FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS 2015/39

FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS

MÁTRA MÚZEUM

GYÖNGYÖS

2015 39

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A kötet Gyöngyös Város Önkormányzata támogatásával készült.

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Publikációs dátum: 2015. december 23.

ISSN 2062-7602

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
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Contribution to the aquatic macroinvertebrate fauna of the Eger-patak (Eger stream) in Northern Hungary

András Csercsa, Tamás Bozóki, Eszter Á. Krasznai, Márk Ficsór & Gábor Várbíró

Abstract: During the quantitative sampling of the Eger-patak in 2014 altogether 99 taxa were identified which belong to 10 higher taxonomical groups: Bivalvia: 2, Coleoptera: 15, Crustacea: 6, Diptera: 7, Ephemeroptera: 11, Gastropoda: 15, Heteroptera: 2, Hirudinea: 4, Odonata: 9, Trichoptera: 28, among which 45 aquatic macroinvertebrate taxa were new to the fauna of the stream.

Introduction

Eger-patak is the main watercourse of the Eger–Laskó–Csincse water system in Northern Hungary. The spring of the Eger-patak is near Balaton village, and after flowing across the Hevesi-sík (Hevesi plain) and the Borsodi-mezőség it finally falls into the Kiskörei-víztározó (Kisköre Reservoir). According to the Water Basin Management Plan (Anonim 2008) the Eger-patak belongs to the Bükk and Borsodi-mezőség subunit as a strongly modified watercourse.

Several authors published records of the macroinvertebrate fauna of the Eger-patak (Andrikovics & Kiss 1999, Ficsór 2011, 2013, 2014, 2015, Juhász et al. 2006a,b,c, Kiss et al. 2006a,b, Kovács 2006, 2009, Kovács & Merkl 2005, Ködöböcz et al. 2006, Milinki & Murányi 1999, Móra et al. 2006, Müller et al. 2006, Szepesi & Harka 2011, Tóth 2001, Varga 2001). However, the majority of these papers did not report data exclusively from the Eger-patak but from several watercourses simultaneously.

The main objective of the present study was to detect the macroinvertebrate communities in the Eger-patak based on a quantitative survey with a great number of sampling sites which were not included in any of the previously published studies. In this paper only the faunistical data of this investigation is presented.

Materials and methods

The Eger-patak was sampled on 10th May and 30th October in 2014. The 15 sampling sites were located between the settlements of Almár and Nagytálya (Table 1).

The sampling was carried out based on the multi habitat sampling protocol with 20 sampling units where the "kick and sweep" method was used with a pond net (mesh size: 0.5-1 mm). The samples were collected by A. Csercsa and are available at the MTA Centre for Ecological Research Department of Tisza River Research (H-4026 Debrecen, Bem tér 18/c). In the laboratory the samples were sorted and kept in 70% ethanol.

The identification of the collected specimens were accomplished with stereomicroscope using the following keys: Askew 1988, Bauernfeind & Humpesch 2001, Cham 2009, Csabai 2000, Csabai et al. 2002, Eiseler 2005, Gerken & Sternberg 1999, Glöer & Meier-Brook 2003, Haybach 1999, Klonowska-Olejnik 2004, Kontschán et al. 2002, Nesemann 1997, Richnovszky & Pintér 1979, Savage 1989, Waringer & Graf 1997. The species

of the different taxa were identified by specialists: M. Ficsór (Hirudinea, Trichoptera); G. Várbíró (Mollusca, Odonata, Diptera); E. Á. Krasznai (Malacostraca, Coleoptera) and A. Csercsa (Ephemeroptera).

We identified the young and damaged individuals to the genus or family-level and the Diptera larvae to the family-level. The nomenclature follows Boda et al. (2015), B.-Muskó (2007), Csabai (2009), Glöer (2002), Glöer & Meier-Brook (2003), Kovács & Bauernfeind (2003), Nógrádi & Uherkovics (2002), Neubert & Nesemann (1999), Vajda & Dévai (2015). Those species which are new to the fauna of the Eger-patak are indicated with an asterisk (*).

Table 1. Sampling sites in the Eger-patak with their codes, the names of the sampling sites and the exact geographical coordinates

Code	Sampling site	Latitude (N)	Longitude (E)
EGR-001	Almár (Eger)	47°57’24.1”	20°21’21.6”
EGR-002	Felnémet (Eger)	47°56’19.7”	20°21’57.0”
EGR-003	Eger	47°55’31.7”	20°22’02.1”
EGR-004	Eger	47°55’19.9”	20°21’59.5”
EGR-005	Eger	47°54’58.2”	20°22’09.4”
EGR-006	Eger	47°54’30.0”	20°22’28.8”
EGR-007	Eger	47°53’54.3”	20°22’50.6”
EGR-008	Eger	47°53’51.1”	20°22’54.3”
EGR-009	Eger	47°53’49.2”	20°22’54.6”
EGR-010	Eger	47°53’45.1”	20°22’58.2”
EGR-011	Eger	47°53’37.9”	20°23’03.7”
EGR-012	Eger	47°53’18.5”	20°23’34.2”
EGR-013	Kistálya (Andornaktálya)	47°51’51.9”	20°24’03.1”
EGR-014	Andornaktálya	47°51’14.6”	20°24’18.0”
EGR-015	Nagytálya	47°49’18.7”	20°24’50.5”

New records

HIRUDINEA

Glossiphoniidae Vaillant, 1890

Glossiphonia complanata (Linnaeus, 1758) – **EGR-004**, 30.10.2014 (1).

Erpobdellidae Blanchard, 1894

Erpobdella octoculata (Linnaeus, 1758) – **EGR-001**, 10.05.2014 (4); **EGR-003**, 30.10.2014 (3); **EGR-004**, 10.05.2014 (2); **EGR-005**, 10.05.2014 (1), 30.10.2014 (2); **EGR-006**, 10.05.2014 (2); **EGR-007**, 30.10.2014 (1); **EGR-013**, 30.10.2014 (4); **EGR-014**, 30.10.2014 (4).
Erpobdella vilnensis (Liskiewicz 1925) – **EGR-001**, 10.05.2014 (6), 30.10.2014 (1); **EGR-002**, 30.10.2014 (6); **EGR-003**, 10.05.2014 (2), 30.10.2014 (8); **EGR-004**, 10.05.2014 (5), 30.10.2014 (8); **EGR-005**, 10.05.2014 (11), 30.10.2014 (16); **EGR-006**, 10.05.2014 (3), 30.10.2014 (3); **EGR-013**, 30.10.2014 (1); **EGR-014**, 10.05.2014 (1).
Erpobdella sp. – **EGR-001**, 10.05.2014 (1); **EGR-004**, 10.05.2014 (2), 30.10.2014 (10); **EGR-005**, 10.05.2014 (2), 30.10.2014 (2); **EGR-011**, 30.10.2014 (1).

MOLLUSCA

BIVALVIA

SPHAERIIDAE Deshayes, 1855 (1820)

Pisidium casertanum (Poli, 1791) – **EGR-011**, 10.05.2014 (2).
Pisidium sp. **–** **EGR-002**, 10.05.2014 (1); **EGR-003**, 10.05.2014 (1); **EGR-004**, 30.10.2014 (1); **EGR-006**, 10.05.2014 (1); **EGR-008**, 10.05.2014 (2); **EGR-009**, 10.05.2014 (15); **EGR-011**, 30.10.2014 (3); **EGR-012**, 30.10.2014 (1).

GASTROPODA

BITHYNIIDAE Troschel, 1857

Bithynia tentaculata (Linnaeus, 1758) – **EGR-013** 30.10.2014 (1).

HYDROBIIDAE Troschel, 1857

Potamopyrgus antipodarum (J. E. Gray, 1843) – **EGR-001**, 30.10.2014 (1); **EGR-002**, 10.05.2014 (4), 30.10.2014 (2); **EGR-003**, 10.05.2014 (151), 30.10.2014 (10); **EGR-004**, 10.05.2014 (47), 30.10.2014 (46); **EGR-005**, 10.05.2014 (75), 30.10.2014 (48); **EGR-006**, 10.05.2014 (31), 30.10.2014 (12); **EGR-007**, 10.05.2014 (2); **EGR-008**, 30.10.2014 (1); **EGR-009**, 30.10.2014 (9); **EGR-010**, 30.10.2014 (7); **EGR-011**, 10.05.2014 (7), 30.10.2014 (3); **EGR-012**, 30.10.2014 (1); **EGR-013**, 30.10.2014 (2); **EGR-014**, 10.05.2014 (10), 30.10.2014 (14); **EGR-015**, 10.05.2014 (3904), 30.10.2014 (492).

VALVATIDAE J. E. Gray, 1840

Borysthenia naticina (Menke, 1845)* – **EGR-001**, 10.05.2014 (1); **EGR-002**, 10.05.2014 (1); **EGR-004**, 30.10.2014 (1); **EGR-009**, 10.05.2014 (2).
Valvata macrostoma Morch 1864* – **EGR-011**, 10.05.2014 (3).

LYMNAEIDAE Rafinesque, 1815

Galba truncatula (O. F. Müller, 1774) – **EGR-001**, 30.10.2014 (1); **EGR-002**, 30.10.2014 (1); **EGR-003**, 10.05.2014 (15), 30.10.2014 (41); **EGR-004**, 10.05.2014 (21), 30.10.2014 (3); **EGR-005**, 30.10.2014 (8); **EGR-006**, 10.05.2014 (216), 30.10.2014 (24); **EGR-007**, 10.05.2014 (1), 30.10.2014 (11); **EGR-008**, 30.10.2014 (13); **EGR-009**, 30.10.2014 (9); **EGR-010**, 30.10.2014 (35); **EGR-011**, 10.05.2014 (2), 30.10.2014 (9); **EGR-013**, 10.05.2014 (1), 30.10.2014 (1); **EGR-015**, 10.05.2014 (15616), 30.10.2014 (1974).
Omphiscola glabra (O. F. Müller, 1774)* – **EGR-001**, 30.10.2014 (1); **EGR-002**, 10.05.2014 (2), 30.10.2014 (1); **EGR-003**, 10.05.2014 (2), 30.10.2014 (1).
Radix balthica (Linnaeus, 1758)* – **EGR-010**, 10.05.2014 (3).
Stagnicola fuscus (C. Pfeiffer, 1821)* – **EGR-003**, 30.10.2014 (1); **EGR-012**, 30.10.2014 (1); **EGR-013** 30.10.2014 (1).
Stagnicola palustris (O. F. Müller, 1774)* – **EGR-007**, 30.10.2014 (1).

PHYSIDAE Fitzinger, 1833

Haitia acuta (Draparnaud, 1805) – **EGR-004**, 30.10.2014 (6); **EGR-005**, 30.10.2014 (2); **EGR-006**, 10.05.2014 (3), 30.10.2014 (1); **EGR-007**, 10.05.2014 (16); **EGR-008**, 10.05.2014 (1); **EGR-009**, 10.05.2014 (4), 30.10.2014 (7); **EGR-010**, 10.05.2014 (6), 30.10.2014 (1); **EGR-011**, 10.05.2014 (2), 30.10.2014 (2); **EGR-012**, 30.10.2014 (8); **EGR-013**, 10.05.2014 (6), 30.10.2014 (1); **EGR-014**, 30.10.2014 (3).

Planorbidae Rafinesque, 1815

Anisus spirorbis (Linnaeus, 1758)* – **EGR-002**, 10.05.2014 (1).
Gyraulus albus (O. F. Müller, 1774)* – **EGR-008**, 30.10.2014 (1); **EGR-013**, 30.10.2014 (1).
Menetus dilatatus (A. A. Gould, 1841)* – **EGR-001**, 30.10.2014 (1).
Planorbis planorbis (Linnaeus, 1758)* – **EGR-003**, 10.05.2014 (1).

Thiaridae Troschel, 1857

Melanoides tuberculatus (O. F. Müller, 1774) – **EGR-001**, 10.05.2014 (1); **EGR-003**, 10.05.2014 (1), 30.10.2014 (1); **EGR-006**, 30.10.2014 (1); **EGR-007**, 10.05.2014 (2); **EGR-008**, 10.05.2014 (4), 30.10.2014 (5); **EGR-009**, 30.10.2014 (2); **EGR-010**, 10.05.2014 (1), 30.10.2014 (2); **EGR-011**, 30.10.2014 (1); **EGR-012**, 10.05.2014 (1); **EGR-014**, 30.10.2014 (1).

MALACOSTRACA

Gammaridae Leach, 1813

Dikerogammarus haemobaphes (Eichwald, 1841)* – **EGR-007**, 30.10.2014 (1).
Gammarus balcanicus Schäferna, 1922 – **EGR-001**, 10.05.2014 (101), 30.10.2014 (43); **EGR-002**, 10.05.2014 (99), 30.10.2014 (396); **EGR-003**, 10.05.2014 (2), 30.10.2014 (96); **EGR-004**, 10.05.2014 (87), 30.10.2014 (594); **EGR-005**, 10.05.2014 (128), 30.10.2014 (109); **EGR-006**, 30.10.2014 (56); **EGR-007**, 10.05.2014 (14), 30.10.2014 (48); **EGR-008**, 30.10.2014 (4); **EGR-009**, 30.10.2014 (1); **EGR-010**, 30.10.2014 (1); **EGR-012**, 30.10.2014 (1).
Gammarus fossarum Koch, 1835 – **EGR-001**, 10.05.2014 (36), 30.10.2014 (72); **EGR-002**, 10.05.2014 (111), 30.10.2014 (164); **EGR-003**, 10.05.2014 (29), 30.10.2014 (142); **EGR-004**, 10.05.2014 (73), 30.10.2014 (398); **EGR-005**, 10.05.2014 (12), 30.10.2014 (138); **EGR-006**, 10.05.2014 (138), 30.10.2014 (57); **EGR-007**, 10.05.2014 (35), 30.10.2014 (65); **EGR-008**, 10.05.2014 (19), 30.10.2014 (51); **EGR-009**, 10.05.2014 (1), 30.10.2014 (25); **EGR-010**, 30.10.2014 (2); **EGR-012**, 10.05.2014 (1); **EGR-014**, 30.10.2014 (2).
Gammarus roeselii Gervais, 1835 – **EGR-001**, 10.05.2014 (201), 30.10.2014 (52); **EGR-002**, 10.05.2014 (213), 30.10.2014 (120); **EGR-003**, 10.05.2014 (808), 30.10.2014 (2155); **EGR-004**, 10.05.2014 (1034), 30.10.2014 (646); **EGR-005**, 10.05.2014 (401), 30.10.2014 (127); **EGR-006**, 10.05.2014 (266), 30.10.2014 (227); **EGR-007**, 10.05.2014 (168), 30.10.2014 (42); **EGR-008**, 10.05.2014 (151), 30.10.2014 (124); **EGR-009**, 10.05.2014 (91), 30.10.2014 (147); **EGR-010**, 30.10.2014 (13); **EGR-011**, 30.10.2014 (5); **EGR-012**, 30.10.2014 (5); **EGR-013**, 10.05.2014 (322), 30.10.2014 (815); **EGR-014**, 10.05.2014 (3030), 30.10.2014 (1382); **EGR-015**, 10.05.2014 (1249), 30.10.2014 (733).
Gammarus sp. – **EGR-001**, 10.05.2014 (476), 30.10.2014 (25); **EGR-002**, 10.05.2014 (419), 30.10.2014 (467); **EGR-003**, 10.05.2014 (63), 30.10.2014 (628); **EGR-004**, 10.05.2014 (277), 30.10.2014 (334); **EGR-005**, 10.05.2014 (191), 30.10.2014 (165); **EGR-006**, 30.10.2014 (52); **EGR-007**, 10.05.2014 (44), 30.10.2014 (17); **EGR-008**, 10.05.2014 (16), 30.10.2014 (10); **EGR-009**, 10.05.2014 (19), 30.10.2014 (8); **EGR-010**, 30.10.2014 (1); **EGR-012**, 10.05.2014 (1); **EGR-014**, 10.05.2014 (4); **EGR-015**, 10.05.2014 (1).

Asellidae Latreille, 1803

Asellus aquaticus (Linnaeus, 1758) – **EGR-001**, 10.05.2014 (1), 30.10.2014 (1); **EGR-002**, 30.10.2014 (1); **EGR-003**, 10.05.2014 (1), 30.10.2014 (14); **EGR-004**, 10.05.2014 (6), 30.10.2014 (21); **EGR-006**, 30.10.2014 (1); **EGR-007**, 10.05.2014 (2); **EGR-008**, 10.05.2014 (2), 30.10.2014 (1); **EGR-009**, 10.05.2014 (31), 30.10.2014 (3); **EGR-010**, 10.05.2014 (7), 30.10.2014 (4); **EGR-011**, 10.05.2014 (2), 30.10.2014 (2); **EGR-012**, 30.10.2014 (5); **EGR-013**, 10.05.2014 (4), 30.10.2014 (12); **EGR-014**, 10.05.2014 (5), 30.10.2014 (23).

EPHEMEROPTERA

Baetidae Leach, 1815

Baetis buceratus Eaton, 1870 – **EGR-014**, 10.05.2014 (1); **EGR-015**, 10.05.2014 (1), 30.10.2014 (2).
Baetis pentaphlebodes Ujhelyi, 1966* – **EGR-001**, 10.05.2014 (1); **EGR-002**, 10.05.2014 (3); **EGR-005**, 30.10.2014 (1); **EGR-007**, 10.05.2014 (2); **EGR-015**, 10.05.2014 (1).
Baetis rhodani (Pictet, 1843) – **EGR-001**, 10.05.2014 (6), 30.10.2014 (1); **EGR-002**, 10.05.2014 (10), 30.10.2014 (1); **EGR-003**, 30.10.2014 (1); **EGR-004**, 10.05.2014 (1), 30.10.2014 (4); **EGR-005**, 10.05.2014 (9); **EGR-007**, 10.05.2014 (44), 30.10.2014 (3); **EGR-015**, 30.10.2014 (4).
Baetis vernus Curtis, 1834 – **EGR-001**, 30.10.2014 (1); **EGR-002**, 10.05.2014 (3); **EGR-004**, 10.05.2014 (2); **EGR-006**, 10.05.2014 (1), 30.10.2014 (4); **EGR-007**, 10.05.2014 (14); **EGR-015**, 10.05.2014 (1).
Baetis sp. – **EGR-001**, 10.05.2014 (3); **EGR-002**, 10.05.2014 (7); **EGR-004**, 10.05.2014 (1); **EGR-006**, 10.05.2014 (1), 30.10.2014 (2); **EGR-007**, 10.05.2014 (1); **EGR-008**, 10.05.2014 (1); **EGR-015**, 10.05.2014 (1).

Heptageniidae Needham, 1901

Rhithrogena carpatoalpina Klonowska, Olechowska, Sartori & Weichselbaumer, 1987* – **EGR-001**, 30.10.2014 (2); **EGR-002**, 10.05.2014 (1), 30.10.2014 (1).
Rhithrogena semicolorata species-group* – **EGR-001**, 30.10.2014 (117); **EGR-002**, 10.05.2014 (1), 30.10.2014 (39).
Rhithrogena sp. – **EGR-001**, 10.05.2014 (5).

Ephemeridae Latreille, 1810

Ephemera danica Müller, 1764 – **EGR-001**, 10.05.2014 (127), 30.10.2014 (70); **EGR-002**, 10.05.2014 (12), 30.10.2014 (34); **EGR-003**, 10.05.2014 (6), 30.10.2014 (9); **EGR-004**, 10.05.2014 (3), 30.10.2014 (9); **EGR-005**, 10.05.2014 (57); **EGR-006**, 10.05.2014 (1); **EGR-008**, 30.10.2014 (1); **EGR-013**, 30.10.2014 (1).

Potamanthidae Albarda, 1888

Potamanthus luteus (Linnaeus, 1767)* – **EGR-014**, 30.10.2014 (1); **EGR-015**, 10.05.2014 (1).

Ephemerellidae Klapálek, 1909

Ephemerella ignita (Poda, 1761) – **EGR-002**, 10.05.2014 (47), 30.10.2014 (4); **EGR-003**, 10.05.2014 (2), 30.10.2014 (3); **EGR-004**, 10.05.2014 (10), 30.10.2014 (1); **EGR-005**, 10.05.2014 (2); **EGR-007**, 10.05.2014 (15); **EGR-008**, 10.05.2014 (1); **EGR-015**, 10.05.2014 (2).

ODONATA

Calopterygidae Selys, 1850

Calopteryx splendens (Harris, 1782) – **EGR-001**, 30.10.2014 (1); **EGR-003**, 30.10.2014 (17); **EGR-004**, 10.05.2014 (1), 30.10.2014 (2); **EGR-006**, 30.10.2014 (1); **EGR-008**, 30.10.2014 (1); **EGR-009**, 30.10.2014 (2); **EGR-010**, 10.05.2014 (2), 30.10.2014 (4); **EGR-011**, 10.05.2014 (1); **EGR-012**, 10.05.2014 (7), 30.10.2014 (2); **EGR-013**, 10.05.2014 (11), 30.10.2014 (1); **EGR-014**, 10.05.2014 (2), 30.10.2014 (1); **EGR-015**, 30.10.2014 (3).

Platycnemididae Tillyard, 1917

Platycnemis pennipes (Pallas, 1771)* – **EGR-003**, 30.10.2014 (3); **EGR-008**, 10.05.2014 (1); **EGR-009**, 30.10.2014 (4); **EGR-010**, 10.05.2014 (1); **EGR-011**, 10.05.2014 (2); **EGR-012**, 10.05.2014 (11), 30.10.2014 (7); **EGR-013**, 10.05.2014 (7), 30.10.2014 (13); **EGR-014**, 10.05.2014 (1), 30.10.2014 (3).

Coenagrionidae Kennedy, 1920

Ischnura elegans (Vander Linden, 1820)* – **EGR-011**, 10.05.2014 (1).

Gomphidae Rambur, 1842

Gomphus flavipes (Charpentier, 1825)* – **EGR-003**, 30.10.2014 (2); **EGR-009**, 30.10.2014 (1); **EGR-011**, 10.05.2014 (1); **EGR-014**, 30.10.2014 (3).
Gomphus vulgatissimus (Linnaeus 1758)* – **EGR-010**, 30.10.2014 (1); **EGR-013**, 10.05.2014 (2); **EGR-015**, 30.10.2014 (1).
Onychogomphus forcipatus (Linnaeus, 1758) – **EGR-001**, 10.05.2014 (1); **EGR-002**, 10.05.2014 (2), 30.10.2014 (4); **EGR-003**, 30.10.2014 (1); **EGR-004**, 30.10.2014 (2); **EGR-005**, 10.05.2014 (2), 30.10.2014 (1); **EGR-007**, 10.05.2014 (1); **EGR-008**, 10.05.2014 (1), 30.10.2014 (4); **EGR-009**, 10.05.2014 (1), 30.10.2014 (5); **EGR-010**, 30.10.2014 (3); **EGR-011**, 10.05.2014 (1), 30.10.2014 (7); **EGR-012**, 10.05.2014 (8), 30.10.2014 (16); **EGR-013**, 10.05.2014 (1), 30.10.2014 (1); **EGR-014**, 10.05.2014 (11), 30.10.2014 (6); **EGR-015**, 30.10.2014 (91).

Libellulidae Rambur, 1842

Orthetrum brunneum (Fonscolombe, 1837)* – **EGR-004**, 30.10.2014 (2); **EGR-009**, 30.10.2014 (1).
Orthetrum cancellatum (Linnaeus, 1758)* – **EGR-006**, 10.05.2014 (2); **EGR-009**, 10.05.2014 (1).
Orthetrum sp. – **EGR-014**, 10.05.2014 (1).

HETEROPTERA

Nepidae Latreille, 1802

Nepa cinerea Linnaeus, 1758 – **EGR-001**, 10.05.2014 (1); **EGR-004**, 30.10.2014 (1); **EGR-008**, 10.05.2014 (1).

Corixidae Leach, 1815

Sigara striata (Linnaeus, 1758) – **EGR-014**, 30.10.2014 (1).

COLEOPTERA

Haliplidae Brullé, 1835

Haliplus fluviatilis Aubé, 1836* – **EGR-005**, 10.05.2014 (1).
Peltodytes caesus (Duftschmid, 1805)* – **EGR-004**, 10.05.2014 (1).

Dytiscidae Leach, 1815

Graptodytes granularis (Linnaeus, 1767)* – **EGR-007**, 10.05.2014 (1).
Platambus maculatus (Linnaeus, 1758)* – **EGR-001**, 10.05.2014 (1); **EGR-002**, 10.05.2014 (1); **EGR-003**, 30.10.2014 (1).

Helophoridae Thomson, 1859

Helophorus redtenbacheri Kuwert, 1885* – **EGR-003**, 10.05.2014 (1).

Hydrophilidae Latreille, 1802

Laccobius minutus (Linnaeus, 1758) – **EGR-003**, 10.05.2014 (1).

Hydraenidae Mulsant, 1844

Hydraena cf. ***palustris*** Erichson, 1837* – **EGR-005**, 30.10.2014 (2).
Hydraena gracilis Germar, 1824* – **EGR-003**, 30.10.2014 (1); **EGR-004**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (1).

Elmidae Westwood, 1838

Elmis maugetii Latreille, 1798 – **EGR-002**, 10.05.2014 (12), 30.10.2014 (2); **EGR-003**, 10.05.2014 (4), 30.10.2014 (5); **EGR-004**, 10.05.2014 (10), 30.10.2014 (8); **EGR-005**, 10.05.2014 (22), 30.10.2014 (7); **EGR-006**, 10.05.2014 (1); **EGR-007**, 10.05.2014 (1).
Elmis sp. – **EGR-001**, 10.05.2014 (1); **EGR-002**, 10.05.2014 (158), 30.10.2014 (28); **EGR-003**, 10.05.2014 (79), 30.10.2014 (29); **EGR-004**, 10.05.2014 (231), 30.10.2014 (52); **EGR-005**, 10.05.2014 (508), 30.10.2014 (47); **EGR-006**, 10.05.2014 (3), 30.10.2014 (4); **EGR-007**, 10.05.2014 (7); **EGR-009**, 10.05.2014 (1); **EGR-010**, 30.10.2014 (1); **EGR-015**, 10.05.2014 (1), 30.10.2014 (10).
Limnius volckmari (Panzer, 1793)* – **EGR-004**, 30.10.2014 (1); **EGR-005**, 10.05.2014 (2).
Limnius sp. – **EGR-001**, 30.10.2014 (1); **EGR-002**, 10.05.2014 (2); **EGR-003**, 30.10.2014 (5); **EGR-004**, 30.10.2014 (3); **EGR-005**, 10.05.2014 (9); **EGR-006**, 30.10.2014 (1); **EGR-011**, 30.10.2014 (1).
Macronychus quadrituberculatus Müller, 1806* – **EGR-003**, 10.05.2014 (1).
Riolus sp. – **EGR-005**, 30.10.2014 (1).

Dryopidae Fleming, 1821

Pomatinus substriatus (P. J. W. Müller, 1806) – **EGR-002**, 10.05.2014 (1); **EGR-004**, 30.10.2014 (1); **EGR-015**, 30.10.2014 (1).

TRICHOPTERA

Rhyacophilidae Stephens, 1836

Rhyacophila fasciata Hagen, 1859 – **EGR-002**, 30.10.2014 (3); **EGR-004**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (23), 30.10.2014 (2).
Rhyacophila vulgaris Pictet, 1834* – **EGR-002**, 10.05.2014 (1).
Rhyacophila sp. – **EGR-002**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (2); **EGR-008**, 30.10.2014 (1).

Hydropsychidae Curtis, 1825

Hydropsyche angustipennis (Curtis, 1834) – **EGR-004**, 10.05.2014 (1), 30.10.2014 (1); **EGR-005**, 30.10.2014 (2); **EGR-007**, 30.10.2014 (2); **EGR-014**, 10.05.2014 (3), 30.10.2014 (6); **EGR-015**, 10.05.2014 (1), 30.10.2014 (2).
Hydropsyche fulvipes Curtis, 1834* – **EGR-001**, 10.05.2014 (4), 30.10.2014 (2); **EGR-002**, 30.10.2014 (1); **EGR-003**, 30.10.2014 (1).
Hydropsyche bulbifera McLachlan, 1878 – **EGR-001**, 30.10.2014 (1); **EGR-004**, 30.10.2014 (1); **EGR-005**, 10.05.2014 (1), 30.10.2014 (2); **EGR-006**, 30.10.2014 (53); **EGR-007**, 10.05.2014 (1), 30.10.2014 (74); **EGR-008**, 30.10.2014 (21); **EGR-009**, 30.10.2014 (3); **EGR-010**, 30.10.2014 (6); **EGR-011**, 10.05.2014 (3), 30.10.2014 (12); **EGR-012**, 10.05.2014 (4), 30.10.2014 (95); **EGR-013**, 30.10.2014 (2); **EGR-014**, 10.05.2014 (9), 30.10.2014 (168); **EGR-015**, 10.05.2014 (21), 30.10.2014 (75).
Hydropsyche instabilis (Curtis, 1834) – **EGR-001**, 10.05.2014 (3); **EGR-002**, 30.10.2014 (3); **EGR-005**, 10.05.2014 (3).
Hydropsyche modesta Navàs, 1925 – **EGR-007**, 10.05.2014 (1); **EGR-010**, 30.10.2014 (2); **EGR-012**, 30.10.2014 (8); **EGR-013**, 30.10.2014 (1); **EGR-014**, 30.10.2014 (19); **EGR-015**, 30.10.2014 (168).
Hydropsyche saxonica McLachlan, 1884 – **EGR-003**, 30.10.2014 (1); **EGR-004**, 30.10.2014 (2); **EGR-005**, 10.05.2014 (1), 30.10.2014 (4).
Hydropsyche sp. – **EGR-001**, 30.10.2014 (9); **EGR-002**, 10.05.2014 (2), 30.10.2014 (5); **EGR-003**, 30.10.2014 (2); **EGR-004**, 30.10.2014 (6); **EGR-005**, 10.05.2014 (3), 30.10.2014 (3); **EGR-006**, 30.10.2014 (11); **EGR-007**, 10.05.2014 (1), 30.10.2014 (11); **EGR-008**, 30.10.2014 (4); **EGR-009**, 10.05.2014 (2), 30.10.2014 (2); **EGR-010**, 30.10.2014 (2); **EGR-011**, 10.05.2014 (3), 30.10.2014 (4); **EGR-012**, 10.05.2014 (1), 30.10.2014 (12); **EGR-013**, 30.10.2014 (1); **EGR-014**, 10.05.2014 (23), 30.10.2014 (9); **EGR-015**, 10.05.2014 (43), 30.10.2014 (38).

HYDROPTILIDAE Stephens, 1836

Hydroptila sp. – **EGR-005**, 10.05.2014 (32), 30.10.2014 (1); **EGR-006**, 30.10.2014 (2).
Hydroptilidae Gen. sp. – **EGR-005**, 30.10.2014 (6).

PSYCHOMYIIDAE Walker, 1852

Psychomyia pusilla (Fabricius, 1781)* – **EGR-010**, 30.10.2014 (1); **EGR-015**, 30.10.2014 (12).

LIMNEPHILIDAE Kolenati, 1848

Anabolia furcate Brauer, 1857 – **EGR-004**, 10.05.2014 (2).
Annitella obscurata (McLachlan, 1876)* – **EGR-001**, 10.05.2014 (6); **EGR-002**, 10.05.2014 (3), 30.10.2014 (1).
Chaetopteryx fusca Brauer, 1857* – **EGR-001**, 10.05.2014 (1), 30.10.2014 (11); **EGR-003**, 10.05.2014 (1).
Halesus digitatus (von Paula Schrank, 1781) – **EGR-001**, 10.05.2014 (1).
Halesus tesselatus (Rambur, 1842) – **EGR-001**, 10.05.2014 (2).
Limnephilidae Gen. sp. – **EGR-001**, 10.05.2014 (8), 30.10.2014 (26); **EGR-002**, 10.05.2014 (1); ger: Lidl, 10.05.2014 (1); **EGR-004**, 30.10.2014 (2); **EGR-005**, 10.05.2014 (1); **EGR-012**, 10.05.2014 (1).
Limnephilus lunatus Curtis, 1834* – **EGR-005**, 10.05.2014 (1).
Limnephilus sp. – **EGR-002**, 10.05.2014 (1).
Potamophylax rotundipennis (Brauer, 1857) – **EGR-001**, 10.05.2014 (4).

GOERIDAE Ulmer, 1903

Goera pilosa (Fabricius, 1775)* – **EGR-002**, 10.05.2014 (1), 30.10.2014 (1); **EGR-003**, 10.05.2014 (2), 30.10.2014 (1); **EGR-004**, 10.05.2014 (13), 30.10.2014 (1); **EGR-005**, 30.10.2014 (4).
Goeridae Gen. sp. – **EGR-003**, 10.05.2014 (1); **EGR-004**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (2), 30.10.2014 (2).
Silo pallipes (Fabricius, 1781) – **EGR-001**, 30.10.2014 (3); **EGR-004**, 30.10.2014 (2); **EGR-005**, 30.10.2014 (2).

LEPTOCERIDAE Leach, 1815

Athripsodes bilineatus (Linnaeus, 1758)* – **EGR-002**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (1); **EGR-006**, 10.05.2014 (1).
Athripsodes cinereus (Curtis 1834)* – **EGR-005**, 30.10.2014 (1); **EGR-006**, 10.05.2014 (1).
Athripsodes sp. – **EGR-006**, 10.05.2014 (1).

DIPTERA

ATHERICIDAE Stuckenberg, 1973

Athericidae Gen. sp.* – **EGR-001**, 10.05.2014 (17); **EGR-004**, 10.05.2014 (1); **EGR-007**, 10.05.2014 (18); **EGR-009**, 10.05.2014 (3); **EGR-010**, 30.10.2014 (1).

CHIRONOMIDAE Newman, 1834

Chironomidae Gen. sp. – **EGR-002**, 10.05.2014 (1); **EGR-003**, 10.05.2014 (1); **EGR-005**, 10.05.2014 (3); **EGR-006**, 30.10.2014 (1); **EGR-007**, 10.05.2014 (13), 30.10.2014 (3); **EGR-008**, 10.05.2014 (47), 30.10.2014 (3); **EGR-009**, 10.05.2014 (71), 30.10.2014 (3); **EGR-010**, 10.05.2014 (31), 30.10.2014 (51); **EGR-011**, 10.05.2014 (22), 30.10.2014 (6); **EGR-012**, 10.05.2014 (3), 30.10.2014 (24); **EGR-013**, 10.05.2014 (59), 30.10.2014 (129); **EGR-014**, 10.05.2014 (109), 30.10.2014 (51); **EGR-015**, 10.05.2014 (30), 30.10.2014 (1).

Limoniidae Latreille, 1802

Limoniidae Gen. sp.* – **EGR-002**, 30.10.2014 (1); **EGR-005**, 10.05.2014 (23), 30.10.2014 (6); **EGR-006**, 10.05.2014 (8), 30.10.2014 (8); **EGR-007**, 10.05.2014 (1), 30.10.2014 (4); **EGR-008**, 10.05.2014 (7), 30.10.2014 (3); **EGR-009**, 10.05.2014 (5), 30.10.2014 (1); **EGR-010**, 30.10.2014 (2); EGR-11, **EGR-011**, 30.10.2014 (3); **EGR-012**, 10.05.2014 (1), 30.10.2014 (5).

Simuliidae Newman, 1834

Simuliidae Gen. sp.* – **EGR-002**, 10.05.2014 (1); **EGR-007**, 10.05.2014 (76), 30.10.2014 (8); **EGR-009**, 10.05.2014 (1); EGR-11, **EGR-011**, 10.05.2014 (2), 30.10.2014 (2); **EGR-012**, 30.10.2014 (19); **EGR-014**, 10.05.2014 (3); **EGR-015**, 30.10.2014 (13).

Stratiomyidae Latreille, 1802

Stratiomyidae Gen. sp.* – **EGR-002**, 10.05.2014 (4); **EGR-005**, 30.10.2014 (1); **EGR-007**, 30.10.2014 (1); EGR-11, **EGR-011**, 10.05.2014 (1).

Tabanidae Latreille, 1802

Tabanidae Gen. sp.* – **EGR-002**, 10.05.2014 (6), 30.10.2014 (3); **EGR-003**, 10.05.2014 (1), 30.10.2014 (4); **EGR-004**, 10.05.2014 (1), 30.10.2014 (10); **EGR-005**, 10.05.2014 (4), 30.10.2014 (3); **EGR-006**, 10.05.2014 (2), 30.10.2014 (5); **EGR-007**, 30.10.2014 (1); **EGR-008**, 30.10.2014 (2); **EGR-009**, 10.05.2014 (2); **EGR-010**, 10.05.2014 (2); **EGR-012**, 30.10.2014 (1).

Tipulidae Latreille, 1802

Tipulidae Gen. sp.* – **EGR-004**, 30.10.2014 (1); **EGR-005**, 10.05.2014 (2); **EGR-006**, 30.10.2014 (1); **EGR-007**, 30.10.2014 (1); **EGR-008**, 30.10.2014 (1); **EGR-009**, 10.05.2014 (2); **EGR-010**, 10.05.2014 (1); EGR-11, **EGR-011**, 10.05.2014 (2), 30.10.2014 (5); **EGR-012**, 30.10.2014 (2); **EGR-014**, 10.05.2014 (1), 30.10.2014 (1); **EGR-015**, 30.10.2014 (1).

Results

During the investigation we collected 48,881 individuals belonging to 99 taxa from which 74 were identified to the species level and classified into 10 higher taxonomical groups: Bivalvia: 2, Coleoptera: 15, Crustacea: 6, Diptera: 7, Ephemeroptera: 11, Gastropoda: 15, Heteroptera: 2, Hirudinea: 4, Odonata: 9, Trichoptera: 28. During the sampling 4 protected species were identified: *Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus* and *Orthetrum brunneum*.

Altogether, 99 species and 2 taxa were published previously from the Eger-patak. From the taxa that we identified 45 (38 species and 7 taxa) were new to the fauna of the watercourse.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 17–29

Odonata from Batanta (Indonesia, West Papua) with description of three new species

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Abstract: Thirty-eight taxa of Odonata are reported from Batanta Island (including Arefi and Birie Islands). Three new species are described: *Drepanosticta batanta* sp. n., *Palaiargia susannae* sp. n. and *Diplacina olahi* sp. n. *Hydrobasileus vittatus* Kirby, 1889 is new to New Guinea. The following 15 species are new to the Raja Ampat Islands: *Drepanosticta auriculata* (Selys, 1878), *Metagrion postnodale* (Selys, 1878), *Selysioneura* cf. *cervicornu* Förster, 1900, *Nososticta* cf. *finisterrae* (Förster, 1897), *Idiocnemis bidentata* Selys, 1878, *I. inornata* Selys, 1878, *Agriocnemis femina* (Brauer, 1869), *Ceriagrion aeruginosum* Brauer, 1869, *Ischnura senegalensis* (Rambur, 1842), *Pseudagrion* cf. *civicum* Lieftinck, 1932, *Xiphiagrion cyanomelas* Selys, 1876, *Diplacodes trivialis* (Rambur, 1842), *Huonia epinephela* Förster, 1903, *Neurothemis ramburii* (Brauer, 1866), *Orthetrum serapia* Watson, 1984, *Rhyothemis phyllis* (Sulzer, 1776).

Introduction

The regular research of aquatic insects on Batanta Island started in 2010, organised by Róbert Horváth and János Oláh. Of the material collected by Róbert Horváth with UV light traps the Trichoptera were studied by János Oláh. The fauna of the island proved to be very rich and most of the species were undescribed (Oláh 2012, 2013, 2014). In 2014, Péter Juhász and Tibor Kovács joined in the team, and the work was continued with new methods and inclusion of further groups (Ephemeroptera, Odonata). The present paper provides the results of Odonata collectings in 2014 and 2015.

The only odonate known so far from Batanta is *Idiocnemis bidentata* Selys, 1878, which was collected during the 1996 trip of the Zoölogisch Museum, Amsterdam on the southern part of the island (Gassmann 2000). The record below of *Hydrobasileus vittatus* for New Guinea is mentioned in Orr & Kalkman (2015).

Material and methods

The material was collected during two trips (16.01.-02.02.2014 and 01.02.-19.02.2015) in 23 sites. For collecting methods of larvae see Kovács *et al*. (1998). Exuviae were hand-collected while adults were captured with sweeping net. All material is preserved in 70% ethanol and deposited in the Mátra Museum of the Hungarian Natural History Museum, Gyöngyös. The larvae and the exuviae are still unidentified, except for three species.

Abbreviations: HR = Róbert Horváth, JP = Péter Juhász, KT = Tibor Kovács; PPER = Papua Paradise Eco Resort; MM = Mátra Museum of the Hungarian Natural History Museum (Gyöngyös).

Results

ZYGOPTERA

PLATYSTICTIDAE Kennedy, 1920

Drepanosticta auriculata (Selys, 1878) – Batanta Island, right side stream of Forum River, 00º52'11.32", 130°27'41.69", 13.02.2015, 2 males, KT-HR-JP (MM: 2015-14).

Drepanosticta batanta sp. n. Kovács et Theischinger (Figs 1–5)

Type material – Holotype. **Indonesia**, Batanta Island, right side stream of Forum River, 00º52'11.32", 130°27'41.69", 215 m, 13.02.2015, 1 male, KT-HR-JP (MM: 2015-14). Paratype. Batanta Island, valley of Weras stream, 00º49'51.2", 130º38'00.0", 250 m, 08.02.2015, 1 male, KT-JP (MM: 2015-9).

Diagnosis – Male: Small, predominantly brown *Drepanosticta* species. Head shiny bronze, prothorax and legs yellowish brown, synthorax dark brown with 5 or 6 yellowish brown spots. Abdomen brown with yellowish basal rings in segments 3 to 6, segments 9 and 10 dark brown with greenish sheen, appendages yellowish brown. Occiput with distinct transverse occipital carina. Posterior margin of posterior lobe of pronotum with a pair of processes. Superior anal appendage with denticle in basal half.

Description – Male.

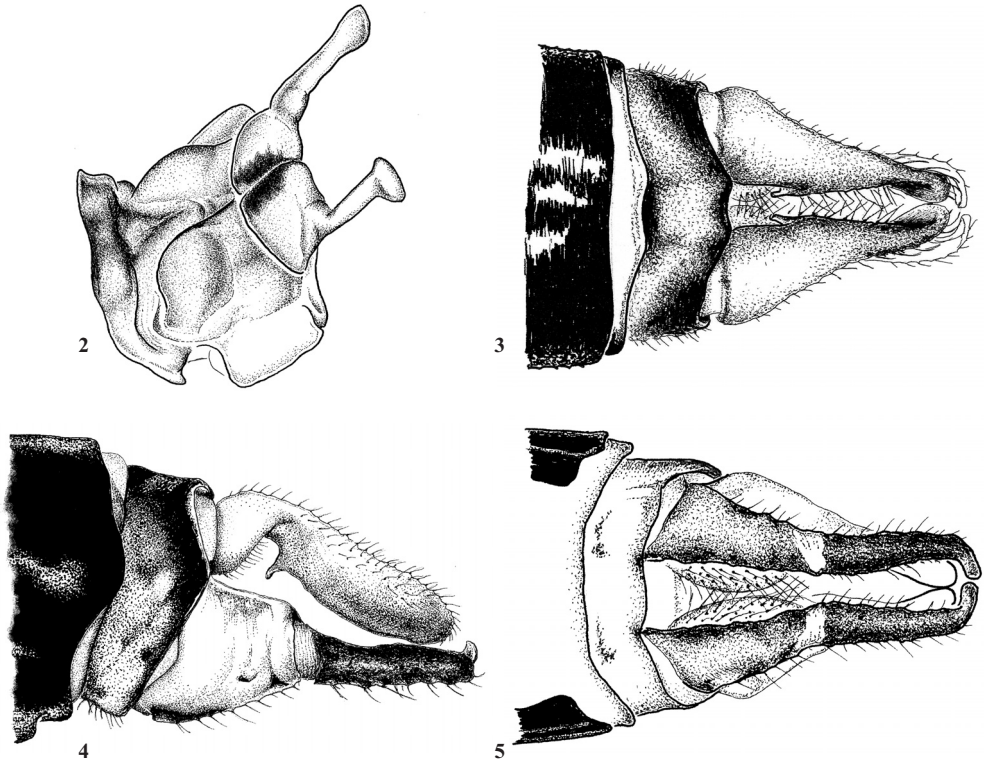
Head. Labium yellowish brown to brown; base of mandibles yellowish, remainder brown; whole labrum yellowish, whole anteclypeus ivory white, rest of head shiny bronze. Transverse occipital carina distinct. Antennae with scape and flagellum brown, pedicel yellowish.

Prothorax (Fig. 1). Pronotum dorsally largely light to darker brown, sides yellowish, lower portion yellowish; other prothoracic and cervical sclerites yellowish. Posterior margin of posterior lobe of pronotum with a pair of conspicuous processes. Processes nearly equal in length to rest of pronotum (Fig. 2), largely parallel-sided, with broadened and rounded apex. Coxa and trochanter yellowish; femur yellowish with one spot at posterior third and apex greyish brown, remainder of leg yellowish, posterior quarter of third tarsomere brown.

Synthorax (Fig. 1). Pleura largely shiny dark brown with 5–6 yellowish and yellowish brown patches: one or two, ill-defined, in lateral portion of mesanepisternum; one, 2/3 length, in anterodorsal corner of mesepimeron; one along almost whole metapleural suture in metepisternum, this patch narrowly subdivided at level metastigma; one, squarish, in posterodorsal portion of metepimeron. Poststernum largely shiny dark brown. Coxae yellowish to brown, rest of legs as given above for foreleg. Wings with venation black and membrane hyaline; 14–16 postnodals in Fw, 13–15 in Hw; pterostigma light brown, 1.8–2.1 times as long as wide, overlying 2 crossveins, posterior border slightly longer than anterior border, proximal and distal borders subequal in length, proximal angle at R approximately 60°.

Abdomen. Segments 1–8 brown, segments 2–6 with ill-defined narrow brownish yellow basal ring; segments 9–10 dark brown with greenish sheen. Anal appendages (Figs 3–5) yellowish

Fig. 1. *Drepanosticta batanta* sp. n., holotype male thorax, lateral view



Figs 2–5. *Drepanosticta batanta* sp. n., holotype male: 2 = pronotum, oblique dorso-lateral view; 3 = anal appendages, dorsal view; 4 = anal appendages, lateral view; 5 = anal appendages, ventral view

brown to brown, superiors with strong subbasal bend and remainder somewhat bulbous (as seen only in lateral view), moderately thick, abruptly narrowing and slightly incurved toward apex, with denticle well visible in dorsal and lateral view in anterior ¼, inferiors slightly longer than superiors, narrow, with short membranous portion at half length, almost straight, gradually narrowing toward incurved and dorsally directed apex.

Measurements. Hind wing 18.6–19.1 mm, abdomen (including appendages) 28.7–31.9 mm.

Female and larva unknown.

Etymology – Batanta, after the type locality.

Habitat – The specimens were collected in tropical rainforest, at 215–250 m above sea level, in shade, at outfall of a slow-running, clear spring. They occurred there together with *Drepanosticta auriculata*.

