. 8. Gonarcus (lateral view); Fig. 9. Parameres (pa) (dorsal view); Fig. 10. Parameres (lateral view); Fig. 11. Hypandrium internum (hyi) (ventral view); Fig. 12. Hypandrium internum (lateral view). Other abbreviations: ent - entoprocessus, gs - gonapophyse, med - mediuncus, S - sternit, T - tergite.

Symphorobius (Symphorobius) elegans (Stephens, 1836)

Międzyzdroje, 29 VI – 1 VII 1992, 3♂♂; Międzyzdroje, 4 VII 1992, 1♂; Łeba, 2 VII 1992, 1♀.

Symphorobius (Niremberge) fuscescens (Wallengren, 1863)

Karwia, dune, 17-26 VI 1996, 2♂♂, leg. R. Dobosz; Hel-Bór, coastal pine forest, 21 VI 1998, 2♀♀, ex *Pinus sylvestris* L., leg. R. Dobosz.

Drepanopteryx phalaenoides (Linnaeus, 1758)

Międzyzdroje, 18 VII 1992, 1♂; Czolpino, dune, 7 VIII 2006, 1♂, leg. W. Żyła.

Lit.: Brischke (1887): no accurate data available; Karl (1937): Poddąbie XA25.

Micromus variegatus (Fabricius, 1793)

Międzyzdroje, 11-20 VII 1992, 1♀; Międzyzdroje, 27 VII 1992, 1♀; Międzyzdroje, 28-30 VIII 1992, 1♀; Międzywodzie, 3 VIII 1989, 1♂, leg. J. A. Lis; Świętousć, forest clearing, 8 VIII 1989, 1♂, leg. J. A. Lis; Mrzeżyno, military training area, 26 VII 1989, 1♀; Dźwirzyno, 17 VIII 1998, 1♀, leg. J. Betleja; Ustka, 2 VIII 1992, 1♀; Rowy, 25 VII 1992, 1♂, 1♀; Smoldzino, 4 VIII 2007, 1 ex., leg. B. Lis.

Micromus angulatus (Stephens, 1836)

Międzyzdroje, 15 VIII 1992, 1♀.

SISYRIDAE

Sisyra nigra (Retzius, 1783)

Ustka, 5 VI 1992, 2♂♂, 1♀; Ustka 13-14 VII 1992, 1♂, 2♀♀; Ustka 2 VIII 1992, 1♂, 3♀♀; Rowy, 21 VII 1992, 1♂.

Lit.: Karl (1937): Niewierowo XA34.

CONIOPTERYGIDAE

Aleuropteryx loewii Klapálek, 1894

Hel-Bór, 21 VI 1992, 3♀♀, ex *Pinus sylvestris*, leg. R. Dobosz; Wiselka, 17-25 VII 1997, 1♀, leg. R. Dobosz.

It is one of the most rarely collected species of the family in Poland. Known from a few localities in the vicinities of Warsaw (Plewka, 1974; Czechowska, 1982, 1985, 1997), the Wielkopolska National Park (Woźniak, 1974), the Błędów Desert (Dobosz, 1993a) and the vicinity of Babimost (Czechowska, 1997).

Helicoconis (Helicoconis) lutea (Wallengren, 1871)

Karwia, 15-18 VI 1996, 3♂♂, leg. R. Dobosz.

A very rarely recorded species in Poland, known from only four localities focused in relatively small, highland-montane area in the southern part of the country. Most data available are old, from the first half of the 20th century: Muszyna in the Beskid Sądecki Mts (Mikulski, 1931), Kraków (Zaćwilichowski, 1938a) and Bytom (Dobosz, 1989). The only recent records are from the Babia Góra Massif (Dobosz, 2003).

Coniopteryx (Coniopteryx) pygmaea Enderlein, 1906

Karwia, 15-18 VI 1996, 3♂♂, 15♀♀, leg. R. Dobosz; Jastarnia, 22 VI 1996, 2♂♂, 5♀♀, ex *Pinus sylvestris*, leg. R. Dobosz; Hel-Bór, 21 VI 1992, 1♂, 5♀♀, ex *P. sylvestris*, leg. R. Dobosz.

Coniopteryx (Coniopteryx) tineiformis Curtis, 1834

Lit.: Enderlein (1906, 1908): Lubkowo ad Żarnowiec CF17, Hel Peninsula, between Jastarnia CF46 and Hel CF55.

Parasemidalis fuscipennis (Reuter, 1894)

Hel-Bór, 21 VI 1992, 2♂♂, ex *Pinus sylvestris*, leg. R. Dobosz.

Conwentzia pineticola Enderlein, 1905

Lit.: Enderlein (1905, 1906, 1908): Hel CF55; Enderlein (1906, 1908): Rzucewo CF36.

Semidalis aleyrodiformis (Stephens, 1836)

Karwia, 15-18 VI 1996, 6♂♂, 4♀♀, leg. R. Dobosz; Władysławowo, 8 VI 1993, 1♀, leg. R. Dobosz; Jastarnia, 20 VI 1998, 2♂♂, 4♀♀, ex *Quercus* sp., leg. R. Dobosz.

Lit.: Enderlein (1906, 1908): Karwieńskie Błota CF17.

MYRMELEONTIDAE

Acanthaclisis occitanica (Villers, 1789)

Lit.: Hagen (1859, 1873): Krynica Morska CF92; Hagen (1859), Brischke (1887): Przebrno CF92; Hagen (1873): Elbląg CF90.

Only historical data from the Baltic coast are available on the presence of this relic species in Poland. Since the 19th century *A. occitanica* has not been rediscovered in the known localities, and no new populations are found in the country. The species is listed in Polish Red Data Book of Animals with given category EX? – probably extinct (Dobosz, 2004a).

Myrmeleon formicarius Linnaeus, 1767

Międzyzdroje, 18 VII 1992, 1♀.

Lit.: Brischke (1879): Gdańsk-Oliwa CF43; Brischke (1887): no accurate data available; Brischke (1888): Hel CF55; Brischke (1889): Stegna CF72; Zaćwilichowski (1938b): Jastarnia CF46; Dobosz & Żyła (2005): Smołdziński Las XA46.

Myrmeleon inconspicuus Rambur, 1842

Lit.: Dobosz (1994): Jastarnia CF46; Dobosz and Żyła (2005): Smołdziński Las XA46.

The unique species in Poland, known from only two localities on the Baltic coast. A small, isolated population is preserved over 500 kilometres north from the continuous range of the species (Aspöck *et al.*, 1980). Category EN – endangered in the Polish Red Data Book of Animals (Dobosz, 2004c).

Myrmeleon bore (Tjeder, 1941)

Piaski, 22-26 VII 1992, 1♂, 2♀♀; Świnoujście, dune, 21-31 VIII 1991, 1♀; Czołpino, Czołpino Dune, 1-10 VII 1991, 2♀♀; Czołpino, Czołpino Dune, 11-20 VII 1991, 1♂, 1♀; Czołpino, Czołpino Dune, 21-31 VIII 1991, 1♂; Czołpino, Czołpino Dune, 1-10 IX 1991, 2♂♂; Leba, 20 VIII 1992, 1♀; Rąbka ad Leba, open dune in the pine forest, e. l. 5 V 2007, 1♀, larva: 24 IX 2006, leg. T. Blaik.

Lit.: Dobosz (1993b): Dźwirzyno WA20; Dobosz *et al.* (2008): Wiselka VV78.

With exception of the Baltic coast, where it is probably widely distributed, only two recent localities in the Upper Silesia are known: the Błędów Desert (Dobosz, 1993a, b) and the vicinity of Kolonowskie (Blaik, 2007) and only a single historical specimen collected in the vicinity of Bydgoszcz (Dobosz, 1993b). Category EN – endangered in the Polish Red Data Book of Animals (Dobosz, 2004b).

Euroleon nostras (Geoffroy in Fourcroy, 1785)

Jastarnia, 14 VIII 2007, shore of the Gulf of Puck, 1♀, ex *Populus tremula* L., leg. T. Blaik; Jastarnia, pine forest, 19 VIII 2007, 1♀, at light, leg. T. Blaik; Hel-Bór, e.l., 1♀, larva: 20 VII 1985, leg. R. Dobosz; Hel-Bór, coastal pine forest, 18 VIII 2007, 2♂♂, at light, leg. T. Blaik.

Lit.: Krüger (1921): Świnoujście VV57; Zaćwilichowski (1938b): Jastarnia CF46; Zaćwilichowski (1938b, 1939): Hel CF55; Dobosz *et al.* (2008): Wiselka VV78.

Distoleon tetragrammicus (Fabricius, 1798)

Hel-Jastarnia, 13-30 VII 1991, 1♀.

Lit.: Brischke (1888), Zaćwilichowski (1938b, 1939): Hel CF55; Zaćwilichowski (1938b): Jastarnia CF46.