Comparison with other species. *Drepanosticta batanta* sp. n. belongs to the *Drepanosticta megametta* species group, that includes the following species: *D. centrosaurus*, *D. megametta* (Mindanao), *D. halmahera*, *D. rudicula* (Halmahera), *D. misoolensis* (Misool) (VAN TOL 2005, 2007) and *D. pararudicula* (Halmahera) according to THEISCHINGER et al. (2015). *D. batanta* significantly differs from the Philippine *D. centrosaurus* and *D. megametta* by long (set widely apart) vs short (set close together) processes on the posterior lobe of pronotum (VAN TOL 2005: 163, Fig. 47 and 165, Fig. 50), from *D. rudicula* and *D. pararudicula* by the denticle of the superior anal appendage being visible vs not visible in lateral view (cf. VAN TOL 2007: 12, Fig. 17; THEISCHINGER et al. 2015: 4, Fig. 9); and from *D. halmahera* (VAN TOL 2007: 9, Fig. 7), *D. misoolensis* (VAN TOL 2007: 9, Fig. 19) and *D. pararudicula* (THEISCHINGER et al. 2015: 4, Fig. 8) by most of the apical quarter/half of the inferior anal appendages being almost perfectly straigth and only slightly tapered vs strongly constricted or arched. From this it appears that *D. misoolensis* is the species most similar to *D. batanta*.

CALOPTERYGIDAE Selys, 1850

Neurobasis australis Selys, 1897 – Batanta Island, valley of Waridor River, between 00º50’30.55”, 130º31’30.54” and 00º52’09.66”, 130º32’11.54”, 18.01.2014, 2 males, KT-HR-JP (MM: 2014-5); 03.02.2015, 1 female, KT-HR-JP (MM: 2015-4).

CHLOROCYPHIDAE Cowley, 1937

Rhinocypha tincta cf. ***sagitta*** Lieftinck, 1938 – Batanta Island, Teluk Warai, stream, 00º50’51.0”, 130º35’14.0”, 11.02.2015, 1 male, KT-JP (MM: 2015-13). – Batanta Island, valley of Waridor River, between 00º50’30.55”, 130º31’30.54” and 00º52’09.66”, 130º32’11.54”, 18.01.2014, 6 males, 2 females, KT-HR-JP (MM: 2014-5); 03.02.2015, 2 males, 3 females, KT-HR-JP (MM: 2015-4). – Batanta Island, valley of Waridor River, between 00º52’09.66”, 130º32’11.54” and 00º51’51”, 130º33’41”, 04.02.2015, 2 females, KT-HR-JP (MM: 2015-6). – Batanta Island, valley of Weras stream, 00º49’42.05”, 130º38’12.23”, 27.01.2014, 1 male, KT-JP (MM: 2014-22); 00º49’51.2”, 130º38’00.0”, 08.02.2015, 1 male, KT-JP (MM: 2015-9). – Batanta Island, Welebed, valley of Kalijakut River, 00º52’52.0”, 130º38’08.0”, 16.02.2015, 1 male, KT-JP-Kris (MM: 2015-16). – Batanta Island, Welebed, valley of Kalijakut River, between 00º54’20.59”, 130º38’31.70” and 00º53’12.88”, 130º38’16.40”, 23.01.2014, 1 male, KT-HR-JP (MM: 2014-17).

ARGIOLESTIDAE Fraser, 1957

Metagrion postnodale (Selys, 1878) – Batanta Island, right side stream of Forum River, 00º52’09.6”, 130º27’42.3”, 13.02.2015, 1 male, 1 female, KT-HR-JP (MM: 2015-14). – Batanta Island, Teluk Warai, stream, 00º50’51.0”,

130º35’14.0”, 11.02.2015, 1 male, KT-JP (MM: 2015-13). – Batanta Island, valley of Warmon stream, between the lower and upper waterfall (00º50’04.50”, 130º42’54.01” and 00º50’23.25”, 130º42’35.18”), 21.01.2014, 1 mele, 1 female, KT-HR-JP (MM: 2014-12). – Batanta Island, valley of Weras stream, 00º49’51.2”, 130º38’00.0”, 08.02.2015, 2 males, KT-JP (MM: 2015-9). – Batanta Island, Welebed, valley of Kalijakut River, 00º52’52.0”, 130º38’08.0”, 16.02.2015, 1 male, 1 female, KT-JP-Kris (MM: 2015-16).

Isostictidae Fraser, 1955

Selysioneura cf. ***cervicornu*** Förster, 1900 – Batanta Island, valley of Warmon stream, between the lower and upper waterfall (00º50’04.50”, 130º42’54.01” and 00º50’23.25”, 130º42’35.18”), 21.01.2014, 2 females, KT-HR-JP (MM: 2014-12).

Platycnemididae Yacobson & Bianchi, 1905

Disparoneurinae Fraser, 1957

Nososticta aurantiaca (Lieftinck, 1938) – Batanta Island, left side stream of Waridor River, 00º52’10.7”, 130º32’11.6”, 04.02.2015, 4 males, 1 female, KT-HR-JP (MM: 2015-5). – Batanta Island, right side stream of Forum River, 00º52’09.6”, 130º27’42.3”, 13.02.2015, 3 males, KT-HR-JP (MM: 2015-14). – Batanta Island, Teluk Warai, stream, 00º50’51.0”, 130º35’14.0”, 11.02.2015, 4 males, KT-JP (MM: 2015-13). – Batanta Island, Welebed, valley of Kalijakut River, between 00º54’20.59”, 130º38’31.70” and 00º53’12.88”, 130º38’16.40”, 23.01.2014, 2 males, 1 female, KT-HR-JP (MM: 2014-17). – Batanta Island, valley of Waridor River, between 00º50’30.55”, 130º31’30.54” and 00º52’09.66”, 130º32’11.54”, 18.01.2014, 2 males, KT-HR-JP (MM: 2014-5). – Batanta Island, valley of Warmon stream, between the lower and upper waterfall (00º50’04.50”, 130º42’54.01” and 00º50’23.25”, 130º42’35.18”), 21.01.2014, 1 male, KT-HR-JP (MM: 2014-12).
Nososticta cf. ***finisterrae*** (Förster, 1897) – Batanta Island, right side stream of Forum River, 00º52’09.6”, 130º27’42.3”, 13.02.2015, 1 male, KT-HR-JP (MM: 2015-14). – Batanta Island, valley of Warmon stream, between the lower and upper waterfall (00º50’04.50”, 130º42’54.01” and 00º50’23.25”, 130º42’35.18”), 21.01.2014, 2 males, 2 females, KT-HR-JP (MM: 2014-12). – Batanta Island, valley of Weras stream, 00º49’51.2”, 130º38’00.0”, 08.02.2015, 1 male, 1 female, KT-JP (MM: 2015-9).

Idiocnemidinae Dijkstra, Kalkman, Dow, Stokvis & van Tol, 2014

Idiocnemis bidentata Selys, 1878 – Batanta Island, left side stream of of Waridor River, between 00º52’09.66”, 130º32’11.54” and 00º51’51”, 130º33’41”, 04.02.2015, 3 males, 1 female, KT-HR-JP (MM: 2015-6b).
Idiocnemis inornata Selys, 1878 – Batanta Island, valley of Weras stream, 00º49’51.2”, 130º38’00.0”, 08.02.2015, 3 males, KT-JP (MM: 2015-9).

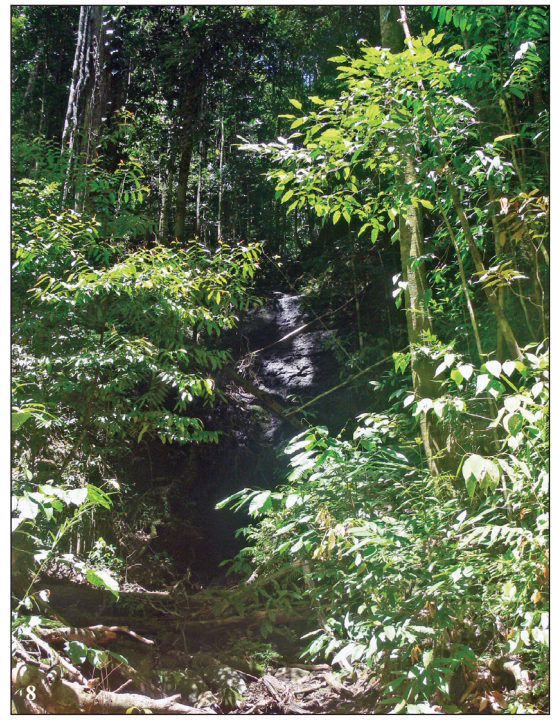
Palaiargia susannae sp. n. Kovács et Theischinger (Figs 6–14)

Type material – Holotype. **Indonesia**, Batanta Island, right side stream of Forum River, 00º52’09.6”, 130º27’42.3”, 225 m, 13.02.2015, 1 male, KT-HR-JP (MM: 2015-14). Paratypes. Same as holotype, 2 males, KT-HR-JP (MM: 2015-14).

Diagnosis – Male: Small *Palaiargia* species (Fig. 6). Head black with rich bright red pattern, prothorax brown, legs largely black, synthorax dark brown to black, with one bright red and two light blue markings. Wings with yellowish brown lustre. Abdomen black with light blue pattern on segments 1–6 and 8–10, appendages black.

Description – Male.

Head (Fig. 7). Labium brown to dark brown; base of mandibles brown, remainder dark brown; labrum brown with narrow darker spot on upper part, anteclypeus ivory white with two narrow dark brown spots on lower part, postclypeus largely red, margined with brown, within the red patch 1 small brown spot each side at about one-fourth of width of postclypeus.



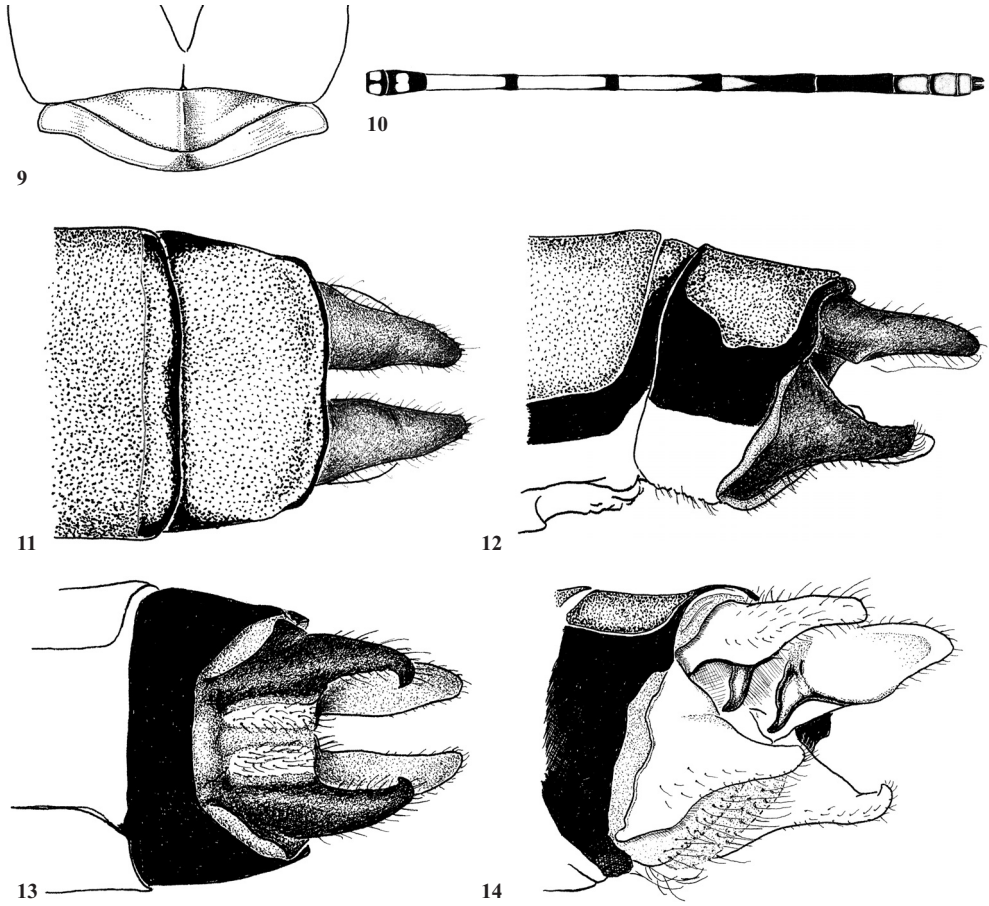
Figs 6–8. *Palaiargia susannae* sp. n., male: 6 = paratype, lateral view; 7 = holotype, head and part of thorax, dorsal view; 8 = habitat at locus typicus

Lower part of frons bright red, upper part black, the bar with three triangular prominences on upper edge: 1-1 small on each side between antenna and eye, one large between antennae, with edge surrounding median ocellus. Top of head between eyes and anterior part of occiput bright red, area around two ocelli black, rest of head brown to black. Antennae black.

Prothorax. Pronotum largely brown dorsally (Fig. 7), sides brown or with small blue spot in posterior upper corner, lower portion brown; other prothoracic and cervical sclerites also brown. Posterior margin of posterior lobe of pronotum arcuately convex, corners slightly upright (Fig. 9). Coxa and trochanter brown, lower third of femur brownish, rest of leg black.

Synthorax (Figs 6–7). Pleura dark brown to black with one bright red and two light blue patches: the red patch in antero-lateral portion, two-fifths to one-half as long and nearly half as wide as mesanepisternum; one light blue patch across aproximately dorsal three-quarters of metepisternum and one light blue patch across most of posterodorsal two-thirds of metepimeron. Poststernum largely dark brown. Coxae and trochanters brown, lower two-thirds of femora brownish, rest of legs black. Wing venation black, membrane with yellowish brown lustre; 13–14 postnodals in Fw, 12–13 in Hw; pterostigma black.

Abdomen (Fig. 10). Segments 1–10 black, segments 1–6 and 8–10 with light blue dorsal pattern. Anal appendages (Figs 11–14) black, superiors narrowing posteriorly in posterior and lateral view, with apex rounded, with small widening at anterior third in lateral view, interior side at base with large tooth curved forward, visible in posterior-lateral view only.



Figs 9–14. *Palaiargia susannae* sp. n., holotype male: 9 = posterior lobe of prothorax, dorsal view; 10 = abdomen, dorsal view; 11 = anal appendages, dorsal view; 12 = anal appendages, lateral view; 13 = anal appendages, ventral view; 14 = anal appendages, oblique ventro-caudal view

Inferiors shorter than superiors, abruptly widening from base in lateral view, with apex slightly upturned; in ventral view narrower, gradually narrowing toward incurved and acute apex.

Measurements. Hind wing 18–20.1 mm, abdomen (including appendages) 26.8–30.6 mm.

Female and larva unknown.

Etymology – The species is dedicated to Zsuzsanna Benkó, the beloved wife of the senior author.

Habitat – The specimens were collected in tropical rainforest, at 225 m above sea level, along the upper stretches of a small tributary of Forum River. The 60 cm wide, stone-bedded stream was mostly shaded, but the individuals flew in the sunny parts (Fig. 8). There was a spring 15 m from this part of the stream. They occurred there together with *Metagrion postnodale*. The site is 200 m from the type locality of *Drepanosticta batanta*.

Comparison with other species. The male of *Palaiargia susannae* sp. n. is most similar to *P. charmosyna* (see KALKMAN & ORR 2013, ORR & RICHARDS 2014, ORR et al. 2014). It can be distinguished from this species by the presence of a red antehumeral patch and of a light blue dorsal patch on abdominal tergite 6. In male *P. charmosyna* the frons of synthorax and abdominal tergite 6 are black without any markings (KALKMAN & ORR 2013: 54, plate 23; 57, plate 26).

COENAGRIONIDAE Kirby, 1890

Agriocnemis femina (Brauer, 1869) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 8 males, 2 females, KT (MM: 2015-11); 18.02.2015, 1 male, KT (MM: 2015-18). – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 02.02.2015, 6 males, 1 female KT (MM: 2015-3); 15.02.2015, 2 females, KT (MM: 2015-15).
Ceriagrion aeruginosum Brauer, 1869 – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 17.01.2014, 1 larva, KT-JP (MM: 2014-3); Birie Island, PPER, marsh, 00º46'14", 130º44'51", 02.02.2015, 1 male, KT (MM: 2015-3).
Ischnura senegalensis (Rambur, 1842) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 2 males, KT (MM: 2015-11); 18.02.2015, 2 females, KT (MM: 2015-18).
Pseudagrion cf. ***civicum*** Lieftinck, 1932 – Batanta Island, left side stream of Waridor River, 00º52'10.7", 130º32'11.6", 04.02.2015, 5 males, KT-HR-JP (MM: 2015-5).
Pseudagrion starreanum Lieftinck, 1949 – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 09.02.2015, 1 male, 1 female, KT-HR-JP (MM: 2015-10); 10.02.2015, 1 female, KT (MM: 2015-11). – Batanta Island, Forum River, 00º52'45.78", 130º27'28.04", 14.02.2015, 3 males, KT-HR-JP (MM: 2015-14b). – Batanta Island, Welebed, 00º53'55.5", 130º39'50.0", 17.02.2015, 4 males, KT-JP-Kris (MM: 2015-17).
Teinobasis rufithorax (Selys, 1877) – Birie Island, PPER, moor, 00º46'21", 130º44'43", 17.01.2014, 6 males, KT-JP (MM: 2014-3); 20.01.2014, 2 males, 1 female, KT-JP (MM: 2014-10). – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 02.02.2015, 1 male, KT (MM: 2015-3).
Xiphiagrion cyanomelas Selys, 1876 – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 2 males, 1 female, KT (MM: 2015-11).

ANISOPTERA

AESHNIDAE Leach, 1815

Gynacantha mocsaryi Förster, 1898 – Birie Island, PPER, moor, 00º46'21", 130º44'43", 17.01.2014, 1 larva, 1 exuviae, T. KT-JP (MM: 2014-3); 25.01.2014, 3 exuviae, KT (MM: 2014-21); 29.01.2014, 2 females, KT (MM: 2014-24); 15.02.2015, 1 exuvium, 1 male, KT (MM: 2015-15a). – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 07.02.2015, 1 exuvium, KT (MM: 2015-8).

MACROMIIDAE Needham, 1903

Macromia euphrosyne Lieftinck, 1952 – Batanta Island, valley of Weras stream, 00º49'51.2", 130º38'00.0", 08.02.2015, 1 male, 1 female, KT-JP (MM: 2015-9).

LIBELLULIDAE Leach, 1815

Agrionoptera insignis (Rambur, 1842) – Birie Island, PPER, moor, 00º46'21", 130º44'43", 20.01.2014, 3 males, KT-JP (MM: 2014-10); 02.02.2015, 1 male, KT (MM: 2015-3a); 07.02.2015, 1 male, KT (MM: 2015-8a).
Agrionoptera longitudinalis Selys, 1878 – Arefi Island, Arefi, Mandur, east, water hole, 00º47'39.7", 130º42'28.4", 18.02.2015, 1 male, KT (MM: 2015-18b). – Batanta Island, valley of Waridor River, between 00º50'30.55", 130º31'30.54"and 00º52'09.66", 130º32'11.54", 18.01.2014, 1 male, KT-HR-JP (MM: 2014-5). – Batanta Island, valley of Waridor River, between 00º51'52.42", 130º32'26.34" and 00º51'48.7", 130º33'06.3", 01.02.2014, 1 female, KT-JP (MM: 2014-27a).
Brachydiplax duivenbodei (Brauer, 1866) – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 20.01.2014, 2 males, KT-JP (MM: 2014-10); 29.01.2014, 1 male, KT (MM: 2014-24); 02.02.2014, 1 male, KT (MM: 2014-28);

02.02.2015, 1 male, KT (MM: 2015-3); 15.02.2015, 1 male, KT (MM: 2015-15); 07.02.2015, 1 male, KT (MM: 2015-8).

Camacinia gigantea (Brauer, 1867) – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 29.01.2014, 1 exuviae, 2 males, 2 females, KT (MM: 2014-24); 07.02.2015, 1 male, KT (MM: 2015-8).

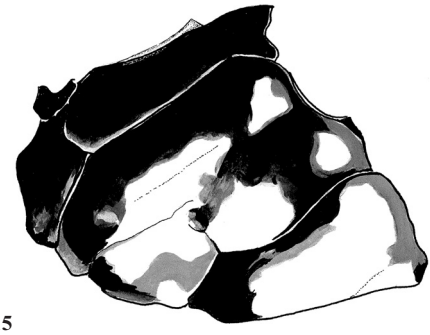
Diplacina olahi sp. n. Theischinger et Kovács (Figs 15–18)

Type material – Holotype. **Indonesia**, Batanta Island, Welebed, valley of Kalijakut River, between 00º54'20.59", 130º38'31.70" and 00º53'12.88", 130º38'16.40", 23.01.2014, 1 male, KT-HR-JP (MM: 2014-17).

Diagnosis – Male: Middle-sized species of *Diplacina*. Frons and vertex brilliant metallic green, prothorax brown, legs largely black, synthorax brilliant metallic green with yellow pattern. Abdomen dark brown to black, segments 1–7 with yellow pattern, appendages black. Superiors narrow, ending with acute point, apex of inferior appendix laterally expanded and with very shallow wide-angled median emargination making it appear bilobed.

Description – Male.

Head. Labium dark brown, on each side at base of lateral lobes with yellowish spot; these spots as large as dark median lobe, with three small emergences on upper edge. Mandibles brown; whole labrum black, whole anteclypeus ivory white, postclypeus ivory white with brownish middle third, frons and vertex brilliant metallic green, frons with ivory white spots in lower edges, occiput black. Antennae dark brown.



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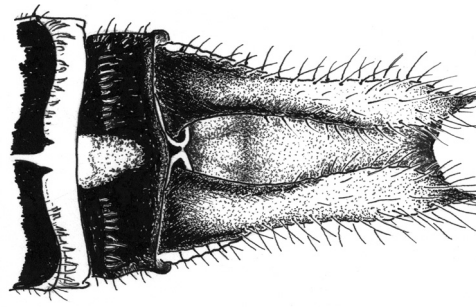

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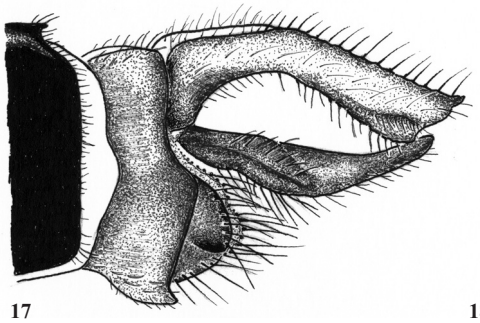

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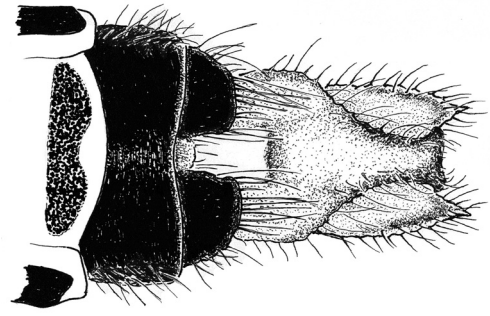

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Figs 15–18. *Diplacina olahi* sp. n., holotype male: 15 = synthorax, lateral view; 16 = anal appendages, dorsal view; 17 = anal appendages, lateral view; 18 = anal appendages, ventral view

Prothorax. Pronotum brownish, other prothoracic and cervical sclerites also brownish. Posterior lobe of pronotum ivory white. Coxa and trochanter brown; inner surfaces of trochanter and femur with yellowish streak, other parts of legs black.

Synthorax (Fig. 15). Pleura largely brilliant metallic green with a few yellow patches: a small mark each on mesokatepisternum and metakatepisternum; two rather small triangular patches along subalar ridge, one in mesepimeron, the other in metepisternum; a large U-shaped patch covering approximately ventral 2/3 of mesepimeron and metepisternum; a large patch covering approximately posterior ¾ of metepimeron. Poststernum largely brown. Coxa and trochanter brown; other parts of legs black. Wings with venation black, membrane hyaline; 8.11.11.8 nodals in Fw, 7.8.9.8 in Hw; pterostigma brown.

Abdomen. Segments 1–10 dark brown to black, with yellow pattern laterally and dorsally in segments 1–3, with yellow basal rings in segments 4–7, segments 4 and 7 with yellow pattern directing posteriorly from dorsal part of ring (similar to that of *D. merope*). Anal appendages (Figs 16–18) black, superiors narrow, straight in dorsal view, strongly curved downwards in lateral view, apex acute in both views. Ventrally in posterior four-fifths with longitudinal elevation with 4–6 minute teeth. Inferior appendage ventrally slightly shorter than superiors, moderately broadening to first third, then abruptly narrowing, divergent apically and with very shallow wide-angled median emargination making it appear bilobed.

Measurements. Hind wing 25.4 mm, abdomen (including appendages) 22.6 mm.

Female and larva unknown.

Etymology – The species is dedicated to János Oláh, a noted expert of world Trichoptera, supporter of research of Tibor Kovács in Batanta.

Habitat – The only known specimen was collected in tropical rainforest, in the valley of the Kalijakut River (0–105 m a.s.l.), along with *Rhinocypha tincta* cf. *sagitta*, *Metagrion postnodale* and *Nososticta aurantiaca*.

Comparison with other species. *Diplacina olahi* roughly fits the subgroup of *Diplacina* in Orr & Kalkman (2015) defined by „Inferior appendage clearly bifid; superior apps in lateral view bent downwards, with shallow ventral subapical angle". In this subgroup only *D. smaragdina* is included. With the „Inferior appendage widened at the tip and clearly bifid" it even better fits another group that is, however, further defined by „superior apps in lateral view bent downwards with a small subapical ventral tooth" and includes *D. arsinoe*, *D. callirrhoe*, *D. cyrene*, *D. dioxippe* and *D. merope* (all Orr & Kalkman 2015, plates 21 and 22). Whereas the superior appendages of *D. olahi* are most similar to *D. smaragdina* (Orr & Kalkman 2015, plate 22), its inferior appendix, very wide basally then very narrow and with apex widened, clearly bifid and with shallow median emargination, comes very close to *D. merope. D. olahi* and *D. merope* also share a yellowish spot at base of the lateral lobes of the labium. To sum it up the superior anal appendages of *D. olahi*, pointed, are clearly different from *D. merope* (blunt), the inferior appendage of *D. olahi* apically expanded and with shallow median emargination clearly differs form *D. smaragdina* (apically not expanded and with deep median emargination.

Diplacodes trivialis (Rambur, 1842) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 09.02.2015, 1 female, KT-HR-JP (MM: 2015-10); 10.02.2015, 1 male, 1 female, KT (MM: 2015-11); 18.02.2015, 1 male, 3 females, KT (MM: 2015-18).

Huonia epinephela Förster, 1903 – Batanta Island, Teluk Warai, stream, 00º50'51.0", 130º35'14.0", 11.02.2015, 1 male, KT-JP (MM: 2015-13).

Huonia thais Lieftinck, 1953 – Batanta Island, valley of Waridor River, between 00º50'30.55", 130º31'30.54" and 00º52'09.66", 130º32'11.54", 18.01.2014, 3 males, 1 female, KT-HR-JP (MM: 2014-5); 03.02.2015, 1 female, KT-HR-JP (MM: 2015-4). – Batanta Island, valley of Waridor River, between 00º52'09.66", 130º32'11.54"and 00º51'51", 130º33'41", 04.02.2015, 1 male, KT-HR-JP (MM: 2015-6).
Hydrobasileus vittatus Kirby, 1889 – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 1 female, KT (MM: 2015-11).

Localities – Indonesia: Menado [Manado], Celebes [Sulawesi] (Kirby 1889), Buru, Celebes, Amboina [Ambon] (Lieftinck 1926), Flores (Monk et al. 1997). Philippines: Mindanao (Villanueva 2011). Three ovipositing females were observed in Arefi, at the shallow lake of Mandur. New to the fauna of New Guinea.

Nannophlebia amnosia Lieftinck, 1955 – Batanta Island, valley of Waridor River, between 00º50'30.55", 130º31'30.54" and 00º52'09.66", 130º32'11.54", 18.01.2014, 1 female, KT-HR-JP (MM: 2014-5).
Neurothemis ramburii (Brauer, 1866) – Batanta Island, valley of Waridor River, 00º52'06", 130º31'30", 18.01.2014, 2 males, KT-HR-JP (MM: 2014-5a); 00º52'09.66", 130º32'11.54", 03.02.2015, 5 males, 1 female, KT-HR-JP (MM: 2015-4b).
Neurothemis stigmatizans (Fabricius, 1775) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 3 males, 1 female, KT (MM: 2015-11). – Batanta Island, Welebed, 00º53'55.5", 130º39'50.0", 17.02.2015, 1 female, KT-JP-Kris (MM: 2015-17). – Batanta Island, valley of Waridor River, 00º52'06", 130º31'30", 03.02.2015, 1 female, KT-HR-JP (MM: 2015-4a). – Birie Island, PPER, marsh, 00º46'14", 130º44'51", 02.02.2014, 1 male, 2 females, KT (MM: 2014-28); 07.02.2015, 1 male, KT (MM: 2015-8).
Orthetrum serapia Watson, 1984 – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 09.02.2015, 1 male, KT-HR-JP (MM: 2015-10); 10.02.2015, 2 male, KT (MM: 2015-11).
Orthetrum villosovittatum (Brauer, 1868) – Batanta Island, valley of Waridor River, between 00º50'30.55", 130º31'30.54" and 00º52'09.66", 130º32'11.54", 18.01.2014, 2 males, KT-HR-JP (MM: 2014-5).
Protorthemis coronata (Brauer, 1866) – Batanta Island, valley of Warmon stream, lower waterfall, 00º50'04.50", 130º42'54.01", 21.01.2014, 1 male, 1 female (copula), KT-HR-JP (MM: 2014-13).
Raphismia bispina (Hagen, 1867) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 09.02.2015, 1 male, KT-HR-JP (MM: 2015-10); 10.02.2015, 2 males, KT (MM: 2015-11); 18.02.2015, 3 males, KT (MM: 2015-18). – Batanta Island, Northwest Coast, 00º48'39.45", 130º27'10.41", 14.02.2015, 1 male, KT-HR-JP (MM: 2015-14c).
Rhyothemis phyllis (Sulzer, 1776) – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 09.02.2015, 1 male, KT-HR-JP (MM: 2015-10); 10.02.2015, 4 males, KT (MM: 2015-11); 18.02.2015, 1 male, KT (MM: 2015-18).
Tramea eurybia Selys 1878 – Arefi Island, Arefi, Mandur, 00º47'17.7", 130º42'20.0", 10.02.2015, 1 male, KT (MM: 2015-11).

Discussion

Thirty-eight species were recoreded from Batanta Island (including Arefi and Birie Islands). The following three new species were described: *Drepanosticta batanta* sp. n., *Palaiargia susannae* sp. n. and *Diplacina olahi* sp. n. *Hydrobasileus vittatus* is new to the fauna of New Guinea. Further 15 species were proved to be new to the fauna of the Raja Ampat Islands: *Drepanosticta auriculata*, *Metagrion postnodale*, *Selysioneura* cf. *cervicornu*, *Nososticta* cf. *finisterrae*, *Idiocnemis bidentata*, *I. inornata*, *Agriocnemis femina*, *Ceriagrion aeruginosum*, *Ischnura senegalensis*, *Pseudagrion* cf. *civicum*, *Xiphiagrion cyanomelas*, *Diplacodes trivialis*, *Huonia epinephela*, *Neurothemis ramburii*, *Orthetrum serapia*, *Rhyothemis phyllis*.

As a comparison, the species numbers of Odonata from the other three major islands of Raja Ampat are the following: Misool 29, Waigeo 30, Salawati 20 (Kalkman & Orr 2013, Orr & Kalkman 2015, V. Kalkman pers. comm.).

Owing to the diverse geomorphology of Batanta, a wealth of microhabitats can be seen on the island, from springs to large streams with waterfalls. Two of the three new Odonata species were found near springs (*Drepanosticta batanta* sp. n., *Palaiargia susannae* sp. n.), while the third (*Diplacina olahi* sp. n.) was collected at a stream. Two bodies of standing water deserve special mention: Lake Mandur at Arefi is the most species-rich with its eleven species; seven species were found exclusively here in Batanta, including *Hydrobasileus vittatus*, which is new to the fauna of New Guinea. The marshy area on Birie Island yielded eight species, including six that were not found elsewhere.

Acknowledgements: Our sincere thanks are due to Vincent J. Kalkman (Naturalis Biodiversity Center, Leiden) and Albert G. Orr (Griffith School of the Environment, Griffith University, Nathan) for their manifold help and information; to Matti Hämäläinen (Naturalis Biodiversity Center, Leiden) for identification of *Neurobasis australis*, to Dirk Gassmann (Naturalis Biodiversity Center, Leiden; Zoologisches Forschungsmuseum Alexander Koenig, Bonn) for identification of *Idiocnemis* species; to György Csóka (ERTI, Mátrafüred) for the possibility of taking microphotos; to Ottó Merkl (Hungarian Natural History Museum, Budapest) for English translation.

Most of the financial support came from János Oláh (Sakertour, Debrecen) who covered all costs of the first author's two trips. The Papua Paradise Eco Resort, Róbert Horváth (Ostoros), Péter Rozman and Anett Hidvégi (Budapest) provided the base camp and helped organise the field trips. Róbert Horváth participated in the collectings as well. We are beholden to Kris and Petrus, our local helpers.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 31–37

A Győr környéki homokpuszták egyenesszárnyú-együttesei (Orthoptera)

Kenyeres Zoltán

Abstract: Orthopteran assemblages of the largest sandy area of the Kisalföld were examined. Four types of assemblages were detected: natural sandy grasslands, humid grasslands, characterless dry grasslands, weedy vegetation. The structure of the local sandy assemblage show analogy with assemblages published from the other Hungarian sandy areas, but can not be referred unequivocally any of them.

Bevezetés

A Győr és Gönyű térségében található homokvidéken ismereteink szerint 1936-ban gyűjtötték az első egyenesszárnyú-példányt (Rácz et al. 2005). Aradi (1955) későbbi eredményei orthopterológiai tényekkel mutattak rá a Kisalföldi homokgyepek Nagyalfölddel való kapcsolatára. Ezt követően a térség egyenesszárnyú-faunájának kutatása csak az 1990-es évek második felétől vált ismét intenzívvé. Az újabb, számos természetvédelmi és állatföldrajzi jelentőségű karakterfaj kimutatását hozó eredmények és a korábbi adatok kritikai áttekintése alapján a Kisalföld homokterületeinek egyenesszárnyú-faunájára vonatkozó legújabb szintézis Kenyeres et al. (2013) munkájában található.

A magyarországi homokpusztagyepek egyenesszárnyú-együtteseinek vizsgálata számottevő múltra tekint vissza. Balogh & Loksa (1948) nemcsak feltárták a Szigetmonostor környéki homoki gyepek egyenesszárnyú-együtteseinek legfontosabb jellemzőit, de azok három, adott éven belüli aszpektusát is elkülönítették: (1) *Dociostaurus brevicollis–Myrmeleotettix antennatus–Calliptamus italicus* (nyár közepe); (2) *Myrmeleotettix antennatus–Calliptamus italicus–Oedipoda caerulescens* (nyár vége); (3) *Acrotylus insubricus–Myrmeleotettix antennatus–Calliptamus italicus* (kora ősz). Gausz (1970) az Alföldön folytatott vizsgálatok összegzéseként a nyílt homokpusztagyepekre jellemzőként az alábbi fajkombinációt írta le: *Acrotylus longipes–Acrotylus insubricus–Calliptamus barbarus.* Rácz & Varga (1978) Igrici térségében végzett kutatásaik során igazi homoki együttesként az ún. Kochia-típust nevezték meg, *Acrida ungarica*, *Myrmeleotettix maculatus* és *Dociostaurus brevicollis* fajokkal. Rácz (1998) összegzésében a homokpusztagyepek (*Festucion vaginatae*) esetében alap-fajkombinációnak az *Acrotylus insubricus*, a *Myrmeleotettix maculatus* és az *Acrida ungarica* együttes előfordulását tartja, melybe lokális karakterfajként épülhet a *Calliptamus barbarus*, az *Acrotylus longipes*, a *Sphingonotus caerulans* és a *Myrmeleotettix antennatus*, továbbá meszes homokon a *Platycleis montana* és az *Euchorthippus pulvinatus*, löszös homokon pedig a *Stenobothrus crassipes*. Rácz (2002) összegzésében a kiskunsági *Festucetum vaginatae* gyepekre jellemző fajkombinációnak az alábbit tartja: *Dociostaurus brevicollis*, *Myrmeleotettix antennatus*, *Calliptamus barbarus*, *Oedaleus decorus*, *Platycleis montana*, *Acrida ungarica.* A bakonyvidéki homoki gyepek indikátor-

fajaiként Kenyeres (2011) a *Dociostaurus brevicollis* és a *Myrmeleotettix maculatus* fajokat jelölte meg.

Annak ellenére, hogy a Kisalföld homokterületeinek faunisztikai kutatása viszonylag jelentős múltra tekint vissza, a lokális egyenesszárnyú-együttesek vizsgálatára eddig nem került sor. Jelen kutatás célkitűzései ennek megfelelően a következők voltak: (a) a kisalföldi homokpuszták legjelentősebb természeti értékét jelentő Gönyűi-homokvidék kiemelt jelentőségű természetmegőrzési terület élőhelyszerkezetét reprezentáló mintavételezésekkel feltárni a területen jellemző egyenesszárnyúegyüttes-típusokat; (b) a feltárt együttestípusok szerkezeti jellemzőit összevetni a Magyarországról eddig leírt együttestípusokkal.

Terület és módszerek

A vizsgált terület természetföldrajzi szempontból (Dövényi 2010) a Komárom–Esztergomi-síkságon belül a Győr–Tatai-teraszvidék kistáj Győr–Moson–Sopron megyei területére esik. Nyugatról a Mosoni-Duna, északról a Duna határolja. 2004 óta természetvédelmi státusza: a HUFH20009 Gönyűi-homokvidék kiemelt jelentőségű természetmegőrzési terület része. A vizsgált területet 112–122 méter tszf. magasságú, viszonylag sík, alacsony, széles hátú, lapos homokos buckahátak és nedves laposok jellemzik.

Az egyensszárnyú-együttesek vizsgálata a következő 11, friss élőhelytérkép alapján a terület élőhelyszerkezetét reprezentáló lokalitásban folytak: (1) Zárt homoki sztyeprét és nyílt homokpusztagyep; (2) Nyílt homokpusztagyep; (3) Aranyvesszős, kis csenkeszes maradványfoltokkal; (4) Akácos–selyemkórós; (5) Kékperjés láprét *Salix rosmarinifolia*val; (6) Jellegtelen üde gyep; (7) Jó állapotú zárt homoki sztyeprét; (8) Nyírrel és nyarakkal spontán erdősödő zárt homoki sztyeprét; (9) Jellegtelen száraz gyep; (10) Másodlagos zárt homoki sztyeprét; (11) Jellegtelen száraz gyep.

A fenti mintavételi területeken 2012-ben kettő (augusztus, szeptember), 2013-ban négy, 2015-ben ugyancsak négy (június, július, augusztus, szeptember) alkalommal végeztünk adatgyűjtést. Az összesen 110 orthopterológiai mintavételt a kijelölt 50×50 méteres kvadráton belül végrehajtott 300 fűhálócsapással végeztük. Az ily módon gyűjtött egyedeket tekintettük egy mintának, melyeket egyeléssel kiegészítettünk (a mintákba nem, vagy csak ritkán kerülő fajok jelenlétének rögzítése, egyszerű hozzáadással). A nyílt, gyér növényzetű, vagy magaskórós jellegű növényzetben a mintavételezést az előforduló állatok teljes körű egyelő gyűjtésével végeztük. Az állatok meghatározásához Harz (1975) munkáit használtuk. A fajok nevezéktana Eades et al. (2012) listáját követi.

Az azonos mintavételi területen belül adott évben gyűjtött mintákat összevontuk, így az együttesek szerkezetvizsgálatához 33 összevont minta állt rendelkezésre.

Az összevont egyenesszárnyú-mintavételek statisztikai vizsgálatát klaszteranalízissel végeztük (neigbour joining; szimilaritásindex: korreláció) (Saitou & Nei 1987), a PAST (Hammer et al. 2001) programcsomag alkalmazásával. Ezen túl az egyenesszárnyú-együttesek vizsgálatához a következő változókat használtuk: (a) egyenesszárnyú-együttesek életformatípus összetétele; (b) egyenesszárnyú-együttesek ökológiai preferencia-típus összetétele; (c) egyenesszárnyú-együttesek természetességi mutatója. Ezen összehasonlításokhoz a fajok életforma- és ökotípus besorolása során Ingrisch & Köhler (1998) munkáját követtük, a pseudopsammophil fajok esetében kiegészítve Krištín et al. (2009) megállapításaival. A fajok ökológiai preferenciájának meghatározáshoz Varga (1997), Rácz (1998), valamint Ingrisch & Köhler (1998) kategóriáit használtuk. Az együttesek természetességi mutatóit a Kenyeres & Bauer (2001) által javasolt módszerrel számoltuk ki.

Eredmények

A vizsgálatok során a 11 mintavételi területről 37 egyenesszárnyúfaj előfordulását mutattuk ki (a térségből ismert fajok ~80%-a) (1. táblázat). A kimutatott fajok közül egy védett státuszú (*Calliptamus barbarus*), az előkerült fajok ~20%-a homoki karakterfajnak (*Platycleis montana*, *Calliptamus barbarus*, *Dociostaurus brevicollis*, *Euchorthippus pulvinatus*, *Myrmeleotettix maculatus*, *Myrmeleotettix antennatus*, *Stenobothrus fischeri*) tekintendő.

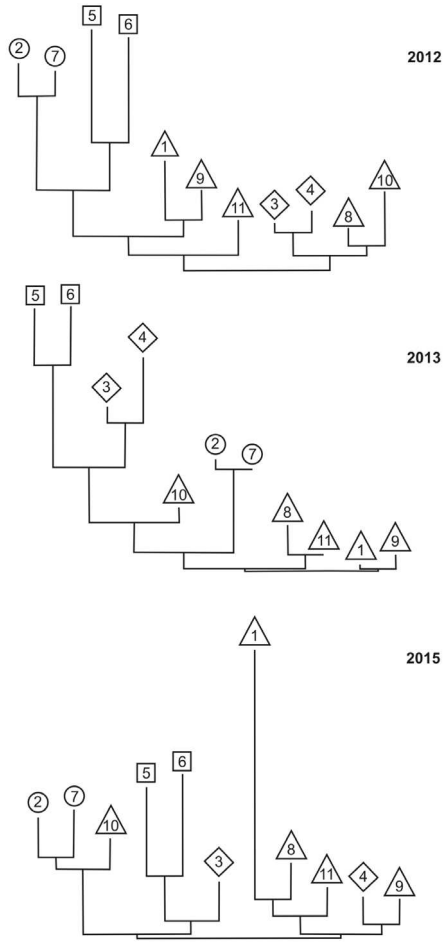
1. táblázat. A vizsgált gyepekből kimutatott egyenesszárnyúfajok földrajzi elterjedése, faunaelem és életformatípus, valamint hőigény szerinti besorolása (INGRISCH & KÖHLER (1998) munkája alapján)

Taxon	Elterjedés	Faunaelem	Életforma	Hőigény
Conocephalus fuscus (Fabricius, 1793)	Pale	Tr	pra	hyg
Conocephalus dorsalis (Latreille, 1804)	Eu-Szib	Tr	pra	hyg
Ruspolia nitidula (Scopoli, 1786)	Paleo-Tr, Med	Tr	pra	m-hyg
Leptophyes albovittata (Kollar, 1833)	Po	Po	arbu	ther
Phaneroptera falcata (Poda, 1761)	Eu-Szib	Tr	arbu	ther
Phaneroptera nana Fieber, 1853	Circ-Med	Tr	arbu	ther
Decticus verrucivorus (Linnaeus, 1785)	Eu-Szib	An	pra	mes
Bicolorana bicolor (Philippi, 1830)	Eu-Szib	An	pra	m-ther
Roeseliana roeselii (Hagenbach, 1822)	Eu-Szib	An	pra	m-hyg
Platycleis montana (Kollar, 1833)	Ke-Eu	An	psps	ther
Platycleis albopunctata (Goeze, 1778)	Eu	An	pra	ther
Tettigonia viridissima Linnaeus, 1758	Pale	An	arbu	mes
Pteronemobius heydenii (Fischer, 1853)	Med-Kö-Eu-DNy-Á	Tr	geo	hyg
Oecanthus pellucens (Scopoli, 1763)	Pale	Tr	pra	m-ther
Calliptamus italicus (Linnaeus, 1758)	Pale	An	gra	ther
Calliptamus barbarus (Costa, 1836)	D-Eu,É-Af, KiÁ	Ir-Tur	ps	ther
Chorthippus biguttulus (Linnaeus, 1758)	Eu-Szib	An	pra	m-ther
Chorthippus brunneus (Thunberg, 1815)	Eu-Szib	An	pra	m-ther
Chorthippus dichrous (Eversmann, 1859)	D-Ke-Eu-Szib	An, Po	pra	mes
Chorthippus dorsatus (Zetterstedt, 1821)	Eu-Szib	An	pra	mes
Chorthippus mollis (Charpentier, 1825)	Eu-Szib	An	pra	mes
Chorthippus ochei Helversen, 1986	Pale	An	pra	mes
Pseudochorthippus parallelus (Zetterstedt, 1821)	Pale	An	pra	mes
Chrysochraon dispar (Germar, 1834)	Eu-Szib	An	pra	m-hyg
Dociostaurus brevicollis (Eversmann, 1848)	Eu	Po	psps	ther
Euchorthippus declivus (Brisout de Barneville, 1848)	D-Eu	Po	gra	ther
Euchorthippus pulvinatus (Fischer de Waldheim, 1846)	Eu-Szib	An	gra	ther
Euthystira brachyptera (Ocskay, 1826)	Eu-Szib	An	pra	mes
Myrmeleotettix antennatus (Fieber, 1853)	D-Eu, Szib	An	gra	ther
Myrmeleotettix maculatus (Thunberg, 1815)	Pale	An	gra	ther
Omocestus haemorrhoidalis (Charpentier, 1825)	Eu-Szib	An	pra	ther
Omocestus rufipes (Zetterstedt, 1821)	Pale	An	pra	mes
Stenobothrus fischeri (Eversmann, 1848)	Pale	Po	pra	ther
Stenobothrus lineatus (Panzer, 1796)	Eu-Szib	An	pra	m-ther
Stenobothrus nigromaculatus (Herrich-Schäffer, 1840)	Eu-Szib	An	gra	ther
Stenobothrus stigmaticus (Rambur, 1838)	Ny-Pale	Neo-At	pra	m-ther
Oedipoda caerulescens (Linnaeus, 1758)	Pale	Holo-Med	geo	ther

Á = Ázsiai; Af = Afrikai; At = Atlantikus; Circ = Cirkum; Cos = Kozmopolita; D = Dél; Eu = Európai; É = Észak; Ho = Holarktikus; Ke = Kelet; KiÁ = Kis-Ázsiai; Kö = Közép; Med = Mediterrán; Ny = Nyugat; Pale = Palearktikus; Pc = Policentikus; Po = Pontuszi; Szib = Szibériai; Tr = Trópusi; An = Angarai; At = Atlantikus; Ir = Iráni; Med = Mediterrán; Po = Pontuszi; Tr = Trópusi; Tur = Turkesztáni; arbo = arboricol; arbu = arbusticol; sil = silvicol; pra = pratinicol; gra = graminicol; geo = geophil; ps = psammophil; psps = pseudopsammophil; ther = thermophil; m-ther = mérsékelten-thermophil; mes = mesophil; m-hyg = mérsékelten-hygrophil; hyg = hygrophil

A klaszteranalízisek (1. ábra) ábráin a mintavételi területek együtteseinek egymáshoz való viszonyában látszanak a területhasználatban megjelenő évek közötti különbségek, de a vizsgálati területen jelen lévő négy egymástól alapvetően eltérő egyenesszárnyúegyüttes-típus minden évben kimutatható volt: (A) természetes homokpusztagyepek együttestípus; (B) természetes üde gyepek együttestípus; (C) jellegtelen száraz gyepek együttestípus; (D) gyomvegetációra jellemző együttestípus.