A very rare species in Poland. Besides the Hel Peninsula, the single recent locality in the Tuchola Forest is known (Berndt, 1984). In the 19th century reported from Wilczyno Leśne in the Trzebnica Hills (Schneider, 1885).

Discussion

Geographically widespread Neuroptera species with more or less continuous range in Central and Northern Europe predominate along the Polish Baltic coast. Most of them represent Siberian and Holarctic faunal elements (Aspöck *et al.*, 1980, 2001). On the other hand, there are some particularly important species in chorological respect, occur in the area in marginal portions of their range (Aspöck & Aspöck, 2005). Among of non-transitional ones, three expansive Holomediterranean antlions: *Acanthaclisis occitanica*, *Myrmeleon inconspicuus* and *Distoleon tetragrammicus* reach their northernmost limit here. The first two species are present in the enclaves remotely isolated from main South European range and even from their Central European distribution centres. The other interesting species is *Wesmaelius balticus*, reaching its eastern limit in South Baltic coast; distribution and characteristics of occurrence in Europe of this hemerobiid new to Poland is given in

a separate paragraph below. Moreover, near northern or northeastern limit of range are also *Aleuropteryx loewii* (expansive Holomediterranean), *Euroleon nostras* (Mediterranean-Extramediterranean), *Nothochrysa capitata* (polycentric Mediterranean and Extramediterranean) and *Nothochrysa fulviceps* (probably polycentric Extramediterranean-European). These species reach Denmark and Southern Sweden in the north. Regarding *A. loewii*, the Polish coast is the northernmost place of occurrence on the continental Europe, further, the species reaches only the Baltic Sea islands Öland and Gotland (Tjeder, 1953). The presence of *N. fulviceps* and numerous localities of *N. capitata* in particular is related to their wide distribution in southwestern region of the Baltic Sea. According to the recent data from Poland, the range of *N. fulviceps* and *N. capitata* in northern part of Central Europe extend to the line of lower and median course of the Vistula. The record of *N. capitata* on the Baltic coast widens the knowledge on distribution of this species in Poland. Up to now, it was only reported from highland-montane regions within natural range of silver fir (*Abies alba* Mill.) (Czechowska, 2002). The localities of *Osmylus fulvicephalus* (expansive Holomediterranean) and *Chrysopa formosa* (polycentric Siberian and Holomediterranean) on the Polish coast are among the few in the northern portion of range of these species, outside of their distribution centres (Popov, 2002). It is opposite to localities of *Myrmeleon bore* (expansive Siberian), for which shores of the Baltic Sea are the main distributional area within clearly distinguishing Central and North European subrange (Röhrlich, 1998).

The presence of *Peyerimhoffina gracilis* in the Baltic region is worthy of notice. This polycentric Mediterranean and Extramediterranean species is mainly distributed in montane regions of Central Europe. Almost up to recent times, it has not been known north to the parallel of 52° N, i.e. over the limit of silver fir and native Central European range of spruce (*Picea abies* (L.) Karst), to which is strictly related in terms of its ecological requirements (Aspöck *et al.*, 1980, 2001; Czechowska, 2002). Quite recently, *P. gracilis* was reported from Northern Europe, based on the museum specimens from Scandinavia (Popov, 2002). The historical locality of the species in Gdańsk is placed within North European range of spruce, beginning in Northeastern Poland and Southern Fennoscandia. It is the northernmost locality of this species in the Central Europe, derived from the continuous range, including rest of Polish sites. These two facts suggest that locality of *P. gracilis* in Northern Poland probably belongs to North European refugium, separated from the centres of distribution of the species by disjunctive zone within European range of spruce. The strongly scattered populations of *P. gracilis* in northern portion of its range could point to the key function of *Abies* spp. in the formation of the principal distributional pattern of the species in Central and Southern Europe.

Similar observations make the presence of expansive Siberian elements as: *Hemerobius perelegans*, *Hemerobius fenestratus* and *Wesmaelius mortoni* or Holarctic ones *Helicoconis lutea* and *Hemerobius simulans* very interesting. These species are widely distributed over the Central European mountain regions and in Fennoscandia, while in the northern part of Central and Western Europe they occur scattered or show the range discontinuities (Aspöck *et al.*, 1980, 2001). Their not numerous localities in Poland are located in coniferous woodlands mainly in highland-montane regions, within the range of spruce, fir and larch (*Larix decidua* Mill.). The new sites on the Baltic coast are the first, sometimes the only localities in lowlands. In the future, new data from central part of Poland should give the answer to the question of presence or absence of discontinuity of their local range, and as result give more light into relationships between North European and North Polish populations (including the Baltic ones) of these species.