(A) természetes homokpusztagyepek együttestípus: a kimagaslóan jó természetességi állapotú nyílt homokpusztagyepek mintái kerültek ide (2, 7). Az ezekben számottevő részesedéssel előforduló fajok szinte kivétel nélkül homoki karakterfajok (*Calliptamus barbarus*, *Euchorthippus declivus*, *Dociostaurus brevicollis*, *Euchorthippus pulvinatus*, *Myrmeleotettix maculatus*). A kis egyedszámmal előkerült további fajok között vannak ugyan általános nyílt szárazgyepi fajok, mint a *Calliptamus italicus*, vagy a *Chorthippus mollis*, de lokálisan ritka



1. ábra. A kisalföldi homokpusztagyepek klaszteranalízissel elkülönített egyenesszárnyúegyüttes-típusai (kör = természetes homokpusztagyepek együttestípus; négyzet = természetes üde gyepek együttestípus; háromszög = jellegtelen száraz gyepek együttestípus; rombusz = gyomvegetációra jellemző együttestípus)

homoki színezőelemek is, mint a *Myrmeleotettix antennatus* és a *Stenobothrus fischeri*. A 2015-ös évi felvételek alapján a 10-es számú mintavételi területen feltárt együttes is ebbe a típusba sorolódott. Utóbbi gyep vegetációszerkezete és állapota alkalmas jó természetességi állapotú nyílt homokpusztagyepi együttes kialakulására, azonban a 2014-es leégetését megelőzően e karaktere nem volt annyira kifejezett.

(B) természetes üde gyepek együttestípus: a kutatási terület ugyancsak markánsan elkülönülő egyenesszárnyú együttestípusa az üde gyepekben van jelen (5, 6). Ezek, – az üde gyepek egyenesszárnyú-együtteseire jellemzően – fajszegények: területükön a kifejezetten hygrophil igényű *Conocephalus fuscus* dominál, de jellemzően előfordul bennük a *Conocephalus dorsalis* és a *Ruspolia nitidula* is. A további kísérőfajok is részben üde gyepi fajok közül kerülnek ki, így jellemzően előfordul területükön a *Chrysochraon dispar* és a *Roeseliana roeselii* – a mesophil fajok (pl. *Pseudochorthippus parallelus* és *Euthystira brachyptera*) előfordulása ugyancsak tipikus bennük. A tapasztalatok szerint a közeli szárazgyepek irányából érkező nyomásnak köszönhetően ezeken az üde gyepeken markánsan jelenhetnek meg xerophil szárazgyepi fajok (*Chorthippus brunneus*, *Calliptamus italicus*, *Chorthippus mollis*, *Chorthippus biguttulus*) – különösen aszályos években a kaszálást követően. A 2015-ös évben – köszönhetően néhány mesophil faj markáns jelenlétének – a 3-as mintavételi terület is ebbe az együttestípusba sorolódott.

(C) jellegtelen száraz gyepek együttestípus: heterogén szerkezetű csoport, a korábbi területhasználattól függő természetességi állapotú egyenesszárnyú-együttesekkel (1, 8, 9, 10, 11). Az ide tartozó együttesek közül néhánynak a fajösszetétele nagy mértékben hasonlít a legjobb állapotú homokpusztagyepekben előfordulóra, de az érzékenyebb homoki fajok ezekben nem vagy csak nagyon alacsony egyedszámmal fordulnak elő – ellenben a zavarástűrő fajok fajszáma és egyedszáma általában magas. A zavartabb nyílt, ill. különböző mértékben záródott együtteseket általában a *Calliptamus italicus* és az *Euchorthippus declivus* dominálja, de a jobb állományokban előfordulnak különböző jelentőségű homoki karakterfajok (*Calliptamus barbarus*, *Stenobothrus fischeri*, *Platycleis montana*).

(D) gyomvegetációra jellemző együttestípus: gyenge természetességi állapotú egyenesszárnyú-együttes-típus önálló karakter nélkül, tágtűrésű xerophil fajokkal (3, 4). 2013-ban markánsan különálló csoportot alkotó felvételek más években a száraz gyepek, illetve részben az üde gyepek csoportjába sorolódtak. A nyílt száraz gyepek mobilis fajai (*Oedipoda caerulescens*, *Calliptamus italicus*) mellett nagy egyedszámmal fordulnak elő bennük a gyomvegetáció-foltok jellemző fajai, mint például a *Chorthippus mollis*, de a magas (*Bicolorana bicolor*) és a rövidfüvű szárazgyepek (*Euchorthippus declivus*), a zártabb mesophil gyepek (*Stenobothrus lineatus*, *Euthystira brachyptera*, *Pseudochorthippus parallelus*) fajai is előkerültek itt. Utóbbinak köszönhető az ide tartozó együttesek bizonyos években tapasztalható átsorolódása más csoportokba.

Az együttesek közötti fenti különbségek az életforma- és ökotípus-összetételekben is markánsan kirajzolódtak. A psammophil és pseudopsammophil fajok részaránya a természetes homokpusztagyepek együttestípusban (2, 7) a legmagasabb (rel. gyak.: 0,253–0,539 és 0,053–0,106). Ugyanez igaz az ökotípus-összetétel tekintetében a thermophil fajok részarányára (rel. gyak.: 0,891–0,990). A természetes üde gyepek együttestípust (5, 6) a pratinicol fajok dominálják (rel. gyak.: 0,927–1,000), az ökotípus-spektrumok tekintetében pedig a hygrophil és mérsékelten-hygrophil életformák részesedése kimagasló (rel. gyak.: 0,028–0,400 és 0,100–0,363) a többi együttessel való összevetésben.

A jellegtelen száraz gyepekre, ill. gyomvegetációra jellemző típusként feltárt együttesek között a fajkészlet és mennyiségi viszonyokban fennálló különbségek az életforma- és ökotípus-összetételben nem találtunk (mindkét típust a pratinicol fajok dominálják a thermophil fajok alacsony részaránya mellett).

A természetes homokpusztagyepek együttestípus (2, 7) természetessége a kvantitatív indexek szerint is kiemelkedő (átlag: 3,765 és 3,703). Az üde gyepek (5, 6) természetessége az egyenesszárnyúak jelzései alapján ugyancsak magasnak (átlag: 3,323 és 2,595), de a szárazodás miatt csökkenő tendenciájúnak tekinthető. A jellegtelen száraz gyepek együttestípuson belül a csoport heterogén jellegéből adódóan az egyes feltárt együttesek természetességi indexe viszonylag nagy szórást mutatott (2,106–2,528; átlag: 2,346). A legalacsonyabb természetességi indexet a gyomvegetációra jellemző együttestípusban mértük (1,755–2,247; átlag: 2,001).

Értékelés

A Kisalföld legnagyobb kiterjedésű homokvidékének egyenesszárnyú-együttesein végzett vizsgálatok eredményei alapján megállapítható, hogy a jó természetességi állapotú lokális homokgyepek egyenesszárnyú-együttesei kis fajszámú, természetvédelmi és állatföldrajzi szempontból jelentős, thermophil, psammophil és pseudopsammophil ökológiai igényű fajokban gazdag közösségek. A lokális homokpusztagyepek karakterfajainak a következők tekinthetők: *Calliptamus barbarus*, *Dociostaurus brevicollis*, *Euchorthippus pulvinatus*, *Myrmeleotettix maculatus*. A fentieken túl rendszeresen kerülnek elő a térségben olyan fontos homoki színezőelemek, mint a *Stenobothrus fischeri*, a *Platycleis montana* és a *Myrmeleotettix antennatus*. Feltűnő azonban az *Acrida ungarica* és a *Gampsocleis glabra* hiánya. A kisalföldi homokpusztagyepekben a karakterfajok közül a psammophilokkal szemben jellemzőbbek a pseudopsammophil fajok. Ezek a taxonok a legmarkánsabb állományokkal homok alapkőzeten található gyepekben fordulnak elő, de az alföldi területekkel érintkező, rendzina talajokkal fedett, ill. erőteljesebben löszös felszíneken is előfordulnak (Krištín et al. 2009).

Összességében a kisalföldi homokpusztagyepekben feltárt együttesek szerkezete egyik Magyarország más területeiről leírt homokgyepi egyenesszárnyúegyüttes-típusba sem sorolható. Az ennek hátterében lévő okok feltárása további elemzéseket, ill. más homokterületekről származó mintákkal történő összevetést igényel.

A vizsgálati terület üde gyepjein kimutatott természetközeli egyenesszárnyú-együttes közösségmutatóiban nem látható érdemi eltérés a más alapkőzetekről leírt lápréti és mocsárréti együttesektől (Poschmann et al. 2009, Kenyeres 2011). Ez alapján a természetes üde gyepek egyenesszárnyú-együttesének kialakulásában az alapkőzet nem, sokkal inkább a mikroklíma és a növényzetszerkezet a meghatározó.

A vizsgálati terület gyengébb természetességi állapotú szárazgyepjeiben feltárt együttesek nem tekinthetők homoki együtteseknek. Ez a befoglaló gyepek eltérő természetességi állapotával, különböző fokú bolygatottságával magyarázható. Azok területén azonban az elmúlt években intenzív természetvédelmi célú beavatkozások kezdődtek (zavarás megszűntetése és kizárása, invazív növényfajok irtása, extenzív legeltetés stb.), melyek következtében – és a tágabb élőhely-szerkezet, valamint a homoki egyenesszárnyú karakterfajok erős állományainak ismeretében – a ma még általános elterjedésű szárazgyepi fajok uralta együttesek szerkezete is jelentős mértékben mozdulhat el a természetes homoki együttesek felé.

Köszönetnyilvánítás: A szerző a kutatásainak rendszeres támogatásáért hálás köszönetét fejezi ki a Fertő–Hanság Nemzeti Park Igazgatóságnak és kiemelten Takács Gábor úrnak.
A vizsgálatokat a LIFE08 NAT/H/000289 projekt és a Fertő–Hanság Nemzeti Park Igazgatóság támogatta.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 39–52

Data to the Orthoptera fauna of the Kisalföld (Western Hungary)

Zoltán Kenyeres

Abstract: The paper presents data about distribution of 60 grasshopper species collected between 2012 and 2015 in the Kisalföld region, northwestern Hungary. From the nature conservation and zoogeographical points of view the following species are worthwhile to mention: *Isophya costata* (Natura 2000 protected), *Polysarcus denticauda* and *Calliptamus barbarus* (both protected in Hungary), *Platycleis montana*, *Myrmeleotettix antennatus*, *Acrotylus insubricus*, *Stenobothrus fischeri* (characteristic to sandy grassland) and *Platycleis affinis* (characteristic to sandy/alkaline grassland).

Introduction

The newest synthesis of Orthoptera fauna of the Kisalföld was compiled by Kenyeres et al. (2013), based on published data and recent studies. This publication enlisted the distributions of 78 species currently confirmed from the Kisalföld.

Detailed research history of the study area is given in Kenyeres et al. (2013), in this paper we show data collected in the period between early-summer of 2012 and autumn of 2015.

Material and methods

Delimitation of the boundaries of the study area of Kisalföld followed Marosi & Somogyi (1990). Borders of the studied area were: border of Hungary in the north, Alpokalja Region, Sopron-Vasi-síkság and Kemeneshát in the west, Zalai-dombvidék in the south and Bakony Region, Vértes-Velencei Mts., Dunazug Mts. and Visegrádi Mts. in the east.

Data were obtained by sweep-netting, direct observation and sometimes pitfall trapping. Most of the sites were studied by regular surveys of several quadrates, but data collected in the same place, time and habitat are handled as one data block.

The checklist was compiled according to Eades et al. (2012).

The studies were supported by LIFE08 NAT/H/000289 tender and Fertő-Hanság National Park Directorate.

Results

In the species list the revealed localities are featured by the settlement name, topographical name, habitat type and date of observation. Data blocks are separated by semicolons. Specimens were collected by pitfall are marked by "pf", data were collected by the author excluding those which are labelled PK = Péter Kovács.

ENSIFERA

TETTIGONIOIDEA

Ephippiger ephippiger (Fiebig, 1784) – Gönyű, Gönyűi-erdő, closed sandy grassland: 16.06.2012; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013; 28.06.2014.

Conocephalus fuscus (Fabricius, 1793) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Baj, Középső-dűlő, weedy humid grassland: 18.07.2012; Fertőszéplak, Körgát, salt meadow: 22.06.2015, 26.08.; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012, 12.07.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07.; Győr, Gazdák erdeje, characterless dry grassland: 05.09.2013; Győr, Gazdák erdeje, characterless humid grassland: 17.08.2012, 15.09.; 24.07.2013, 09.08., 05.09.; Győr, Gazdák erdeje, Molinia meadow: 21.06.2013, 05.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, sandy grassland reconstruction: 31.07.2015; Győr, Gönyűi-erdő, closed sandy grassland: 15.09.2012; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013; 28.06.2014, 29.07., 28.08.; 17.06.2015, 31.07.; Győr, Széles-földek, secondary dry grassland: 17.06.2015, 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 11.07.2012.(PK); 18.06.2013; 28.06.2014, 28.08.; Lébény, Fűzfa-szigetek, Molinia meadow: 07.07.2012, 15.08., 10.09.; 18.06.2013, 14.07., 06.08., 06.09.; 10.06.2014, 10.07., 17.08., 17.09.; 11.06.2015, 11.07., 11.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 10.06.2014; Lébény, Fűzfa-szigetek, mowed marshy meadow: 14.07.2013; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 11.07.2015; Lébény, Fűzfa-szigetek, semi-dry grassland: 10.09.2012; 17.09.2014; Lébény, Fűzfa-szigetek, marshy meadow: 07.07.2012, 10.09.; 18.06.2013, 14.07., 06.08., 06.09.; 10.06.2014, 10.07.; 11.07.2015, 11.08.; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012; 14.07.2013, 06.08.; 10.06.2014, 10.07., 17.08., 17.09.; Lébény, Pintér-sziget, humid grassland reconstruction: 07.07.2012; 14.07.2013; 10.06.2014, 10.07., 17.08., 17.09.; 11.06.2015, 11.07., 11.08.; Lébény, Pintér-sziget, semi-dry grassland: 17.08.2014; 11.06.2015, 11.07., 11.08.; Nagyszentjános, Cuhai-Bakony-ér mente, secondary dry grassland: 28.08.2014; Sarród, Cikes, salt meadow: 22.06.2015; Tata, fischerlake, weedy humid grassland: 18.08.2012; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 29.07.2014.

Conocephalus dorsalis (Latreille, 1804) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Győr, Gazdák erdeje, Molinia meadow: 17.08.2012; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary grassland: 28.08.2014; Lébény, Fűzfa-szigetek, marshy meadow: 08.06.2013, 06.09.; 10.07.2014; Lébény, Fűzfa-szigetek, Molinia meadow: 07.07.2012, 15.08., 10.09.; 14.07.2013, 06.08., 06.09.; 10.07.2014, 17.08., 17.09.; 11.07.2015, 11.08.; Lébény, Pintér-sziget, humid grassland reconstruction: 17.09.2014; 11.08.2015.

Ruspolia nitidula (Scopoli, 1786) – Fertőszéplak, Körgát, salt meadow: 22.06.2015; Gönyű, Gönyűi-erdő, margin of Robinia forest: 12.07.2012; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 12.07.2012; Győr, Gazdák erdeje, Molinia meadow: 17.08.2012; 31.07.2015, 14.08.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013; 28.06.2014, 29.07.; 26.08.2015; Győr, Széles-földek, secondary dry grassland: 17.06.2015; Lébény, Fűzfa-szigetek, marshy meadow: 06.08.2013; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 06.08.2013; Nagyszentjános, Cuhai-Bakony-ér mente, weedy humid grassland: 19.07.2012; Tata, fischerlake, weedy humid grassland: 18.07.2012; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012.

Meconema thalassinum (De Geer, 1773) – Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.08.2012; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 22.06–25.07.2012; Vaszar, southern to Csíkvándi-Bakony-ér, oak forest, bottle trap, PK: 11.07–25.07.2012.

Isophya costata Brunner von Wattenwyl, 1878 – Gyóró, Répaszer, hayfield: 02.06.2015; Jobaháza, Köles-tó, hayfield: 04.06.2015; Sopron, Halászrét, hayfield-marshy meadow mosaic: 25.05.2013.

Leptophyes albovittata (Kollar, 1833) – Baj, Középső-dűlő, weedy dry grassland: 18.07.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 08.06.2014; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 21.06.2013; Győr, Gazdák erdeje, Molinia meadow: 26.06.2015; Győr, Gazdák erdeje, weedy dry grassland: 21.06.2013; 26.06.2015; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013; 28.06.2014, 28.08.; Győr, Szentiváni-erdő, closed sandy grassland: 27.06.2013; Győr, Szentiváni-homokpuszták, weedy sandy grassland: 08.06.2014; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, PK: 11.07.2012; 28.06.2014; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 11.06.2015; Lébény, Pintér-sziget, semi-dry grassland: 17.08.2014; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 17.06.2015; Tata, Középső-dűlő, weedy dry grassland: 18.07.2012; Vaszar, southern to Csíkvándi-Bakony-ér, secondary dry grassland, PK: 11.07.2012; 18.06.2013.

Phaneroptera falcata (Poda, 1761) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Gönyű, Gönyűi-erdő, margin of Robinia forest: 12.07.2012; Gönyű, Gönyűi-erdő, weedy sandy grassland: 12.07.2012; 15.09.2012; 05.09.2013; Győr, Gazdák erdeje, Molinia meadow: 17.08.2012; 05.09.2013; 16.09.2015; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 05.09.2013; Győr, Gazdák erdeje, weedy dry grassland: 24.07.2013; 18.09.2014; 16.09.2015; Győr, Szentiváni-homokpuszták, weedy sandy grassland: 26.08.2015; Lébény, Fűzfa-szigetek, Molinia meadow: 15.08.2012, 10.09.; 11.08.2015; Tata, Cseke-tótól északra, weedy dry grassland: 18.07.2012; Vaszar, Csíkvándi-Bakony-értől keletre, oak forest, PK: 11.07.2012.
Phaneroptera nana Fieber, 1853 – Győr, Gazdák erdeje, characterless dry grassland: 24.07.2013; Győr, Sas-hegy, secondary weedy vegetation: 28.08.2014.
Polysarcus denticauda (Charpentier, 1825) – Bogyoszló, Felső-gyep, mowed humid grassland: 04.06.2015; Dör, Külső-kert, mowed marshy meadow: 04.06.2015; Fertőhomok, Fertő-part, marshy meadow: 04.06.2015; Mérges, Tálos, marshy meadow: 04.06.2015; Pásztori, Linkó-szer, marshy meadow: 04.06.2015; Répceszemere, Répcemente, marshy meadow: 02.06.2015; Szilsárkány, Gyep-rét, marshy meadow: 04.06.2015.
Decticus verrucivorus (Linnaeus, 1785) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Győr, Gazdák erdeje, closed sandy grassland: 24.07.2013; Lébény, Fűzfa-szigetek, marshy meadow: 06.09.2013; Lébény, Fűzfa-szigetek, Molinia meadow: 06.08.2013; Lébény, Fűzfa-szigetek, mowed marshy meadow: 14.07.2013, 06.09.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 18.06.2013, 14.07., 06.09.; 10.07.2014; 11.07.2015.
Bicolorana bicolor (Philippi, 1830) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Fertőszéplak, Körgát, salt meadow: 22.06.2015, 22.07.; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.06.2012, 12.07.; 21.06.2013, 20.07.; 08.06.2014, 16.07.; 17.06.2015, 18.07.; Gönyű, Gönyűi-erdő, margin of Robinia forest: 16.06.2012, 16.08.; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012; 08.06.2014, 16.07.; 17.06.2015; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.06.2012, 12.07.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 08.06.2014, 16.07.; 18.07.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 08.06.2014; 17.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 08.06.2014; 17.06.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012, 12.07., 16.08.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07., 16.08.; 20.07.2013; Győr, Gazdák erdeje, characterless dry grassland: 21.06.2013, 24.07.; Győr, Gazdák erdeje, closed sandy grassland: 26.06.2015; Győr, Gazdák erdeje, margin of Robinia forest: 21.06.2013, 24.07.; Győr, Gazdák erdeje, Molinia meadow: 21.06.2013; 26.06.2015; Győr, Gazdák erdeje, sandy grassland reconstruction: 26.06.2015, 31.07.; Győr, Gazdák erdeje, weedy dry grassland: 21.06.2013, 24.07.; 16.07.2014, 19.08.; 26.06.2015; Győr, Gazdák erdeje, closed sandy steppegrassland/open sandy grassland mosaic: 09.08.2013; 16.07.2014, 18.09.; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07.; 28.06.2014, 29.07., 28.08.; 17.06.2015; Győr, Szentiváni-homokpuszták, weedy sandy grassland: 08.06.2014, 16.07., 19.08.; 30.06.2015, 31.07.; Győr, Szentiváni erdő, closed sandy grassland: 27.06.2013, 24.07.; 19.08.2014; 30.06.2015, 31.07.; Győr, Szentiváni erdő, sandy grassland recontruction: 30.06.2015; Győr, Széles-földek, secondary dry grassland: 28.06.2014; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 10.05.2012–21.05.; PK: 11.07.2012; 18.06.2013; 28.06.2014, 29.07., 28.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 18.06.2013; 11.06.2015, 11.07.; 10.06.2014, 10.07.; Lébény, Fűzfa-szigetek, marshy meadow: 06.08.2013; 10.06.2014, 10.07.; Lébény, Fűzfa-szigetek, Molinia meadow: 15.08.2012; 11.06.2015; Lébény, Fűzfa-szigetek, mowed marshy meadow: 11.06.2015, 11.07., 11.08.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012; 14.07.2013; 10.07.2014; 11.06.2015, 11.07., 11.08.; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012; Lébény, Pintér-sziget, humid grassland reconstruction: 18.06.2013; 10.06.2014; Lébény, Pintér-sziget, semi-dry grassland: 07.07.2012, 15.08.; 18.06.2013; 10.06.2014, 10.07.; 11.06.2015, 11.07., 11.08.; Nagyszentjános, Cuhai-Bakony-ér mente, secondary dry grassland: 19.07.2012; pf, PK: 22.06.2012–18.07.; 28.06.2014, 28.08.; Tata, Cseke-tótól északra, weedy dry grassland: 18.07.2012; Vaszar, Csíkvándi-Bakony-értől keletre, secondary dry grassland: 28.06.2014.
Roeseliana roeselii (Hagenbach, 1822) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Baj, Középső-dűlő, weedy humid grassland: 18.07.2012; Fertőszéplak, Körgát, salt meadow: 22.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012, 16.08.; 17.06.2015; Győr, Gazdák erdeje, characterless humid grassland: 24.07.2013, 09.08.; Győr, Gazdák erdeje, Molinia meadow: 26.06.2015, 31.07., 14.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 11.07.2012; 18.06.2013; 28.06.2014, 29.07.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 18.06.2013; 11.07.2015; Lébény, Fűzfa-szigetek, marshy meadow: 07.07.2012, 15.08.; 18.06.2013, 14.07., 06.08.; 10.06.2014, 10.07.; 11.07.2015; Lébény, Fűzfa-szigetek, Molinia meadow: 07.07.2012, 15.08.; 18.06.2013, 14.07., 06.08.; 10.06.2014, 10.07., 17.08.; 11.06.2015, 11.07.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012; 14.07.2013; 11.06.2015; Lébény, Fűzfa-szigetek, mowed marshy meadow: 11.06.2015; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012; 14.07.2013, 06.08.; 10.06.2014,

10.07., 17.08., 17.09.; Lébény, Pintér-sziget, humid grassland reconstruction: 15.08.2012; 18.06.2013, 14.07.; 10.06.2014, 10.07.; 11.06.2015, 11.07.; Lébény, Pintér-sziget, semi-dry grassland: 11.06.2015, 11.07.; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 17.06.2015; Nagyszentjános, Cuhai-Bakony-ér-mente, weedy humid grassland: 19.07.2012; Sarród, Cikes, salt meadow: 22.06.2015; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012; Vaszar, Csíkvándi-Bakony-értől keletre, secondary dry grassland: 28.06.2014.

Pholidoptera fallax (Fischer, 1853) – Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 17.06.2015, 18.07., 05.08.

Pholidoptera griseoaptera (De Geer, 1773) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.06.2012, 12.07.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 08.06.2014; 17.06.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 08.06.2014; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012; Győr, Sas-hegy, secondary weedy vegetation: 28.06.2014; 17.06.2015, 17.06.2015, 26.08.; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 17.06.2015; Vaszar, southern to Csíkvándi-Bakony-ér, oak forest, bottle trap, PK: 11.07.2012–25.07.

Platycleis montana (Kollar, 1833) – Gönyű, Gönyűi-erdő, open sandy grassland: 17.06.2015; Győr, Gazdák erdeje, characterless dry grassland: 09.08.2013; Győr, Gazdák erdeje, closed sandy grassland: 26.06.2015; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012; 26.06.2015; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 24.07.2013, 09.08.

Platycleis affinis Fieber, 1853 – Fertőszéplak, Körgát, salt meadow: 22.07.2015.

Platycleis albopunctata (Goeze, 1778) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Fertőszéplak, Körgát, salt meadow: 22.06.2015; Gönyű, Gönyűi-erdő, closed sandy grassland: 20.07.2013; 16.07.2014; 17.06.2015, 05.08.; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012, 12.07., 16.08.; 20.07.2013; 17.06.2015; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.08.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 19.08.2014; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 20.07.2013, 05.09.; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 17.06.2015; Gönyű, Gönyűi-erdő, weedy sandy grassland: 12.07.2012, 16.08.; Győr, Gazdák erdeje, characterless dry grassland: 24.07.2013; Győr, Gazdák erdeje, closed sandy grassland: 14.08.2015, 16.09.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012, 15.09.; 05.09.2013; 16.07.2014; Győr, Gazdák erdeje, Molinia meadow: 31.07.2015; Győr, Gazdák erdeje, sandy grassland reconstruction: 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 05.09.2013; Győr, Gazdák erdeje, weedy dry grassland: 26.06.2015, 31.07., 14.08.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 28.06.2014, 29.07., 28.08.; 26.08.2015; Győr, Szentiváni-homokpuszták, weedy sandy grassland: 16.07.2014, 19.08.; 30.06.2015; Győr, Szentiváni erdő, sandy grassland reconstruction: 30.06.2015, 31.07., 26.08.; Győr, Széles-földek, secondary dry grassland: 29.08.2013; 29.07.2014, 28.08.; 17.06.2015, 26.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 11.07.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 10.07.2014; Nagyszentjános, Cuhai-Bakony-ér mente, secondary dry grassland: 28.06.2014, 29.07., 28.08.; 17.06.2015; Tata, northern to Cseke-tó, weedy dry grassland: 18.07.2012; Tata, fischerlake, weedy dry grassland: 18.07.2012.

Platycleis vittata (Charpentier, 1825) – Gönyű, Gönyűi-erdő, closed sandy grassland: 08.06.2014; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 11.07.2015.

Tettigonia viridissima Linnaeus, 1758 – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.06.2012; 21.06.2013; Gönyű, Gönyűi-erdő, margin of Robinia forest: 16.06.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 08.06.2014; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 17.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012; 08.06.2014; 17.06.2015; Győr, Gazdák erdeje, Molinia meadow: 26.06.2015; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013; Győr, Szentiváni erdő, closed sandy grassland: 30.06.2015; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 28.06.2014; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 11.06.2015; Lébény, Fűzfa-szigetek, marshy meadow: 10.06.2014; Lébény, Fűzfa-szigetek, Molinia meadow: 14.07.2013; 10.06.2014; 11.06.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 06.08.2013; 11.06.2015, 11.07.; Lébény, Pintér-sziget, humid grassland reconstruction: 18.06.2013; 11.06.2015; Lébény, Pintér-sziget, semi-dry grassland: 10.06.2014; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 28.08.2014; 17.06.2015; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012.

GRYLLOIDEA

Gryllus campestris Linnaeus, 1758 – Győr, Gazdák erdeje, sandy grassland reconstruction: 16.09.2015; Kajárpéc, Sokorói-Bakony-értől keletre, secondary dry grassland, pf, PK: 10.05.2012–21.05.; pf, PK: 21.05.2012–22.06.; pf, PK: 22.06.2012–25.07.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 17.09.2014.
Oecanthus pellucens (Scopoli, 1763) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Fertőszéplak, Körgát, salt meadow: 22.06.2015, 22.07.; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.08.2012; Gönyű, Gönyűi-erdő, open sandy grassland: 16.08.2012; 19.08.2014; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 12.07.2012; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 18.07.2015; Győr, Gazdák erdeje, characterless dry grassland: 24.07.2013, 09.08.; Győr, Gazdák erdeje, closed sandy steppe grassland: 17.08.2012; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 05.09.2013; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012; Győr, Gazdák erdeje, sandy grassland reconstruction: 31.07.2015, 14.08.; Győr, Gazdák erdeje, weedy dry grassland: 19.08.2014; 31.07.2015; Győr, Szentiváni erdő, closed sandy grassland: 24.07.2013; 19.08.2014; Győr, Szentiváni homokpuszták, weedy sandy grassland: 26.08.2015; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, PK: 11.07.2012; 28.06.2014; Sarród, Cikes, salt meadow: 22.06.2015, 22.07.

CAELIFERA

TETRIGOIDEA

Tetrix bipunctata (Linnaeus, 1758) – Győr, Sas-hegy, secondary weedy vegetation: 17.06.2015; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland, PK: 11.07.2012.
Tetrix subulata (Linnaeus, 1758) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Lébény, Fűzfa-szigetek, marshy meadow: 10.09.2012; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012; 06.09.2013; Lébény, Pintér-sziget, humid grassland reconstruction: 07.07.2012; 18.06.2013; 17.08.2014.
Tetrix tenuicornis Sahlberg, 1893 – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.

ACRIDOIDEA

Calliptamus barbarus (Costa, 1836) – Győr, Gazdák erdeje, closed sandy grassland: 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 21.06.2013, 05.09.; 16.07.2014, 19.08.; Győr, Gazdák erdeje, closed sandy steppe grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 24.07.2013; Győr, Gönyűi-erdő, closed sandy grassland: 16.06.2012; 09.08.2013, 05.09.; Győr, Gazdák erdeje, Molinia meadow: 24.07.2013; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; 31.07.2015, 16.09.; Győr, Gazdák erdeje, sandy grassland reconstruction: 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 24.07.2013, 09.08., 05.09.; Győr, Gazdák erdeje, weedy dry grassland: 26.06.2015; Győr, Szentiváni homokpuszták, weedy sandy grassland: 31.07.2015.
Calliptamus italicus (Linnaeus, 1758) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Baj, Középső-dűlő, open dry grassland: 18.07.2012; Fertőszéplak, Körgát, salt meadow: 22.06.2015; Gönyű, Gönyűi-erdő, closed sandy grassland: 12.07.2012, 16.08.; 20.07.2013; 16.07.2014, 19.08.; 05.08.2015; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012, 12.07., 16.08.; 20.07.2013, 05.09.; 08.06.2014, 16.07., 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 16.07.2014, 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 20.07., 05.09.; 08.06.2014, 16.07., 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 20.07.2013, 05.09.; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 12.07.2012; 20.07.2013; 16.07.2014, 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07., 16.08.; 21.06.2013, 20.07., 05.09.; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, characterless humid grassland: 09.08.2013; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012, 15.09.; 24.07.2013, 09.08., 05.09., 16.07.2014, 18.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 09.08.2013; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, margin of Robinia forest: 21.06.2013; Győr, Gazdák erdeje, Molinia meadow: 21.06.2013; 31.07.2015; Győr, Gazdák

erdeje, open sandy grassland: 09.08.2013; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014, 19.08., 18.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 17.08.2012, 15.09.; 24.07.2013, 09.08.; Győr, Gazdák erdeje, weedy dry grassland: 15.09.2012; 24.07.2013, 05.09.; 16.07.2014, 19.08., 18.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gönyűi-erdő, closed sandy grassland: 20.07.2013; Győr, Gönyűi-erdő, weedy sandy grassland: 15.09.2012, 09.08.2013; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07., 29.08.; 29.07.2014, 28.08.; 31.07.2015, 26.08.; Győr, Szentiváni erdő, closed sandy grassland: 24.07.2013, 29.08.; 16.07.2014, 19.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 29.08.2013; 08.06.2014, 16.07., 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013, 29.08.; 16.07.2014, 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Széles-földek, secondary dry grassland: 19.07.2012, 16.08.; 21.06.2013, 26.07., 29.08.; 29.07.2014, 28.08.; 17.06.2015, 31.07., 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 21.05.2012–22.06.; 18.06.2013, 23.07., 29.08.; 28.06.2014, 29.07., 28.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 07.07.2012.; 06.08.2013., 06.09.; 10.07.2014., 17.08.; 11.07.2015., 11.08.; Lébény, Fűzfa-szigetek, mowed marshy meadow: 15.08.2012., 06.09.; 10.07.2014.; 11.08.2015.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 10.07.2014.; Lébény, Pintér-sziget, semi-dry grassland: 10.06.2014, 10.07.; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 19.07.2012; pf, PK: 24.05.2012–22.06.; pf, PK: 22.06.2012–18.07.; 27.06.2013, 26.07., 29.08.; 28.06.2014, 29.07., 28.08.; 18.07.2015, 05.08.; Tata, fischer-lake, open dry grassland: 18.07.2012; Tata, Középső-dűlő, open dry grassland: 18.07.2012; Tata, northern to Cseke-tó, open dry grassland: 18.07.2012; Vaszar, easternt to Csíkvándi-Bakony-ér, secondary dry grassland: 18.06.2013, 23.07., 29.08.; 29.07.2014, 28.08.

Pezotettix giornae (Rossi, 1794) – Baj, Középső-dűlő, weedy dry grassland: 18.07.2012; Gönyű, Gönyűi-erdő, closed sandy grassland: 12.07.2012; Győr, Sas-hegy, secondary weedy vegetation: 28.08.2014; 26.08.2015; Győr, Széles-földek, secondary dry grassland: 16.08.2012; 29.07.2014, 28.08.; 26.08.2015.

Chorthippus apricarius (Linnaeus, 1758) – Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 17.06.2015.

Chorthippus biguttulus (Linnaeus, 1758) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Fertőszéplak, Körgát, salt meadow: 22.07.2015; Gönyű, Gönyűi-erdő, closed sandy grassland: 19.08.2014; Gönyű, Gönyűi-erdő, margin of Robinia forest: 12.07.2012; Gönyű, Gönyűi-erdő, open sandy grassland: 16.08.2012; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 19.08.2014; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.08.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 05.09.2013; 08.06.2014, 19.08.; 17.06.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 20.07.2013, 05.09.; 08.06.2014, 16.07., 19.08.; 17.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.08.2012; 19.08.2014; Gönyű, Gönyűi-erdő, weedy sandy grassland: 12.07.2012, 15.09.; 21.06.2013, 20.07., 05.09.; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 05.09.2013; Győr, Gazdák erdeje, characterless humid grassland: 24.07.2013; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012, 15.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 17.08.2012; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 15.09.2012; Győr, Gazdák erdeje, Molinia meadow: 14.08.2015; Győr, Gazdák erdeje, sandy grassland reconstruction: 08.06.2014, 16.07., 19.08., 18.09.; 26.06.2015, 14.08., 16.09.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 17.08.2012, 05.09.; Győr, Gazdák erdeje, undergrowth of Robinia forest: 05.09.2013; Győr, Gazdák erdeje, weedy dry grassland: 17.08.2012, 09.08., 05.09.; 19.08.2014, 18.09.; 26.06.2015, 14.08.; Győr, Gönyűi-erdő, closed sandy grassland: 16. 08.2012, 15.09.; Győr, Gönyűi-erdő, weedy sandy grassland: 15.09.2012; 05.09.2013; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 28.08.2014; 17.06.2015, 26.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 24.07.2013; 19.08.2014; 30.06.2015; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013; 19.08.2014; 26.08.2015; Győr, Széles-földek, secondary dry grassland: 19.07.2012, 16.08.; 21.06.2013, 26.07., 29.08.; 28.08.2014; 31.07.2015; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 21.05.2012–22.06.; pf, PK: 22.06.2012–25.07.; 23.07.2013; 29.07.2014, 28.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 15.08.2012; 14.07.2013, 06.08., 06.09.; 10.07.2014, 17.09.; Lébény, Fűzfa-szigetek, mowed marshy meadow: 15.08.2012; 06.08.2013; 17.08.2014, 17.09.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 15.08.2012; 06.08.2013, 06.09.; 17.09.2014; 11.08.2015; Lébény, Laci-rétek, weedy humid grassland: 06.09.2013; Lébény, Pintér-sziget, semi-dry grassland: 15.08.2012, 06.09.; 17.09.2014; 11.08.2015; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 16.08.2012; pf, PK: 22.06.2012–18.07.; 26.07.2013, 29.08.; 28.08.2014; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 23.07.2013; 29.07.2014, 28.08.

Chorthippus brunneus (Thunberg, 1815) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Baj, Középső-dűlő, weedy dry grassland: 18.07.2012; Fertőszéplak, Körgát, salt meadow: 22.07.2015, 26.08.; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, undergrowth of

black pine forest: 16.08.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 20.07., 05.09.; 08.06.2014, 16.07., 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 16.07.2014; 18.07.2015; Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012; 21.06.2013, 20.07.; 16.07.2014, 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.08.2012; 20.07.2013, 05.09.; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 09.08.2013, 05.09.; Győr, Gazdák erdeje, characterless humid grassland: 24.07.2013; Győr, Gazdák erdeje, closed sandy grassland: 14.08.2015, 16.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 15.09.2012; 05.09.2013; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 17.08.2012, 15.09.; 21.06.2013; Győr, Gazdák erdeje, Molinia meadow: 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 26.06.2015, 16.09.; Győr, Gazdák erdeje, sandy grassland reconstruction: 08.06.2014, 16.07., 19.08.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 15.09.2012; Győr, Gazdák erdeje, undergrowth of Robinia forest: 17.08.2012, 15.09.; 24.07.2013, 05.09.; Győr, Gazdák erdeje, weedy dry grassland: 17.08.2012, 15.09.; 24.07.2013, 09.08., 05.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gönyűi-erdő, closed sandy grassland: 15.09.2012; 05.09.2013; Győr, Gönyűi-erdő, weedy sandy grassland: 20.07.2013, 09.08., 05.09.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 29.07.2014; 17.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 24.07.2013; 19.08.2014; 31.07.2015, 26.08.; Győr, Szentiváni erdő, closed sandy grassland: 29.08.2013; 26.08.2015; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013, 29.08.; 16.07.2014, 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Széles-földek, secondary dry grassland: 19.07.2012, 16.08.; 26.07.2013, 29.08.; 29.07.2014; 17.06.2015, 31.07., 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér keletre, secondary dry grassland, pf, PK: 21.05.2012–22.06.; pf, PK: 22.06.2012–25.07.; 23.07.2013, 29.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 07.07.2012, 15.08., 10.09.; 14.07.2013, 06.08.; 17.08.2014; 11.07.2015, 11.08.; Lébény, Fűzfa-szigetek, marshy meadow: 11.08.2015; Lébény, Fűzfa-szigetek, Molinia meadow: 15.08.2012; 17.08.2014; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 15.08.2012, 10.09.; 06.08.2013, 06.09.; 17.08.2014, 17.09.; 11.08.2015; Lébény, Fűzfa-szigetek, mowed marshy meadow: 07.07.2012, 15.08.; 06.08.2013; 17.09.2014; 11.07.2015, 11.08.; Lébény, Laci-rétek, weedy humid grassland: 10.09.2012; Lébény, Pintér-sziget, semi-dry grassland: 15.08.2012, 10.09.; 14.07.2013; 17.08.2014, 17.09.; 11.08.2015; Nagyszentjános, Cuhai-Bakony-érmente, secondary dry grassland: 19.07.2012, 16.08.; pf, PK: 24.05.2012–22.06.; pf, PK: 22.06.2012–18.07.; 27.06.2013, 26.07., 29.08.; 29.07.2014; 17.06.2015, 18.07., 05.08.; Sarród, Cikes, salt meadow: 22.06.2015, 22.07.; Tata, northern to Cseke-tó, weedy dry grassland: 18.07.2012; Tata, Középső-dűlő, weedy dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 23.07.2013, 29.08.; 28.08.2014.

Chorthippus dichrous (Eversmann, 1859) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 05.09.2013; 19.08.2014; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 05.09.2013; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012; Győr, Gazdák erdeje, weedy dry grassland: 17.08.2012; 18.09.2014; Győr, Sas-hegy, secondary weedy vegetation: 28.08.2014; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 28.08.2014; Lébény, Pintér-sziget, semi-dry grassland: 06.09.2013; 17.08.2014, 17.09.; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary grassland: 23.07.2013; 29.07.2014.

Chorthippus dorsatus (Zetterstedt, 1821) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Fertőszéplak, Körgát, salt meadow: 26.08.2015; Győr, Gazdák erdeje, characterless humid grassland: 09.08.2013, 05.09.; Győr, Gazdák erdeje, Molinia meadow: 31.07.2015, 14.08.; Győr, Gazdák erdeje, sandy grassland reconstruction: 19.08.2014; Győr, Gazdák erdeje, weedy dry grassland: 18.09.2014; Győr, Szentiváni homokpuszták, weedy sandy grassland: 31.07.2015; Győr, Széles-földek, secondary dry grassland: 29.07.2014; Kajárpéc, Sokorói-Bakony-értől keletre, secondary dry grassland: 28.08.2014; Lébény, Fűzfa-szigetek, marshy meadow: 15.08.2012; 17.09.2014; 11.08.2015; Lébény, Fűzfa-szigetek, Molinia meadow: 10.09.2012; 17.08.2014, 17.09.; Lébény, Fűzfa-szigetek, mowed marshy meadow: 11.08.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 06.09.2013; 11.08.2015; Lébény, Pintér-sziget, humid grassland reconstruction: 17.09.2014; Lébény, Pintér-sziget, semi-dry grassland 06.09.2013; 17.09.2014; Sarród, Cikes, salt meadow: 22.07.2015; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary grassland: 23.07.2013; 29.07.2014.

Chorthippus mollis (Charpentier, 1825) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Baj, Középső-dűlő, weedy dry grassland: 18.07.2012; Gönyű, Gönyűi-erdő, open sandy grassland: 21.06.2013, 05.09.; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 19.08.2014; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 20.07., 05.09.; 08.06.2014, 16.07., 19.08.; 18.07.2015;

Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 21.06.2013, 20.07.; 08.06.2014, 16.07., 19.08.; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland: 21.06.2013, 05.09.; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 19.08.2014; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012, 12.07.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 16.08., 15.09.; 21.06.2013, 20.07., 05.09.; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 09.08.2013; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012, 15.09.; 05.09.2013; 19.08.2014, 18.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 15.09.2012; 21.06.2013; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 17.08.2012, 15.09.; 05.09.2013; Győr, Gazdák erdeje, margin of Robinia forest: 24.07.2013; Győr, Gazdák erdeje, Molinia meadow: 14.08.2015, 16.09.; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012; 21.06.2013; Győr, Gazdák erdeje, sandy grassland reconstruction: 08.06.2014, 16.07., 19.08., 18.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 17.08.2012, 15.09.; Győr, Gazdák erdeje, weedy dry grassland: 15.09.2012; 09.08.2013, 05.09.; 16.07.2014, 19.08., 18.09.; 31.07.2015, 16.09.; Győr, Gönyűi-erdő, closed sandy grassland: 16.08.2012, 15.09.; Győr, Gönyűi-erdő, weedy sandy grassland: 15.09.2012; 21.06.2013, 09.08.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 28.06.2014, 29.07., 28.08.; 31.07.2015, 26.08.; Győr, Szentiváni erdő, closed sandy grassland: 16.07.2014; Győr, Szentiváni erdő, sandy grassland reconstruction: 19.08.2014; 26.08.2015; Győr, Szentiváni homokpuszták, weedy sandy grassland: 26.08.2015; Győr, Széles-földek, secondary dry grassland: 19.07.2012; 21.06.2013, 29.08.; 28.06.2014, 29.07., 28.08.; 17.06.2015, 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 21.05.2012–22.06.; pf, PK: 22.06.2012.–25.07.; 23.07.2013, 29.08.; 29.07.2014, 28.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 07.07.2012, 10.09.; 18.06.2013, 14.07., 06.09.; 10.07.2014, 17.08., 17.09.; 11.06.2015, 11.08.; Lébény, Fűzfa-szigetek, marshy meadow: 15.08.2012; Lébény, Fűzfa-szigetek, mowed marshy meadow: 18.06.2013, 06.09.; 17.08.2014; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 15.08.2012, 10.09.; 06.08.2013, 06.09.; 17.08.2014; 11.08.2015; Lébény, Laci-rétek, weedy humid grassland: 10.09.2012; 14.07.2013; Lébény, Pintér-sziget, semi-dry grassland: 10.09.2012; 06.08.2013, 06.09.; 10.07.2014, 17.08., 17.09.; 11.08.2015; Nagyszentjános, Cuhai-Bakony-ér mente, secondary dry grassland: 19.07.2012, 16.08.; pf, PK: 24.05.2012–22.06.; pf, PK: 22.06.2012–18.07.; 27.06.2013; 28.06.2014, 29.07., 28.08.; 18.07.2015, 05.08.; Tata, fischerlake, weedy dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 18.06.2013, 23.07., 29.08.; 28.06.2014, 29.07., 28.08.

Chorthippus montanus (Charpentier, 1825) – Lébény, Fűzfa-szigetek, marshy meadow: 07.07.2012.

Chorthippus oschei Helversen, 1986 – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Győr, Gazdák erdeje, Molinia meadow: 31.07.2015, 14.08.

Pseudochorthippus parallelus (Zetterstedt, 1821) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Baj, Középső-dűlő, weedy humid grassland: 18.07.2012; 21.06.2013; Fertőszéplak, Körgát, salt meadow: 22.06.2015, 22.07., 26.08.; Gönyű, Gönyűi-erdő, closed sandy grassland: 12.07.2012; 21.06.2013, 20.07.; 17.06.2015, 18.07.; Gönyű, Gönyűi-erdő, open sandy grassland: 12.07.2012; 17.06.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 20.07.2013; 17.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012, 12.07.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012, 12.07.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07., 15.09.; Győr, Gazdák erdeje, characterless dry grassland: 21.06.2013; Győr, Gazdák erdeje, characterless humid grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08.; Győr, Gazdák erdeje, closed sandy steppe grassland: 15.09.2012; Győr, Gazdák erdeje, margin of Robinia forest: 21.06.2013; Győr, Gazdák erdeje, Molinia meadow: 17.08.2012; 21.06.2013, 24.07., 09.08.; 31.07.2015, 14.08.; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 15.09.2012; 21.06.2013; Győr, Gazdák erdeje, weedy dry grassland: 21.06.2013; 16.07.2014, 19.08., 18.09.; 26.06.2015, 31.07.; Győr, Gönyűi-erdő, closed sandy grassland: 21.06.2013; Győr, Gönyűi-erdő, weedy sandy grassland: 15.09.2012; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07.; 28.06.2014, 29.07.; 17.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, closed sandy grassland: 27.06.2013; 30.06.2015; Győr, Szentiváni erdő, sandy grassland reconstruction: 27.06.2013; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013; 16.07.2014; 30.06.2015; Győr, Széles-földek, secondary dry grassland: 28.06.2014, 28.08.; Kajárpéc, Sokorói-Bakony-értől keletre, secondary dry grassland, PK: 11.07.2012; 28.06.2014, 29.07., 28.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 06.09.2013; 11.07.2015; Lébény, Fűzfa-szigetek, marshy meadow: 07.07.2012, 15.08., 10.09.; 06.09.2013; 17.09.2014; 11.07.2015, 11.08.; Lébény, Fűzfa-szigetek, Molinia meadow: 15.08.2012, 10.09.; 18.06.2013, 14.07., 06.08., 06.09.; 10.07.2014, 17.08., 17.09.; 11.06.2015, 11.07., 11.08.; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012, 10.09.; 14.07.2013, 06.09.; 17.08.2014, 17.09.; 11.06.2015, 11.07., 11.08.; Lébény, Fűzfa-szigetek, mowed marshy meadow: 14.07.2013, 06.08., 06.09.; 17.09.2014; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012, 10.09.; 14.07.2013, 06.08.,

06.09.; Lébény, Pintér-sziget, humid grassland reconstruction: 07.07.2012; 10.07.2014, 17.08., 17.09.; 11.06.2015, 11.07.; Lébény, Pintér-sziget, semi-dry grassland: 07.07.2012, 15.08.; 18.06.2013, 14.07.; 10.06.2014, 10.07., 17.08., 17.09.; 11.06.2015, 11.07., 11.08.; Nagyszentjános, Cuhai-Bakony-ér-mente, weedy humid grassland: 19.07.2012; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 19.07.2012; 29.07.2014; Sarród, Cikes, salt meadow: 22.06.2015; Tata, northern to Cseke-tó, weedy humid grassland: 18.07.2012; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland, PK: 11.07.2012; 18.06.2013, 23.07., 29.08.

Chrysochraon dispar (Germar, 1834) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Fertőszéplak, Körgát, salt meadow: 22.06.2015; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.06.2012; Győr, Gazdák erdeje, characterless humid grassland: 17.08.2012; 21.06.2013, 24.07., 05.09.; Győr, Gazdák erdeje, Molinia meadow: 21.06.2013, 24.07.; 26.06.2015, 31.07., 14.08.; Győr, Sas-hegy, secondary weedy vegetation: 28.08.2014; Lébény, Fűzfa-szigetek, marshy meadow: 15.08.2012, 06.09.; 10.06.2014, 10.07.; 11.07.2015, 11.08.; Lébény, Fűzfa-szigetek, Molinia meadow: 07.07.2012, 10.09.; 14.07.2013, 06.08., 06.09.; 10.06.2014, 10.07., 17.09.; 11.06.2015, 11.07.; 11.08.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 11.06.2015; Lébény, Fűzfa-szigetek, mowed marshy meadow: 06.09.2013; Lébény, Laci-rétek, weedy humid grassland: 07.07.2012; 14.07.2013, 06.08.; Lébény, Pintér-sziget, humid grassland reconstruction: 10.07.2014, 17.08.; 11.06.2015, 11.07.2015; 11.08.2015; Lébény, Pintér-sziget, semi-dry grassland: 11.06.2015.

Dociostaurus brevicollis (Eversmann, 1848) – Fertőszéplak, Körgát, salt meadow: 22.07.2015; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.08.2012; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 19.08.2014; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 16.07.2014, 19.08.; 18.07.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 18.07.2015; Győr, Gazdák erdeje, closed sandy grassland: 31.07.2015, 16.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 17.08.2012; 21.06.2013, 24.07., 05.09.; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 05.09.; 26.06.2015, 31.07.; Győr, Gazdák erdeje, sandy grassland reconstruction: 31.07.2015, 16.09.; Győr, Szentiváni erdő, closed sandy grassland: 29.08.2013; 19.08.2014; Győr, Szentiváni homokpuszták, weedy sandy grassland: 31.07.2015; Győr, Széles-földek, secondary dry grassland: 29.07.2014, 28.08.; 31.07.2015, 26.08.; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 29.07.2014; Tata, fischerlake, open dry grassland: 18.07.2012.

Euchorthippus declivus (Brisout Barneville, 1849) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Baj, Középső-dűlő, weedy dry grassland: 18.07.2012; Fertőszéplak, Körgát, salt meadow: 22.07.2015, 26.08.; Gönyű, Gönyűi-erdő, closed sandy grassland: 12.07.2012, 16.08.; 20.07.2013; 08.06.2014, 16.07.; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012, 12.07., 16.08.; 20.07.2013, 05.09.; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 20.07.2013, 05.09.; 08.06.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 20.07.2013; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; 16.07.2014, 19.08.; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 17.06.2015, 18.07.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07., 16.08.; 21.06.2013, 20.07., 05.09.; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, closed sandy grassland: 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; 16.07.2014, 19.08., 18.09.; Győr, Gazdák erdeje, closed sandy steppe grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 24.07.2013, 09.08., 05.09.; Győr, Gazdák erdeje, Molinia meadow: 24.07.2013; 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07., 09.08., 05.09.; 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014, 19.08., 18.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 17.08.2012; 21.06.2013, 24.07., 09.08., 05.09.; Győr, Gazdák erdeje, weedy dry grassland: 24.07.2013; 19.08.2014, 18.09.; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gönyűi-erdő, closed sandy grassland: 21.06.2013, 20.07., 09.08.; Győr, Gönyűi-erdő, weedy sandy grassland: 05.09.2013; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 29.07.2014, 28.08.; 17.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 19.08.2014; 30.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, closed sandy grassland: 27.06.2013, 24.07., 29.08.; 16.07.2014, 19.08.; 31.07.2015, 26.08.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013, 29.08.; 08.06.2014, 16.07., 19.08.; 30.06.2015, 31.07.; Győr, Széles-földek, secondary dry grassland: 29.08.2013; 29.07.2014, 28.08.; 17.06.2015, 31.07., 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 23.07.2013; 28.06.2014; Lébény, Fűzfa-szigetek, dry grassland reconstruction:

10.07.2014, 17.08.; 11.08. 2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012, 10.09.; 06.08.2013; Lébény, Fűzfa-szigetek, mowed marshy meadow: 15.08.2012, 14.07., 06.09.; 17.08.2014; 11.07.2015, 11.08.; Lébény, Pintér-sziget, humid grassland reconstruction: 14.07.2013; Lébény, Pintér-sziget, semi-dry grassland: 15.08.2012, 10.09.; 18.06.2013, 14.07., 06.08., 06.09.; 17.08.2014; 11.07.2015; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 29.07.2014, 28.08.; 17.06. 2015, 18.07., 05.08.; Nagyszentjános, Cuhai-Bakony-ér-mente, weedy humid grassland: 26.07.2013, 29.08.; Sarród, Cikes, salt meadow: 22.06.2015, 22.07.; Tata, Középső-dűlő, weedy dry grassland: 18.07.2012; Tata, northern to Cseke-tó, weedy dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 18.06.2013, 23.07., 29.08.; 29.07.2014, 28.08.

Euchorthippus pulvinatus (Fischer de Waldheim, 1846) – Fertőszéplak, Körgát, salt meadow: 22.07.2015; Gönyű, Gönyűi-erdő, open sandy grassland: 20.07.2013, 05.09.; 18.07.2015; Győr, Gazdák erdeje, closed sandy grassland: 24.07.2013; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 24.07.2013, 05.09.; 16.09.2015; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 21.06.2013.

Euthystira brachyptera (Ocskay, 1826) – Ásványráró, Kucser, weedy humid grassland: 11.07.2015; Baj, Középső-dűlő, weedy humid grassland: 18.07.2012; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.06.2012, 12.07., 16.08.; 21.06.2013; 08.06.2014, 16.07.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, margin of Robinia forest: 16.06.2012, 12.07., 16.08.; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012; 21.06.2013; 17.06.2015; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.06.2012, 16.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 20.07.; 08.06.2014; 17.06.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 21.06.2013, 20.07.; 08.06.2014; 18.07.2015; Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 16.06.2012, 12.07., 16.08.; 21.06.2013; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.06.2012, 12.07., 16.08.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07.; Győr, Gazdák erdeje, characterless dry grassland: 21.06.2013, 24.07.; Győr, Gazdák erdeje, characterless humid grassland: 21.06.2013; Győr, Gazdák erdeje, closed sandy grassland: 17.08.2012; 21.06.2013; 16.09.2015; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 21.06.2013; 18.09.2014; Győr, Gazdák erdeje, margin of Robinia forest: 24.07.2013; Győr, Gazdák erdeje, Molinia meadow: 17.08.2012; 21.06.2013, 24.07., 09.08.; 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014; 26.06.2015, 31.07.; Győr, Gazdák erdeje, weedy dry grassland: 17.08.2012; 21.06.2013, 24.07.; 16.07.2014, 19.08.; 26.06.2015; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07.; 28.06.2014, 29.07., 28.08.; 26.08.2015; Győr, Szentiváni erdő, sandy grassland reconstruction: 27.06.2013; 08.06.2014; Győr, Szentiváni erdő, closed sandy grassland: 27.06.2013; 08.06.2014, 16.07., 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 08.06.2014, 16.07.; 30.06.2015, 31.07.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 28.06.2014, 29.07.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 10.06.2014; 11.07.2015; Lébény, Fűzfa-szigetek, marshy meadow: 10.09.2012; 10.07.2014; 11.08.2015; Lébény, Fűzfa-szigetek, Molinia meadow: 07.07.2012, 15.08., 10.09.; 18.06.2013, 14.07.; 10.06.2014, 10.07., 17.08., 17.09.; 11.08.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012; 11.07.2015; Lébény, Lacirétek, weedy humid grassland: 07.07.2012, 10.09.; 14.07.2013; 10.06.2014, 10.07., 17.08.; Lébény, Pintér-sziget, humid grassland reconstruction: 17.08.2014; Lébény, Pintér-sziget, semi-dry grassland: 18.06.2013; 10.07.2014; 11.06.2015, 11.07.; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 28.06.2014; 17.06.2015, 05.08.; Nagyszentjános, Cuhai-Bakony-ér-mente, weedy humid grassland: 19.07.2012; Tata, northern to Cseke-tó, weedy humid grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 29.08.2013; 29.07.2014.

Gomphocerippus rufus (Linnaeus, 1758) – Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.08.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 19.08.2014; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.08.2012.

Myrmeleotettix antennatus (Fieber, 1853) – Győr, Gazdák erdeje, open sandy grassland: 05.09.2013.

Myrmeleotettix maculatus (Thunberg, 1815) – Gönyű, Gönyűi-erdő, open sandy grassland: 05.09.2013; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 05.08.2015; Gönyű, Gönyűi-erdő, weedy sandy grassland: 05.09.2013; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012, 15.09.; 21.06.2013, 24.07.; 19.08.2014; 26.06.2015, 31.07., 14.08., 16.09.; Győr, Gazdák erdeje, closed sandy grassland: 14.08.2015; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 09.08.2013; Győr, Gazdák erdeje, sandy grassland reconstruction: 31.07.2015, 16.09.; Győr, Gazdák erdeje, weedy sandy grassland: 05.09.2013; Győr, Szentiváni homokpuszták, weedy sandy grassland: 29.08.2013; 16.07.2014; Győr, Szentiváni erdő, closed sandy grassland: 19.08.2014.

Omocestus haemorrhoidalis (Charpentier, 1825) – Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 20.07.2013; Győr, Gazdák erdeje, characterless dry grassland: 15.09.2012; Győr, Gazdák erdeje, characterless humid grassland: 17.08.2012; Győr, Gazdák erdeje, closed sandy steppe grassland: 15.09.2012; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 05.09.2013; Győr, Gazdák erdeje, sandy grassland reconstruction: 14.08.2015; Győr, Gazdák erdeje, weedy dry grassland: 17.08.2012; 31.07.2015; Győr, Gönyűi-erdő, weedy sandy grassland: 15.09.2012; 05.09.2013; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; Győr, Széles-földek, secondary dry grassland: 31.07.2015; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 23.07.2013; Lébény, Fűzfa-szigetek, mowed marshy meadow: 06.08.2013; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 10.09.2012; Lébény, Pintér-sziget, semi-dry grassland: 10.09.2012; 11.07.2015; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 19.07.2012; Vaszar, Csíkvándi-Bakony-értől keletre, secondary dry grassland: 29.07.2014.

Omocestus petraeus (Brisout Barneville, 1856) – Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07., 29.08.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 29.08.2013; Győr, Szentiváni erdő, sandy grassland reconstruction: 08.06.2014; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 06.09.2013; Nagyszentjános, Cuhai-Bakony-ér mente, secondary dry grassland: 27.06.2013.

Omocestus rufipes (Zetterstedt, 1821) – Gönyű, Gönyűi-erdő, closed sandy grassland: 16.08.2012; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 08.06.2014; 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, undergrowth of black pine forest: 16.06.2012; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 05.09.; 08.06.2014, 16.07.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 21.06.2013; 08.06.2014; 17.06.2015; Gönyű, Gönyűi-erdő, weedy sandy grassland: 12.07.2012; 20.07.2013; Győr, Gazdák erdeje, sandy grassland reconstruction: 18.09.2014; 26.06.2015; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 15.09.2012; Győr, Gazdák erdeje, weedy dry grassland: 26.06.2015; Győr, Sas-hegy, secondary weedy vegetation: 28.06.2014; Győr, Széles-földek, secondary dry grassland: 28.06.2014, 29.07.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 16.07.2014; 26.08.2015; Győr, Szentiváni erdő, sandy grassland reconstruction: 08.06.2014, 16.07., 19.08.; Lébény, Pintér-sziget, semi-dry grassland: 07.07.2012; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 10.06.2014; 11.07.2015; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 19.07.2012, 16.08.; 27.06.2013; Tata, Középső-dűlő, weedy dry grassland: 18.07.2012; Tata, northern to Cseke-tó, weedy dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 29.07.2014.

Stenobothrus crassipes (Charpentier, 1825) – Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland: 28.08.2014.

Stenobothrus fischeri (Eversmann, 1848) – Gönyű, Gönyűi-erdő, closed sandy grassland: 18.07.2015; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 05.08.2015; Győr, Gazdák erdeje, closed sandy steppe grassland: 21.06.2013, 24.07.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 21.06.2013; 16.07.2014; Győr, Gazdák erdeje, open sandy grassland: 31.07.2015, 14.08.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 24.07.2013, 05.09.; Győr, Szentiváni erdő tisztása, closed sandy grassland: 29.08.2013; 19.08.2014.

Stenobothrus lineatus (Panzer, 1796) – Ásványráró, Kucser, weedy humid grassland: 08.06.2015, 11.07.; Gönyű, Gönyűi-erdő, closed sandy grassland: 16.06.2012, 12.07., 16.08.; 21.06.2013, 20.07.; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012, 16.08.; 21.06.2013, 20.07., 05.09.; 17.06.2015, 18.07.; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 21.06.2013, 05.09.; 08.06.2014, 16.07., 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 21.06.2013, 20.07.; 17.06.2015; Gönyű, Gönyűi-erdő, weedy humid grassland: 21.06.2012; 20.07.2013; Gönyű, Gönyűi-erdő, weedy humid grassland on sand: 08.05.2015; Gönyű, Gönyűi-erdő, weedy humid grassland and scrub complex: 16.08.2012; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012, 15.09.; 21.06.2013, 05.09.; Győr, Gazdák erdeje, closed sandy grassland: 31.07.2015, 14.08., 16.09.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 17.08.2012; Győr, Gazdák erdeje, closed sandy steppe grassland: 21.06.2013; Győr, Gazdák erdeje, closed sandy steppe grassland with birch and poplar trees: 17.08.2012; 21.06.2013, 24.07.; Győr, Gazdák erdeje, margin of Robinia forest: 09.08.2013; Győr, Gazdák erdeje, Molinia meadow: 21.06.2013, 24.07.; 26.06.2015, 14.08.; Győr, Gazdák erdeje, open sandy grassland: 17.08.2012; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014; 26.06.2015, 31.07., 14.08.; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 21.06.2013, 24.07., 05.09.; Győr, Gazdák erdeje, weedy dry grassland: 15.09.2012; 24.07.2013, 09.08.; 16.07.2014, 19.08.; 26.06.2015, 31.07., 14.08.; 26.06.2015, 31.07., 14.08.; Győr, Gönyűi-erdő, closed sandy

grassland: 15.09.2012; 21.06.2013, 20.07.; Győr, Gönyűi-erdő, weedy sandy grassland: 16.06.2012, 12.07., 16.08., 15.09.; 21.06.2013, 20.07., 09.08., 05.09.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013; 17.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 27.06.2013; 16.07.2014; 30.06.2015; Győr, Szentiváni erdő, closed sandy grassland: 27.06.2013, 24.07., 29.08.; 16.07.2014, 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013, 29.08.; 16.07.2014, 19.08.; 30.06.2015; Győr, Széles-földek, secondary dry grassland: 17.06.2015, 26.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 14.07.2013; Lébény, Fűzfa-szigetek, mowed marshy meadow: 14.07.2013, 06.08.; 10.07.2014; 11.07.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012, 10.09.; 14.07.2013; 10.07.2014; 11.07.2015, 11.08.; Lébény, Pintér-sziget, semi-dry grassland: 07.07.2012, 15.08.; 14.07.2013, 06.09.; 10.06.2014, 10.07., 17.08.; 11.06.2015, 11.08.; Lébény, Pintér-sziget, humid grassland reconstruction: 10.06.2014, 10.07.; Nagyszentjános, Cuhai-Bakony-ér-mente, weedy dry grassland: 19.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland, PK: 11.07.2012.

Stenobothrus nigromaculatus (Herrich-Schäffer, 1840) – Gönyű, Gönyűi-erdő, closed sandy grassland: 12.07.2012; Gönyű, Gönyűi-erdő, open sandy grassland: 16.06.2012; Győr, Gazdák erdeje, closed sandy grassland: 16.09.2015; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 24.07.2013; Győr, Gazdák erdeje, closed sandy steppe grassland: 15.09.2012; Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 24.07.2013; Győr, Gönyűi-erdő, closed sandy grassland: 21.06.2013, 20.07.; Lébény, Pintér-sziget, semi-dry grassland: 07.07.2012; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 07.07.2012.

Stenobothrus stigmaticus (Rambur, 1838) – Győr, Gazdák erdeje, secondary closed sandy steppe grassland: 15.09.2012.

Acrotylus insubricus (Scopoli, 1786) – Szigetmonostor, Hegyre való, open sandy grassland: 19.06.2013.

Aiolopus thalassinus (Fabricius, 1781) – Fertőszéplak, Körgát, salt meadow: 22.07.2015, 26.08.; Győr, Sas-hegy, secondary weedy vegetation: 26.07.2013, 29.08.; 29.07.2014; 31.07.2015; Győr, Széles-földek, secondary dry grassland: 19.07.2012, 16.08.; 21.06.2013, 29.08.; 29.07.2014, 28.08.; 17.06.2015, 31.07., 26.08.; Kajárpéc, estern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 21.05.2012–22.06.; pf, PK: 22.06.2012–25.07.; 23.07.2013; Lébény, Fűzfa-szigetek, mowed marshy meadow: 17.09.2014; Lébény, Pintér-sziget, semi-dry grassland: 17.09.2014; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 19.07.2012, 16.08.; 27.06.2013, 26.07., 29.08.; Sarród, Cikes, salt meadow: 26.08.2015; Tata, fischerlake, open dry grassland: 18.07.2012; Tata, Középső-dűlő, open dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 11.07.2012., PK; 18.06.2013, 23.07., 29.08.; 29.07.2014, 28.08.

Mecostethus parapleurus (Hagenbach, 1822) – Lébény, Fűzfa-szigetek, marshy meadow: 15.08.2012, 10.09.; 17.09.2014; 17.08.2014, 17.09.; 11.07.2015, 11.08.; Lébény, Fűzfa-szigetek, Molinia meadow: 10.07.2014, 17.09.; 11.07.2015; Lébény, Fűzfa-szigetek, mowed semi-dry grassland: 11.07.2015; Lébény, Laci-rétek, weedy humid grassland: 10.06.2014; Lébény, Pintér-sziget, humid grassland reconstruction: 14.07.2013; 17.09.2014; 11.07.2015, 11.08.; Lébény, Pintér-sziget, semi-dry grassland: 11.08.2015.

Oedaleus decorus (Germar, 1826) – Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 18.07.2015, 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 19.08.2014; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014; 14.08.2015, 16.09.; Győr, Szentiváni erdő, closed sandy grassland: 24.07.2013; Győr, Széles-földek, secondary dry grassland: 29.07.2014, 28.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, PK: 11.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 29.07.2014.

Oedipoda caerulescens (Linnaeus, 1758) – Fertőszéplak, Körgát, salt meadow: 22.07.2015; Gönyű, Gönyűi-erdő, open sandy grassland: 19.08.2014; 18.07.2015; Gönyű, Gönyűi-erdő, sandy grassland reconstruction: 19.08.2014; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy black pine forest: 05.09.2013; 16.07.2014, 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy dry grassland on deforested area of sandy Robinia forest: 20.07.2013, 05.09.; 08.06.2014, 16.07., 19.08.; 17.06.2015, 18.07., 05.08.; Gönyű, Gönyűi-erdő, weedy humid grassland: 05.09.2013; 16.07.2014, 19.08.; Gönyű, Gönyűi-erdő, weedy sandy grassland: 16.08.2012; 20.07.2013; Győr, Gazdák erdeje, characterless dry grassland: 17.08.2012; 24.07.2013; Győr, Gazdák erdeje, closed sandy grassland: 31.07.2015, 16.09.; Győr, Gazdák erdeje, closed sandy grassland/open sandy grassland mosaic: 09.08.2013; 16.07.2014; Győr, Gazdák erdeje, sandy grassland reconstruction: 16.07.2014, 19.08.; 26.06.2015, 31.07., 14.08., 16.09.; 18.07.2015, 05.08.; Győr, Gazdák erdeje, weedy dry grassland: 05.09.2013; 14.08.2015, 16.09.; Győr, Gönyűi-erdő, weedy sandy grassland: 09.08.2013; Győr, Sas-hegy, secondary weedy vegetation: 21.06.2013, 26.07., 29.08.; 28.08.2014; 31.07.2015, 26.08.; Győr, Szentiváni erdő, sandy grassland reconstruction: 29.08.2013; 08.06.2014, 16.07., 19.08.; 30.06.2015, 31.07., 26.08.; Győr, Szentiváni erdő, closed sandy grassland:

24.07.2013, 29.08.; 26.08.2015; Győr, Szentiváni homokpuszták, weedy sandy grassland: 24.07.2013, 29.08.; 16.07.2014; 30.06.2015; Győr, Széles-földek, secondary dry grassland: 19.07.2012; 26.07.2013; 28.08.2014; 31.07.2015, 26.08.; Kajárpéc, eastern to Sokorói-Bakony-ér, secondary dry grassland, pf, PK: 21.05.2012–22.06.;, PK: 11.07.2012; pf, PK: 22.06.2012–25.07.; 23.07.2013, 29.08.; Lébény, Fűzfa-szigetek, dry grassland reconstruction: 17.08.2014; Nagyszentjános, Cuhai-Bakony-ér-mente, secondary dry grassland: 16.08.2012; 26.07.2013; Tata, northern to Cseke-tó, open dry grassland: 18.07.2012; Tata, Középső-dűlő, open dry grassland: 18.07.2012; Vaszar, eastern to Csíkvándi-Bakony-ér, secondary dry grassland: 29.08.2013; 28.08.2014.

Sphingonotus caerulans (Linnaeus, 1767) – Győr, Gönyűi-erdő, weedy sandy grassland: 20.07.2013; Tata, Középső-dűlő, weedy humid grassland: 18.07.2012.

Stethophyma grossum (Linnaeus, 1758) – Győr, Marcalmente-dűlő, marshy meadow: 12.09.2015.

Discussion

The species list summerizes data of 60 species collected since 2012. New species compared to the latest synthesis (Kenyeres et al. 2013) were not found, but our knowledge about the distribution of several species was widened regarding conservation and zoogeography. We have to emphasize the revealed populations of the strictly protected and Natura 2000 *Isophya costata*. Most of the Pannonian endemisms take place in regions characterized as potential steppe and forest steppe vegetation (for example Balaton Uplands, Southern-Bakony, Mezőföld, margins of Mecsek Mts.). *Isophya costata* presumably used to be a species typical of loess and steppe grasslands rich in dicotyledonous plant species. However, natural grasslands tend to be altered to anthropogenic mesophitic hayfields, which contain dicotyledonous plant species in suitable numbers therefore they keep catering for the nutrition needs of *I. costata*. In the Kisalföld the species has been known only from the margin of the study area in contact with the Transdanubian Mts. and from Sopron (Halászrét) belonging to the isolated populations of the Viennese Basin. The newly found small populations near Jobaháza and Gyóró show the area-connection between the Transdanubian Mts. and the Viennese Basin. These intermediate populations have not only zoogeographical, but also conservational importance, because the Kisalföld is dominated by antropogenous habitats (arable fields, secondary grasslands, sown grasslands) and potential habitats (mesophitic native hayfields) of *I. costata* are only sporadically represented in the local landscape.

In the last years, several populations of the protected *Polysarcus denticauda* were found in the Kisalföld. The species distributed in South and Central-Europe in the Carpathian Basin and lives mainly in high altitude regions. Its lowland populations are in humid marshes and fens. Also the data published here originate from eu- and mesotrophic meadows. This fact explains that *P. denticauda* occurs only occasionally in the same habitat as *Isophya costata* which requires grasslands with mesophitic microclimate and high cover of dicotyledonous plant species.

The protected *Calliptamus barbarus* is a psammophil ponto-mediterranean species. It is one of the most typical character species of natural sandy grasslands. In Hungary over the Duna-Tisza-köze *C. barbarus* has small number of occurrences. Based on the historical data the species presumably penetrated from the southern areas to the Kisalföld in the common way of xerophitc species (Nagy 2005). The recent studies revealed several new occurrences of the species in the sandy area of Győr and Gönyű.

Over the above mentioned species several occurrences of non-protected, but important sand (*Platycleis montana*, *Myrmeleotettix antennatus*, *Acrotylus insubricus*, *Stenobothrus*

fischeri) and sand/alkaline (*Platycleis affinis*) character species rare in the Kisalföld were revealed or confirmed by our research.

Acknowledgements: Special thanks of the author go to the Fertő-Hanság National Park Directorate and primarily to Mr. Gábor Takács for the permanent supporting.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 53–54

Three longhorn beetles new to the fauna of Albania (Coleoptera: Cerambycidae)

Tibor Kovács

Abstract: Three species of Cerambycidae, *Cerambyx carinatus* Küster, 1846, *Xylotrechus stebbingi* Gahan, 1906 and *Agapanthia markusi* Rapuzzi, Sama & Kotán, 2013 are recorded for the first time from Albania.

A comprehensive account on the longhorn beetles (Cerambycidae) of Albania was provided by Rapuzzi & Sama (2012) who listed 184 species and subspecies, including 32 recorded for the first time from the country. Kovács & Merkl (2013) mentioned locality data of three species: the second record of *Parmena pubescens pilosa* and the third records of *Prinobius myardi* and *Rhaesus serricollis*. Kovács *et al*. (2015) found three species, *Callimoxys gracilis*, *Dorcadion arenarium hypsophilum* and *D. lineatocolle* as new to Albania. The two specimens of *D. arenarium hypsophilum* later proved to be misidentified: the specimen from Malësi e Madhe district was identified as *Dorcadion abruptum* Germar, 1839, and the specimen from Tiranë district was identified as *Dorcadion arenarium skypetarum* Heyrovsky, 1937 by Pierpaolo Rapuzzi and Kálmán Székely.

In the 2014 and 2015 trips by the author to Albania many longicorn species were collected, including the following three which are new to the country. The voucher specimens are deposited in the Mátra Museum of Hungarian Natural History Museum, Gyöngyös.

Cerambyx carinatus Küster, 1846 – **Albania**, Vlorë district, Himarë, beach, 40°06’02.3”, 19°44’46.5”, 1 m, 25.06.2015, 1 dead adult, K. Harmos, T. Kovács, G. Magos. Rapuzzi & Sama (2012) mention it as a species expected to occur in Albania because it is known from the adjacent countries. Its host plant in Croatia is *Pyrus amygdaliformis* (Kovács *et al*. 1999), which is widely distributed around its Albanian locality.

Xylotrechus stebbingi Gahan, 1906 (Fig. 1) – **Albania**, Shkodër district, Omarë, W of the village, 42°09’13.6”, 19°27’49.6” 10 m, 22.06.2015, 20:45–21:50, at light, 1 adult, K. Harmos, T. Kovács, G. Magos. This species was described from North India and Tibet, and is now expanding its range to the Mediterranean. Its European localities were summarised by Cocquempot & Lindelöw (2010). It is polyphagous on deciduous trees (Sama 2002). The collected specimen came to an illuminated screen in the flatland near Lake Shkodër with a few willow and poplar trees around.

Agapanthia markusi Rapuzzi, Sama & Kotán 2013 – **Albania**, Korçë district, Opari area, Moglicë, E of the village, 40°42’25.2”, 20°25’04.6” 525 m, 27.06.2014, 1 adult, P. Juhász, T. Kovács, D. Murányi. The species was described by Rapuzzi *et al*. (2013) from Greece. Its host plants are unknown. The flying individual was captured in tall herb vegetation near a stream.

Acknowledgements: The authors' thanks are due to Pierpaolo Rapuzzi (Prepotto) and Kálmán Székely (Budapest) for help in identification, to Tamás Németh (Hungarian Natural History Museum, Budapest) for the photo of *Xylotrechus stebbingi*, to Krisztián Harmos and Gábor Magos (Directorate of the Bükk National Park, Eger), Péter Juhász (Hortobágy National Park, Debrecen) and Dávid Murányi (Hungarian Natural History Museum, Budapest) for help in the field work. Ottó Merkl (Hungarian Natural History Museum, Budapest) is thanked for English translation. The trip in 2014 was financially supported by János Oláh (Sakertour, Debrecen).

Fig. 1. *Xylotrechus stebbingi* Gahan, 1906 (photo by T. Németh)

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 55–61

Ritka és természetvédelmi szempontból jelentős bogarak (Coleoptera) Lillafüred környékéről

Kovács Tibor, Domboróczki Gábor & Urbán László

Abstract: (Rare and protected Coleoptera in the area of the Lillafüred, Bükk Mts.) This paper provides locality data of 39 Coleoptera species from the Bükk Mountains. Five species are of European Community interest listed in the EU Habitat Directive (*Rhysodes sulcatus*, *Lucanus cervus*, *Osmoderma eremita*, *Cucujus cinnaberinus*, *Cerambyx cerdo*), two species (*O. eremita*, *Eurythyrea quercus*) is strictly protected and 25 species are protected in Hungary.

Species interesting from the faunistical point of view: *Omoglymmius germari*, *Rhysodes sulcatus*, *Osmoderma eremita*, *Coraebus undatus*, *Pycnomerus terebrans*, *Prostomis mandibularis*.

The following species are new to the Bükk Mountains: *Omoglymmius germari*, *Coraebus undatus*, *Ampedus elegantulus*, *Pycnomerus terebrans*.

The following natural habitats are especially valuable on the basis of their insect fauna: Alsó-Sebes-víz, Demény-hegy, Fehér-kő-bérc, Kerek-hegy, Kis-kút-bérc, Kovács-kő, Olvasztó-tető, Savós-tető, Sebes-tető, Vesszős-oldal, Vörös-kő-tető.

Bevezetés

A cikkben folytatódik a hazai (Anonim 2012, Merkl & Kovács 1997, Varga et al. 1989) és európai (Berni Egyezmény 1994, Corine 1991, Council Directive 1992, Good & Speight 1996, Iucn 1996, Nieto & Alexander 2010) védettségi listákon található xilofág és szaproxilofág, illetve egyéb ritka, védett bogarak lelőhelyeinek közlése (Kovács 2013, Kovács & Németh 2010, 2012, Kovács et al. 2009, 2010, 2012, 2015).

Kutatásainkat a Lillafüredi erdőtervezési körzet idős és természetközeli állapotú erdőállományaiban végeztük, valamennyi mintavételi hely Miskolc közigazgatási területéhez tartozik.

Rövidítések: BA = Bartha Attila, CsV = Csikos Valéria, DG = Domboróczki Gábor, KrT = Korompai Tamás, KT = Kovács Tibor, UL = Urbán László; L = lárva, B = báb, I = imágó, + = elpusztult imágó.

A fajok faunisztikai adatai

Rhysodidae Laporte, 1840

Omoglymmius germari (Ganglbauer, 1891) – Kerek-hegy, 2015.04.15., I, *Fagus sylvatica*, DG-KT-UL.
Rhysodes sulcatus (Fabricius, 1787) – Alsó-Sebes-víz, 2015.08.12., I, *Fagus sylvatica*, DG-KrT-KT-UL; Demény-hegy, 2015.04.15., I, *F. sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., I, *F. sylvatica*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Sebes-tető, 2015.08.12., I, *F. sylvatica*, DG-KrT-KT-UL.

Carabidae Latreille, 1802

Carabus coriaceus Linnaeus, 1758 – Tiplák-rét, 2015.08.12., I, DG-KrT-KT-UL.
Carabus intricatus Linnaeus, 1761 – Alsó-Sebes-víz, 2015.08.12., I, DG-KrT-KT-UL; Demény-hegy, 2015.04.15., I, DG-KT-UL; Kerek-hegy, 2015.04.15., I, +, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, DG-KrT-KT-UL; Vadász-völgy-fő, 2015.08.27., I, DG-KT-UL; Vesszős-oldal, 2015.08.27., +, DG-KT-UL; Vörös-kő-tető, 2015.08.27., I, +, DG-KT-UL.

Lucanidae Latreille, 1804

Aesalus scarabaeoides (Panzer, 1794) – Kis-kút-bérc, 2015.08.19., +, *Quercus petraea*, DG-KT-UL; Savós-völgy, 2015.08.12., L, *Quercus* sp., DG-KrT-KT-UL; Sebes-tető, 2015.08.12., L, B, *Fagus sylvatica*, DG-KrT-KT-UL.
Dorcus parallelipipedus (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., +, DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., L, I, +, *Fagus sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., +, *F. sylvatica*, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., I, *F. sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *F. sylvatica*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Lusta-völgy, 2015.08.19., I, *Fraxinus angustifolia* ssp. *pannonica*, DG-KT-UL; Olvasztó-tető, 2015.08.12., L, I, +, *F. sylvatica*, DG-KrT-KT-UL; Savós-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Vörös-kő-tető, 2015.08.27., +, *Q. petraea*, DG-KT-UL.
Lucanus cervus (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., +, DG-KrT-KT-UL; Demény-hegy, 2015.04.15., +, DG-KT-UL; Kerek-hegy, 2015.04.15., +, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, DG-KrT-KT-UL; Savós-tető, 2015.08.12., +, DG-KrT-KT-UL; Savós-völgy, 2015.08.12., +, DG-KrT-KT-UL; Szent István, 2015.08.27., +, DG-KT-UL; Vesszős-oldal, 2015.08.27., +, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, DG-KT-UL.
Sinodendron cylindricum (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., L,+, *Acer* sp., +, *A. pseudoplatanus*, *Fagus sylvatica*, DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., L, I, +, *F. sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., I, +, *F. sylvatica*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *F. sylvatica*, *Fraxinus* sp., DG-KT-UL; Lusta-völgy, 2015.08.19., L, *F. angustifolia* ssp. *pannonica*, +, *Acer* sp., DG-KT-UL; Nagy-mező, 2014.06.05., +, *F. angustifolia* ssp. *pannonica*, BA-CsV-DG-KT; Olvasztó-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Őserdő, 2014.06.05., +, *F. sylvatica*, BA-CsV-DG-KT; Sebes-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Szent István, 2015.08.27., +, *F. sylvatica*, DG-KT-UL; Tiplák-rét, 2015.08.12., +, *A. campestre*, DG-KrT-KT-UL; Miskolc, Vadász-völgy-fő, 2015.08.27., +, *A. pseudoplatanus*, *F. sylvatica*, DG-KT-UL.

Scarabaeidae Latreille, 1802

Gnorimus nobilis (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., +, DG-KrT-KT-UL.
Gnorimus variabilis (Linnaeus, 1758) – Demény-hegy, 2015.04.15., +, *Quercus petraea*, DG-KT-UL; Fehér-kő-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *Q. petraea*, DG-KrT-KT-UL; Vörös-kő-tető, 2015.08.27., +, *Q. petraea*, DG-KT-UL.
Osmoderma eremita (Scopoli, 1763) – Fehér-kő-bérc, 2015.08.19., +, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *Q. petraea*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, DG-KrT-KT-UL; Vesszős-oldal, 2015.08.27., +, *Q. pubescens*, DG-KT-UL.
Protaetia aeruginosa (Drury, 1773) – Nagy-mező, 2014.06.05., +, *Fagus sylvatica*, BA-CsV-DG-KT.
Protaetia lugubris (Herbst, 1786) – Demény-hegy, 2015.04.15., +, *Quercus petraea*, DG-KT-UL.

Buprestidae Leach, 1815

Coraebus fasciatus (Villers, 1789) – Vörös-kő-tető, 2015.08.27., gyűrűzött ág, *Quercus petraea*, DG-KT-UL.
Coraebus undatus (Fabricius, 1787) – Demény-hegy, 2015.04.15., +, *Quercus petraea*, DG-KT-UL.
Dicerca berolinensis (Herbst, 1779) – Alsó-Sebes-víz, 2015.08.12., +, *Fagus sylvatica*, DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., +, *F. sylvatica*, BA-CsV-DG-KT; Kerek-hegy, 2015.04.15., +, *Carpinus betulus*, *F. sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *C. betulus*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Szent István, 2015.08.27., +, *C. betulus*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *C. betulus*, DG-KT-UL.
Eurythyrea quercus (Herbst, 1780) – Fehér-kő-bérc, 2015.08.19., +, *Quercus petraea*, DG-KT-UL; Kerek-hegy,

2015.04.15., +, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *Q. petraea*, DG-KrT-KT-UL; Savós-tető, 2015.08.12., +, *Q. petraea*, DG-KrT-KT-UL; Vesszős-oldal, 2015.08.27., +, *Q. petraea*, *Q. pubescens*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *Q. petraea*, DG-KT-UL.

Elateridae Leach, 1815

Ampedus elegantulus (Schönherr, 1817) – Demény-hegy, 2015.04.15., I, *Fagus sylvatica*, DG-KT-UL.
Ampedus nigerrimus (Lacordaire in Boisduval & Lacordaire, 1835) – Demény-hegy, 2015.04.15., I, *Quercus petraea*, DG-KT-UL.
Ampedus praeustus (Fabricius, 1792) – Bem Apó-kő, 2014.06.05., I, *Fagus sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., I, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., I, *Q. petraea*, DG-KT-UL.
Cardiophorus gramineus (Scopoli, 1763) – Demény-hegy, 2015.04.15., I, *Quercus petraea*, DG-KT-UL.
Elater ferrugineus Linnaeus, 1758 – Demény-hegy, 2015.04.15., L, +, *Fagus sylvatica*, DG-KT-UL; Fehér-kő-bérc, 2015.08.19., L, *Quercus petraea*, DG-KT-UL; Vesszős-oldal, 2015.08.27., L, *Q. pubescens*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., L, +, *Q. petraea*, DG-KT-UL.
Hypoganus inunctus (Panzer, 1795) – Demény-hegy, 2015.04.15., I, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., I, *Fagus sylvatica*, DG-KT-UL; Vesszős-oldal, 2015.08.27. B > 09.03. I, *Q. pubescens*, DG-KT-UL.
Ischnodes sanguinicollis (Panzer, 1793) – Szent István, 2015.08.27., L, *Acer pseudoplatanus*, DG-KT-UL.

Trogossitidae Latreille, 1802

Thymalus limbatus (Fabricius, 1787) – Miskolc, Kerek-hegy, 2015.04.15., I, *Fagus sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., I, *Quercus petraea*, DG-KT-UL.

Cucujidae Latreille, 1802

Cucujus cinnaberinus (Scopoli, 1763) – Alsó-Sebes-víz, 2015.08.12., L, *Fagus sylvatica*, *Fraxinus* sp., B, *Fraxinus* sp., DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., L, *Acer pseudoplatanus*, BA-CsV-DG-KT; Borovnyák, 2014.06.05., L, *F. sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., I, *F. sylvatica*, DG-KT-UL; Kerek-hegy, 2015.04.15., L, *A. pseudoplatanus*, *Acer* sp., +, *Quercus petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., L, *Q. petraea*, DG-KT-UL; Kovács-kő, 2015.04.15., L, *Fraxinus* sp., DG-KT-UL; Lusta-völgy, 2015.08.19., L, *A. pseudoplatanus*, DG-KT-UL; Olvasztó-tető, 2015.08.12., L, B, *Q. petraea*, DG-KrT-KT-UL; Vadász-völgy-fő, 2015.08.27., L, *F. sylvatica*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., L, +, *Q. petraea*, DG-KT-UL.

Zopheridae Solier, 1834

Pycnomerus terebrans (Olivier, 1790) – Alsó-Sebes-víz, 2015.08.12., I, *Fagus sylvatica*, DG-KrT-KT-UL.

Tenebrionidae Latreille, 1802

Accanthopus velikensis (Piller & Mitterpacher, 1783) – Fehér-kő-bérc, 2015.08.19., I, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *Fagus sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., I, *F. sylvatica*, *Q. petraea*, DG-KT-UL; Szent István, 2015.08.27., +, *Q. pubescens*, DG-KT-UL; Vesszős-oldal, 2015.08.27., +, *Q. pubescens*, DG-KT-UL.
Bolitophagus interruptus Illiger, 1800 – Borovnyák, 2014.06.05., I, bükkön levő *Fomes fomentarius*, BA-CsV-DG-KT; Kerek-hegy, 2015.04.15., I, bükkön levő *Fomes fomentarius*, DG-KT-UL.
Neomida haemorrhoidalis (Fabricius, 1787) – Olvasztó-tető, 2015.08.12., I, bükkön levő *Fomes fomentarius*, DG-KrT-KT-UL.
Platydema dejeani Laporte de Castelnau & Brullé, 1831 – Kerek-hegy, 2015.04.15., I, gombás bükk kéreg alól, DG-KT-UL.
Tenebrio opacus Duftschmid, 1812 – Demény-hegy, 2015.04.15., I, *Fagus sylvatica*, *Quercus petraea*, +, *Q. petraea*, DG-KT-UL; Fehér-kő-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Vesszős-oldal, 2015.08.27., +, *Q. pubescens*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *Q. petraea*, DG-KT-UL.

Prostomidae C. G. Thomson, 1859

Prostomis mandibularis (Fabricius, 1801) – Demény-hegy, 2015.04.15., L, *Fagus sylvatica*, L, I, *Quercus petraea*, DG-KT-UL; Fehér-kő-bérc, 2015.08.19., I, *Q. petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., L, I, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., L, I, *Q. petraea*, DG-KT-UL; Kovács-kő, 2015.04.15., L, I, *Q. petraea*, DG-KT-UL; Olvasztó-tető, 2015.08.12., L, B, I, *Q. petraea*, DG-KrT-KT-UL; Savós-tető, 2015.08.12., I, *Q. petraea*, DG-KrT-KT-UL; Vesszős-oldal, 2015.08.27., I, *Q. pubescens*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., L, *Q. petraea*, I, *F. sylvatica*, DG-KT-UL.

Pyrochroidae Latreille, 1807

Schizotus pectinicornis (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., L, *Fraxinus* sp., DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., L, *Fagus sylvatica*, BA-CsV-DG-KT; Borovnyák, 2014.06.05., L, I, *F. sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., L, *F. sylvatica*, *Fraxinus* sp., *Tilia* sp., B, *Fraxinus* sp., *Tilia* sp., DG-KT-UL; Kerek-hegy, 2015.04.15., L, *Acer* sp., *Fraxinus* sp., B, *F. sylvatica*, *Fraxinus* sp., DG-KT-UL; Kovács-kő, 2015.04.15., L, *F. sylvatica*, *Fraxinus* sp., I, *Fraxinus* sp., DG-KT-UL; Lusta-völgy, 2015.08.19., L, *Acer* sp., DG-KT-UL; Olvasztó-tető, 2015.08.12., L, *F. sylvatica*, *Quercus petraea*, DG-KrT-KT-UL; Vadász-völgy-fő, 2015.08.27., L, *F. sylvatica*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., L, *Q. petraea*, *Sorbus* sp., DG-KT-UL.

Cerambycidae Latreille, 1802

Aegosoma scabricorne (Scopoli, 1763) – Miskolc, Alsó-Sebes-víz, 2015.08.12., +, *Fagus sylvatica*, DG-KrT-KT-UL; Demény-hegy, 2015.04.15., +, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Kovács-kő, 2015.04.15., L, *F. sylvatica*, DG-KT-UL; Lusta-völgy, 2015.08.19., +, *Acer* sp., DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Szent István, 2015.08.27., +, *F. sylvatica*, DG-KT-UL; Vadász-völgy-fő, 2015.08.27., +, *A. pseudoplatanus*, *F. sylvatica*, DG-KT-UL; Vesszős-oldal, 2015.08.27., +, *F. sylvatica*, DG-KT-UL.

Cerambyx cerdo Linnaeus, 1758 – Fehér-kő-bérc, 2015.08.19., +, *Quercus petraea*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *Q. petraea*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., L, *Q. petraea*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *Q. petraea*, *Quercus* sp., DG-KrT-KT-UL; Savós-tető, 2015.08.12., +, *Q. petraea*, DG-KrT-KT-UL; Vesszős-oldal, 2015.08.27., +, *Q. petraea*, *Q. pubescens*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *Q. petraea*, DG-KT-UL.

Cerambyx scopolii Füsslin, 1775 – Demény-hegy, 2015.04.15., +, *Fagus sylvatica*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *F. sylvatica*, DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *Sorbus* sp., *Quercus petraea*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *Cerasus avium*, *F. sylvatica*, DG-KT-UL; Olvasztó-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Szent István, 2015.08.27., +, *F. sylvatica*, DG-KT-UL; Vadász-völgy-fő, 2015.08.27., +, *Acer pseudoplatanus*, *F. sylvatica*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *F. sylvatica*, *Q. petraea*, DG-KT-UL.

Rosalia alpina (Linnaeus, 1758) – Alsó-Sebes-víz, 2015.08.12., +, *Acer pseudoplatanus*, *Fagus sylvatica*, *Fraxinus angustifolia* ssp. *pannonica*, *Ulmus* sp., DG-KrT-KT-UL; Bem Apó-kő, 2014.06.05., +, *F. sylvatica*, BA-CsV-DG-KT; Demény-hegy, 2015.04.15., +, *F. sylvatica*, *Fraxinus* sp., DG-KT-UL; Fehér-kő-bérc, 2015.08.19., +, *F. sylvatica*, DG-KT-UL; Kerek-hegy, 2015.04.15., +, *A. platanoides*, *A. pseudoplatanus*, *Carpinus betulus*, *F. sylvatica*, *Fraxinus* sp., DG-KT-UL; Kis-kút-bérc, 2015.08.19., +, *F. sylvatica*, DG-KT-UL; Kovács-kő, 2015.04.15., +, *Acer* sp., *F. sylvatica*, DG-KT-UL; Lusta-völgy, 2015.08.19., +, *A. platanoides*, DG-KT-UL; Nagy-mező, 2014.06.05., +, *Acer* sp., *F. sylvatica*, BA-CsV-DG-KT; Olvasztó-tető, 2015.08.12., +, *F. sylvatica*, DG-KrT-KT-UL; Szent István, 2015.08.27., +, *F. sylvatica*, DG-KT-UL; Tiplák-rét, 2015.08.12., +, *A. campestre*, DG-KrT-KT-UL; Vadász-völgy-fő, 2015.08.27., +, *A. pseudoplatanus*, *F. sylvatica*, DG-KT-UL; Vörös-kő-tető, 2015.08.27., +, *F. sylvatica*, DG-KT-UL.

Saperda scalaris (Linnaeus, 1758) – Vadász-völgy-fő, 2015.08.27., L, *Acer* sp., DG-KT-UL.

Eredmények, értékelés

A cikk 39 bogárfaj adatait közli, melyek közül 5 közösségi jelentőségű (Natura 2000 jelölőfaj: *Rhysodes sulcatus*, *Lucanus cervus*, *Osmoderma eremita*, *Cucujus cinnaberinus*, *Cerambyx cerdo*), 2 fokozottan védett (*O. eremita*, *Eurythyrea quercus*) és 25 védett.