The special attention is necessary for the first record of *Wesmaelius balticus* in Poland – the one of the most rarely reported European species of Hemerobiidae. One male specimen (Fig. 2) was collected in light trap by J. Nowacki, 21 VII 1992 in Rowy, in the habitat of a white dune overgrown by *Elymo-Ammophiletum* plant community.

W. balticus is a stenotopic species with characteristic type of occurrence in semi-fixed coastal sand dunes; exceptionally migrating specimens were recorded inland, in the other habitats (Plant, 1991, 1994). Its range in Western and Northern Europe comprises only a narrow belt of Atlantic coast of Southwestern Great Britain, British and continental coastline of the North Sea, and two islands in the Baltic (Fig. 3). This type of distribution characterize the Atlantolittoral (*sensu* Aspöck & Aspöck, 2005) faunal elements - the group of species which populations survived in ice-uncovered glacial refugees on the French (perhaps also the Spanish) Atlantic shores and expanded their range northwards, migrating along the coast in the postglacial periods.

The species has been listed from six countries so far: Sweden: Gotska Sandön Island (Baltic Sea) - *locus typicus* (Tjeder, 1931); Great Britain - a review of all records is given in Plant (1991); England (Killington, 1932a, b, 1937; Stroyan, 1941; Kirby, 1991; Plant, 1991), Wales (Killington, 1937; Morgan, 1990; Kirby, 1991; Plant, 1991), East Scotland (Plant, 1991); Denmark: West Jutland (Esben-Petersen, 1938), Anholt Island (Kattegat)

(Schmidt Nielsen, 1976); Germany: North Frisian Islands: Amrum (Friedrich, 1939), Sylt (Friedrich, 1939; Ohm, 1965), East Frisian Islands: Wangerooge (Ohm, 1965); The Netherlands: South Holland (Bakker, 1942; Geijskes, 1972), Zeeland (Geijskes, 1969), West Frisian Islands: Terschelling (Geijskes, 1969), Rottumeroog (Geijskes, 1972); Southwest Norway: Rogaland (Greve, 1967).

Many authors relate *W. balticus* with *Ammophila arenaria* (L.), but it was relatively rarely swept directly from this grass (Morley, 1931, emended by Killington, 1937), or observed on the leaves or nearby the tufts (Ohm, 1965). Most data comes from specimens attracted to the light in the habitats of dunes with *A. arenaria*, less so collected during the day. The association between an insect and marram grass is supposedly very close, including larval stages (Killington, 1937; Plant, 1994).

The appearance period of imagines extends from the end of May to the end of August. Phenological data are still too scarce to confirm bivoltine development of *W. balticus* (Killington, 1937; Aspöck *et al.*, 1980), however the presence of the separate summer generation seems to be probable. Noteworthy is the increment of records and collected specimens from the second half of July, third decade in particular, to the first decade of August (Killington, 1937; Esben-Petersen, 1938; Stroyan, 1941; Plant, 1991). The specimen from Poland was also collected during this period, and on the same date (i.e. 21 July) the species was recorded in the Southern England (Killington, 1932b) and Denmark (Esben-Petersen, 1938). The second, distinctly lower period of higher numbers of quantity and frequency is observed during the second and third decade of June (Killington, 1932a; Plant, 1991, 1994).

Both forewings of Polish specimen present typical, dark fuscous, outer cross-vein between M_{3+4} and Cu_1 (Fig. 2). The right forewing presents three well developed radial sectors, while the left one – four branches. It is a rare case of asymmetrical venation of this species, classified as the “3-sectoral” subgenus *Kimminsia* Killington, 1937 (Tjeder, 1931; Killington, 1932a, b, 1937; Stroyan, 1941; Aspöck *et al.*, 1980). In comparison with the type specimen, the genitalia show only a small shape variation of weak sclerotized basal part of gonarcus and parameres and apical area of hypandrium internum (Tjeder, 1931). The general view of last abdominal segments and detailed genital structures of the collected male are illustrated (Figs. 4–12).

The new Polish locality of *W. balticus* in Rowy is the third, and first not insular, in the whole Baltic Sea area (including Kattegat Strait), moreover the site is easternmost place of its occurrence in continental Europe.