Faunisztikai szempontból kiemelendő fajok: ***Omoglymmius germari*** – Hazánkban a Dunától keletre két pontról volt ismert, Tarnalelesz: Szállás-verő-hegy (Kovács et al. 2009) és Recsk: Cserepes-tető (Kovács et al. 2010, 2012). Bükki lelőhelye Miskolc: Kerek-hegy. Az imágó elhalt, gombás, fekvő *Fagus sylvatica* törzsből került elő (hasonlóan, mint a Szállás-verő-hegyi), a Cserepes-tetőn *Acer pseudoplatanus* hatalmas odvának farészében voltak a példányok. ***Rhysodes sulcatus*** – Az Északi-középhegységben a következő helyekről ismert: Parád (Kuthy 1897), Répáshuta (Ádám 1994), [Háromhuta:] István-kút, Miskolc: Garadna-völgy, Nagyvisnyó: Hármas-teber (Szél 1996), Cserépfalu: Közép-szék (Kovács et al. 2012), Váraszó: Lúgzós (Kovács 2013). A fenti öt Lillafüred környéki lelőhelyén kívül még egy további bükki ponton is megtaláltuk: Mályinka: Látó-kövek, 2014.06.05., I, *Picea abies*, BA-CsV-DG-KT. Az itteni, illetve korábbi (Kovács et al. 2012, Kovács 2013) tapasztalataink a következők: egy alkalommal került elő hatalmas *Picea abies* tuskó gombás kérge alól (a közelben idős bükkös van) és hét esetben *Fagus sylvatica* elpusztult, gombás törzséből. A hatalmas bükktörzsek valamennyien nedves állapotúak, viszonylag puhák voltak, egy lábon állt, a további hat feküdt. A cikkben közölt élőhelyeinek életkora 106 és 166 év közötti. ***Osmoderma eremita*** – Újabb 4 pontról került elő a Bükkből. Lelőhelyei közül 3 kocsánytalan tölgyes (ezt a faj által kedvelt élőhelytípust Kovács & Németh (2010) korábban a mátrai és bükki új adatok kapcsán is kiemelte), egy pedig molyhos tölgyes. Az erdőállományok gerinc közeli helyzetűek, életkoruk 146 és 186 év közötti. Mind a négy területen sikerült bizonyítani az *Eurythyrea quercus* jelenlétét is. ***Coraebus undatus*** – Az Északi-középhegységben három pontról ismert: Isaszeg, Máriabesnyő, Pécel (Muskovits & Hegyessy 2002). Egyetlen példányát a Demény-hegy idős kocsánytalan tölgyesében találtuk. ***Pycnomerus terebrans*** – Az Északi-középhegységben négy pontról ismert: Máriabesnyő, Pécel, Tolcsva (Ślipiński & Merkl 1993), Parád: Som-hegy (Kovács et al. 2010). Az Alsó-Sebes-víznél hatalmas *Fagus sylvatica* törzsben találtuk, a Som-hegyen *Acer platanoides* vastag törzságában volt. Az idén a Mátrából több példánya gombás *Quercus petraea* (Mátrafüred: Menyecske-hegy, 2015.06.10., KT; Parád: Mraznica-tető, 2015.11.11., KT), illetve *Pinus nigra* (Gyöngyössolymos: Tarma-oldal, 2015.11.24, UL) kéreg alól került elő. ***Prostomis mandibularis*** – Az Északi-középhegységben az alábbi pontokról ismert: Parád (Kuthy 1897), Háromhuta: István-kút, Putnok, Sátoraljaújhely: Bibérc (Merkl et al. 2006), Parád: Disznó-tető, Som-hegy (Kovács et al. 2010), Felsőtárkány: Sándor-hegy-alja (Kovács 2013). A Bükk kilenc új területéről sikerült kimutatni. Az itteni, illetve korábbi (Kovács et al. 2010, Kovács 2013) tapasztalataink a következők: kétszer *Fagus sylvatica*, egyszer *Quercus pubescens*, 22 esetben pedig *Q. petraea* fekvő törzséből került elő. Valamennyi tögyfa kívül kemény, belül pedig vörös korhadásos volt. Több alkalommal találtuk *Aesalus scarabaeoides*, *Gnorimus variabilis*, *Ampedus nigerrimus* és *A. praeustus* társaságában. Az itt közölt élőhelyek kora 106 és 186 év közötti.

A következő fajok újak a Bükk hegység faunájára: *Omoglymmius germari*, *Coraebus undatus*, *Ampedus elegantulus*, *Pycnomerus terebrans*.

Harmincegy fajnál a tápnövényeket – számuk 12 – is megadtuk. A *Cucujus cinnaberinus* esetében a korábbihoz hasonló módon jártunk el (Kovács et al. 2009). A *Bolitophagus interruptus* mindkét lelőhelyén idős bükkön levő *Fomes fomentarius* elhalt termőtestéből került elő.

Az alábbi természetközeli állapotú területeket lehet kiemelni értékes bogárfaunájuk alapján: Alsó-Sebes-víz, Demény-hegy, Fehér-kő-bérc, Kerek-hegy, Kis-kút-bérc, Kovács-kő, Olvasztó-tető, Savós-tető, Sebes-tető, Vesszős-oldal, Vörös-kő-tető. Ezeknek az elsősorban

szaproxilofág bogárritkaságokban gazdag refúgium jellegű élőhelyeknek (optimális mennyiségű holt- és odvas fa) fenn kell maradnia a biodiverzitás tér és idő folytonossága érdekében!

Köszönetnyilvánítás: Értékes segítségéért fogadja köszönetünket Magos Gábor, Papp Viktor Gábor, Schmotzer András és Sulyok József (Bükki Nemzeti Park Igazgatóság, Eger) és Petr Svácha (Institute of Entomology, Czech Academy of Sciences, Èeské Budìjovice), aki meghatározta a *Saperda scalaris* lárváját.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 63–71

Presence of two extant genera of dusty lacewings (Neuroptera: Coniopterygidae) in Baltic amber, with remarks on some earlier described fossil taxa

György Sziráki & Carsten Gröhn

Abstract: Two specimens determined as *Semidalis fritschi* (Enderlein, 1930) and a *Parasemidalis* sp. from the considerable amber collection with insect inclusions of the second author are discussed. Moreover, it is pointed out that *Heminiphetia* Enderlein, 1930 is a junoir synonym of *Semidalis* Enderlein, 1905, *Gallosemidalis* Nel, Perrichot & Azar, 2005 is a junior synonym of *Parasemidalis* Enderlein, 2005, while the Cretaceous genus *Libanosemidalis* Azar, Nel & Solignac, 2000 closely related to *Parasemidalis*. Paratype of *Gallosemidalis eocenica* Nel, Perrichot & Azar, 2005 belongs to the genus *Coniopteryx*, and it is the eldest known representative of this genus. *Hemisemidalis sharovi* Meinander, 1975 is a *Parasemidalis* species, and *H. kulickae* Dobosz & Krzemiñski, 2000 also not a *Hemisemidalis* Meinander, 1972, but with high probability belongs to a hitherto undescribed fossil coniopterygid genus.

Introduction

Regarding the countless lumps of Baltic amber with insect inclusions, the number of Neuroptera fossils preserved in this manner is surprisingly low. Such remainings of Coniopterygidae turned up sporadically as well. The first species representing this lacewing family, namely the *Coniopteryx timidus* (Hagen, 1856), was published in the middle of the 19th century. The next one (*Archiconiocompsa prisca* Enderlein, 1910) was described more than fifty years later, while the other five species (*Archiconis electrica* Enderlein, 1930, *Heminiphetia fritschi* Enderlein, 1930, *Hemisemidalis sharovi* Meinander, 1975, *Hemisemdalis kulickae* Dobosz & Krzeminski, 2000 and *Geroconiocompsa ostara* Engel, 2010) within the subsequent one-hundred years. Moreover, apart from the *Archiconiocompsa prisca*, no additional specimens of these species were reported until the present (2015) year. This circumstance emphasizes the importance of the second author's private collection, with a considerable number of Baltic amber coniopterygids, from which photographs of five adults and a larva will be given in a new book (Gröhn in press).

In the present paper taxonomic evaluations of two specimens of the above mentioned collection are given. Besides, these investigations offer a possibility to discuss the taxonomic position of some earlier described Baltic amber coniopterygid allied to (or identical with) the examined taxa.

Material and methods

The material investigated housed now in the private collection of Carsten Gröhn, Glinde, Germany, but in the future it will be deposited in Geologisch-paläontologisches Museum der Universität Hamburg.

The camera used was a Canon EOS 450D, while the microscope was Zeiss with Luminar-lens 40 mm 1:4/A0,13 and 16mm/A0,2.

As the wing venation regards, we follow the generally accepted terminology of KILLINGTON (1936) – including the abbreviations, while in the case of the female external genitalia we agree the interpretation of TJEDER (1957).

Systematic part

Semidalis Enderlein, 1905

Large genus, with somewhat more than 70 recent, and with one subfossil (copal) species. Worldwide distributed, with exception of the Australian and Oceanian Regions. Its diversity is the largest in the Neotropic Region, while only two species are living in the arboreal zone of the Palaearctic Region, and only one in Madagascar. The genus was based on *Coniopteryx aleyrodiformis* Stephens, 1836 (ENDERLEIN 1905), which may be the most widely distributed dusty lacewing species of the world, with rather large intraspecific variability. Besides, several other allied recent genera were described in the first three decades of the 20th century: such as *Alema* Enderlein,1905, *Alemella* Enderlein, 1906, *Niphas* Enderlein, 1908, *Protosemidalis* Karny, 1924, *Metasemidalis* Karny, 1924, *Ahlersia* Enderlein, 1929 and *Niphetia* Enderlein, 1930. The last one has been based on *Semidalis curtisana* Enderlein, 1906, which species was regarded to be a junior synonym of *S. aleyrodiformis* by KILLINGTON (1936). Consequently, also the genus *Niphetia* was regarded to be a junior synonym of *Semidalis* Enderlein, 1905 already by this author, while the other above mentioned genera were synonymized with *Semidalis* by MEINANDER (1972). It turned out that the alterations in the position of the cross vein R_1-R_{2-3}, or R_1-Rs, as well as R_{2+3}-R_{4+5} (which were regarded as basic distinctive features of the given genera) are very variable even at intraspecific level.

At the same time, the validity of the fossil genus *Heminiphetia* Enderlein, 1930 containing the single species *H. fritschi* Enderlein, 1930 was hitherto not queried. According to the corresponding figure of the original description (ENDERLEIN 1930) the cross vein M-Cu_1 oblique in both wings, striking the stem of M very near to the fork in the fore wing, and the branch M_{3+4} in the hind wing (Fig. 1). MEINANDER (1972) stated that in the case of this fossil genus „the wing venation resembles *Neosemidalis*", though in fore wing of *Neosemidalis* the cross vein M-Cu_1 is not oblique and situated far from the fork of M. Moreover, M-Cu_1 of hind wing bit the stem of M (MEINANDER 1972, Fig. 94), or (exactly or approximately) the fork of M (MEINANDER 1972, Fig. 97E).

On the contrary, the unique distinctive feature of wing venation of the genus *Semidalis* is that cross vein M-Cu_1 oblique in both wings (as in *Heminiphetia*), striking M_{3+4} in the hind wing (also as in *Heminiphetia*), and striking the longitudinal vein M of fore wing at different points; most frequently on the branch M_{3+4} (e.g. MEINANDER 1972, Fig. 200B), not so often on the fork (e.g. MEINANDER 1972, Fig. 199C), or rarely on the stem near to the fork (Fig. 2). In the latter case do not any differences between the such specimens of recent (and subfossil) *Semidalis* species and the type specimen of the fossil „*Heminiphetia*" *fritschi*. Consequently, *Heminiphetia* Enderlein, 1930 should be regarded as a junior synonyme of *Semidalis* Enderlein, 1905. (It is worth to mention that M-Cu_1 cross vein of fore wing of *Semidalis copalina* Meunier, 1910 bit the stem of M (MEUNIER 1910, Fig. 2); nevertheless MEINANDER (1972) accept it as a *Semidalis* species.)

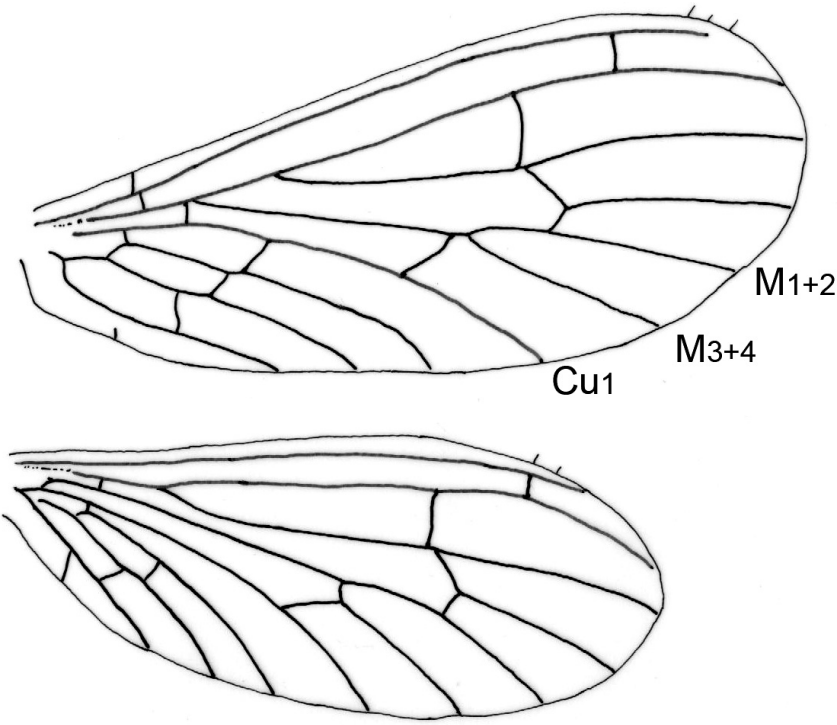

Fig. 1. Wings of the holotype of *Heminiphetia fritchi* Enderlein (after ENDERLEIN 1930, Fig. 1)

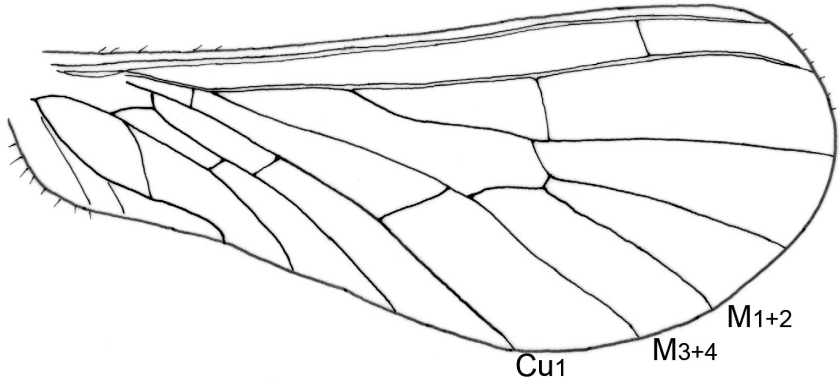

Fig. 2. Fore wing of a *Semidalis aleyrodiformis* (Stephens) specimen from Fenyőfő (Bakony Mountains, Hungary)

Besides, the frequency of the relative proximal situation of M-Cu_1 in the fore wing may be different in various species. It was not studied thoroughly, but an unpublished survay of the first author showed that 1 of 40 specimens had M-Cu_1 cross vein basally of the fork of the longitudinal vein M in a Hungarian population of *S. aleyrodiformis* (Fig. 2), and 2 of 20 specimens in the case of *S. mascarenica* Fraser, 1952 in a material from Madagascar.

Semidalis fritschi (Enderlein,1930) (Figs 3-4)

Age: Late Eocene. It is embedded in a translucent lump of Baltic amber, together with some debris and air bubbles. Inventory number: 2888.

Head – together with palpi and antennae –, as well as the legs are not visible clearly, though length of antenna ca. 1.4 mm. Mesothorax with dark shoulder spots, abdomen visible below the right fore wing. The left fore wing inversed around its longitudinal axis, right hind wing folded along the vein M. Shape of the wings is the same as in many species of *Semidalis* (e.g. as in *S. africana* Enderlein, 1906 (ENDERLEIN 1906, Fig. 14)), and the venation agrees entirely with those specimens of the genus where M-Cu_1 bit the stem of M (e.g. as in Fig. 2). Length of the fore wing 3.4 mm, of hind wing 2.7 mm. Wing membrane hyaline, without any pattern. Most of the veins medium brown, fringes short.

Remarks: The species level identification of the vast majority of coniopterygids is possible only on the basis of the examination of male genitalia. However, nowadays the species diversity regarding the genus *Semidalis* is very low on some large geographical territories (see above). Consequently, it has a considerable probability that about 40 million years ago the species diversity of this genus may be low in the amber-bearing forests of Fennoscandia as well, and the present specimen – considering also that it has not any distinctive eidonomical features, e.g. some wing patterns – belongs to the same species as the holotype of *Heminiphetia fritschi* (i.e.: *Semidalis fritschi*).

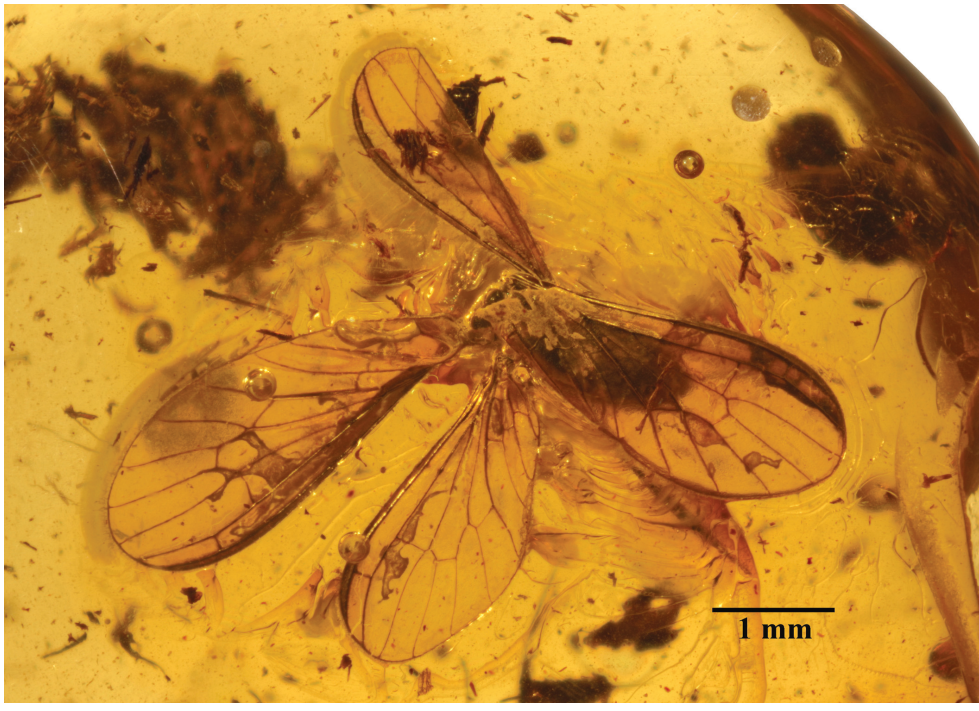

Fig. 3. *Semidalis fritschi* (Enderlein), habitus; Gröhn collection, inventory number: 2888

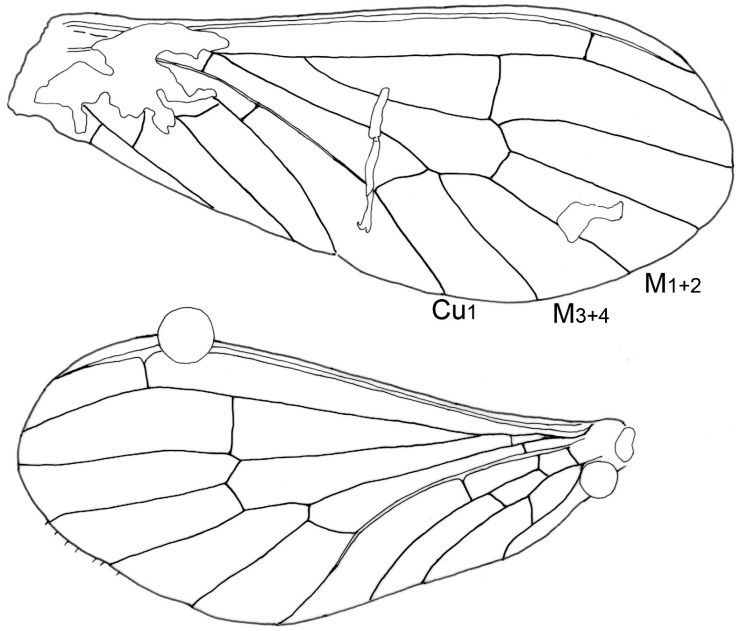

Fig. 4. *Semidalis fritschi* (Enderlein), right fore wing and left hind wing; Gröhn collection, inventory number: 2888

Parasemidalis Enderlein,1905

Small genus with 8 recent species belonging to three subgenera (Sziráki 2009): *Canarisemidalis* Sziráki, 2009, *Parasemidalis* Enderlein, 1905 s.str. and *Stangesemidalis* González Olazo, 1984. Distributed in the Palaearctic, Nearctic and Neotropic Regions.

No fossil species was hitherto assigned to the genus *Parasemidalis*. On the other hand, there are two Baltic amber coniopterygid (described in different genera), which should be regarded as *Parasemidalis*.

In his paper on fossil coniopterygids Meinander (1975) described the *Hemisemidalis sharovi* on the basis of a female specimen. In connection of the wing venation it was stated by him, that it agrees with description of the genus „except that … in the hind wing the cross-vein M-Cu_1 strikes M perpendicularly, instead of slightly obliguely, as in the earlier described species of *Hemisemidalis*…". However just this „exception" is the difference between the wing venation of genera *Hemisemidalis* and *Parasemidalis* (see Sziráki 2011, key for the genera of the subfamily Coniopteryginae p. 128–129). Therefore, the given species was the first described fossil representative of the genus *Parasemidalis*, and its correct name: *Parasemidalis sharovi* (Meinander, 1975) (new combination). (Besides, in the original description it was mentioned that the genitalia „are surrounded by some milky substance, which … makes a closer study of them impossible". Thus these structures do not offer possibility to support of any statement in connection of the identification.)

The subgeneric position of *Parasemidalis sharovi* is uncertain, first of all because the basal part of the hind wing is invisible.

More recently *Gallosemidalis eocenica* Nel, Perrichot & Azar, 2005 was described as a new genus and new species (Nel et al. 2005). In the very detailed discussion given in the original description it was stated that „…*Stangesemidalis* González Olazo, 1984 has also a base of Rs very close to that of M in hind wing and a general wing venation very similar to those of *Gallosemidalis*…", and „*Gallosemidalis* differs from *Stangesemidalis* in its pedicel only slightly longer than wide, instead of being two times longer than broad (González Olazo 1984)".

In a framework of a comparative examination of the *Parasemidalis* and *Stangesemidalis* species (Sziráki 2009) it turned out that *Stangesemidalis* is a subgenus of the genus *Parasemidalis*, rather close to the Palaearctic subgenus *Canarisemidalis* (= *P. alluaudina* group sensu Meinander 1972). There is not any differences between these two subgenera regarding the wing venation; Rs branching off from R_1 very near to the wing base of hind wing not only in *Stangesemidalis,* but also in *Canarisemidalis*, e.g. as in *Parasemidalis (Canarisemidalis) alluaudina* (Meinander 1962, Fig. 3 as *Parasemidalis canariensis*). In fact, the wing venation of *Gallosemidalis* agrees well with the wing venation not only of the Neotropical subgenus *Stangesemidalis* but also that of the Palaearctic subgenus *Canarisemidalis*. Besides, the „ellipsoidal" last segment of labial palp of *Gallosemidalis eocenica* (Nel et al. 2005) agrees well with the „swollen, egg-shaped" apical segment of palpus labialis of *Parasemidalis* (Meinander 1972).

As the length of the pedicel (the only stated distinctive feature between the *Gallosemidalis* and two subgenera of *Parasemidalis*) regards, it slightly longer than the wide in *Canarisemidalis* (as in *Parasemidalis fusca*, Meinander 1963), while in *Stangesemidalis* it may be rather variable, even at intraspecific level. According to the reexamination of the type material of *Stangesemidalis subandina* González Olazo, 1984 the pedicel 1.3-1.7 times as long as broad, while in *Parasemidalis (Stangesemidalis) enriquei* Sziráki, 2009 this ratio is 1.2-1.8 (Sziráki 2009).

Thus there is not any differences between *Gallosemidalis* and two subgenera of *Parasemidalis*. Consequently, *Gallosemidalis* Nel, Perrichot & Azar, 2005 should be regarded as a junior synonym of *Parasemidalis* Enderlein, 2005.

It is already another problem that the paratype of *Gallosemidalis eocenica* is not conspecific with the holotype of the species. Regarding the unforked vein M of the hind wing (Nel et al 2005, Fig. 3) it is clearly a *Coniopteryx* specimen, which is the eldest known representative of the genus.

In addition to the above discussed taxa, there is a further genus, with wing venation rather similar to that of the subgenera *Canarisemidalis* and *Stangesemidalis*, namely the *Libanosemidalis* Azar, Nel & Solignac, 2000 from the Lower Cretaceous amber of Lebanon. Besides, even the male terminalia of *Libanosemidalis hammanaensis* (Azar et al. 2000, Figs 2 and 3/5) are rather resembling to those of *P. (S.) enriquei* (Sziráki 2009, Fig. 28). However, the length of the longitudinal part of Sc_2 takes about 1/3 of the length of the fore wing of *Libanosemidalis*. This unusually long Sc_2, especially in the fore wing, seems to be enough to regard *Libanosemidalis* as a separate genus, thought closely related to *Parasemidalis*.

Finally, *Hemisemidalis kulickae* Dobosz & Krzemiński, 2000, the second amber species described as *Hemisemidalis*, has a hind wing with venation also very similar to that of *Parasemidalis*. On the other hand, the cross vein M-Cu_1 of the fore wing distinctly oblique, and because of this feature the fore wing venation of *H. kulickae* differs from both

Parasemidalis and *Hemisemidalis*. The single known specimen of *H. kulickae*, i. e. the holotype of the species, is really well preserved; the hairs of the abdomen, and the main structure of the female external genitalia are all well visible (Dobosz & Krzemiński 2000, Fig. 6). It seems clearly that gonapophyses laterales are small, rounded structures, without large, hooked bristles, instead of the prominent gonapophyses laterales with long, hooked bristles, characteristic for *Hemisemidalis* (e.g. in Meinander 1972 Fig. 190D). Moreover, according to Fig. 3 in the original description, the flagellomeres are conic, instead of the (short or elongated) cylindrical shape, usual in the family Coniopterygidae. Consequently, the species described as *Hemisemidalis kulickae* surely does not belong to the genus *Hemisemidalis*, but probable to an undescribed fossil genus.

Parasemidalis sp. (Figs 5-6)

Age: Late Eocene. It is embedded in a translucent lump of Baltic amber together with some debris and air bubbles. Inventory number: 2779.

The body covered by an air layer, thus pigmentation invisible. Head in lateral view about as high as broad. Eyes large. Antennae1.1 mm, light brown, 28 segmented. Scape and flagellar segments about as long as wide, pedicel somewhat longer than wide. Last segment of maxillary palpi slender. Wing membrane hyaline, veins light brown. Left hind wing inversed around the longitudinal axis, and basal half of its anterior part folded in an apically narrowing strip. Length of the fore wing 1.7 mm, of hind wing 1.4 mm. Wing venation shows the

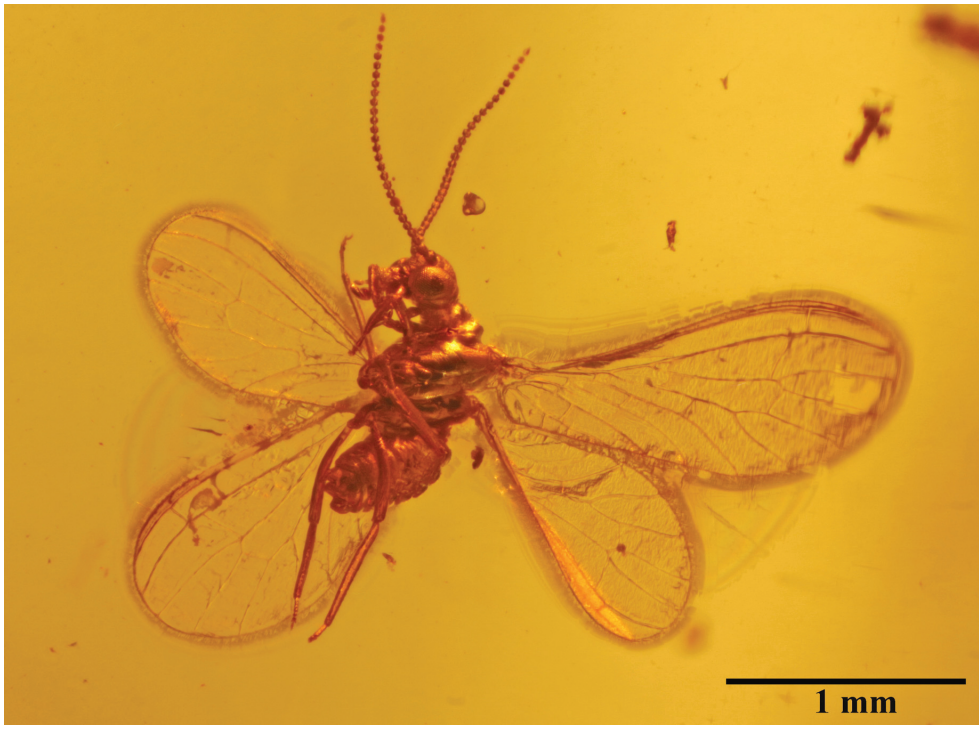

Fig. 5. *Parasemidalis* sp., habitus; Gröhn collection, inventory number: 2779

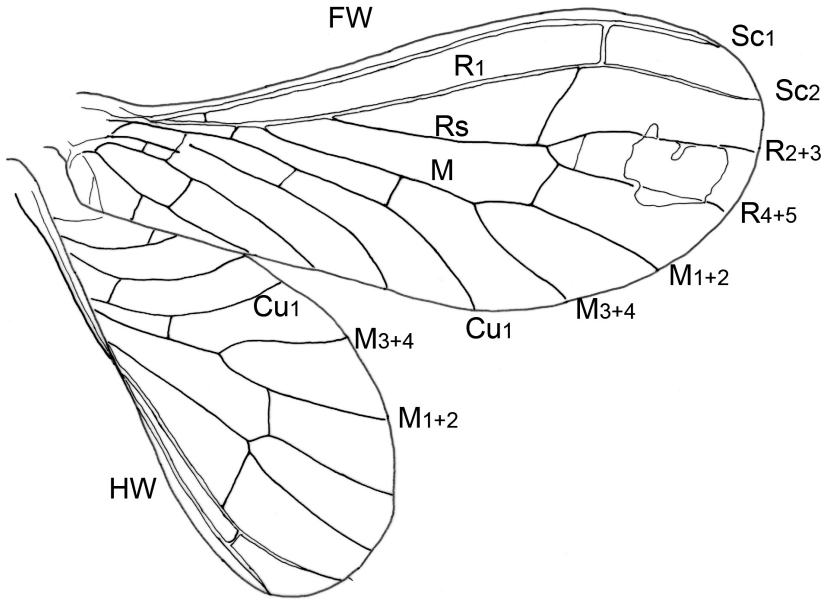

Fig. 6. *Parasemidalis* sp., right wings; Gröhn collection, inventory number: 2779.
FW = fore wing, HW = hind wing

distinctive features of the genus, i.e.: veins Rs and M forked in both wings, cross vein M-Cu_1 strikes the latter in right angle in fore wing, this cross vein is transverse (not oblique) in hind wing and situated well before the fork of M, Rs originates basally of the middle of hind wing, and basal parts of R and M fused. Cross vein R-M bit M_{1+2} distinctly apically from the fork in the fore wing, while Rs originates rather far from the wing base in the hind wing. Fringes short. The extra cross vein in left fore wing between the two branches of Rs clearly is an aberration. The examined specimen is a female. Ectoproct in its terminalia rounded, gonapophyses laterales seems to be stalked, as in *P. similis* Ohm, 1986 (MEINANDER 1972, Fig. 183C, as *Parasemidalis* sp.1). Eighth sternite strongly sclerotized. (This feature is characteristic for the genus.)

Subgeneric position of the species to wich the examined specimen belongs is uncertain, but because of the shape of the head capsule and the position of branching off of Rs it is closer to the *Parasemidalis* s.str. than to the two others. On the other hand, the situation of the cross vein R-M agrees that of the species of subgenus *Canarisemidalis*. (However, this character seems not to be entirely constant: in some cases cross vein Rs-M striking M_{1+2} in fore wing in *Parasemidalis (Parasemidalis) fuscipennis* (KILLINGTON 1936, Fig. 55B) also.)

However, the shape of the head of *Parasemidalis sharovi* was not discussed in the original description, and the basal part of the hind wing partly absent, partly covered by the fore wing, the apical part of its hind wing distinctly tapering, while in the examined specimen it is widely rounded. Thus, the latter one surely is not conspecific with *P. sharovi*. On the other hand – in our opinion – the available eidonomical features are not enough to describe it as a new species.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 73–76

Megachile sculpturalis Smith, 1853 in Hungary (Hymenoptera, Megachilidae)

Tibor Kovács

Dedicated to the memory of László Móczár (1915–2015)

Abstract: *Megachile sculpturalis* Smith, 1853 is recorded for the first time in Hungary.

Several interesting insects species thrive in the Orczy Garden of the Mátra Museum in Gyöngyös (Hungary), including protected beetles such as *Aegosoma scabricorne* (Kovács & Hegyessy 1997, 1998), *Oryctes nasicornis* (Csóka et al. 2010), and *Elater ferrugineus* (6 May 2013, dead specimen found in rot hole of *Tilia cordata*, leg. T. Gurúz, T. Kovács). On July, 2015, eight to ten hymenopterans flying around a tree were spotted (Fig. 1a). From a distance they were thought to be hornets (*Vespa crabro*) because of their large size; however, with a closer look they resembled leaf-cutter bees (*Megachile*) pictured in the book "Rovarok közelről" (Móczár 1957) which was one of my favourite books in my childhood (Fig. 1b). One specimen was captured and was found to belong to *Megachile sculpturalis* Smith, 1853 (Fig. 1c). The species is missing from the Hungarian checklists (Józan 2011). Its collecting data are as follows: Gyöngyös, Orczy-kert, N 47°47'05.8", E 19°56'03.2", 174 m, 17 July 2015, 1 male, leg. T. Kovács. The voucher specimen is deposited in the Hymenoptera Collection of Hungarian Natural History Museum, Budapest.

Megachile sculpturalis is native in East Asia (China, Korea, Taiwan, Japan) (Iwata 1933, Wu 2006), and was introduced to several countries. It was first found in North America in 1994 (Mangum & Brooks 1997), and since then expands rapidly (cf. Vereecken & Barbier 2009, Gihr & Westrich 2013, Quaranta et al. 2014). In Europe, it was observed for the first time in Allauch, France (Vereecken & Barbier 2009), then found in Verbania, Italy in 2009 (Quaranta et al. 2014), in Ascone, Switzerland in 2010 (Amiet 2012), and in Les Mées, France in 2012 (Gihr & Westrich 2013). Gogala (2014) mentions it as a species expected to appear in Slovenia. The European localities are depicted in Fig. 2.

The life history of the species is well known, so only a few details are given here. The bees were buzzing around a barkless, 75 cm long and 30 cm wide dead limb of common hackberry (*Celtis occidentalis*) 185 cm above ground. Boreholes of *Aegosoma scabricorne* (Coleoptera: Cerambycidae) were present on the dead limb. The bees constructed their brood cells in these tunnels (Fig. 1d). Of the 11 holes they sealed 4 in the summer. Two days after the first observation the number of the bees started to decline, but until 5 August 2015 a few individuals always flew around the tree if the weather was favourable. The last bee was seen on 24 August 2015. A compound of artificial nesting blocks with many holes suitable for nesting bees has been built in an open place 20 m from the tree, but the bees did not colonise it.

Fig. 1a = Nesting site of *Megachile sculpturalis* on *Celtis occidentalis*,
1b = four *M. sculpturalis* around a dead limb, **1c** = the captured specimen of *M. sculpturalis*,
1d = boreholes of *Aegosoma scabricorne* sealed by *M. sculpturalis*,

It is unknown that the presence of this population in Hungary is a result of the expansion from the known sites (France, Italy, Switzerland) or from an unknown origin. As data from North America show *Megachile sculpturalis* is able to easily colonise new habitats.

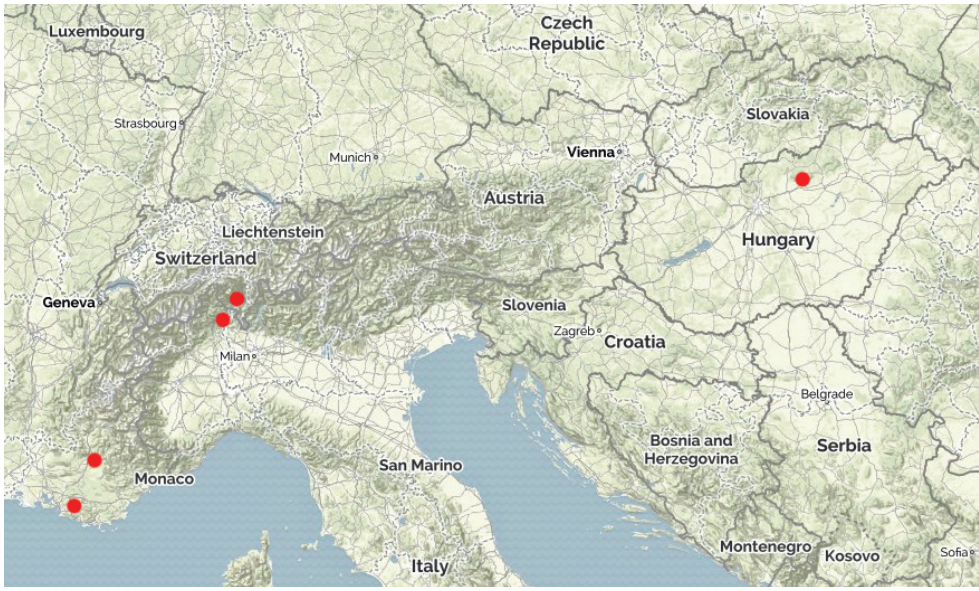

Fig. 2. Localities of *Megachile sculpturalis* in Europe (www.mapquest.com)

Acknowledgements: Thanks are due to Ottó Merkl (Hungarian Natural History Museum, Budapest) for English translation, Zsolt Józan (Mernye) for information and Zoltán Vas (Hungarian Natural History Museum, Budapest) for advice.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 77–83

Faunisztikai adatok a Mátrában előforduló levélaknázók parazitoidjainak ismeretéhez (Hymenoptera)

Szőcs Levente, Thuróczy Csaba, George Melika & Csóka György

Abstract: (Faunistic data on the leaf miner parasitoid species composition occurring in the Mátra region (Hymenoptera).) We have studied the parasitoid complexes of various leaf miners during four years (2011–2014). From 44 host species collected in the Mátra region, 59 parasitoid species were reared and identified. In this paper we report the faunistic data of the identified parasitic Hymenoptera species.

Bevezetés

A 2011-ben elnyert OTKA pályázat (OTKA 84096) egyik céljaként az erdei ökoszisztémák többszintű interakcióinak vizsgálatát tűztük ki. Modellcsoportként a levélaknázókat választottuk, mivel tápnövény-specialista életmódjuk és parazitoid együtteseik fajgazdagsága miatt alkalmasnak tekinthetők a trófikus szintek közötti interakciók tanulmányozására (Price 1991, Rott & Godfray 2000, Lopez-Vaamonde et al. 2005, Ives & Godfray 2006, Valladares et al. 2006, Hirao & Murakami 2007, Salvo et al. 2011, Connor & Taverner 2012).

A hazai őshonos levélaknázó-fauna parazitoidjainak összetételével célirányosan csak kevés hazai szakirodalom foglalkozik (Erdős 1956, Szőcs 1958, 1979, Szőcs et al. 2013, 2014).

Jelen cikkünkben a 2011 és 2014 között a Mátrában gyűjtött levélaknázókból kinevelt Hymenoptera parazitoidfajok faunisztikai adatait tesszük közzé.

Anyag és módszer

Az aknával fertőzött leveleket (Lepidoptera, Coleoptera, Hymenoptera és Diptera) eltávolítottuk a növényről, azt helyszínnel és dátummal megjelölt zárható fóliába tettük. A minta érkezésekor az előkészítés és a fiolázás azonnal megtörtént. A nevelésre való előkészítéskor az aknákat sérülésmentesen kiemeltük a levélből, és pár óra felszíni szárítás után a fiolákba helyeztük. A kikelt imágókat az akna sorszámával ellátott fiolába tettük. A kikelt parazitoidokat 96% etilalkoholban, míg az aknázók imágóit vattában tároljuk a NAIK ERTI Mátrafüredi Kísérleti állomásán. A kikelt parazitoidokat Dr. George Melika és Dr. Thuróczy Csaba határozta fajra, ha ez nem volt lehetséges, akkor genusz vagy család szintre. A parazitoidok neveit a Noyes-féle Chalcidoidae Nemzetközi Adatbázisnak (Noyes 2015) megfelelően használtuk.

Az adatsorban a kikelt példány száma és neme után a gazda, zárójelben pedig a gazda tápnövényének latin neve következik.

Faunisztikai eredmények

Eulophidae (Westwood, 1829)

Achrysocharoides (Girault, 1913) sp. – Mátrafüred: Bene-hát, 2011.07.25., 1♂, *Stigmella* sp. (*Pyrus pyraster*); Menyecske-hegy, 2011.07.18., 1♂, Hymenoptera sp. (*Spiraea media*) – Nyírjes, 2011.07.25., 2♂, *Phyllonorycter maestingella* (*Fagus sylvatica*).

Achrysocharoides altilis (Delucchi, 1954) – Mátrafüred: Abasári u., 2011.06.28., 1♀, *Phyllonorycter comparella* (*Populus alba*).

Achrysocharoides cilla (Walker, 1839) – Galyatető, 2013.06.15., 6♀, 1♂, *Phyllonorycter maestingella* (*Fagus sylvatica*) – Mátrafüred: Abasári u., 2011.06.07., 2♀, 3♂, *P. comparella* (*Populus alba*); 2011.06.28., 1♂, *P. comparella* (*P. alba*); Bene-hát, 2011.06.16., 1♀, 1♂, *P. roboris* (*Quercus petraea*); 2011.06.21., 1♀, *P. heegeriella* (*Q. petraea*); 2011.06.21., 1♀, *P. quercifoliella* (*Q. petraea*); Hegyalja u., 2011.07.14., 1♂, *Profenusa pygmaea* (*Q. cerris*); Menyecske-hegy, 2011.06.07., 2♀, 2♂, *P. pygmaea* (*Q. petraea*); 2011.06.07., 5♀, 4♂, *P. comparella* (*P. alba*); Templomkert, 2013.07.17., 1♀, *P. issikii* (*Tilia cordata*) – Mátraháza, 2013.06.05., 3♀, 3♂, *P. maestingella* (*F. sylvatica*).

Achrysocharoides latreillii (Curtis, 1826) – Mátrafüred: Hegyalja u., 2014.10.07., 3♀, *Phyllonorycter ilicifoliella* (*Quercus cerris*); Peresi erdészház, 2013.05.29., 1♂, *P. quercifoliella* (*Q. petraea*); 2013.05.29., 1♂, *P. heegeriella* (*Q. petraea*); 2013.05.29., 2♀, *Phyllonorycter* sp. (*Q. petraea*); Templomkert, 2014.06.17., 1♂, *P. roboris* (*Q. petraea*); 2014.08.12., 1♀, *P. quercifoliella* (*Q. petraea*).

Achrysocharoides robiniae (Hansson et Shevtsova, 2010) – Mátrafüred: Hegyalja u., 2014.10.07., 1♀, *Phyllonorycter quercifoliella* (*Quercus petraea*); Templomkert, 2014.08.12., 3♂, *Macrosaccus robiniella* (*Robinia pseudoacacia*).

Achrysocharoides scaposa (Erdős, 1961) ─ Mátrafüred: Menyecske-hegy, 2011.06.07., 3♀, *Phyllonorycter comparella* (*Populus alba*).

Achrysocharoides splendens (Delucchi, 1954) ─ Mátrafüred: Hegyalja u., 2013.10.21., 2♀, *Phyllonorycter nicellii* (*Corylus avellana*).

Aprostocetus (Westwood, 1833) sp. – Mátrafüred: Hegyalja u., 2011.08.08., 1♀, *Phyllonorycter quercifoliella* (*Quercus cerris*); 2013.06.11., 1♂, *P. heegeriella* (*Q. petraea*); Templomkert, 2012.06.02., 1♂, *Parna apicalis* (*Tilia cordata*).

Aprostocetus zoilus (Walker, 1839) ─ Mátrafüred: Templomkert, 2013.07.17., 1♀, *Phyllonorycter issikii* (*Tilia cordata*).

Baryscapus (Förster, 1954) sp. – Mátrafüred: Abasári u., 2011.06.28., 1♀, 2♂, *Phyllonorycter comparella* (*Populus alba*); Béke u., 2011.07.06., 1♀, *Macrosaccus robiniella* (*Robinia pseudoacacia*); 2011.07.06., 1♂, *Stigmella aceris* (*Acer pseudoplatanus*); Bene-hát, 2011.06.16., 1♂, *P. heegeriella* (*Quercus petraea*); 2011.06.16., 1♂, *P. roboris* (*Q. petraea*); 2011.06.21., 6♀, 7♂, *P. heegeriella* (*Q. petraea*); Hegyalja u., 2011.07.13., 2♂, *P. heegeriella* (*Q. petraea*); 2011.08.08., 5♀, 2♂, *P. quercifoliella* (*Q. cerris*); 2011.09.14., 1♀, *P. quercifoliella* (*Q. pubescens*); 2011.09.14., 1♂, *P. quercifoliella* (*Q. cerris*); 2011.09.14., 1♂, *Tischeria dodonaea* (*Q. petraea*); 2012.05.24., 1♂, *P. quercifoliella* (*Q. petraea*); 2012.06.04., 4♀, *P. quercifoliella* (*Q. petraea*); 2012.06.14., 1♀, 1♂, *P. roboris* (*Q. petraea*); 2012.06.14., 1♀, *P. heegeriella* (*Q. petraea*); 2012.06.20., 1♂, *T. ekebladella* (*Q. petraea*); 2012.08.29., 2♀, *P. roboris* (*Q. petraea*); 2012.09.27., 1♀, *T. ekebladella* (*Q. petraea*); Ifjúsági tábor, 2012.09.27., 1♂, *T. decidua* (*Q. petraea*); Menyecske-hegy, 2011.05.07., 1♂, *P. quercifoliella* (*Q. petraea*); 2011.05.12., 1♂, *P. roboris* (*Q. petraea*); 2011.05.17., 1♂, *P. heegeriella* (*Q. petraea*); 2011.06.07., 1♂, *P. comparella* (*P. alba*); 2011.07.18., 1♂, Hymenoptera sp. (*Spiraea media*); 2011.07.20., 5♀, 6♂, *T. ekebladella* (*Q. petraea*) – Mátraháza, 2012.08.13., 1♀, *T. ekebladella* (*Q. petraea*); 2012.08.13., 3♀, *P. heegeriella* (*Q. petraea*) – Mátraszőlős, 2012.05.11., 1♀, *Acrocercops brongniardella* (*Q. petraea*); 2012.05.11., 2♀, 1♂, *Rynchenus* sp. (*Q. pubescens*) – Nyírjes, 2011.07.25., 10♀, 1♂, *P. maestingella* (*Fagus sylvatica*).

Baryscapus nigroviolaceus (Nees, 1834) – Szurdokpüspöki, 2013.07.22., 1♀, *Phyllonorycter platani* (*Platanus acerifolia*).

Chrysocharis (Förster, 1856) sp. – Mátrafüred: Hegyalja u., 2012.06.04., 1♀, *Stigmella* sp. (*Crataegus monogyna*); Menyecske-hegy, 2012.06.04., 2♂, *Paralelomma vittatum* (*Polygonatum officinale*); Templomkert, 2014.06.03., 7♂, *Profenusa pygmaea* (*Quercus petraea*); 2014.08.12., 1♀, *Tischeria ekebladella* (*Quercus petraea*).

Chrysocharis laomedon (Walker, 1839) – Galyatető, 2013.06.15., 1♂, *Phyllonorycter quercifoliella* (*Quercus petraea*) – Mátrafüred: Templomkert, 2014.06.03., 1♀, *P. issikii* (*Tilia cordata*); 2014.08.12., 1♀, *P. cerasicolella* (*Prunus cerasi*); 2014.08.25., 1♀, *Phyllonorycter issikii* (*T. cordata*) - Mátraháza, 2013.06.05., 1♀, *P. maestingella* (*Fagus sylvatica*).

Chrysocharis cf. ***nephereus*** (Walker, 1839) – Gyöngyössolymos: 106/B erdőrészlet, 2014.08.18., 2♀, *Phyllonorycter roboris* (*Quercus petraea*).

Chrysocharis nephereus (Walker, 1839) – Galyatető, 2013.06.15., 2♂, *Phyllonorycter maestingella* (*Fagus sylvatica*) ─ Gyöngyössolymos: 84 erdőrészlet, 2012.07.03., 2♀, 2♂, *Tischeria ekebladella* (*Quercus petraea*) – Mátrafüred: Hegyalja u., 2012.06.04., 1♀, *P. roboris* (*Q. petraea*); 2012.06.20., 2♂, *T. ekebladella* (*Q. petraea*); 2012.06.29., 7♀, 3♂, *T. ekebladella* (*Q. petraea*); 2012.07.17., 1♀, *T. dodonaea* (*Q. cerris*); Templomkert, 2014.06.19., 1♀,

2♂, *Cameraria ohridella* (*Aesculus hyppocastanum*)**;** 2014.06.19., 2♀, *C. ohridella* (*A. hyppocastanum*)**;** 2014.06.19., 3♀, 1♂, *C. ohridella* (*A. hyppocastanum*)**.**

Chrysocharis cf. ***nitidifrons*** (Graham, 1963) – Gyöngyössolymos: 7/A erdőrészlet, 2013.09.27., 6♀, 4♂, *Heteranthrus vagans* (*Alnus glutinosa*) – Mátrafüred: Peresi erdészház, 2013.05.29., 4♀, 2♂, *Orchestes pilosus* (*Quercus cerris*).

Chrysocharis nitetis (Walker, 1839) ─ Mátrafüred: Menyecske-hegy, 2012.06.04., 2♀, 1♂, *Profenusa pygmaea* (*Quercus petraea*).

Chrysocharis pentheus (Walker, 1839) – Mátrafüred: Abasári u., 2013.06.25., 1♂, *Phyllonorycter comparella* (*Populus alba*); Bene-hát, 2011.06.16., 1♀, *P. roboris* (*Quercus petraea*); 2011.06.21., 2♀, *P. heegeriella* (*Q. petraea*); 2013.05.29., 1♀, *Caloptilia* sp. (*Q. petraea*); Hegyalja u., 2012.05.24., 1♀, *Stigmella paradoxa* (*Crataegus monogyna*); 2013.05.02., 1♀, *Eriocrania subpurpurella* (*Q. petraea*); 2013.07.17., 1♀, *Tischeria ekebladella* (*Q. cerris*); Menyecske-hegy, 2012.05.09., 1♀, Diptera sp. (*Doronicum hungaricum*); 2012.06.04., 1♂, *Stigmella pyri* (*Pyrus pyraster*); Peresi erdészház, 2013.05.29., 1♀, *Phyllonorycter* sp. (*Q. petraea*); 2013.05.29., 1♀, *P. quercifoliella* (*Q. petraea*); 2013.05.29., 2♀, *P. roboris* (*Q. petraea*); 2014.06.11., 1♀, *Fenusa dohrnii* (*Alnus glutinosa*); Templomkert, 2013.07.17., 4♀, *T. ekebladella* (*Q. petraea*) – Mátraháza, 2013.06.05., 2♀, *P. maestingella* (*Fagus sylvatica*).

Chrysocharis phryne (Walker, 1839) – Mátrafüred: Hegyalja u., 2014.10.07., 1♀, *Phyllonorycter lautella* (*Quercus petraea*).

Cirrospilus (Westwood, 1832) sp. – Mátrafüred: Templomkert, 2012.06.26., 1♀, *Stigmella* tiliae (*Tilia cordata*).

Cirrospilus (Westwood, 1832) sp. „**A**" – Mátrafüred: Templomkert, 2014.06.19., 207♀, 128♂, *Cameraria ohridella* (*Aesculus hyppocastanum*).

Cirrospilus elegantissimus (Westwood, 1832) – Mátrafüred: Abasári u., 2011.06.07., 1♀, *Phyllonorycter comparella* (*Populus alba*); 2011.06.28., 1♂, *P. comparella* (*P. alba*); Bene-hát, 2011.06.21., 5♀, *P. heegeriella* (*Quercus petraea*) – Nyírjes, 2011.07.25., 1♀, *P. maestingella* (*Fagus sylvatica*).

Cirrospilus elongatus (Boucek, 1959) – Mátraháza, 2012.08.13., 1♀, *Phyllonorycter quercifoliella* (*Quercus petraea*).

Cirrospilus lyncus (Westwood, 1838) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 1♀, *Phyllonorycter lautella* (*Quercus petraea*); 2014.09.04., 1♀, *P. roboris* (*Q. petraea*); 106/B erdőrészlet, 2014.08.18., 2♀, *P. roboris* (*Q. petraea*) – Mátrafüred: Hegyalja u., 2012.05.24., 5♀, *P. quercifoliella* (*Q. petraea*); 2012.06.14., 3♀, *P. roboris* (*Q. petraea*); 2012.07.17., 1♀, *P. roboris* (*Q. petraea*); 2012.08.28., 1♀, *P. roboris* (*Q. petraea*); 2012.08.29., 1♀, *P. roboris* (*Q. petraea*); 2013.06.11., 1♀, *P. quercifoliella* (*Q. petraea*); 2013.06.11., 1♀, *P. heegeriella* (*Q. petraea*); 2014.10.07., 1♀, *P. heegeriella* (*Q. petraea*); Menyecske-hegy, 2011.05.09., 1♂, *P. roboris* (*Q. petraea*); 2011.05.12., 1♂, *P. heegeriella* (*Q. petraea*); 2011.05.13., 1♀, *P. heegeriella* (*Q. petraea*); 2011.05.14., 1♂, *P. roboris* (*Q. petraea*); 2011.05.27., 2♀, *P. quercifoliella* (*Q. petraea*); 2011.07.20., 1♀, *P. heegeriella* (*Q. petraea*); Templomkert, 2011.05.27., 1♂, *P. issikii* (*Tilia cordata*); 2011.06.16., 1♂, *P. issikii* (*T. cordata*); 2013.07.17., 1♀, *P. issikii* (*T. cordata*); 2013.07.17., 1♀, *Tischeria. ekebladella* (*Q. petraea*); 2014.08.12., 1♀, *T. ekebladella* (*Q. petraea*).

Cirrospilus viticola (Rondani, 1877) – Mátrafüred: Bene-hát, 2011.06.21., 1♀, *Phyllonorycter heegeriella* (*Quercus petraea*); Menyecske-hegy, 2011.05.13., 1♀, *P. quercifoliella* (*Q. petraea*); 2011.06.07., 1♀, *P. quercifoliella* (*Q. petraea*); 2011.06.07., 1♀, *P. roboris* (*Q. petraea*); Templomkert, 2013.09.01., 2♀, *P. issikii* (*Tilia cordata*).

Cirrospilus vittatus (Westwood, 1913) – Mátrafüred: Hegyalja u., 2011.08.08., 1♀, *Phyllonorycter quercifoliella* (*Quercus cerris*).

Closterocerus trifasciatus (Westwood, 1833) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 1♀, *Phyllonorycter roboris* (*Quercus petraea*) – Mátrafüred: Abasári u., 2011.06.28., 1♀, *P. comparella* (*Populus alba*); Bene-hát, 2011.06.21., 1♀, 1♂, *P. quercifoliella* (*Q. pubescens*); 2011.06.21., 5♀, *P. heegeriella* (*Q. petraea*); Hegyalja u., 2011.07.13., 1♂, *Profenusa pygmaea* (*Q. petraea*); 2011.07.15., 1♂, *P. roboris* (*Q. cerris*); 2011.07.18., 1♀, *P. roboris* (*Q. cerris*); 2012.06.20., 4♀, *P. roboris* (*Q. petraea*); Templomkert, 2014.06.19., 32♀, 22♂, *Cameraria ohridella* (*Aesculus hyppocastanum*); 2014.08.12., 1♀, *Tischeria ekebladella* (*Q. petraea*).

Conomorium patulum (Walker, 1835) – Mátrafüred: Hegyalja u., 2013.06.11., 1♀, *Phyllonorycter quercifoliella* (*Quercus petraea*).

Elachertus (Spinola, 1811) sp. – Mátrafüred: Templomkert, 2014.06.19., 5♂, *Cameraria ohridella* (*Aesculus hyppocastanum*); 2014.08.25., 1♀, *Phyllonorycter issikii* (*Tilia cordata*).

Minotetrastichus frontalis (Nees, 1834) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 1♀, *Phyllonorycter roboris* (*Q. petraea*); 2014.09.04., 2♀, *P. lautella* (*Q. petraea*); 2014.09.04., 7♀, 1♂, *P. heegeriella* (*Q. petraea*); 106/B erdőrészlet, 2014.08.18., 2♂, *P. roboris* (*Q. petraea*); 2014.10.01., 2♀, *P. heegeriella* (*Q. petraea*) – Mátrafüred: Bene-hát, 2011.06.21., 3♀, *P. heegeriella* (*Q. petraea*); Hegyalja u., 2012.06.04., 1♀, *Stigmella* sp. (*Crataegus monogyna*); 2014.09.23., 3♀, *P. roboris* (*Q. petraea*); 2014.10.07., 1♀, 2♂, *P. roboris* (*Q. petraea*);

2014.10.07., 3♂, *P. heegeriella* (*Q. petraea*); Menyecske-hegy, 2011.07.08., 3♀, *P. roboris* (*Q. petraea*); Templomkert, 2013.07.17., 2♀, 4♂, *P. issikii* (*Tilia cordata*); 2013.09.01., 3♀, 1♂, *P. issikii* (*T. cordata*); 2014.05.26., 11♀, *Phyllonorycter issikii* (*T. cordata*); 2014.06.19., 219♀, 110♂, *Cameraria ohridella* (*Aesculus hyppocastanum*); 2014.08.11., 1♀, *P. issikii* (*T. cordata*); 2014.08.12., 1♀, *Tischeria ekebladella* (*Q. petraea*); 2014.08.25., 14♀, *P. issikii* (*T. cordata*); 2014.09.23., 2♀, 2♂, *P. issikii* (*T. cordata*); 2014.09.23., 4♀, *P. issikii* (*T. cordata*) – Mátraháza, 2013.06.05., 1♀, *P. maestingella* (*Fagus sylvatica*) – Szurdokpüspöki, 2013.07.22., 6♀, *P. platani* (*Platanus acerifolia*).

Neochrysocharis formosus (Westwood, 1833) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 1♀, *Phyllonorycter lautella* (*Quercus petraea*) – Mátrafüred: Hegyalja u., 2011.07.05., 1♀, *P. roboris* (*Q. petraea*); 2011.07.05., 1♀, *Tischeria ekebladella* (*Q. petraea*); 2012.06.14., 1♀, *P. heegeriella* (*Q. petraea*); 2012.06.20., 2♀, 3♂, *P. quercifoliella* (*Q. petraea*); 2012.06.20., 5♀, 3♂, *P. roboris* (*Q. petraea*); 2012.07.17., 5♀, 5♂, *P. quercifoliella* (*Q. petraea*); 2013.07.17., 4♀, *P. roboris* (*Q. petraea*); Menyecske-hegy, 2011.07.18., 1♂, Hymenoptera sp. (*Spiraea media*); Templomkert, 2013.07.17., 10♀, 2♂, *P. roboris* (*Q. petraea*) – Nyírjes, 2011.07.25., 1♀, *P. maestingella* (*Fagus sylvatica*).

Pediobius pyrgo (Walker, 1839) – Mátrafüred: Bene-hát, 2011.06.21., 1♀, *Phyllonorycter quercifoliella* (*Quercus pubescens*); Hegyalja u., 2011.07.22., 1♀, *P. roboris* (*Q. cerris*); 2011.07.24., 1♀, *P. roboris* (*Q. cerris*).

Pediobius saulius (Walker, 1839) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 1♂, *Phyllonorycter lautella* (*Quercus petraea*); 2014.09.04., 1♂, *P. roboris* (*Q. petraea*) – Mátrafüred: Abasári u., 2013.06.25., 1♂, *P. comparella* (*Populus alba*); Bene-hát, 2011.06.21., 2♀, *P. heegeriella* (*Q. petraea*); Hegyalja u., 2011.07.13., 1♂, *Tischeria ekebladella* (*Q. petraea*); 2011.08.08., 1♀, 1♂, *P. quercifoliella* (*Q. cerris*); 2013.06.11., 1♀, *P. roboris* (*Q. petraea*); 2013.06.11., 1♂, *P. heegeriella* (*Q. petraea*); Templomkert, 2013.07.17., 1♀, *P. roboris* (*Q. cerris*); 2014.06.19., 181♀, 163♂, *Cameraria ohridella* (*Aesculus hyppocastanum*) – Mátraháza, 2012.08.13., 1♀, *P. roboris* (*Q. petraea*) – Nyírjes, 2012.08.27., 1♀, *T. ekebladella* (*Q. petraea*) – Szurdokpüspöki, 2013.07.22., 1♀, 2♂, *P. platani* (*Platanus acerifolia*).

Pnigalio agraules (Walker, 1839) – Mátrafüred: Templomkert, 2012.07.08., 1♀, *Phyllonorycter issikii* (*Tilia cordata*); 2013.07.17., 2♀, 1♂, *Tischeria ekebladella* (*Quercus petraea*); 2013.09.01., 1♂, *P. issikii* (*T. cordata*); 2014.06.19., 1♂, *Cameraria ohridella* (*Aesculus hyppocastanum*); 2014.08.12., 1♀, *T. ekebladella* (*Q. petraea*).

Pnigalio pectinicornis (Linnaeus, 1758) – Gyöngyössolymos: 84 erdőrészlet, 2012.07.03., 1♀, *Tischeria ekebladella* (*Quercus petraea*) – Mátrafüred: Bene-hát, 2011.06.16., 1♀, *Phyllonorycter heegeriella* (*Q. petraea*); 2011.06.21., 1♀, *Profenusa pygmaea* (*Q. pubescens*); Hegyalja u., 2012.06.29., 1♀, *T. ekebladella* (*Q. petraea*); Templomkert, 2013.09.01., 1♀, *Emmetia angusticollella* (*Rosa canina*); 2014.08.12., 1♂, *T. ekebladella* (*Q. petraea*).

Pnigalio soemius (Walker, 1839) – Mátrafüred: Hegyalja u., 2012.06.14., 2♀, *Phyllonorycter roboris* (*Quercus petraea*); 2012.06.20., 2♀, 1♂, *Tischeria ekebladella* (*Q. petraea*); 2014.05.05., 6♀, *Agromyza* sp. (*Doronicum hungaricum*); 2014.06.02., 1♀, *Agromyza nana* (*Trifolium* sp.); Templomkert, 2013.07.17., 1♀, 1♂, *Perittia herrichiella* (*Lonicera* sp.); 2014.08.12., 1♀, *P. schreberella* (*Ulmus minor*); 2014.08.12., 1♀, *T. ekebladella* (*Q. petraea*).

Sympiesis angustipennis (Erdős, 1934) – Mátrafüred: Bene-hát, 2011.06.16., 1♀, *Phyllonorycter heegeriella* (*Quercus petraea*); Menyecske-hegy, 2011.05.05., 1♀, *P. heegeriella* (*Q. petraea*); Templomkert, 2011.05.29., 1♀, *P. issikii* (*Tilia cordata*).

Sympiesis dolichogaster (Ashmead, 1888) – Mátrafüred: Abasári u., 2011.06.28., 1♀, *Phyllonorycter comparella* (*Populus alba*); Hegyalja u., 2011.08.08., 2♀, *P. quercifoliella* (*Quercus cerris*); 2012.05.24., 1♀, *P. quercifoliella* (*Q. petraea*); 2012.06.04., 1♀, *P. quercifoliella* (*Q. petraea*); 2012.06.14., 2♀, *P. roboris* (*Q.petraea*); 2012.06.20., 1♀, 1♂, *Tischeria ekebladella* (*Q. petraea*).

Sympiesis gordius (Walker, 1839) – Galyatető, 2013.06.15., 1♀, 1♂, *Phyllonorycter maestingella* (*Fagus sylvatica*) – Gyöngyössolymos: 84 erdőrészlet, 2014.09.04., 4♀, *P. roboris* (*Quercus petraea*) – Mátrafüred: Bene-hát, 2011.06.16., 1♂, *P. roboris* (*Q. petraea*); Hegyalja u., 2011.08.08., 1♂, *P. quercifoliella* (*Q. petraea*); 2011.08.08., 4♂, *P. quercifoliella* (*Q. cerris*); 2012.06.14., 1♀, 1♂, *P. roboris* (*Q. petraea*); 2012.06.20., 1♀, *Tischeria ekebladella* (*Q. petraea*); 2012.06.29., 3♂, *T. ekebladella* (*Q. petraea*); 2013.06.11., 1♀, *P. quercifoliella* (*Q. petraea*); 2014.09.23., 1♂, *P. roboris* (*Q. petraea*); Menyecske-hegy, 2011.05.27., 1♂, *P. quercifoliella* (*Q. petraea*); 2011.05.27., 1♂, *P. roboris* (*Q. petraea*); Templomkert, 2011.06.11., 1♂, *P. issikii* (*Tilia cordata*); 2011.06.17., 1♂, *P. issikii* (*T. cordata*); 2012.06.08., 1♂, *P. issikii* (*T. cordata*); 2013.06.11., 5♀, 1♂, *P. issikii* (*T. cordata*); 2013.07.17., 5♀, 2♂, *P. issikii* (*T. cordata*); 2014.06.17., 1♀, *P. roboris* (*Q. petraea*); 2014.08.11., 1♂, *P. issikii* (*T. cordata*); 2014.08.12., 1♀, 1♂, *P. issikii* (*T. cordata*); 2014.08.12., 1♀, *P. roboris* (*Q. petraea*); 2014.08.12., 1♀, *P. quercifoliella* (*Q. petraea*); 2014.08.25., 7♀, 5♂, *P. issikii* (*T. cordata*); 2014.09.23., 1♀, *P. issikii* (*T. cordata*); 2014.09.23., 1♀, *P. issikii* (*T. cordata*); 2014.09.23., 5♀, 3♂, *P. issikii* (*T. cordata*) – Mátraháza, 2013.06.05., 3♀, 1♂, *P. maestingella* (*F. sylvatica*) – Szurdokpüspöki, 2013.07.23., 1♀, *P. issikii* (*T. cordata*).

Sympiesis sericeicornis (Nees, 1834) – Galyatető, 2013.06.15., 1♂, *Phyllonorycter stettinensis* (*Alnus glutinosa*); 2013.06.15., 3♀, *P. maestingella* (*Fagus sylvatica*) – Gyöngyössolymos: 106/B erdőrészlet, 2014.08.18., 2♀, *P. roboris* (*Quercus petraea*) – Mátrafüred: Abasári u., 2011.06.07., 1♀, *P. comparella* (*Populus alba*); 2011.06.28., 1♀, *P. comparella* (*P. alba*); 2012.08.09., 1♀, *P. nicellii* (*Corylus avellana*); 2013.06.25., 4♀, 1♂, *P. comparella* (*P. alba*); Csepegő-forrás, 2013.06.09., 1♀, *Fenusa dohrnii* (*A. glutinosa*); Hegyalja u., 2011.08.08., 1♀, *P. quercifoliella* (*Q. cerris*); 2013.06.11., 2♀, *P. quercifoliella* (*Q. petraea*); 2014.10.07., 1♂, *P. heegeriella* (*Q. petraea*); Ifjúsági tábor, 2012.09.27., 1♀, *P. heegeriella* (*Q. petraea*); Menyecske-hegy, 2011.06.07., 1♂, *P. heegeriella* (*Q. petraea*); 2011.06.07., 2♂, *P. comparella* (*P. alba*); 2011.07.20., 1♀, *Tischeria ekebladella* (*Q. petraea*); Peresi erdészház, 2013.05.29., 1♀, *Phyllopnorycter* sp. (*Q. petraea*); 2013.05.29., 1♂, *P. quercifoliella* (*Q. petraea*); 2014.06.11., 1♀, *P. stetinensis* (*A. glutinosa*); Templomkert, 2013.09.01., 1♀, *P. issikii* (*Tilia cordata*); 2014.06.19., 1♀, *Cameraria ohridella* (*Aesculus hyppocastanum*); 2014.08.11., 1♂, *P. issikii* (*T. cordata*); 2014.08.12., 1♀, *P. acerifoliella* (*Acer campestre*); 2014.08.12., 1♀, *P. issikii* (*T. cordata*); 2014.08.12., 2♂, *P. acerifoliella* (*A. platanoides*); 2014.08.25., 17♀, 6♂, *P. issikii* (*T. cordata*); 2014.09.23., 1♀, *P. issikii* (*T. cordata*); 2014.09.23., 2♀, 3♂, *P. issikii* (*T. cordata*); 2014.09.23., 4♀, *P. issikii* (*T. cordata*) – Mátraháza, 2013.06.05., 1♀, *P. maestingella* (*F. sylvatica*) – Nyírjes, 2011.07.25., 1♀, *P. maestingella* (*F. sylvatica*).
Tetrastichus miser (Nees, 1834) – Mátraalmás, 2013.06.25., 1♀, *Orchestes testaceus* (*Alnus glutinosa*).
Zagrammosoma variegatum (Masi, 1907) – Mátrafüred: Abasári u., 2013.06.25., 1♀, *Phyllonorycter comparella* (*Populus alba*).

EUPELMIDAE (Walker, 1833)

Eupelmus urozonus (Dalman, 1820) – Mátrafüred: Templomkert, 2014.06.19, 1♂, *Cameraria ohridella* (*Aesculus hyppocastanum*).

PTEROMALIDAE (Dalman, 1820)

Semiotellus (Westwood, 1839) sp. – Mátrafüred: Ifjúsági tábor, 2013.05.16, 1♀, Diptera sp. (*Doronicum hungaricum*).

ENCYRTIDAE (Walker, 1837)

Encyrtidae (Walker, 1837) sp. – Mátrafüred: Abasári u., 2011.06.28., 19♀, *Phyllonorycter comparella* (*Populus alba*); 2012.06.26., 5♀, *P. comparella* (*P. alba*); Hegyalja u., 2011.07.16., 2♀, *P. roboris* (*Quercus cerris*); 2011.07.19., 16♀, *P. roboris* (*Q. cerris*); 2011.07.24., 10♀, *P. roboris* (*Q. cerris*); 2011.07.26., 2♀, *P. roboris* (*Q. cerris*); Menyecske-hegy, 2011.07.20., 6♀, *Tischeria ekebladella* (*Q. petraea*).
Ageniaspis testaceipes (Ratzeburg, 1848) – Mátrafüred: Templomkert, 2013.07.17, 2♂, *Macrosaccus robiniella* (*Robinia pseudoacacia*).

BRACONIDAE (Nees, 1811)

Braconidae (Nees, 1811) sp. – Mátrafüred: Abasári u., 2012.08.09., 1♂, *Phyllonorycter nicellii* (*Corylus avellana*); Hegyalja u., 2014.06.02., 1♀, *P. roboris* (*Quercus petraea*); 2014.10.07., 1♀, *P. lautella* (*Q. petraea*); 2014.10.07., 3♀, *P. heegeriella* (*Q. petraea*); Menyecske-hegy, 2011.06.07., ♀, 1♂ *Profenusa pygmaea* (*Q. petraea*); Templomkert, 2014.06.19., 2♀, *Cameraria ohridella* (*Aescuclus hypocastaneum*); 2014.08.12., 1♀, 1♂, *P. quercifoliella* (*Q. petraea*); 2014.09.23., 1♀, *P. lautella* (*Q. petraea*); 2014.09.23., 1♀, *P. issikii* (*Tilia cordata*).
Apanteles (Förster, 1862) sp. s.l. – Mátrafüred: Hegyalja u., 2012.07.17., 3♀, *Phyllonorycter roboris* (*Quercus petraea*); 2012.08.29., 5♀, 5♂, *P. roboris* (*Q. petraea*); 2012.09.27., 2♀, *P. roboris* (*Q. petraea*).
Apanteles (Förster, 1862) sp. s.s. – Mátrafüred: Hegyalja u., 2012.06.04., 1♂, *Phyllonorycter quercifoliella* (*Quercus petraea*); 2012.06.20., 1♂, *P. quercifoliella* (*Q. petraea*).
Macrocentrus sp. (Curtis, 1833) – Mátrafüred: Hegyalja u., 2012.06.04., 2♂, *Phyllonorycter roboris* (*Quercus petraea*); 2012.06.20., 1♂, *P. quercifoliella* (*Q. petraea*).

ICHNEUMONIDAE (Latreille, 1802)

Ichneumonidae (Latreille, 1802) sp. – Mátrafüred: Hegyalja u., 2014.10.29., 1♂, *Tischeria ekebladella* (*Quercus petraea*).
Itoplectis (Förster, 1869) sp. – Mátrafüred: Hegyalja u., 2012.06.29., 1♂, *Tischeria ekebladella* (*Quercus petraea*).
Itoplectis alternans (Gravenhorst, 1829) – Mátrafüred: Hegyalja u., 2012.06.29., 2♀, *Tischeria ekebladella* (*Quercus petraea*).

Itoplectis maculator (Fabricius, 1775) – Mátraháza, 2012.08.13., 1♂, *Tischeria ekebladella* (*Quercus petraea*).

PLATYGASTRIDAE (Latreille, 1809)

Platygaster (Latreille, 1809) sp. – Mátrafüred: Hegyalja u., 2014.05.05., 1♀, *Agromyza* sp. (*Doronicum hungaricum*).

Összegzés

2011 és 2014 között a Mátrából gyűjtött mintáink összesen 24 különböző tápnövényfajon élő 44 levélaknázófajt tartalmaztak. A 796 db parazitált levélaknázó-mintából 1822 parazitoid egyedet sikerült kinevelni, illetve meghatározni. Az 59 azonosított faj többsége (46) az Eulophidae (karcsú fémfürkész) családhoz tartozik. A család fajai jellemzően a levélaknázókat parazitálják. A leggyakoribb parazitoidok, mint a *Minotetrastichus frontalis*, *Sympiesis sericeicornis*, *S. gordius*, *Cirrospilus lyncus* és egyes *Chrysocharis* fajok igen széles gazdaspektrummal rendelkeznek, így gyakran a Mátrában is előforduló invazív levélaknázófajok (*Phyllonorycter issikii*, *Cameraria ohridella*, *Macrosaccus robiniella* és *Parectopa robiniella*) parazitoid komplexumainak domináns tagjai közé tartoznak. A *Cirrospilus* sp. „A" parazitoid fajt egyelőre csak genusz szintig tudtuk meghatározni és csak a *Cameraria ohridella* mintákból keltek ki. Eddig úgy tűnik, hogy e faj csak helyenként dominálja a *C. ochridella* aknázó egyébként is kevés fajból álló parazitoid komplexumát. A *Sympiesis angustipennis* ectoparazitoidot *P. issikii* levélaknázóból eddig még nem nevelték ki, így adatsorunk új gazda-parazitoid kapcsolatot is feltárt.

Jelen munka alapvető adatokkal járul hozzá a Mátrában előforduló parazitoidok ismeretéhez. Azonban feltételezéseink szerint a parazitoidok jóval magasabb fajszámmal képviseltethetik magukat, főként a Mátrában, így érdemesnek tartjuk a gyűjtést/nevelést a jövőben is folytatni.

Köszönetnyilvánítás: Munkánkat az OTKA 84096 (Levélaknázók parazitoid együttesei elegyes lombos erdőkben) kutatási projekt támogatta. Köszönet illeti SZABÓKY Csabát (Budapest) a problémás aknázó molyok meghatározásával nyújtott segítségéért.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 85–97

New records of the Carpathian Trichoptera

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Abstract: In this paper, as a byproduct of our intense efforts to collect young incipient limnephilid species, we publish the primary distributional and seasonal data of other 86 Trichoptera species from the following families: Philopotamidae: 4 species, Polycentropodidae: 5 species, Psychomyiidae: 3 species, Hydropsychidae: 6 species, Rhyacophilidae: 13 species, Glossosomatidae: 3 species, Brachycentridae: 1 species, Goeridae: 3 species, Apataniidae: 2 species, Limnephilidae: Drisinae: 7 species, Limnephilinae: Limnephilini: 7 species, Chaetopterygini: 11 species, Stenophylacini: 19 species, Beraeidae: 2 species and Sericostomatidae: 2 species.

Introduction

During a systematic and tedious process in the last seven years we have discovered the very sensitive fine structure of the genitalia as speciation trait while working on the taxonomy of unsettled limnephilid taxa (Oláh et al. 2015). Applying the fine structure analysis of the speciation traits we have collected, specified and determined 70 new European limnephilid species mostly from the Carpathian Basin s.l., that is from the inner slopes of the Carpathians, the Alps and mountain ranges of the Western Balkan Peninsula (Oláh 2010, 2011a,b,c,d; Oláh & Kovács 2012, 2013, 2014; Oláh et al. 2012, 2013a,b, 2014, 2015; Vitecek et al. 2015). During population sampling of these incipient limnephilid species we have collected by sweep netting and light trapping other caddisfly species from various families. Here we present their distributional and seasonal primary data.

Abbreviations: OPC = Oláh Private Collection under national protection of the Hungarian Natural History Museum, Budapest.

Results

Philopotamidae Stephens, 1829

Philopotamus ludificatus McLachlan, 1878 – **Slovakia**, Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48’15”, E20°13’33”, 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC).
Philopotamus montanus (Donovan, 1813) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 03.07.2013, light, Cs. Balogh (3♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros Saritoarea-Cascade Bohodeiului, N46°39’31.97”, E22°38’26.25”, 1123 m, 04.07.2013, Cs. Balogh (1♂, 1♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Aleului, N46°38’24.3”, E22°36’27.9”, 634 m, 04.07.2013, Cs. Balogh (2♂, 8♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Sebiselu, N46°36’56.61”, E22°29’16.68”, 518 m, 04.07.2013, Cs. Balogh (4♂, OPC). Apuseni Mts, Bihor Mts, Baita, Baita Plai, tributary Crisul Baita, N46°28’52.10”, E22°36’10.03”, 507 m, 15.05.2014, Cs. Balogh, B. V. Béres (8♂, OPC). Apuseni Mts,

Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29'56.08", E22°43'48.64", 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (9♂, OPC). Apuseni Mts, Muntii Gilaului, Caps, stream Iara, N46°35.688', E23°15.067', 979 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (9♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Iertii, N46°33.001', E23°20.014', 1055 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°39.524', E23°55.019', 1138 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (4♂, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (2♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (4♂, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, below Lubnya (Kiesvölgy), N49°00'54.81", E22°43'23.82", 478 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (2♂, 1♀, OPC).

Philopotamus variegatus (Scopoli 1763) – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (8♂, 3♀, OPC). Apuseni Mts, Muntii Trascaului, Valea Borzesti stream, near Turda, 20.06.2013, sinled J. Oláh, Cs. Balogh, S. Fekete (2♂, OPC). Apuseni Mts, Vladeasa Mts, Jada stream, Cascada Valul Miresei, N46°42'42.2", E22°35'04.9", 900 m, 03.07.2013, Cs. Balogh (3♂, OPC).

Wormaldia occipitalis Pictet, 1834 – **Romania**, Apuseni Mts, Bihor Mts, Crisul Pietros, Valea. Aleului, N46°38'24.3", E22°36'27.9", 634 m, 04.07.2013, Cs. Balogh (2♂, 1♀, OPC). Apuseni Mts, Bihor Mts, Crisul Pietros, Valea. Sebiselu, N46°36'56.61", E22°29'16.68", 518 m, 04.07.2013, Cs. Balogh (2♂, 6♀, OPC). Apuseni Mts, Vladeasa Mts, Jada stream, Jedulului triburaty, Saritoarea Iedutului Waterfall, N46°42'42.2", E22°35'04.9", 950 m, 03.07.2013, Cs. Balogh (4♂, 1♀, OPC). Apuseni Mts, Bihor Mts, Baita, Baita Plai, tributary Crisul Baita, N46°28'52.10", E22°36'10.03", 507 m, 15.05.2014, Cs. Balogh, B. V. Béres (3♂, 1♀, OPC). Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29'56.08", E22°43'48.64", 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°27'30.23", E22°47'55.15", 788 m, 22.08.2013, singled, Cs. Balogh (6♂, 9♀, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (5♂, 2♀, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (47♂, 39♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (10♂, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (4♂, 2♀, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (3♂, 2♀, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°41.999', E23°53.527', 726 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♀, OPC). Retezat Mts, tributary of Cerna stream, 1208 m, N45°13'10.39", E22°50'24.17", 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (3♂, 4♀, OPC). **Slovakia**, Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés J2♂, 2♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48'53", E20°15'51", 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (4♂, 3♀, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, below Lubnya (Kiesvölgy), N49°00'54.81", E22°43'23.82", 478 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (2♀, OPC). Bieszczady Mts (Besszádok), Ung National Park, small forested stream between Uzsok Pass and Uzsok, N48°59'33.52", E22°52'03.40", 642 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (8♂, 7♀, OPC).

Polycentropodidae Ulmer, 1903

Plectrocnemia brevis McLachlan, 1871 – **Romania**, Retezat Mts, Chele Butii, 910 m, N45°18'06.96", E22°58'31.48", 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC). Retezat Mts, Pietrele stream, above Cascada Lolaia, 1260 m, N45°24'56.3", E22°53'19.7", 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Plectrocnemia conspersa (Curtis, 1834) – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (12♂, 3♀, OPC).

Plectrocnemia kisbelai Botosaneanu, 1967 – **Romania**, Apuseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (1♂, 1♀, OPC). Apuseni Mts, Bihor Mts, Valea Iada, Tilpe tributary, N46°42'45.5", E22°35'48.46", 930 m, 03.07.2013, light, Cs. Balogh (1♂, OPC). Apuseni Mts, Girda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 26.06.2014, singled, Cs. Balogh (1♂, OPC).

Polycentropus excisus Klapálek, 1894 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (2♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18'06.96", E22°58'31.48", 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).
Polycentropus flavomaculatus (Pictet, 1834) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 03.07.2013, light trap, Cs. Balogh (1♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (1♂, OPC).

PSYCHOMYIIDAE Walker, 1852

Psychomyia pusilla (Fabricius, 1781) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (1♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (11♂, 8♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (1♂, OPC).
Tinodes kimminsi Sykora, 1962 – **Romania**, Apuiseni Mts, Vladeasa Mts, Jada stream, Iedulului triburaty, Saritoarea Iedutului Waterfall, N46°42'42.2", E22°35'04.9", 950 m, 03.07.2013, Cs. Balogh (1♂, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°41.999', E23°53.527', 726 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC).
Tinodes rostocki McLachlan, 1878 – **Romania**, Apuiseni Mts, Vladeasa Mts, Jada stream, Iedulului triburaty, Saritoarea Iedutului Waterfall, N46°42'42.2", E22°35'04.9", 950 m, 03.07.2013, Cs. Balogh (1♂, OPC). Apuseni Mts, Muntii Trascaului, Valea Borzesti stream, near Turda, 20.06.2013, sinled J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC).

HYDROPSYCHIDAE Curtis, 1835

Hydropsyche bulbifera McLachlan, 1878 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 03.07.2013, light trap, Cs. Balogh (3♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (1♂, OPC).
Hydropsyche contubernalis McLachlan, 1865 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (1♂, OPC).
Hydropsyche dinarica Marinković-Gospodnetić, 1979 – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC).
Hydropsyche incognita Pitsch, 1993 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (3♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 03.07.2013, light trap, Cs. Balogh (3♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (14♂, OPC).
Hydropsyche instabilis (Curtis, 1834) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (3♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 03.07.2013, light trap, Cs. Balogh (2♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18'06.96", E22°58'31.48", 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).
Hydropsyche tabacarui Botosaneanu, 1960 – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, singled and light, J. Oláh, Cs. Balogh, S. Fekete (4♂, OPC). Retezat Mts, Ursu stream, 1170 m, N45°15'56.86", E22°52'51.94", 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

RHYACOPHILIDAE Stephens, 1836

Rhyacophila fasciata Hagen, 1859 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros Saritoarea-Cascade Bohodeiului, N46°39'31.97", E22°38'26.25", 1123 m, 04.07.2013, Cs. Balogh (1♂, 1♀, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°27'30.23", E22°47'55.15", 788 m, 22.08.2013, singled, Cs. Balogh (2♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare,

N46°270.493', E22°47.895', 788 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♂, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (109♂, 57♀, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, above Lubnya (Kiesvölgy), N49°02'13.90", E22°42'59.75", 579 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♂, OPC).

Rhyacophila furcifera Klapálek, 1904 – **Romania**, Cindrel Mts, Paltinis, spring streams of stream Batrana Mica, N45°37.716', E23°55.248', 1583 m, 28.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (2♂, 1♀, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°38.582', E23°55.577', 1378 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Retezat Mts, Nucsoara stream, Cascada Lolaia, 1080 m, N45°25'33.73", E22°53'53.94", 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Rhyacophila hageni McLachlan, 1879 – **Slovakia**, Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (4♂, 1♀, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48'15", E20°13'33", 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48'15", E20°13'33", 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (3♂, OPC). Rejdova (Sajóréde), small tributary, 21.09.2013, light trap, J. Oláh jr. (1♂, OPC).

Rhyacophila kimminsiana Botosaneanu, 1958 – **Romania**, Bucegi Mts, Lalomita stream, N45.416957°, E25.416958°, 1837 m, 15.07.2015, Z. Baczó, J. Kecskés (1♂, OPC).

Rhyacophila laevis Pictet, 1834 – **Romania**, Apuseni Mts, Bihor Mts, Baita, Baita Plai, tributary Crisul Baita, N46°28'52.10", E22°36'10.03", 507 m, 15.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (11♂, 1♀, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (3♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (5♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701', E23°16.279', 1620 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (4♂, OPC). Retezat Mts, tributary of Cerna stream, 1208 m, N45°13'10.39", E22°50'24.17", 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (3♂, OPC).

Rhyacophila mocsaryi Klapálek, 1898 – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Vadului stream, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (2♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18'06.96", E22°58'31.48", 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (4♂, 3♀, OPC). Retezat Mts, Nucsoara stream, Cascada Lolaia, 1080 m, N45°25'33.73", E22°53'53.94", 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Rhyacophila motasi Botosaneanu, 1957 – **Romania**, Apuiseni Mts, Vladeasa Mts, Jada stream, Cascada Valul Miresei, N46°42'42.2", E22°35'04.9", 900 m, 03.07.2013, Cs. Balogh (1♂, OPC). Apuseni Mts, Bihor Mts, Baita, Baita Plai, tributary Crisul Baita, N46°28'52.10", E22°36'10.03", 507 m, 15.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29'56.08", E22°43'48.64", 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (2♂, OPC). Apuseni Mts, Garda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (2♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (3♂, OPC). Apuseni Mts, Vartop, spring stream (Flescula), N46°31'07.23", E22°39'41.69", 1209 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♀, OPC).

Rhyacophila nubila Zetterstedt, 1840 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 03.07.2013, light trap, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36'56.61", E22°29'16.68", 255 m, 21.08.2013, light, Cs. Balogh (1♂, OPC). Apuseni Mts, Girda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Retezat Mts, Chele Butii, 936 m, N45°18'07.30",

E22°58’27.92”, 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, above Stuzhytsya village (Patkófalu), N49°02’31.92”, E22°34’51.16”, 453 m, 19.09.2013, light, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♂, OPC). Bieszczady Mts (Besszádok), Ung National Park, below Lubnya (Kiesvölgy), N49°00’54.81”, E22°43’23.82”, 478 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♂, OPC).

Rhyacophila obliterata McLachlan, 1863 – **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248’, E19°17.822’, 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (6♂, 2♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553’, E19°18.048’, 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (109♂, 57♀, OPC). Banskobystrický region, Poľana Mts, Hriňová, sidebrook of Slatina Stream, N48°37.210’, E19°31.582’, 514 m, 08.10.2013, singled, J. Oláh, L. Szél (8♂, 6♀;OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48’53”, E20°15’51”, 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (7♂, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, above Lubnya (Kiesvölgy), N49°02’13.90”, E22°42’59.75”, 579 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (5♂, 1♀, OPC). Bieszczady Mts (Besszádok), Ung National Park, below Lubnya (Kiesvölgy), N49°00’54.81”, E22°43’23.82”, 478 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (2♂, OPC).

Rhyacophila orghidani Botosaneanu, 1952 – **Romania**, Apuseni Mts, Bihor Mts, above Galbena village, valley Cepelor, N46°27’44.01”, E22°43’58.88”, 1035 m, 13.05.2014, Cs. Balogh, B. V. Béres (1♂, 1♀, OPC). Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, 14.05.2014, l N46°29’56.08”, E22°43’48.64”, 902 m, Cs. Balogh, B. V. Béres (41♂, 8♀, OPC). Apuseni Mts, Muntii Gilaului, Baisoara, 01.07.1997, L. Újvárosi (1♂, OPC). Apuseni Mts, Muntii Gilaului, Baisoara, 1378 m, 30.05.2007, M. Bálint (1♂, OPC). Apuseni Mts, Muntii Gilaului, Caps, stream Iara, N46°35.688’, E23°15.067’, 979 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (3♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001’, E23°20.014’, 1055 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (3♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001’, E23°20.014’, 1055 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (5♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (8♂, 2♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juász (3♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701’, E23°16.279’, 1620 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (97♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701’, E23°16.279’, 1620 m, 20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (3♂, OPC). Apuseni Mts, Vartop, spring stream (Flescula), N46°31’07.23”, E22°39’41.69”, 1209 m, 14.05.2014, Cs. Balogh, B. V. Béres (3♂, 3♀, OPC).

Rhyacophila polonica McLachlan, 1879 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 03.07.2013, light, Cs. Balogh (2♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Aleului, N46°38’24.3”, E22°36’27.9”, 634 m, 04.07.2013, Cs. Balogh (2♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Sebiselu, N46°36’56.61”, E22°29’16.68”, 518 m, 04.07.2013, Cs. Balogh (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (7♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701’, E23°16.279’, 1620 m, 20.06.2015, singled, M. Kiss, J. Oláh, L. Szél (6♂, 1♀, OPC). Apuseni Mts, Muntii Trascaului, Valea Borzesti stream, near Turda, 20.06.2013, sinled J. Oláh, Cs. Balogh, S. Fekete (8♂, 3♀, OPC). Apuseni Mts, Vladeasa Mt, Stana de Vale, upper section of Ciripa stream, N46°40.546’, E22°38.515’, 1360 m, 06.06.2015, M. Kiss, J. Oláh, L. Szél (1♂, OPC). Romania, Rodna Mts, Numerous spring streamlets on the spring area of Cailor waterfall, Piatra Rea, N47°35’1.9”, E24°47’49.4”, 1564 m, 28.09.2014, J. Oláh, Cs. Balogh (4♂, OPC).

Rhyacophila torrentium Pictet, 1834 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 03.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35’23.25”, E22°37’54.74”, 450 m, 04.07.2013, light, Cs. Balogh (1♂, 1♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 21.08.2013, light, Cs. Balogh (8♂, OPC).

Rhyacophila tristis Pictet, 1834 – **Romania**, Apuiseni Mts, Bihor Mts, Canton Padis, Valea Ursului, Izbuc Rece, Spring area N46°33’58.1”, E22°43’31.08”, 1090 m, 04.07.2013, Cs. Balogh (5♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros Saritoarea-Cascade Bohodeiului, N46°39’31.97”, E22°38’26.25”, 1123 m, 04.07.2013, Cs. Balogh (1♂, 1♀, OPC). Apuiseni Mts, Vladeasa Mts, Jada stream, Cascada Valul Miresei, N46°42’42.2”, E22°35’04.9”, 900 m, 03.07.2013, Cs. Balogh (2♀, OPC). Apuiseni Mts, Vladeasa Mts, Jada stream, Iedulului triburaty, Saritoarea

Iedutului Waterfall, N46°42’42.2”, E22°35’04.9”, 950 m, 03.07.2013, Cs. Balogh (3♂, 4♀, OPC). Apuseni Mts, Bihor Mts, Baita, Baita Plai, tributary Crisul Baita, N46°28’52.10”, E22°36’10.03”, 507 m, 15.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29’56.08”, E22°43’48.64”, 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Muntii Gilaului, Caps, stream Iara, N46°35.688’, E23°15.067’, 979 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Iertii, N46°33.001’, E23°20.014’, 1055 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Iertii, N46°34.532’, E23°22.593’, 890 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (2♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (3♂, 4♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juász (1♂, 1♀, OPC). Retezat Mts, Nucsoara stream, Cascada Lolaia, 1080 m, N45°25’33.73”, E22°53’53.94”, 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♀, OPC). Retezat Mts, Ursu stream, 1170 m, N45°15’56.86”, E22°52’51.94”, 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (6♂, OPC).

Glossosomatidae Wallengren, 1891

Agapetus iridipennis McLachlan, 1879 – **Romania**, Retezat Mts, tributary of Cerna stream, 1208 m, N45°13’10.39”, E22°50’24.17”, 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (9♂, 16♀, OPC).
Glossosoma conformis Neboiss, 1963 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 03.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35’23.25”, E22°37’54.74”, 450 m, 04.07.2013, light, Cs. Balogh (1♂, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Aleului, N46°38’24.3”, E22°36’27.9”, 634 m, 04.07.2013, Cs. Balogh (2♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18’06.96”, E22°58’31.48”, 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (6♂, 11♀, OPC). Retezat Mts, Ursu stream, 1170 m, N45°15’56.86”, E22°52’51.94”, 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (2♂, OPC).
Glossosoma intermedium (Klapálek, 1892) – **Romania**, Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N:46°29’56.08”, E:22°43’48.64”, 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Muntii Gilaului, Caps, stream Iara, N46°35.688’, E23°15.067’, 979 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC).

Brachycentridae Ulmer, 1903

Micrasema minimum McLachlan, 1876 – **Romania**, Apuiseni Mts, Vladeasa Mts, Jada stream, Iedulului triburaty, Saritoarea Iedutului Waterfall, N46°42’42.2”, E22°35’04.9”, 950 m, 03.07.2013, Cs. Balogh (3♂, 2♀, OPC).