The present distributional pattern of Neuroptera in the Polish coast is presumably a result of numerous recolonization events initiated in northernmost part of Central Europe after the end of the latest glaciation. Anyway, the concept of two main directions of entomofauna immigration during the postglacial periods appears convincing in this instance (Aspöck & Aspöck, 2005). Mediterranean and also Extramediterranean-European faunal elements may have inhabited the area during climatic optimum. The first migrated northwards from primary afforested South European peninsulas, the second one from scattered refugial centres in southern parts of Central Europe. On the second hand, the Siberian faunal elements have colonized this part of Europe from refugees in Palearctic parts of Asia, probably parallel to spruce and pine forests appearance (Aspöck, 2008; Popov, 2002).

The co-occurrence of Siberian faunal elements typical for the taiga and coniferous zones with thermophilous Holomediterranean species existing here at their northernmost European range limit, in addition being under the Atlantolittoral fauna influence, differentiates the studied part of South Baltic coast from its western shores (Aspöck *et al.*, 1980). In consequence, the number of Neuroptera species occurring along the Polish Baltic coast is comparable with the richness of neuropteran fauna (58 species) of the distinctly greater in area Denmark (Popov, 2002).

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References

- Aspöck, H. 2008. Postglacial formation and fluctuations of the biodiversity of Central Europe in the light of climate change. *Parasitol. Res. (Suppl. 1)*, 103: 7–10.
- Aspöck, H., Aspöck, U. & Hölzel, H. 1980. *Die Neuropteren Europas*. Goecke & Evers, Krefeld. Bd I-II: 495 + 355 pp.

- Aspöck, H., Hölzel, H. & Aspöck, U. 2001. Kommentierter Katalog der Neuropterida (Insecta: Raphidioptera, Megaloptera, Neuroptera) der Westpaläarktis. *Denisia*, 2: 1–606.
- Aspöck, U. & Aspöck, H. 2005. Verbreitungsgrenzen von Neuropterida in Mitteleuropa. *Linzer biol. Beitr. (Verh. XVIII. SIEEC, Linz 2003)*, 37(1): 29–38.
- Bakker, H. A. 1942. Nieuwe en zeldzame Hemerobiidae. *Tijdsch. Ent.*, 85: 39–41.
- Berndt, D. 1984. Zróżnicowanie sezonowe siatkoskrzydłych (Neuropteroidea) w różnych typach siedlisk w Borach Tucholskich. *Acta Univ. Nicolai Copernici (Biol.)*, 26(58): 3–19.
- Blaik, T. 2007. Nowe stanowiska *Nothochrysa fulviceps* (Stephens, 1836) i *Myrmeleon bore* (Tjeder, 1941) (Neuroptera: Chrysopidae, Myrmeleontidae) w południowej Polsce. *Acta ent. siles.*, 14–15 (2006–2007): 83.
- Blaik, T., Hebda, G. & Mazur, M. A. 2007. Przyczynek do entomofauny Masywu Śnieżnika (Insecta: Coleoptera, Neuroptera, Lepidoptera) - wyniki studenckich obozów Koła Naukowego Biologów Uniwersytetu Opolskiego w latach 2005–2007. *Przyr. Sudetów*, 10: 125–132.
- Brischke, C. G. A. 1879. Ueber das Eierlegen von *Myrmeleon*. *Ent. Nachr.*, 5(3): 29–30.
- Brischke, C. G. A. 1887. Bericht über eine zoologische Excursion nach Seeresen im Juni 1886. *Schr. naturf. Ges. Danzig (N. F.)*, 6(4): 73–91.
- Brischke, C. G. A. 1888. Bericht über eine Excursion nach Hela während des Juli 1887. *Schr. naturf. Ges. Danzig (N. F.)*, 7(1): 42–64.
- Brischke, C. G. A. 1889. Bericht über eine Excursion nach Steegen, auf der frischen Nehrung, im Juli 1888. *Schr. naturf. Ges. Danzig (N. F.)*, 7(2): 193–209.
- Brischke, C. G. A. 1891. Bericht über eine zweite Excursion nach Steegen im Jahre 1889. *Schr. naturf. Ges. Danzig (N. F.)*, 7(4): 50–74.
- Brischke, C. G. A. 1894. Entomologische Beobachtungen im Jahre 1892. *Schr. naturf. Ges. Danzig (N. F.)*, 8: 52–59.
- Czechowska, W. 1982. Neuroptera and Mecoptera of Warsaw and Mazovia. *Memorab. zool.*, 36: 165–184.
- Czechowska, W. 1985. Neuropteran (Planipennia and Raphidioptera; Neuropteroidea) communities of coniferous forests in the Kampinoska Forest and in Białoleka Dworska near Warsaw. *Fragm. faun.*, 29(19): 391–404.
- Czechowska, W. 1994. Neuropterans (Neuropteroidea: Raphidioptera, Planipennia) of the canopy layer in pine forests. *Fragm. faun.*, 36(23): 459–467.
- Czechowska, W. 1997. A comparative analysis of the structure of Neuropteroidea communities of tree canopies in linden-oak-hornbeam forests, light oak forests, mixed coniferous forests and pine forests. *Fragm. faun.*, 40(12): 127–168.
- Czechowska, W. 2002. Raphidioptera and Neuroptera (Neuropterida) of the canopy in montane, upland and lowland fir forests of *Abies alba* Mill. in Poland. *Fragm. faun.*, 45: 31–56.
- Czechowska, W. 2007. Sieciarki właściwe (Neuroptera). In: Bogdanowicz, W., Chudzicka, E., Pilipiuk, I. & Skibińska, E. (eds.), *Fauna Polski - Charakterystyka i wykaz gatunków*. Tom II. MiZ PAN Warszawa, pp. 279–292.
- Dobosz, R. 1988. Nowe dla fauny Polski gatunki Hemerobiidae (Planipennia, Neuropteroidea) z Babiej Góry. *Przegl. zool.*, 32(3): 393–395.
- Dobosz, R. 1989. Siatkoskrzydłe (Neuropteroidea) w zbiorach Muzeum Górnośląskiego w Bytomiu. *Roczn. Muz. górnośl.* (Przyr.), 12: 75–89.
- Dobosz, R. 1991. Neuropteroidea in the collection of the Institute of Animal Systematics and Evolution PAS in Cracow. *Ann. up. siles. Mus. (Ent.)*, 2: 221–233.
- Dobosz, R. 1993a. *Neuropteroidea* of the Błędów Desert (South Poland), with remarks on some species. *Ann. up. siles. Mus. (Ent.)*, 4: 47–51.
- Dobosz, R. 1993b. Remarks on *Myrmeleon bore* Tjeder, with new localities from Poland and North Korea. *Ann. up. siles. Mus. (Ent.)*, 4: 53–58.
- Dobosz, R. 1994. *Myrmeleon inconspicuus* Rambur - mrówkolew nowy dla fauny Polski oraz uwagi o polskich gatunkach z rodzaju *Myrmeleon* Linnaeus (Neuroptera: Myrmeleontidae). *Roczn. Muz. górnośl.* (Przyr.), 14: 123–127.