Goeridae Ulmer, 1903

Goera pilosa (Fabricius, 1775) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Saud, N46°36’56.61”, E22°29’16.68”, 255 m, 21.08.2013, light, Cs. Balogh (1♂, 1♀, OPC).
Lithax niger (Hagen 1859) – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Muntele Mare (Öreghavas), Iara (Jára) spring area, N46°28.914’, E23°13.294’, 1750 m, 19.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (16♂, 12♀, OPC). Cindrel Mts, Paltinis, near Surdu, spring streams, N45°37.445’, E23°54.062’, 1872 m, 28.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Rodna Mts, 1800 m, 22 06.2013, Cs. Balogh (1♀, OPC).
Silo graellsii Pictet, 1865 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea Bulz, Pietra Bulzului, N46°36’08.12”, E22°38’33.44”, 560 m, 21.08.2013, light, Cs. Balogh (1♂, 1♀, OPC). Apuseni Mts, Girda de Sus, tributary of Ariesul Mare, N46°270.493’, E22°47.895’, 788 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (5♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Iertii, N46°34.532’, E23°22.593’, 890 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Retezat Mts, tributary of Cerna stream, 1208 m, N45°13’10.39”, E22°50’24.17”, 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Apataniidae Wallengren, 1886

Apatania carpathica Schmid,1954 – **Romania**, Maramures Mts, Bistra stream, N47°52’56.5”, E24°16’35.6”, 594 m, 27.09.2014, J. Oláh, Cs. Balogh (1♂, OPC).

Apatania fimbriata (Pictet, 1834) – **Slovakia**, Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48’15”, E20°13’33”, 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (14♂, 12♀, OPC).

Limnephilidae Kolenati, 1848

Drusinae Banks, 1916

Drusus brunneus Klapálek, 1898 – **Romania**, Apuseni Mts, Bihor Mts, above Galbena village, valley Cepelor, N46°27’44.01”, E22°43’58.88”, 1035 m, 13.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Lupinus stream, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701’, E23°16.279’, 1620 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701’, E23°16.279’, 1620 m, 20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (4♂, 2♀, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045’, E22°39.821’, 1209 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♀, OPC). Apuseni Mts, Vladeasa Mt. Stana de Vale, Galbenele stream, N46°40.809’, E22°37.147’, 1180 m, 07.06.2015, M. Kiss, J. Oláh, L. Szél (6♂, 1♀, OPC). Apuseni Mts, Vladeasa Mt. Stana de Vale, upper section of Ciripa stream, N46°40.546’, E22°38.515’, 1360 m, 06.06.2015, M. Kiss, J. Oláh, L. Szél (2♂, 2♀, OPC). Bucegi Mts, Cocora stream, N45.3402125°, E25.443147°, 1680 m, 16.07.2015, Z. Baczó, J. Kecskés (3♂, OPC). Bucegi Mts, Lalomita stream, N45.397739°, E25.446274°, 1638 m, 14.07.2015, Z. Baczó, J. Kecskés (5♂, 2♀, OPC). Bucegi Mts, Lalomita stream, N45.416957°, E25.416958°, 1837 m, 15.07.2015, Z. Baczó, J. Kecskés (8♂, 4♀, OPC). Bucegi Mts, Lalomita stream, N45.425296°, E25.444064°, 1917 m, 15.07.2015, Z. Baczó, J. Kecskés (27♂, 7♀, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°39.524’, E23°55.019’, 1138 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18’06.96”, E22°58’31.48”, 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Drusus buscatensis Botosaneanu, 1952 – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Muntele Mare (Öreghavas), Iara (Jára) spring area, N46°28.914’, E23°13.294’, 1750 m, 19.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (2♂, OPC). Cindrel Mts, Paltinis, spring streams of stream Batrana Mica, N45°37.716’, E23°55.248’, 1583 m, 28.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, 2♀, OPC).

Drusus carpathicus Dziedzielewicz, 1911 – **Romania**, Rodnei Mts, near Prislop Pass, N47°36’27.61”, E 24°52’00.32”, 1407 m, Cs. Balogh (1♂, OPC).

Drusus discolor Rambur, 1842 – **Romania**, Bucegi Mts, Lalomita stream, N45.416957°, E25.416958°, 1837 m, 15.07.2015, Z. Baczó, J. Kecskés (4♂, 7♀, OPC). Bucegi Mts, Lalomita stream, N45.402125°, E25.443147°, 1680 m, 16.07.2015, Z. Baczó, J. Kecskés (3♂, 12♀, OPC).

Drusus romanicus Mugoci & Botosaneanu, 1953 – **Romania**, Retezat Mts, Bucura stream, 150 m below Bucura lake, 2015 m, N45°21’25.43”, E22°52’31.09”, 10.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (4♂, 1♀, OPC).

Ecclisopteryx dalecarlica Kolenati, 1848 – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35’23.25”, E22°37’54.74”, 450 m, 04.07.2013, light, Cs. Balogh (1♂, OPC). Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29’56.08”, E22°43’48.64”, 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001’, E23°20.014’, 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, 1♀, OPC). Bucegi Mts, Cocora stream, N45.3402125°, E25.443147°, 1680 m, 16.07.2015, Z. Baczó, J. Kecskés (1♂, 1♀, OPC). Bucegi Mts, Cocora stream, N45.394969°, E25.443993°, 1564 m, 15.07.2015, light trap, Z. Baczó, J. Kecskés (14♂, 182♀, OPC). Retezat Mts, Chele Butii, 910 m, N45°18’06.96”, E22°58’31.48”, 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (28♂, 41♀, OPC). Retezat Mts, Chele Butii, 936 m, N45°18’07.30”, E22°58’27.92”, 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (3♂, 2♀, OPC).

Ecclisopteryx madida (McLachlan, 1867) – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juász (1♂, OPC). Retezat Mts, Chele Butii, 910 m, N45°18’06.96”, E22°58’31.48”, 09.07.2013, light, E. Bajka, Cs. Balogh, G. Borics, P. Borics (2♂, 18♀, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248’, E19°17.822’, 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♂, 2♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553’, E19°18.048’, 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (6♀, OPC).

Limnephilini Kolenati, 1848

Limnephilus affinis Curtis, 1834 – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 27.05.2013, light, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701', E23°16.279', 1620 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701', E23°16.279', 1620 m, 20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (1♂, OPC).

Limnephilus auricula Curtis, 1834 – **Romania**, Cindrel Mts, Paltinis, stream Daneasa, N45°38.582', E23°55.577', 1378 m, 29.05.2013, light, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♀, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♀, OPC).

Limnephilus bipunctatus Curtis, 1834 – **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♀, OPC).

Limnephilus decipiens Kolenati, 1848 – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (2♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701', E23°16.279', 1620 m, 20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (1♂, OPC).

Limnephilus extricatus McLachlan, 1865 – **Romania**, Apuseni Mts, before Vartop, spring streams of Ariesul Mare, N46°30.951', E22°40.799', 1132 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC).

Limnephilus ignavus McLachlan, 1865 – **Romania**, Rodnei Mts, Complex Borsa, Viseau stream, 26.09.2014, light trap, J. Oláh, Cs. Balogh (1♂, OPC).

Limnephilus sparsus Curtis, 1834 – **Romania**, Apuseni Mts, Bihor Mts, Bubesti-Cobles, tributary P. Cobles, N46°29'56.08", E22°43'48.64", 902 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). **Slovakia**, Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48'53", E20°15'51", 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♀, OPC).

Chaetopterygini Hagen, 1858

Annitella kosciuszki Klapálek, 1907 – **Romania**, Rodnei Mts, Complex Borsa, small side spring stream of Fantana Stream, 29.09.2014, J. Oláh, Cs. Balogh (1♂, 1♀, OPC). Rodnei Mts, small spring streamlets on the Bistrita Aurie spring area, N47°34'23.8", E24°48'43.9", 1654 m, 28.09.2014, J. Oláh, Cs. Balogh (1♂, OPC).

Annitella lateroproducta (Botosaneanu, 1952) – **Romania**, Apuseni Mts, Ariesul Mare, spring stream, N46°31.045', E22°39.821', 1209 m, 01.11.2014, Cs. Balogh (2♂, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂, OPC). Hargitha Mts, Filio stream, N46°27'03.90", E25°30'20.10", 940 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂, 1♀, OPC).

Annitella obscurata (McLachlan, 1856) – **Romania**, Hargitha Mts, Filio stream, N46°27'03.90", E25°30'20.10", 940 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♀, OPC).

Chaetopterygopsis maclachlani Stein, 1874 – **Romania**, Gurghiu Mts, near Bucin Pass, Frasileasa stream with side springs, N46°38'37.45", E25°17'35.08", 1193 m, 29.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (14♂, 9♀, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♀, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (3♂,2♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 28.10.2013, singled, J. Oláh, T. Kovács (1♂, 1 femal, OPC). Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC). Rejdova (Sajóréde), right tributary of Mlynna stream, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (8♂, 1♀, OPC).

Chaetopteryx biloba Botosaneanu, 1960 – **Romania**, Muntii Gilaului, Belis Fantanele, N46°40'03.06", E22°59'21.85", 1040 m, 16.10.2014, Cs. Balogh (1♂, OPC).

Chaetopteryx bosniaca Marinković-Gospodnetić, 1955 – **Romania**, Alba county, between Şugag and Vîrtoape, left sidebrook of *Sebeş River*, 45°42'12.7", 23°35'20.7", 725 m, 09.11.2014, T. Kovács, G. Magos (5♂, 3♀, OPC). Apuseni Mts, Ariesul Mare, spring stream, N46°31.045', E22°39.821', 1209 m, 01.11.2014, Cs. Balogh (5♂,

1♀, OPC). Caliman Mts, Fantanele stream, N46°59'04.00", E25°05'52.56", 776 m, 01.11.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (10♂, 5♀, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (5♂, 3♀, OPC). Hargitha Mts, Filio stream, N46°27'03.90", E25°30'20.10", 940 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂, OPC). Muntii Gilaului, Belis Fantanele, N46°21'27.88", E23°02'15.56", 1080 m, 16.10.2014, Cs. Balogh (2♂, 3♀, OPC).

Chaetopteryx fusca Brauer, 1857 – **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (38♂, 35♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 28.10.2013, singled, J. Oláh, T. Kovács (15♂, 14♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 28.10.2013, singled, J. Oláh, T. Kovács (5♂, 4♀, OPC). Banskobystrický region, Poľana Mts, Hriňová, sidebrook of Slatina Stream, N48°37.210', E19°31.582', 514 m, 08.10.2013, singled, J. Oláh, L. Szél (3♂, OPC). Banskobystrický region, Poľana Mts, Hriňová, sidebrook of Slatina Stream, N48°37.210', E19°31.582', 514 m, 28.10.2013, singled, J. Oláh, T. Kovács (1♂, 1♀, OPC).

Chaetopteryx polonica Dziedzielewicz, 1889 – **Romania**, Caliman Mts, Fantanele stream, N46°59'04.00", E25°05'52.56", 776 m, 01.11.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (2♂, 3♀, OPC). Gurghiu Mts, near Bucin Pass, Frasileasa stream with side springs, N46°38'37.45", E25°17'35.08", 1193 m, 29.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (3♂, 2♀, OPC). Gurghiu Mts, near Bucin Pass, Gainasa springs and stream, N46°40'11.35", E25°17'39.06", 1400 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (2♂, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (5♂, 1♀, OPC). Hargitha Mts, Filio stream side spring, N46°26'29.54", E25°34'48.09", 1625 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (2♂, OPC). Rodnei Mts, Complex Borsa, small side spring stream of Fantana Stream, 29.09.2014, J. Oláh, Cs. Balogh (1♂, OPC). **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (15♂, 9♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 28.10.2013, singled, J. Oláh, T. Kovács (1♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 28.10.2013, singled, J. Oláh, T. Kovács (1♂, 1♀, OPC). Banskobystrický region, Poľana Mts, Hriňová, Bystré, spring brook of Bystrý Stream, N48°37.569', E19°29.261', 1025 m, 08.10.2013, singled, J. Oláh, L. Szél (2♂, 4♀, OPC). Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♀, OPC). Rejdova (Sajóréde), right tributary of Mlynna stream, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (6♂, 1♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48'53", E20°15'51", 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♀, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, below spring, N48°47'6", E20°12'18", 1120 m, 03.10.2013, singled, J. Oláh, J. Kecskés (3♂, 5♀, OPC).

Psilopteryx carpathica Schmid, 1952 – **Romania**, Rodnei Mts, Numerous spring streamlets on the spring area of Cailor waterfall, Piatra Rea, N47°35'1.9", E24°47'49.4", 1564 m, 28.09.2014, J. Oláh, Cs. Balogh (1♂, OPC). Rodnei Mts, small spring below Lake Isvoru Bistritei, N47°34'46.4", E24°48'49.34", 1586 m, 28.09.2014, J. Oláh, Cs. Balogh (1♂, 1♀, OPC).

Psylopteryx transylvanica Mey & Botosaneanu, 1985 – **Romania**, Gurghiu Mts, near Bucin Pass, Frasileasa stream with side springs, N46°38'37.45", E25°17'35.08", 1193 m, 29.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (8♂, 3♀, OPC). Gurghiu Mts, near Bucin Pass, Gainasa springs and stream, N46°40'11.35", E25°17'39.06", 1400 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (66♂, 7♀, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (13♂, 9♀, OPC). Hargitha Mts, Filio stream side spring, N46°26'29.54", E25°34'48.09", 1625 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (29♂, 9♀, OPC). Hargitha Mts, Filio stream side spring, N46°26'45.18", E25°34'25.73", 1600 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (7♂, OPC). Hargitha Mts, Filio stream side spring, N46°27'03.90", E25°33'29.29", 1350 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (9♂, 5♀, OPC). Hargitha Mts, Filio stream side spring, N46°27'14.53", E25°33'53.04", 1415 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (12♂, 6♀, OPC).

Pseudopsilopteryx zimmeri (McLachlan, 1876) – **Slovakia**, Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46'16", E20°13'31", 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48'53", E20°15'51", 680 m, 03.10.2013, singled, J. Oláh,

J. Kecskés (1♀, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48’15”, E20°13’33”, 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC).

Stenophylacini Schmid, 1955

Allogamus auricollis (Pictet, 1834) – **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, above Lubnya (Kiesvölgy), N49°02’13.90”, E22°42’59.75”, 579 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♂, OPC).

Allogamus uncatus (Brauer, 1857) – **Romania**, Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241’, E23°15.550’, 1552 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Muntele Mare (Öreghavas), Iara (Jára) spring area, N46°28.914’, E23°13.294’, 1750 m, 04.09.2015, singled, M. Kiss, J. Oláh, L. Szél (1♀, OPC). Dâmbovia county, Bucegi Mts, Hotel Peştera, left sidebrook of Ialomiţa, 45°24’08.8”, 25°26’35.1”, 1690 m, 06.11.2014, T. Kovács, G. Magos (2♂, 2♀, OPC). Dâmbovia county, Bucegi Mts, Hotel Peştera, spring area beside the V. Şugărilor, 45°24’25.0”, 25°26’47.8”, 1760 m, 06.11.2014, T. Kovács, G. Magos (1♂, OPC). Dâmbovia county, Bucegi Mts, Hotel Peştera, V. Şugărilor, 45°24’42.1”, 25°27’23.5”, 1850 m, 06.11.2014, T. Kovács, G. Magos (1♂, 2♀, OPC). Dâmbovia county, Bucegi Mts, M. Dichiu, left sidebrook of V. Oboarele, 45°19’32.8”, 25°26’05.0”, 1420 m, 06.11.2014, T. Kovács, G. Magos (1♂, 1♀, OPC). Gurghiu Mts, near Bucin Pass, Târnava Mica springs and stream, N46°39’16.63”, E25°16’42.46”, 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂ OPC). Maramures Mts, Bistra stream, N47°52’56.5”, E24°16’35.6”, 594 m, 27.09.2014, J. Oláh, Cs. Balogh (1♂, OPC). Rodnei Mts, Numerous spring streamlets on the spring area of Cailor waterfall, Piatra Rea, N47°35’1.9”, E24°47’49.4”, 1564 m, 28.09.2014, J. Oláh, Cs. Balogh (6♂, 1♀, OPC). Rodnei Mts, small spring streamlets on the Bistrita Aurie spring area, N47°34’23.8”, E24°48’43.9”, 1654 m, 28.09.2014, J. Oláh, Cs. Balogh (1 copula, 3♀, OPC). Vâlcea county, Parâng Mts, Obrâşia Lotrului, open brook, 200 m of Transalpina (67C) road, 45°22’46.1”, 23°38’30.6”, 1765 m, 09.11.2014, T. Kovács, G. Magos (1♀, OPC). Vâlcea county, Parâng Mts, Obrâşia Lotrului, open brook, 900 m of Transalpina (67C) road, 45°23’9.9”, 23°39’24.9”, 1780 m, 09.11.2014, T. Kovács, G. Magos (1♂, 4♀, OPC). **Slovakia**, Banskobystrický region, Poľana Mts, Hriňová, Bystré, spring brook of Bystrý Stream, N48°37.569’, E19°29.261’, 1025 m, 08.10.2013, singled, J. Oláh, L. Szél (2♂, OPC). Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46’16”, E20°13’31”, 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (2♀, OPC). Rejdova (Sajóréde), right tributary of Mlynna stream, at bridge, N48°46’16”, E20°13’31”, 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (5♂, 4♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48’53”, E20°15’51”, 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, 4♀, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, below spring, N48°47’6”, E20°12’18”, 1120 m, 03.10.2013, singled, J. Oláh, J. Kecskés (2♂, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, lower reach, N48°48’15”, E20°13’33”, 910 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC).

Halesus digitatus (Schrank, 1781) – **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553’, E19°18.048’, 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (1♂, OPC). Banskobystrický region, Poľana Mts, Hriňová, sidebrook of Slatina Stream, N48°37.210’, E19°31.582’, 514 m, 28.10.2013, singled, J. Oláh, L. Szél (1♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48’53”, E20°15’51”, 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, OPC).

Isogamus aequalis (Klapálek, 1907) – **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, below Lubnya (Kiesvölgy), N49°00’54.81”, E22°43’23.82”, 478 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♀, OPC).

Isogamus czarnohorensis (Dziedzielewicz, 1912) – **Romania**, Maramures Mts, Bistra stream valley, small spring with sphagnum bog, N47°53’1.3”, E24°16’47.7”, 609 m, 27.09.2014, J. Oláh, Cs. Balogh (1♂, OPC).

Melampophylax gutinicus Botosaneanu, 1995 – **Romania**, Rodnei Mts, small tributary just below Iza Spring, Albastru al Izei, 1020 m, 27.09.2014, J. Oláh, Cs. Balogh (1♂, OPC).

Melampophylax nepos (McLachlan, 1880) – **Slovakia**, Banskobystrický region, Poľana Mts, Hriňová, Bystré, spring brook of Bystrý Stream, N48°37.569’, E19°29.261’, 1025 m, 08.10.2013, singled, J. Oláh, L. Szél (8♂, 4♀, OPC). Rejdova (Sajóréde), Mlynna stream, below spring, at bridge, N48°46’16”, E20°13’31”, 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (8♂, 31♀, OPC). Rejdova (Sajóréde), right tributary of Mlynna stream, at bridge, N48°46’16”, E20°13’31”, 1250 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♂, 5♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48’53”, E20°15’51”, 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (2♂, 1♀, OPC). Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48’53”, E20°15’51”, 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (2♀, OPC). Rejdova (Sajóréde), Slana (Sajó) stream, below spring, N48°47’6”, E20°12’18”, 1120 m, 03.10.2013, singled, J. Oláh, J. Kecskés (2♂, 2♀, OPC).

Melampophylax triangulifera Botosaneanu, 1957 – **Romania**, Caliman Mts, Fantanele stream, N46°59'04.00", E25°05'52.56", 776 m, 01.11.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (3♀, OPC). Gurghiu Mts, near Bucin Pass, Gainasa springs and stream, N46°40'11.35", E25°17'39.06", 1400 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂, 1♀, OPC). Gurghiu Mts, near Bucin Pass, Tárnava Mica springs and stream, N46°39'16.63", E25°16'42.46", 1290 m, 30.10.2014, Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (49♂, 6♀, OPC). Hargitha Mts, Filio stream side spring, N46°27'03.90", E25°33'29.29", 1350 m, 31.10.2014 Z. Baczó, Cs. Balogh, J. Kecskés, J. Oláh (1♂, 3♀, OPC).

Parachiona picicornis (Pictet 1834) – **Romania**, Apuseni Mts, Muntii Gilaului, Caps, stream Iara, N46°35.688', E23°15.067', 979 m, 27.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (8♂, 2♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (16♂, 6♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, spring stream of Vadului, N46°31.954', E23°16.852', 1552 m, 26.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (8♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, three-branched stream, N46°30.701', E23°16.279', 1620 m, 19.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (11♂, 1♀, OPC). Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Cindrel Mts, Paltinis, spring streams of stream Batrana Mica, N45°37.716', E23°55.248', 1583 m, 28.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°39.524', E23°55.019', 1138 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (3♂, 1♀, OPC). Retezat Mts, Bucura stream, 150 m below Bucura lake, 2015 m, N45°21'25.43", E22°52'31.09", 11.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (18♂, 2♀, OPC).

Potamophylax cingulatus (Stephens, 1837) – **Slovakia**, Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Stara Rieka Stream, N48°25.248', E19°17.822', 764 m, 7-9.10.2013, singled, J. Oláh, L. Szél (2♀, OPC). Banskobystrický region, Javorie Mts, Stará Huta, Blýskavica, Tisovník Stream, N48°27.553', E19°18.048', 671 m, 7-9.10.2013, singled, J. Oláh, L. Szél (3♀, OPC). Banskobystrický region, Poľana Mts, Hriňová, Bystré, spring brook of Bystrý Stream, N48°37.569', E19°29.261', 1025 m, 08.10.2013, singled, J. Oláh, L. Szél (1♀, OPC). **Ukraine**, Bieszczady Mts (Besszádok), Ung National Park, above Lubnya (Kiesvölgy), N49°02'13.90", E22°42'59.75", 579 m, 20.09.2013, singled, J. Oláh, Cs. Balogh, Cs. Deák, I. Meszesán (1♀, OPC).

Potamophylax latipennis (Curtis, 1834) – **Romania**, Muntii Codru-Moma, Moneasa, stream Moneasa, 31.08.2012, light, Cs. Deák (4♂, 5♀, OPC). Rodnei Mts, Complex Borsa, Viseau stream, 26.09.2014, light trap, J. Oláh, Cs. Balogh (1♂, OPC).

Potamophylax luctuosus (Piller & Mitterpachfer, 1783) – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (5♂, 2♀, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°39.524', E23°55.019', 1138 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC). Retezat Mts, Chele Butii, 936 m, N45°18'07.30", E22°58'27.92", 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♀, OPC).

Potamophylax nigricornis (Pictet, 1834) – **Romania**, Apuseni Mts, Girda de Sus, tributary of Ariesul Mare, N46°270.493', E22°47.895', 788 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (1♀, OPC). Bucegi Mts, Lalomita stream, N45.425296°, E25.444064°, 1917 m, 15.07.2015, Z. Baczó, J. Kecskés (2♂, 1♀, OPC).

Rhadicoleptus meridiocarpaticus (Kolenati, 1848) – **Romania**, Apuseni Mts, Vartop, spring streams, N46°31.045', E22°39.821', 1209 m, 29.05.2013, singled, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♀, OPC). Apuseni Mts, Vartop, spring stream (Flescula), N46°31'07.23", E22°39'41.69", 1209 m, 14.05.2014, Cs. Balogh, B. V. Béres (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, La Mocirle, spring streams, N46°30.241', E23°15.550', 1552 m, 19-20.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (3♂, 1♀, OPC).

Stenophylax meridiorientalis Malicky, 1982 – **Romania**, Cindrel Mts, Paltinis, stream Daneasa, N45°38.582', E23°55.577', 1378 m, 29.05.2013, light, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (4♂, OPC).

Stenophylax nycterobius (McLachlan, 1875) – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, 1♀, OPC).

Stenophylax permistus McLachlan, 1895 – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (3♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Iertii, N46°33.001', E23°20.014', 1055 m, 27.05.2013, light, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (8♂, 6♀, OPC). Cindrel Mts, Paltinis, stream Daneasa, N45°38.582', E23°55.577', 1378 m, 29.05.2013, light, J. Oláh, E. Bajka, Cs. Balogh, G. Borics (1♂, OPC).

Stenophylax sequax (McLachlan, 1875) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (1♀, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, 2♀, OPC). **Slovakia**, Rejdova (Sajóréde), right tributary of Slana (Sajó) stream, lower reach, N48°48'53", E20°15'51", 680 m, 03.10.2013, singled, J. Oláh, J. Kecskés (1♀, OPC).
Stenophylax testaceus (Gmelin, 1875) – **Romania**, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Muntele Mare (Öreghavas), Cretoaia spring area (Posaga tributary), N46°28.862', E23°13.921', 1750 m, 19.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (1♀, OPC).

Beraeidae Wallengren, 1891

Beraea pullata (Curtis, 1834) – **Romania**, Apuiseni Mts, Bihor Mts, Canton Padis, Valea Glavoi, Spring area, N46°34'57.33", E22°42'00.15", 1108 m, 04.07.2013, Cs. Balogh (1♂,1♀, OPC). Apuiseni Mts, Vladeasa Mts, Jada stream, Iedulului triburaty, Saritoarea Iedutului Waterfall, N46°42'42.2", E22°35'04.9", 950 m, 03.07.2013, Cs. Balogh (2♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, Valea Tisei, 19.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (2♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Statiunea Muntele Baisorii, Muntele Mare (Öreghavas), Iara (Jára) spring area, N46°28.914', E23°13.294', 1750 m, 19.06.2015, singled, J. Oláh, Cs. Balogh, P. Juhász (1♂, OPC). Apuseni Mts, Vartop, spring, N46°31.045', E22°39.821', 1209 m, 20.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (4♀, OPC). Romania, Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, singled, J. Oláh, Cs. Balogh, S. Fekete (2♂, OPC).
Ernodes articularis (Pictet, 1834) – **Romania**, Retezat Mts, tributary of Cerna stream, 1208 m, N45°13'10.39", E22°50'24.17", 12.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).

Sericostomatidae Stephens, 1836

Oecismus monedula (Hagen, 1859) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros, Valea. Sebiselu, N46°36'56.61", E22°29'16.68", 518 m, 04.07.2013, Cs. Balogh (1♂, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (1♂, OPC). Retezat Mts, Chele Butii, 936 m, N45°18'07.30", E22°58'27.92", 09.07.2013, E. Bajka, Cs. Balogh, G. Borics, P. Borics (1♂, OPC).
Sericostoma schneideri (Kolenati, 1848) – **Romania**, Apuiseni Mts, Bihor Mts, Crisul Pietros – Valea Bulz, Pietra Bulzului, N46°36'08.12", E22°38'33.44", 560 m, 03.07.2013, light, Cs. Balogh (2♂, 6♀, OPC). Apuiseni Mts, Bihor Mts, Crisul Pietros, Boga, Valea Bulz and Valea Galbena, N46°35'23.25", E22°37'54.74", 450 m, 04.07.2013, light, Cs. Balogh (14♂, 1♀, OPC). Apuseni Mts, Muntii Gilaului, Muntele Baisorii, stream Valea Gera, N46°33.001', E23°20.014', 1055 m, 18.06.2013, light, J. Oláh, Cs. Balogh, S. Fekete (7♂, OPC).

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 99–104

New species and records of Trichoptera from Turkey

János Oláh & Ottó Kiss

Abstract: Based on a small collection, 18 new caddisfly species records have been presented from Turkey. A new species, *Hydropsyche derek* sp. n., is described as a sister species of *Hydropsyche acuta* Martynov, 1909 with unknown distribution and contact zones or clines.

Introduction

A small adult caddisfly material, a byproduct of Lepidoptera collection at light installed not necessary at water, was provided to the authors. The availability of a historical collection of the *Hydropsyche acuta* Martynov, 1909 and the discovery of speciation traits permitted a comparative study and resulted in the delineation of a new sister species *Hydropsyche derek* sp. n. in the newly established *Hydropsyche acuta* species complex. The material including the holotype and paratypes is preserved in 70-80% alcohol and is deposited in the collection of the first author (Oláh Private Collection = OPC) under the protection of the Hungarian Natural History Museum (Budapest).

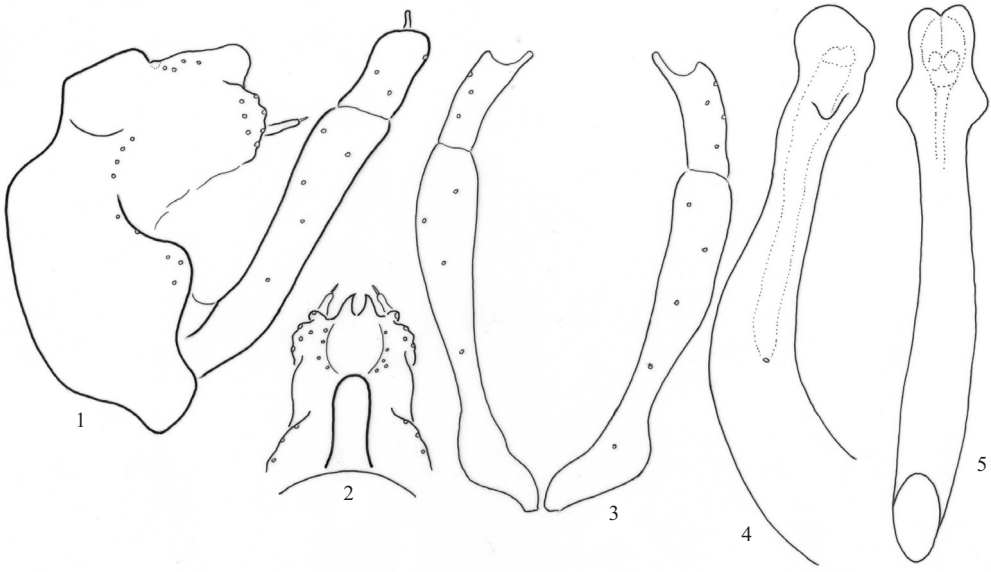
Taxonomic part

Hydropsychidae Curtis, 1835

Hydropsyche acuta Martynov, 1909 (Figs 1–5)
Hydropsyche instabilis ssp. *acuta* Martynov, 1909 – Martynov (1909): 542. Martynov has described two taxa under subspecies *Hydropsyche instabilis acuta*: (1) "Form α" with digitiform apicomesal process on the harpago and (2) "Form β" without this digitiform mesal process. He considered that the head of the phallic organ of these two taxa are similar and he has given the ventral view drawings of the terminal third of the phallic organ together with the gonopods. Martynov described "Form α" as *Hydropsyche instabilis* ssp. *acuta* and considered "Form β" as aberrant specimens of the same species. Both forms were collected by Martynov himself on the same day and in the same habitat in Kars Province (that time in Russia) along the River Tschaldyrka, at outflow from Tschaldyr Lake.

Hydropsyche acuta Martynov, 1909 – Martynov (1916): 173–174. In this paper Martynov has raised the taxonomic status from subspecies to species level. Specimens from Crimea have been considered similar to *H. acuta*. However on his drawing the lateral corner of the harpago is not angled. Specific status of *Hydropsyche* from Crimea having harpago with digitate or filiform mesal process is uncertain, needs further examination.

Hydropsyche acuta Martynov, 1909 – Martynov (1934): 272. In this monograph Martynov has presented all his previous drawings: (1) ventral view of harpago and phallic head of



Figs 1–5. *Hydropsyche acuta* Martynov, 1909 male: 1 = genitalia in left lateral view; 2 = genitalia in dorsal view; 3 = gonopods in ventral view; 4 = phallic organ in left lateral view; 5 = phallic apex in ventral view

"Form α" (2) ventral view of harpago of "Form β", and (3) dorsal view of genitalia of Crimean specimen. This comparative presenting clearly suggests that these three taxa are independent species.

Hydropsyche acuta Martynov, 1909 – Schmid 1959: 772–773. Schmid has collected specimens with filiform mesal process on the harpago from Walazir in the Iranian part of small Caucasus and determined as *Hydropsyche acuta*. His drawings were reproduced in both editions of the Malicky's Atlas of European Trichoptera (Malicky 1983, 2004), in spite of the pronounced differences in the microstructure of harpago and phallic head between the drawings of Martynov and Schmid. The Iranian specimens represent an independent species.

Hydropsyche acuta Martynov, 1909 – Sipahiler (2004): 188–189. According to the drawings, the drawn specimen has long filiform mesal process and obliquely truncate lateral corner apicad on the harpago. Moreover the lateral profile of the entire phallic organ is entirely different compared to *H. acuta*, as drawn here from Armenian specimens having ventral and dorsal microstructures identical to Martynov's original drawings. In Sipahiler's drawings the trait combination suggests a new sibling species from the *H. acuta* species complex. Unfortunately the origin of the drawn specimen is not documented, whether it was selected from Ankara, Ardahan, Kars or Van region.

Examined material – **Armenia**, Sisian District, Dastakert, River Ayriget, 16.07.1956, L. Zhiltzova (2♂, OPC).

Notes – Today we have learnt the taxonomic importance of the microstructural divergences of speciation traits directly involved in sexual selection processes (Oláh et al. 2015). It seems that the lateral and ventral profile of the hydropsychid phallic organ is the most

stable trait in distinguishing among taxa in the contemporary divergences of sibling species. Here we distinguish the *Hydropsyche acuta* new species complex characterized by digitiform or filiform mesal process on the harpago in the *Hydropsyche instabilis* species group. In this complex the phallic head and harpago with stable differences in microstructure must represent independent taxa. The "Form α", the true *Hydrospyche acuta* Martynov, 1909 has short digitate, not long filiform mesal process and angled, not obliquely truncate lateral corner on the harpago. Besides the numerous microstructural stable differences in the lateral profile of the entire phallic organ, especially the lateral subapical projection on the head of the phallic organ has sensitive trait value in distinguishing among contemporary diverging sibling species.

Re-diagnosis – We have examined two male specimens collected from Armenia having identical fine structures of the "Form α", the true *Hydrospyche acuta* as indicated in the original Martynov's drawings. Here we present detailed drawings, including the fine structure of the lateral profile of the entire phallic organ. The lateral profile of the entire phallic organ from the phallobase to the head has proved to be a very sensitive and stable fine structure in separating hydropsychid species (Oláh & Johanson 2008a,b, 2012), even in the initial stages of speciation processes (Oláh et al. 2015). The lateral apical corner of harpago angled, not obliquely rounded truncate; the lateral subapical projection on the head of the phallic organ triangular, not right-angled posterad; the lateral profile of the phallic head rounded, not elongated.

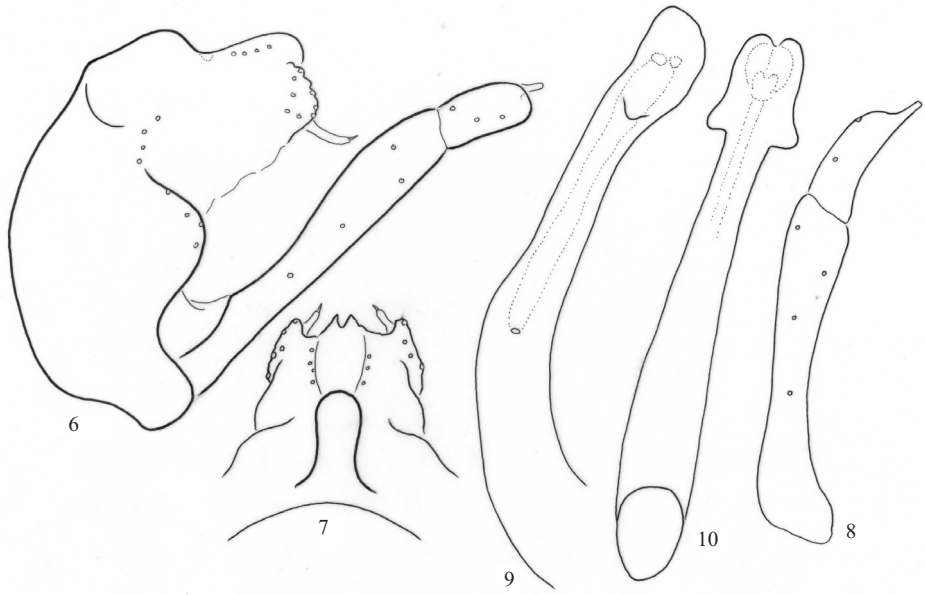
***Hydropsyche derek* sp. n. (Figs 6–10)**

Diagnosis – Belongs to to the *Hydropsyche acuta* species cluster inside the *Hydropsyche instabilis* species group. Close to the nominate species *Hydropsyche acuta* Martynov, 1909 but differs by having lateral apical corner of harpago obliquely rounded truncate, not angled; the lateral subapical projection on the head of the phallic organ right-angled posterad, not triangular; the lateral profile of the phallic head elongated, not rounded. The limited number of specimens collected and available for comparative study of both the nominate species and the new sibling species does not permitted us to realise a detailed survey on the interpopulation and intrapopulation trait variabilities of speciation fine structures of the phallic organ.

Description – Male (dry transferred into alcohol). Body brown, dorsal thoracic sclerites darker. Wings ochraceous with lighter pubescence, without pronounced pattern. Maxillary palp formula I-III-II-IV-V. Spur formula 244. Forewing length 8 mm.

Male genitalia. Segment IX fused annular and short; its median keel rounded broadening apicad with granulose dorsal surface; apical lobe on posterolateral margin rounded triangular, anterior margin concave. Intersegmental profile between the ninth and tenth segments low step, little more than right angled. Segment X short, rounded quadrangular in dorsal view; lateral setose area, the cerci fused with ventroapical setose lobe, located in posterad position; semicircular in lateral and lobulose in dorsal view; dorsoapical setose lobes forming the setose bases of the unsetose dorsolateral stripes of segment low X in lateral view. The coxopodit of the gonopod slightly longer than the apex of segment X, harpago with short digitate mesal process and the lateral apical corner obliquely rounded truncate. Phallic organ with very produced subapical lateral projection right-angled posterad.

Type material – Holotype: **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (1♂, OPC). Paratypes: same



Figs 6–10. *Hydropsyche derek* sp. n. male holotype: 6 = genitalia in left lateral view; 7 = genitalia in dorsal view; 8 = left gonopod in ventral view; 9 = phallic organ in left lateral view; 10 = phallic apex in ventral view

as holotype (5♂, OPC). Agri Province, 6 km NE of Cumacay, 39°56'N, 43°14'E, 2050 m, 9.07.2002, B. Benedek, T. Csővári (2♂, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (7♂, OPC).

Etymology – derek, from "derékszög", rectangular, right-angled in Hungarian, refers to the right-angled lateral subapical projection posterad on the head of the phallic organ.

Hydropsyche incognita Pitsch, 1993 – **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (3♂, OPC).

Hydropsyche instabilis Curtis, 1834 – **Turkey**, Sivas Province, 5 km W of Kizildag Pass, 39°47'N, 42°28'E, 2050 m, 12.07.2002, B. Benedek, T. Csővári (4♂, OPC). Van Province, Yuksekova Mts, 11 km W of Guseldere Pass, 38°14'N, 43°80'E, 2300 m, 02.07.2002, B. Benedek, T. Csővári (45♂, OPC).

Hydropsyche sakarawaka Schmid, 1959 – **Turkey**, Agri Province, 5 km NE of Cumacay, 39°56'N, 43°14'E, 2050 m, 9.07.2002, B. Benedek, T. Csővári (1♂, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (1♂, OPC).

RHYACOPHILIDAE Stephens, 1836

Rhyacophila nubila Zetterstedt, 1840 – **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (1♂, OPC).

BRACHYCENTRIDAE Ulmer, 1903

Micrasema bifoliatum Martynov, 1925 – **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (2♂, OPC). Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (3♂, 2♀, OPC).

Lepidostomatidae Ulmer, 1903

Lepidostoma hirtum Fabriciusy, 1775 – **Turkey**, Agri Province, 65 km NE of Cumacay, 39°56'N, 43°14'E, 2050 m, 9.07.2002, B. Benedek, T. Csővári (1♂, OPC). Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 5.07.2002, B. Benedek, T. Csővári (25♂, 6♀, OPC).

Limnephilidae Kolenati, 1848

Drusinae Banks, 1916

Limnephilus affinis Curtis, 1834 – **Turkey**, Konya Province, Sultan Daglari, 14 km SW of Aksehir, 38°14.878'N, 31°20.447'E, 1659 m, 13.05.2015, T. Csővári, B. Tóth (3♂, 1♀, OPC).
Limnephilus ponticus McLachlan, 1898 – **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (1♂, OPC). Agri Province, 65 km NE of Cumacay, 39°56'N, 43°14'E, 2050 m, 9.07.2002, B. Benedek, T. Csővári (1♂, OPC). Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 5.07.2002, B. Benedek, T. Csővári (1♂, OPC). Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (1♂, OPC).
Mesophylax impunctatus McLachlan, 1884 **– Turkey**, Kütahya Province, 12 km NNE of Kütahya, 39°31'N, 30°45'E, 913 m, 12.05.2015, T. Csővári, B. Tóth (1♂, OPC). Konya Province, Sultan Daglari, 14 km SW of Aksehir, 38°14.878'N, 31°20.447'E, 1659 m, 13.05.2015, T. Csővári, B. Tóth (1♂, 2♀, OPC).
Potamophylax armeniacus Mey, 1979 – Turkey, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (1♂, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (1♂, OPC). Agri Province, 65 km NE of Cumacay, 39°56'N, 43°14'E, 2050 m, 9.07.2002, B. Benedek, T. Csővári (1♂, OPC).
Psilopterna alageza Oláh, 1985 – **Turkey**, Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 02.07.2002, B. Benedek, T. Csővári (3♂, OPC). Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 5.07.2002, B. Benedek, T. Csővári (1♂, OPC).
Stenophylax caesareicus (Schmid, 1959) – **Turkey**, Tokat Province, Camlibel Pass, 39°57'N, 36°31'E, 1700 m, 29.06.2002, B. Benedek, T. Csővári (9♂, 6♀, OPC).
Stenophylax hatatitla Malicky, 1985 – **Turkey**, Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (32♂, 19♀, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 10.07.2002, B. Benedek, T. Csővári (8♂, 2♀, OPC). Sivas Province, 5 km W of Kizildag Pass, 39°47'N, 42°28'E, 2050 m, 12.07.2002, B. Benedek, T. Csővári (1♂, OPC). Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (1♀, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 30.VI-1.07.2000, B. Benedek, T. Csővári (4♂, OPC).
Stenophylax meridiorientalis Malicky, 1980 – **Turkey**, Sivas Province, 5 km W of Kizildag Pass, 39°47'N, 42°28'E, 2050 m, 12.07.2002, B. Benedek, T. Csővári (1♂, 3♀, OPC). Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (6♂, 5♀, OPC). Bilecik Province, 3 km NE of Bözüyük, 39°55.295'N, 30°03.194'E, 962 m, 11.05.2015, T. Csővári, B. Tóth (5♂, 3♀, OPC).
Stenophylax muehleni McLachlan, 1884 – **Turkey**, Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 02.07.2002, B. Benedek, T. Csővári (4♂, 2♀, OPC). Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 5.07.2002, B. Benedek, T. Csővári (9♂, 3♀, OPC). Sivas Province, 5 km W of Kizildag Pass, 39°47'N, 42°28'E, 2050 m, 12.07.2002, B. Benedek, T. Csővári (3♀, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 7-8.07.2000, B. Benedek, T. Csővári (2♀, OPC). Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (2♂, 3♀, OPC). Nevsehir Province, 8 km NE of Ava Nos, 38°45.568'N, 34°54063'E, 1109 m, 15.05.2015, T. Csővári, B. Tóth (1♂, OPC). Agri Province, Karasu-Aras Mts, 5 km SE of Sarican, 39°47'N, 42°28'E, 2000 m, 30.VI-1.07.2000, B. Benedek, T. Csővári (2♀, OPC).
Stenophylax permistus, McLachlan, 1895 – **Turkey**, Konya Province, Sultan Daglari, 14 km SW of Aksehir, 38°14.878'N, 31°20.447'E, 1659 m, 13.05.2015, T. Csővári, B. Tóth (2♀, OPC).
Stenophylax tauricus (Martynov, 1917) – **Turkey**, Van Province, Yuksekova Mts, 2.5 km E of Guseldere Pass, 38°11'N, 43°56'E, 2600 m, 02.07.2002, B. Benedek, T. Csővári (1♂, 1♀, OPC). Konya Province, Sultan Daglari, 14 km SW of Aksehir, 38°14.878'N, 31°20.447'E, 1659 m, 13.05.2015, T. Csővári, B. Tóth (1♂, OPC).
Stenophylax testaceus Gmelin, 1789 – **Turkey**, Erzerum Province, 8 km NW of Kop Pass, 40°02'N, 40°28'E, 2000 m, 11.07.2002, B. Benedek, T. Csővári (1♀, OPC).

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 105–130

New incipient species under reinforcement in the *Drusus discolor* new species complex (Limnephilidae, Trichoptera)

János Oláh, Pavel Chvojka, Constantin Ciubuc, Gennaro Coppa & Halil Ibrahimi

Abstract: In a comprehensive survey high genetic differentiation with haplotype endemism was detected between mountain range populations of the montane caddisfly species *Drusus discolor* especially in the Pyrenees, Massif Central, and Western Alps. However no morphological divergences were recognised by traditional morphology. In the present study, covering the entire area of the species we have discovered stable paraproctal divergences in the same mountain ranges by applying the speciation trait approach together with fine structure analysis and demonstrated empirically by diverged trait matrices. Unlike other limnephilid taxa the parameres in *Drusus* genus vary stochastically with mutation, genetic drift, and recombination as well as modified by standing genetic variation and by fluctuating asymmetry of developmental instability and environmental plasticity. Morphological divergences of the speciation trait evolved from the ancestral species in peripatry during sexual selection processes. We theoretized the possibility that the reproductive barriers were reinforced or are under reinforcement in secondary contacts. Subtle and stable divergences resulted in the formation of phylogenetic incipient sibling species: *Drusus ferdes* sp. n., *D. kupos* sp. n., *D. leker* sp. n. *D. visas* sp. n.

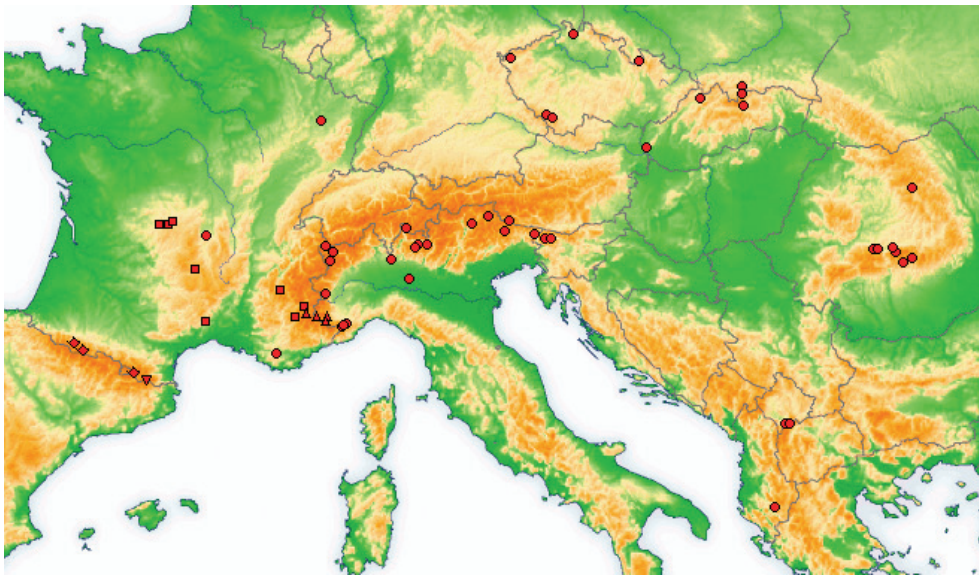
Introduction

Mitochondrial sequence data (COI) of 254 individuals of the montane caddisfly species *Drusus discolor*, covering its entire distributional range, have been analysed to reveal the population genetic structure (Pauls et al. 2006). High level of genetic differentiation was detected between mountain range populations with remarkable haplotype endemism. The uncorrected pairwise divergence reached the value of 6.3% between mountain ranges. However the differentiation within mountain ranges was low. Final conclusion was drawn that genetic distances between populations of different mountain ranges exceed those measured between other closely related species of *Drusus*. Diverged molecular endemic haplotypes were measured but their phenomics was not described taxonomically. Preliminary observations on male genital morphology revealed no morphological divergences among the haplotype groups. The few adults available for study showed higher morphological variability within than between populations. At the same time the significant genetic differentiation between and low genetic diversity within mountain range population was interpreted as speciation events. Further study was suggested using more molecular and morphological markers to elucidate whether they represent cryptic species or subspecies (Pauls, 2004).