- Dobosz, R. 1998. *Wesmaelius malladai* (Navas, 1925) a species of Hemeroibiidae new to the fauna of Poland, and the update list of Neuroptera of the Karkonosze National Park. *Ann. up. siles. Mus. (Ent.)*, 8–9: 193–198.
- Dobosz, R. 1999a. Pierwsze stanowisko *Forcipomyia eques* (Johannsen, 1908) (Diptera: Ceratopogonidae) z Pobrzeża Bałtyku. *Acta ent. siles.*, 5–6 (1997–1998): 50.
- Dobosz, R. 1999b. Owady siatkoskrzydłe (Neuropteroidea: Raphidioptera, Neuroptera) Puszczy Białowieskiej - stan poznania. Parki narod. *Rez. Przynr.*, 18 (Suppl.): 125–132.
- Dobosz, R. 2000. 17. Siatkoskrzydłe (Neuropteroidea) i wojsiłki (Mecoptera) Bieszczadów. *Mon. bieszcz.*, 7: 245–253.
- Dobosz, R. 2003. Owady siatkoskrzydłe (Neuroptera: Megaloptera, Raphidioptera, Neuroptera) Babiej Góry. In: Wołoszyn, B. W., Wołoszyn, D. & Celary, W. (eds.), *Monografia Fauny Babiej Góry*. Komitet Ochrony Przyrody PAN, Kraków, pp. 223–234.
- Dobosz, R. 2004a. *Acanthaclisis occitanica* (Villers, 1789). Pazurecznik wielki. In: Głowaciński, Z. & Nowacki, J. (eds.), *Polska Czerwona Księga Zwierząt. Bezkręgowce*, IOP PAN Kraków & AR Poznań, p. 84.
- Dobosz, R. 2004b. *Myrmeleon (Morter) bore* (Tjeder, 1941). Mrówkolew wydmowy. In: Głowaciński, Z. & Nowacki, J. (eds.), *Polska Czerwona Księga Zwierząt. Bezkręgowce*, IOP PAN Kraków & AR Poznań, p. 87.
- Dobosz, R. 2004c. *Myrmeleon (Morter) inconspicuus* Rambur, 1842. Mrówkolew południowy. In: Głowaciński, Z. & Nowacki, J. (eds.), *Polska Czerwona Księga Zwierząt. Bezkręgowce*, IOP PAN Kraków & AR Poznań, p. 86.
- Dobosz, R. 2005. Nowe stanowiska *Nothochrysa fulviceps* Stephens, 1836 w Polsce (Neuroptera: Chrysopidae). *Acta ent. siles.*, 12–13 (2004–2005): 161.
- Dobosz, R. & Blaik, T. 2008. Owady siatkoskrzydłe (Neuroptera) Roztocza - nowe dane i aktualny wykaz gatunków. *Acta ent. siles.*, 16: 5–11.
- Dobosz, R., Dobosz, M. & Dobosz, M. 2008. *Myrmeleon bore* Tjeder, 1941 (Neuroptera, Myrmeleontidae) na Wolinie wraz z uwagami o biologii i hodowli laboratoryjnej. *Acta ent. siles.*, 16: 13–16.
- Dobosz, R. & Żyła, D. 2005. Drugie stanowisko *Myrmeleon inconspicuus* Rambur, 1842 w Polsce (Neuroptera: Myrmeleontidae). *Acta ent. siles.*, 12–13 (2004–2005): 161–162.
- Enderlein, G. 1905. *Conwentzia pineticola* nov. gen. nov. spec. Eine neue Neuroptere aus Westpreussen. *Ber. westpr. bot.-zool. Ver.*, 26–27: 10–12.
- Enderlein, G. 1906. Monographie der Coniopterygiden. *Zool. Jahrb.*, 23(2): 173–242.
- Enderlein, G. 1908. Biologisch-faunistische Moor- und Dünen-Studien. Ein Beitrag zur Kenntnis biosynöcischer Regionen in Westpreussen. *Ber. westpr. bot.-zool. Ver.*, 30: 54–238.
- Esben-Petersen, P. 1938. *Boriomyia baltica* Tjeder in Denmark. *Ent. Medd.*, 20: 109–110.
- Friedrich, H. 1939. Einige für Schleswig-Holstein neue Neuropteren. *Schr. naturw. Ver. Schl.-Holst.*, 23: 138–139.
- Geijskes D. C. 1969. Odonata, Neuroptera en Trichoptera van Terschelling, met enkele aanvullingen van andere Wadden-Eilanden. *Zool. Bijdr.*, 11: 8–14.
- Geijskes, D. C. 1972. Over de Neuroptera-Fauna van Meijndel. *Zool. Bijdr.*, 13: 43–58.
- Greve, L. 1967. *Wesmaelius balticus* Tjeder, 1931 (Neuroptera, Planipennia) New to Norway. *Norsk ent. Tidsskr.*, 14(2): 95–96.
- Hagen, H. 1859. Ueber das Vorkommen von *Palingenia longicauda* und *Acanthaclisis occitanica* in Preussen. *Stett. ent. Ztg.*, 20: 431–432.
- Hagen, H. 1873. Die Larven von *Myrmeleon*. *Stett. ent. Ztg.*, 34(7–9): 249–295.
- Kaczmarek, S. 1981. Stawonogi (Arthropoda) znalezione w gniazdach ptaków na terenie Słowińskiego Parku Narodowego. In: *Entomologia a gospodarka narodowa*, Warszawa-Wrocław, PWN, pp. 111–118.
- Karl, O. 1937. Ein Beitrag zur Kenntnis der Insektenfauna Ostpommerns. *Dohrmiana*, 16: 56–60.
- Killington, F. J. 1932a. *Boriomyia baltica* Tjeder, a Hemeroibiid (Neuroptera) new to Britain. *Ent. Mon. Mag.*, 68: 83–84.
- Killington, F. J. 1932b. A further note on the occurrence of *Boriomyia baltica* Tjeder (Neuroptera) in Britain. *Ent. Mon. Mag.*, 68: 131.

- Killington, F. J. 1937. *A monograph of the British Neuroptera*. Vol. 2. Ray Society, London, pp. 306.
- Kirby, P. 1991. A review of the scarcer Neuroptera of Great Britain. *Res. Surv. Nat. Conserv. Ser.*, 34: 1–32.
- Kondracki, J. 1994. *Geografia Polski. Mezoregiony fizycznogeograficzne*. PWN, Warszawa, pp. 340.
- Krüger, L. 1921. *Myrmeleon*, Ameisenlöwe. *Abh. Ber. pomm. naturf. Ges.*, 2: 128.
- Mikulski, J. S. 1931. Przyczynek do znajomości fauny doliny Popradu w okolicy Muszyny: Ephemeroptera, Trichoptera i Neuroptera. *Spraw. kom. fizyogr.*, 65: 81–92.
- Morgan, M. J. 1990. Recording in Wales - part 4. *Neuro News*, 7: 12–13.
- Morley, C. 1931. The Neuroptera of Suffolk. *Trans. Suffolk Nat. Soc.*, 1(3): 181–194.
- Nowacki, J. 1994. Struktura zasięgów sówkwatych (Lepidoptera, Noctuidae) w pasie wydm nadmorskich polskiego wybrzeża Bałtyku. *Wiad. ent.*, 12 (Suppl.): 1–127.
- Ohm, P. 1965. Zusammensetzung und Entstehungsgeschichte der Neuropterenfauna der Nordfriesischen Insel Amrum. *Verh. Ver. naturw. Heimatforsch.*, 36: 81–101.
- Plant, C. W. 1991. *Wesmaelius balticus* (Tjeder) (Neuroptera: Hemerobiidae) new to Scotland, with a review of the British records. *Ent. Gaz.*, 42: 171–174.
- Plant, C. W. 1994. *Provisional atlas of the lacewings and allied insects (Neuroptera, Megaloptera, Raphidioptera and Mecoptera) of Britain and Ireland*. Institute of Terrestrial Ecology, Huntingdon, pp. 203.
- Plewka, T. 1974. Bemerkungen über die Neuropterenfauna (Raphidioptera und Planipennia) des Kampinos Nationalparks (Zentralpolen). *Fol. Ent. Hung.*, 27 (Suppl.): 287–289.
- Popov, A. 2002. Neuropterida of Northern Europe. In: Sziráki G. (ed.), *Neuropterology 2000. Proceedings of the 7th International Symposium on Neuropterology (6-9 August 2000, Budapest, Hungary)*. *Acta Zool. Acad. Sci. Hungaricae*, 48 (Suppl. 2): 281–291.
- Röhricht, W. 1998. Distribution of *Myrmeleon (Morter) bore* (Tjeder 1941). *Acta Zool. Fennica*, 209: 221–225.
- Schmidt Nielsen, E. 1976. Neuroptera fra Anholt, med omtale af tre for landet nye arter. Faunistiske undersøgelser på Anholt 5. *Flora og Fauna*, 82: 3–10.
- Schneider, W. G. 1845. Schlesische Arten der Gattung Chrysopa (Hemerobius Linn. Fab. pr. parte). Uebers. Arb. Veränd. schles. Ges. vaterl. Cult., 1844: 76–77.
- Schneider, W. G. 1885. Verzeichniss der Neuropteren Schlesiens. *Z. Ent. (N.F.)*, 10: 17–32.
- Stroyan, H. L. G. 1941. *Kimminsia baltica* Tjeder: a new British record. *Entomologist*, 74: 43.
- Thierry, D., Cloupeau, R., Jarry, M. & Canard, M. 1998. Discrimination of the West-Palaearctic *Chrysoperla* Steinmann species of the *carnea* Stephens group by means of claw morphology (Neuroptera, Chrysopidae). In: Panelius S. P. (ed.), *Neuropterology 1997. Proceedings of the 6th International Symposium on Neuropterology (13-16 July 1997, Helsinki, Finland)*. *Acta Zool. Fennica*, 209: 255–262.
- Tjeder, B. 1931. *Boriomyia persica* Mort., *rava* With., and *baltica* n. sp. *Ent. Tidskr.*, 52: 1–9.
- Tjeder, B. 1953. Catalogus Insectorum Sueciae. Additamenta ad partes I-X, I. Neuroptera et Mecoptera. *Opusc. Ent.*, 18(1): 71.
- Woźniak, W. 1974. Sieciarki (Neuroptera) Wielkopolskiego Parku Narodowego. *Bad. fizjogr. Pol. zach., Ser. C - Zool.*, 27: 117–124.
- Zaćwilichowski, J. 1938a. Materiały do fauny sieciarek (Neuroptera) Polski. *Fragm. faun.*, 3(15): 241–249.
- Zaćwilichowski, J. 1938b. *Formicaleo tetragrammicus* F., piąty gatunek mrówkolwa w Polsce, tudzież klucz do oznaczania krajowych gatunków rodziny mrówkolwów (Myrmeleonidae, Neuroptera). *Fragm. faun.*, 3(25): 495–502.
- Zaćwilichowski, J. 1939. Dalsze materiały do fauny sieciarek (Neuroptera) Polski. *Fragm. faun.*, 4(2): 7–12.