In the present study we have applied our speciation trait approach (Oláh et al. 2015) with fine structure analysis to find initial split criteria in *Drusus discolor* populations by empirical presentation of the diverged trait matrices. In the *Drusus bolivari* species complex we have found that the paraproct is the decisive speciation trait. Many species in the Chaetopterygini

and Stenophylacini tribes evolved incipient sibling species by divergences in the microstructure of the phallic organ. Sclerotized or soft microstructures on the aedeagus or on the paramere diverged as product of adaptive processes in sexual selection (Oláh et al. 2015). In *Drusus* the paraprocts evolve in non-neutral, non-random adaptive genomic processes under sexual selection and the miniaturised parameres are more variable due to neutral, random non-adaptive mechanisms being more exposed to stochastic processes of gene flow, genetic drift and recombination.

With focus on paraproct and paramere fine structures we have examined 1119 specimens of *Drusus discolor* species complex collected almost from the entire distributional area (Map 1). We have detected, delimited and delineated four new incipient species. Those populations from the Pyrenees, Massif-Central, and Western Alps were distinguished as morphologically diverged incipient sibling species which were most differentiated and highly diverged also by neutral molecular marker (Pauls et al. 2006). Here we diagnose these new species and present the detailed diverged trait matrices both for paraproct and paramere just to demonstrate for visual experience how stable are the paraproct speciation trait on the huge distributional area of the ancestral species *Drusus discolor* and how it evolved stably and subtly delicate and consistent in the isolated new siblings.



Map 1. Distribution of *Drusus discolor* species complex. Circle = *D. discolor,* square = *D. ferdes* sp. n., downward triangle = *D. kupos* sp. n., upward triangle = *D. leker* sp. n., twisted square = *D. visas* sp. n.

Theoretical part

Without target research we have found contact populations with hybrid effect under reinforcement processes among the examined samples of the new sibling species. First we present some theoretical details of this speciation process getting more and more importance in the

final stage of speciation. We survey some details on the fluctuating asymmetry, an important indicator of paramere variability and an effective procedure to quantify developmental instability of parameres by geometric morphometrics.

Reinforcement to complete speciation

Character displacement, a term coined by Brown & Wilson (1956), is a speciation process by which traits evolve in respond to selection to lessen resource competition and reproductive interactions between species (Pfennig & Pfennig 2009). The idea originates from Gause (1934). It was demonstrated experimentally that two species cannot coexist if they overlap in resource requirements. Later the competitive exclusion principle was formulated (Hardin 1960). Interacting taxa evolve differences in resource use and reproductive traits to prevent local extinction through exclusion. Individuals, populations or taxa most dissimilar are expected to be more successful. Character displacement in traits associated with resource use is the ecological character displacement and that in traits associated with reproduction is the reproductive character displacement. If reproductive character displacement evolves from selection to avoid hybridization, this process is referred to as reinforcement.

Reinforcement is a speciation mechanism that may contribute to reproductive isolation by strengthening barrier building between populations as a result from selection against unfit hybrid offspring (Butlin et al. 2011). If hybrids have reduced fitness, reinforcement may lead to divergence between two taxa in the region of overlap. As a result taxa more prone to experiencing character displacement will be more diverse, especially if interacting species are phenotypically variable and abundant in standing genetic variation. Divergence rate depends on gene flow into the sympatry of overlap from the allopatry.

Character displacement is vital in completing the process of speciation when selection lessens resource completion or reproductive interaction by causing sympatric species to diverge in traits associated with resource or mate acquisition. It can finalize speciation between already divergent taxa. However character displacement can initiate divergence and reproductive isolation between conspecific populations that differ in their interactions with heterospecifics. Conspecific population in sympatry and in allopatry are expected to diverge either in resource use or in reproductive traits and differentiation between them in sympatry *versus* allopatry occurs if character displacement generates fitness trade-offs in local adaptation (Pfennig & Pfennig 2009, Rice & Pfennig 2010).

Strong reinforcement process of premating isolation (divergent sexual selection by plumage and vocalization) has been detected in *Ficedula* flycatchers with strong intrinsic postzygotic isolation by female hybrid sterility following Haldane's rule of more severe fitness reduction from genetic incompatibilities in hybrids of the heterogametic female sex (Sætre & Sæther 2010). Similar premating isolation occured among neighbouring conspecific populations of spadefoot toads by reproductive character displacement of the reinforcement (Pfennig & Rice 2014). Trait evolved in response to selection to minimize deleterious reproductive interactions with heterospecifics.

Fluctuating asymmetry

Fluctuating asymmetry is measured by variation in the differences between right and left sides of bilateral traits, like parameres and used to assess developmental instability. There are two perspectives on symmetry and three types of asymmetry (Klingenberg 2015). (1) *Matching*

symmetry where the structure is present as two mirror imaged separate copies, like human hands, insect wings or the parameres on insect phallic organ. Symmetry axis runs between the two copies. Insect parameres have matching symmetry. (2) *Object symmetry* where the structure is symmetric in itself, like the human face. Symmetry axis runs through the structure.

There are three types of asymmetry detected mostly with scalar measurement (length, angles, and counts of structures like setae), but applicable also to multidimensional formation of shapes. (1) *Antisymmetry* has bimodal distribution of left-right differences with clear left- or right-biased asymmetry of "left-sided" and "right-sided" individuals or dextral and sinistral morphs. (2) *Directional asymmetry* has left-right differences distributed around a mean of different from zero, asymmetric in a consistent way like most internal organs. (3) *Fluctuating asymmetry* has left-right differences of bell-shaped distribution with a mean of zero. These usually small differences are random imprecisions in developmental processes deviating from the expectation of target phenotype and expressed under genomic and environmental control. However, normal distribution would require many small additive and independent random effects, but fluctuating asymmetries are rather non-linear, non-additive with mutual interdependences although random in their directions. Fluctuating asymmetry is effectively applicable to study the developmental origin of integration within and between morphological structures. Development is not completely deterministic.

Paramere asymmetry

Most paramere exhibit fluctuating asymmetry with imprecision measures of developmental instabilities correlated or caused either by adverse environmental conditions or by genetic challenges. Genomic molecular integration with chromosomal rearrangement rather than selection influences this fluctuating asymmetry in polygenic mechanisms comprised of pleiotropic, epistatic, dominance and various "selfish" genetic processes. Gene flow, genetic drift, mutations, recombination and standing genetic variation all may further influence the effective power of the integrative mechanisms in asymmetry. Developmental processes are inherently stable and could be remarkably precise depending on balance between genomic or environmental noise and buffering by developmental stability and canalization (Klingenberg 2015).

We have experienced very high stability in the complex structure of the parameres in all European populations of the spring-dwelling caddisfly species *Potamophylax nigricornis* (Oláh et al. 2013) as well as in other limnephilid genera (Oláh et al. 2014, 2015). At the same time we have recorded significant fluctuating asymmetry in the count of terminal setae on the parameres of the *Chaetopteryx rugulosa* species group (Oláh et al. 2012). Similarly less stability and more fluctuating asymmetry was experienced during our studies on parameres in the *Drusus bolivari* species complex (Oláh et al. 2015).

Paramere variability in *Drusus discolor* complex

In the present study on the *Drusus discolor* new species complex we have examined the parameres of over one thousand specimens (total number of examined specimens is 1119 in the 5 taxa). Drawings of relevant paramere structure are prepared with focus on the articulation region of the long filiform terminal modified seta. At lower magnification of the stereomicroscope it seems that this long and thin terminal filiform structure is the apical section of the paramere shaft and the variously developed spur-like structure is a modified seta. At higher magnification of compound microscope it is clearly visible that the spur formation

is the apical part of the shaft and terminal filiform long structure is a modified seta attaching with alveolus to the spur-shaped shaft head subapicad. Beside the terminal rigid filament and the apical spur of the shaft there are no more setae or spine formation developed on the paramere of the *Drusus discolor* species complex. The apical spur formation sometimes may disintegrate into various substructures.

In most of the examined limnephilid genera we have detected and documented that parameres are the target trait of the divergence due to their central function acting during the copulatory processes in various mechanisms of sexual selection. As a result the parameres are the most diverged traits and their divergence evolved most stable. The high comparative rate of diversity of parameres suggests some kind of runaway coevolution coupled and enforced by cryptic female choice operating on an unknown genomic segment in the sexual selection processes. High rate and stability of divergences confirm that parameres were generated selectively by non-neutral and non-random adaptive mechanisms. We have concluded that these delicate structures of limnephilid genera directly involved in copulatory processes are speciation traits evolved under sexual selection and confirmed or completed with various reinforcement mechanisms in local adaptation (Oláh et al. 2012, 2013, 2014, 2015).

In subfamily Drusinae the parameres are miniaturised into a slim and slender rod-like structure with some modified setae present in various numbers in various shapes and on various regions of the paramere shaft. Paramere size-reduction induced probably some kind of function alteration manifested in reduced selective power and resulted in increased variability. Due to this reduction in size the parameres were almost neglected in the diagnosis of species descriptions. Usually paramere drawings are lacking or if present, prepared from images of low magnification. Very few paramere drawings have been prepared from proper preparations and with higher resolution (Murgoci & Botosaneanu 1954).

Paraproct divergence

In *Drusus* genus the paraproct with increased direct function in copulatory processes during sexual selection has taken over most selectivity of the parameres. As a result the paraproct diverged under non-neutral, non-random, that is under directed selective and adaptive mechanisms. That is clearly demonstrated as self-evidence of the high stability that we have demonstrated earlier in the diverged trait matrices (Oláh et al. 2015). The lateral profiles of both the ancestral paraproct in *Drusus discolor* as well as of the diverged paraprocts in the four new incipient sibling species are remarkable stable. The divergences in the paraproct shape of all the four new siblings are rather subtle, but consistent. However even subtle modifications in the head shape of the dorsal branch of the paraproct may result in significant alternative stimulatory effect during copulation in the cryptic female choice. The black dorsoapical head of the paraproct are strongly sclerotized and densely packed with peg-like pointed short and black cuticular outgrowths (spinules or tubercles of Schmid and Botosaneanu). The short pointed processes of micro-sculpture are non-cellular in origin and composed entirely of heavily sclerotized cuticula and are fixed to and confluent with the exoskeleton. The serrated pointed sculpture of the paraproctal head may have decisive stimulatory function. Any divergence in shape and direction of this enlarged heavily sclerotized structure with particularly patterned surface must have a dominant copulatory function of barriers in reproductive isolation.

Besides the speciation trait of the paraproct we have found morphological divergences among siblings also in the paramere microstructure and in the gonopod shape. However variability is high due to the stochastic processes dominating in their genetic or epigenetic formation.

There are several possible drawing planes to document the evolved shape divergences in the paraproct structure. We have selected the lateral view that is most simple to align and more reliable to reproduce. SCHMID (1956) already emphasized that lateral view of the paraproct is very characteristic in the genus *Drusus*. The paraproct was adjusted in lateral view with an arrangement having the apical margin exactly in vertical position. This has prime importance to view and draw the paraproctal head in proper direction to image the real lateral head profile and the serrated pattern of pointed peg-like micro-sculpture.

Material and methods

Practical problems for analysis of microstructures

Studies on microstructures of the speciation traits focus on divergences that are fairly subtle. When building and composing diverged trait matrices (structure matrix of diverged speciation traits; visualized structure matrix, as a graphical copy of population reality) we work nearby the structural diverging point of the initial split criteria (OLÁH et al. 1914). We have to pay particular attention to artefacts (KLINGENBERG 2015): (1) from museum specimen stored dry or in liquid; (2) from specimen preparations of clearing and cleaning procedures; (3) from removing setae (hairs); (4) from exposition of internally withdrawn phallic organ by pulling out with super fine forceps; (5) from distortions and injuries frequently occur in nature during mating or copulation processes; (6) from aligning or positioning to microscope when collecting 2D data of 3D structures and loss of information; (7) from lacking clear orientation of front and back, up and down, left and right; (8) from variation in the level of focus or inaccurately focused images; (9) from distortions by low-quality lenses; (10) from enlarged parallax of an oblique angle; (11) from low-quality light with unequal illumination. Moreover there are systematic errors affecting all measurements of any observer with given equipment, magnification especially at higher resolution power. Random errors affect each individual observation differently; produce deviations from the reality in all directions. However the main question remains how much greater divergence is than the artefact error and the range of individual trait variation together.

Depositories: Constantin Ciubuc Private Collection, Sinaia, Romania (CCPC), Coppa Private Collection, Villers-sur-Bar, France (CPC), Hungarian Natural History Museum, Budapest, Hungary (HNHM), Museo Civico di Scienze Naturali "E. Caffi", Bergamo, Italy (MCSNBG), National Museum, Prague, Czech Republic (NMPC), Oláh Private Collection under national protection by the Hungarian Natural History Museum (OPC).

Taxonomical part

Drusus discolor (Rambur, 1842) (Figs 1–190)

Rediagnosis – After a preliminary throughout examination of genital fine structure of all populations we have recorded cerci non-diverse and stable, gonopods diverse and variable, paramere non-diverse and variable. The paraproct exhibited the most stable and most diverse state of trait. These findings confirm the speciation function of the paraproct supported by the selective non-random, non-neutral *versus* random, neutral trait comparative principle, realized in adaptive process of sexual selection and resulted in reproductive barrier building and character displacement.

We have examined 1119 specimens and found 1030 specimens having the ancestral shape of the paraproct, 5 specimens diverged to *Drusus kupos* sp. n. in Pyrénées-Orientales, Err; 39 specimens diverged to *D. ferdes* sp. n. in Massif-Central and in Alpes-de-Haute-Provence; 26 specimens diverged to *D. leker* sp. n. in Piemonte, Italy and Alpes-de-Haute-

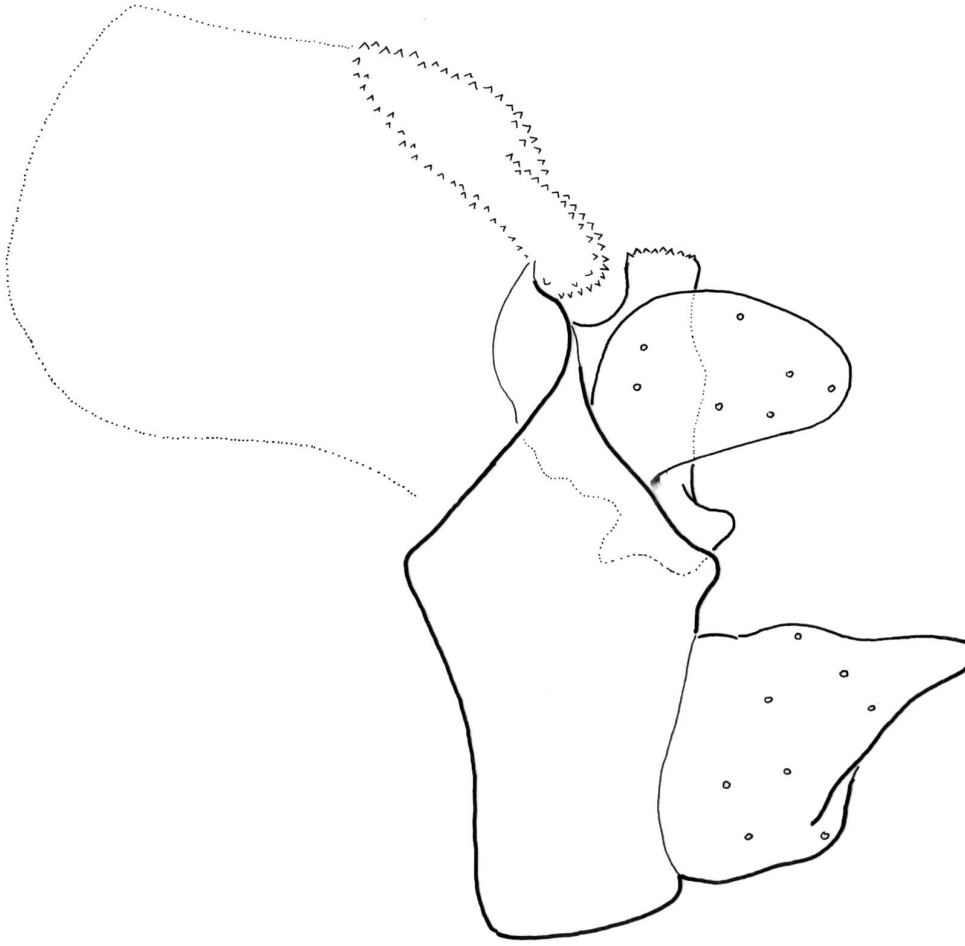
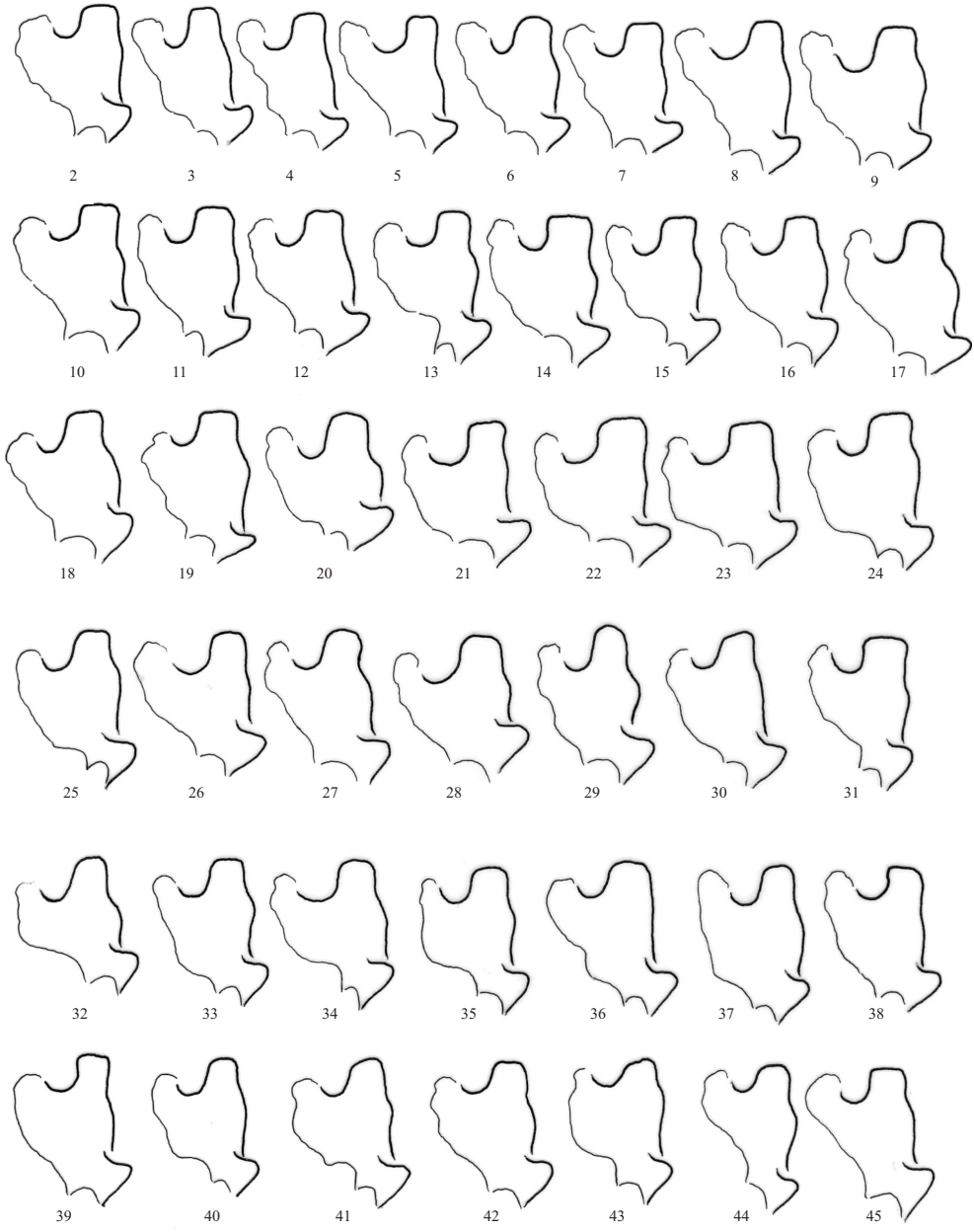


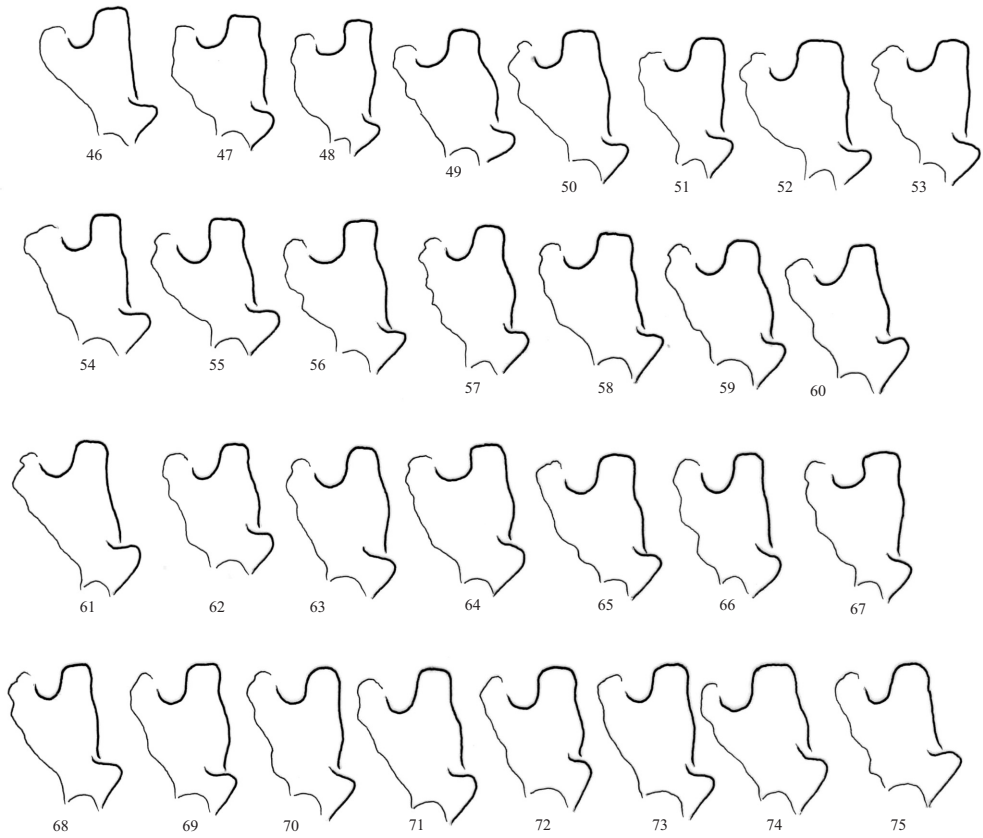
Fig. 1. *Drusus discolor* (Rambur, 1842) male genitalia without phallic organ and with eight tergite profile in left lateral view

Provence, France; 19 specimens diverged to *D. visas* sp. n. in Pyrénées-Orientales, and Hautes-Pyrénées.

The ancestral shape of the paraproct in *Drusus discolor* (Rambur) is characterized by a lateral profile of flat convex serrated head, horizontal and rounded quadrangular relative to the vertically positioned apical margin. The serrated head is rounded truncated. This shape is very stable in all the populations inhabiting huge distributional area from France to Albania through Italy, Slovenia, Czech Republic, Slovakia, Poland, Romania, Bulgaria, and Kosovo. We have to emphasize however what we have experienced during the tedious cleaning procedures as well as during the detailed microscopic examination and drawings of so many specimens, that as it was detailed among the practical problems of microstructure analysis, the alignment of the cleared genitalia may have dramatic effect on the image what



Figs 2–45. *Drusus discolor* (Rambur, 1842) paraproct (superanal complex without cercus) in lateral view. **France**: 2–3 = Vosges, 4–7 = Alpes Maritimes (contact population with *D. leker* sp. n), 8 = Savoie. **Italy**: 9–10 = Briga Alta, 11–16 = Piemonte, Crissolo, 17–19 = Piemonte, Ceresole Reale, 20–25 = Valle d'Aosta, 1700 m, 26–29 = Valle d'Aosta, 1650 m, 30 = Mendatica, 31 = Madisimo, 32 = Ronobello, 33 = Vigilio, 34 = Valbondione, 1940 m, 35 = Valgoglio, 36 = Valbondione, 1862 m, 37–38 = Fiume Po, 50 m, 39–41 = Telve, 42 = Claut, 43–45 = Sappado

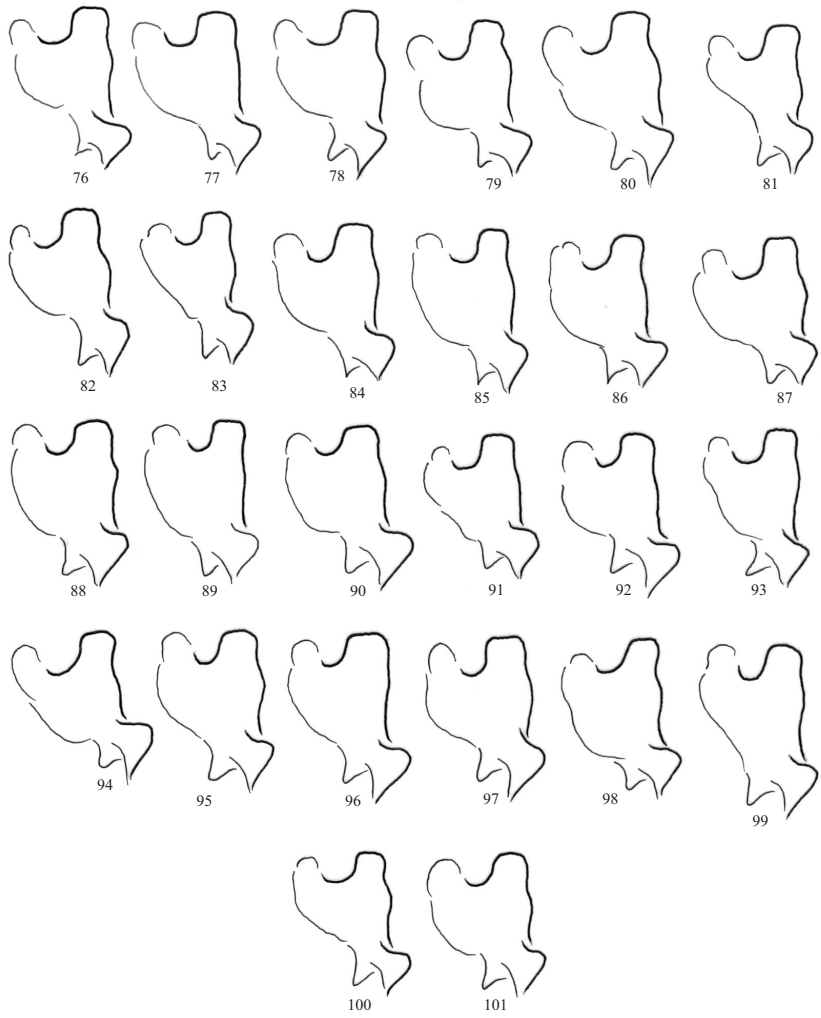


Figs 46–75. *Drusus discolor* (Rambur, 1842) paraproct (superanal complex without cercus) in lateral view.
Italy: 46–48 = Resia. **Slovenia**: 49–52 = Julian Alp.
Slovakia: 53 = Pleso nad Skokem, 54 = Biela Voda, 55 = Mlynica, 56–58 = West Tatra, Jamycky Stream.
Poland: 59–61 = Gorce Mts, **Romania**: 62–64 = Lacu Rosu, 65–66 = Bucegi Mts,
67–68 = Fagaras Mts, 69 = Cibin Mts, 70 = Tarcu Mts
Kosovo: 71 = Lepenc, 72 = Prevall. **Albania**: 73–75 = Ostrovice Mts

we see under the microscope and what we draw with the drawing tube. The serrated head of the paraproct is composed of the two free, not fused dorsal branches of the paraproct. The branches are flat in sagittal plane and positioned oblique from anterolaterad to posteromesad. As a result a very tiny alteration in observation view from exact lateral may change dramatically the length (not the height!) of the head on the images what we see under microscope and consequently the drawings what we prepare.

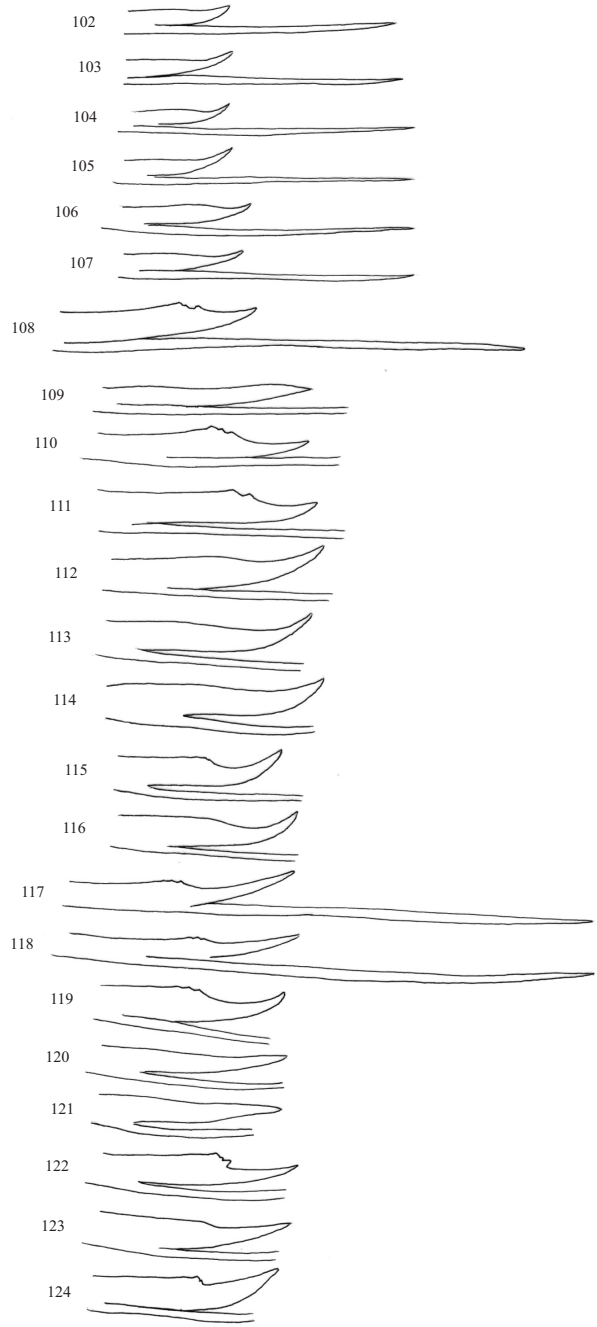
The spur formation, the actual terminal ending of the paramere is developed into a slightly upward curving and narrowing pointed structure with a variously produced dorsosubapical uprising or more frequently without any such outgrowth. The variation within or between populations is almost the same, due to dominating stochastic processes including fluctuating asymmetry, as it was discussed in the theoretical part.

Material examined – **Albania**, Skrapar district, Ostrovicë Mts, Backë, brook and spring NE of the village, N40°31.346', E20°25.096', 1650 m, 29.05.2013, P. Juhász, T. Kovács, G. Magos, G. Puskás (4♂, 11♀, OPC). **Bulgaria**, Blagoevgrad province, Belasica Mts, Petrič, sping of Lesniska Stream SW of the city, N41°21.021', E23°10.767', 1025 m, 27.10.2013, J. Kontschán, D. Murányi, T. Szederjesi (1♀, HNHM). **Czech Republic**, S Bohemia, Šumava Mts, Hamerský potok stream below Horská Kvilda, N49°03'25", E13°32'06", ca. 1000 m, 27.07.1991, P. Chvojka (1♂, NMPC). S Bohemia, Šumava Mts, Hamerský potok stream below Horská Kvilda, 49°03'25"N, 13°32'06"E, ca. 1000 m, 12.06.1992, P. Chvojka (1♂, NMPC). W Bohemia, Krušné hory Mts, Rájecký potok stream above Støíbrná, N50°22'38", E12°32'21", 640 m, 05.06.1993, P. Chvojka (3♂, 1♀, NMPC; 3♂, 1♀, OPC). N Bohemia, Jizerské hory Mts, Jedlová stream above Josefùv Dùl, N50°47'17", E15°14'32", 650 m, 05.06.2002, F. Krampl (6♂, 4♀, OPC). N Moravia, Králický Sní ník Mt., Morava River, N50°11'59", E16°50'36", 1100 m, 16.07.2001, P. Chvojka (2♀, OPC). N Moravia, Králický Sní ník Mt., Morava River, N50°11'59", E16°50'36", 1100 m, 09.07.2003, P. Chvojka (12♂, OPC). **France**, Department Vosges, Le Valtin, la Meurthe, 02.07.2008, G. Coppa (2♂, OPC). Department Alpes-Maritimes, Guila affluent Macruera ancien sentier, 08.07.2008, G. Coppa (4♂, 1♀, OPC). Department Savoie, Bramans, Granges de Savine, 16.08.2009, G. Coppa (1♂, 1♀, OPC). **Italy**, Lombardia, Valbondione (BG), Lago Barbellino, N46.0630°, E10.0482°, 1862 m, 16.07.2003, light trap, R. Calandrina (5♂, 2♀, MCSNBG). Madesimo (SO), Montespluga, torrente, N46.4852°, E9.3538°, 1917 m, 23.07.2004, light trap, M. Valle (8♂, 2♀, MCSNBG; 5♂, 1♀, OPC). Valgoglio (BG), Val Sanguigno, torrente vicino al lago Prespontino, N45.9789°, E9.8457°, 1910 m, 07.08.2009, light trap, S. Cerea (24♂, 10♀, MCSNBG; 10♂, 7♀, OPC). Roncobello (BG), Baite di Mezzeno, N45.9652°, E9.8084°, 1600 m, 08.07.1995, light trap, Bertuetti (22♂, 12♀, MCSNBG). Roncobello (BG), Baite di Mezzeno, N45.9652°, E9.8084°, 1600 m, 08.07.1995, light trap, Bertuetti (22♂, 12♀, MCSNBG). S. Rocco al Porto (LO), Fiume Po, N45.0611°, E9.7042°, 50 m, 29.07.1997, light trap, F. Carrara, O. Lodovici (1♂, MCSNBG). Valbondione (BG), Baite di Sasna, N46.0177°, E10.0446°, 1940 m, 24.07.1995, light trap, Albrici (16♂, 4♀, MCSNBG). Piemonte, Crissolo (CN), Pian della Regina fiume Po, N44.7000°, E7.1163°, 1700 m, 02.09.1997, light trap, M. Valle (74♂, 37♀, MCSNBG; 10♂, 8♀, OPC). Briga Alta (CN) affluente torrente Negrone, N44.1109°, E7.7252°, 1600 m, 18.07.2001, light trap (7♂, 19♀, MCSNBG). Ceresole (TO), Torrente Orco sopra Chiapili, N45.458°, E7.1630°, 1800 m, 21.08.1965, A. Viganò (3♂, 1♀, MCSNBG). Liguria, Mendatica (IM), affluente torrente Tanarello c/o Valcona Sottana, N44.0977°, E7.7509°, 1230 m, 18.05.2001, light trap (1♂, MCSNBG). Mendatica (IM), rio delle Salse, N44.1105°, E7.7367°, 1300 m, 18.07.2001, light trap (1♀, MCSNBG). Trentino Alto-Adige, Telve (TN), torrente Maso, N46.1497°, E11.4496°, 1370 m, 08.08.2001, light trap, L. Bianchi, O. Lodovici (16♂, 18♀, OPC). Marebbe (BZ), San Vigilio Marebbe Val de Rit, N46.6740°, E11.9444°, 1600 m, 27.07.1994, light trap, Becci, Pisoni (7♂, 4♀, MCSNBG). Valle d'Aosta, Courmayeur (AO), torr. Ferret – la Vachey, N45.850°, E7.024°, 1650 m, 11.07.1964, A. Viganò (4♂, MCSNBG). Cogne (AO), Pra Suppiaz – torr. Valnontey, N45.575°, E7.145°, 1700 m, 13-24.08.1970, A. Viganò (13♂, 1♀, CNSMB; 10♂, OPC). Veneto, Sappada, (BL), fiume Piave, N46.5847°, E12.7269°, 1400 m, 08.08.2002, (7♂, 1♀, MCSNBG). Friuli Venezia Giulia, Claut (PN), torrente Cellina M.ga Casavento, N46.2689°, E12.5991°, 950 m, 16.09.1996, light trap, P. Pantini, M. Valle (7♂, 5♀, MCSNBG). Resia (UD), Uccea Rio Uccea, N46.3056°, E13.4168°, 550 m, 20.09.1996, light trap, P. Pantini,

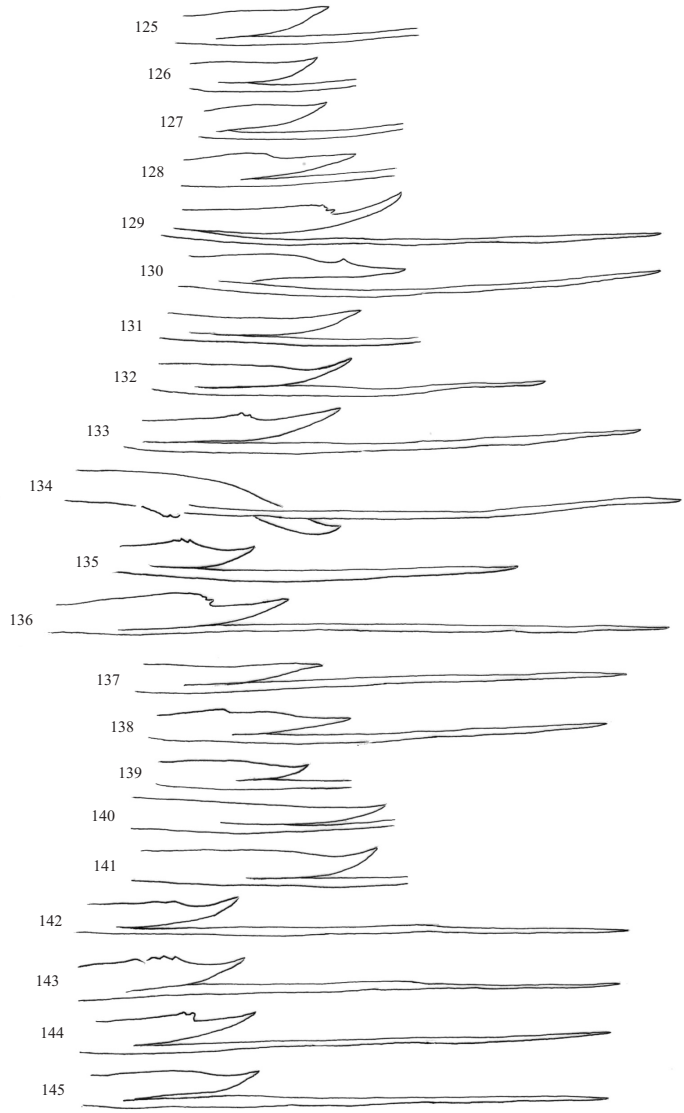


Figs 76–101. *Drusus discolor* (Rambur, 1842) paraproct (superanal complex without cercus) in lateral view. **Czech Republic**: 76–87 = Kralicky Snéznik Mts, 88–93 = Krusné Hory Mts, 94–99 = Jizerské Hory Mts, 100–101 = Sumava Mts

M. Valle (5♂, 2♀; MCSNBG). **Kosovo**, Lepenc, 21.06.2012, H. Ibrahimi (1♂, 1♀, OPC). Prevall, 21.06.2012, H. Ibrahimi (1♂, OPC). **Poland**, Gorce Mts, Kamienice stream, 26.06.1985, light, J. Oláh (3♂, OPC). **Romania**, Lacul Roşu, Valea Cupas, 19.06.1981, light, L. Peregovits, L. Ronkay (1♂, OPC). Lacul Roşu, Valea Cupas, 09.07.1981, light, L. Peregovits, L. Ronkay (1♂, OPC). Lacul Roşu, Valea Cupas, 17.07.1981, light, L. Peregovits, L. Ronkay (1♂, OPC). Caraş-Severin county, Ţarcu Mts, Poina Mãrului, upper section of Sucu Stream, S of the village, N45°20.907', E22°31.073', 955 m, 08.06.2011, T. Kovács, D. Murányi, G. Puskás (2♂, HNHM). Bucegi Mts, Coteanu Padina, N45°22'35.33",

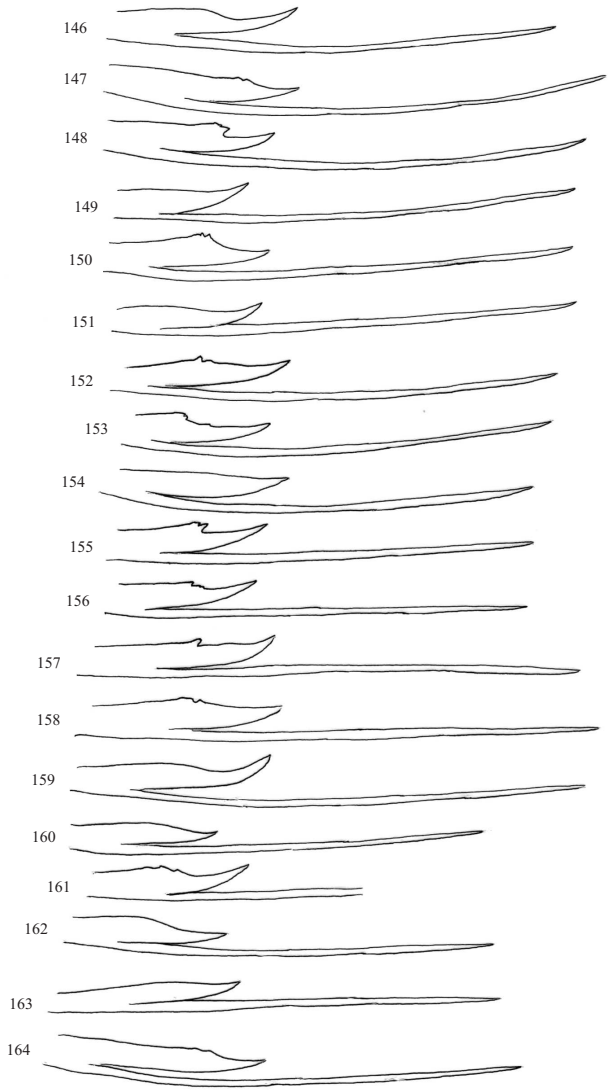


Figs 102–124. *Drusus discolor* (Rambur, 1842) left paramere sections in lateral view.
France: 102–103 = Vosges, 104–107 = Alpes Maritimes (contact population with *D. leker* sp. n), 108 = Savoie.
Italy: 109–110 = Briga Alta, 111–16 = Piemonte, Crissolo, 117–118 = Piemonte, Ceresole Reale, 119–124 = Valle d'Aosta, 1700 m



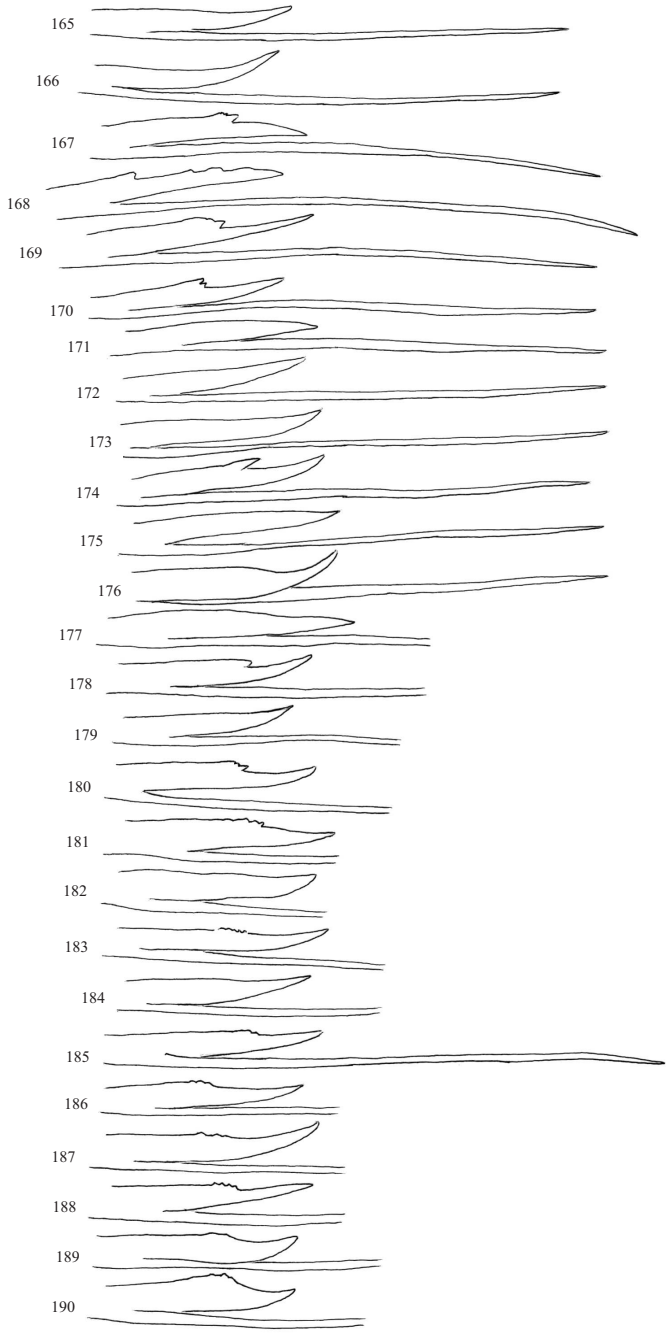
Figs 125–145. *Drusus discolor* (Rambur, 1842) left paramere sections in lateral view. **Italy**: 125–28 = Valle d'Aosta, 1650 m, 129 = Mendatica, 130 = Madisimo, 131 = Ronobello, 132 = Vigilio, 133 = Valbondione, 1940 m, 134 = Valbondione, 1862 m, 135–136 = Fiume Po, 50 m, 137 = Telve, 138 = Claut, 139 = Sappado, 140–141 = Resia. **Slovenia**: 142–145 = Julian Alp.

E25°26'07.96", 1485 m, 29.06.2007, C. Ciubuc (2♂, CCPC). Bucegi Mts, Coteanu Padina, N45°22'35.33", E25°26'07.96", 1485 m, 06.07.2007, C. Ciubuc (1♂, CCPC). Bucegi Mts, Coteanu Padina, N45°22'35.33", E25°26'07.96", 1485 m, 13.07.2007, C. Ciubuc (1♂, CCPC). Bucegi Mts, Coteanu Padina, N45°22'35.33", E25°26'07.96", 1485 m, 03.08.2007,



Figs 146–164. *Drusus discolor* (Rambur, 1842) left paramere sections in lateral view. **Slovakia**: 146 = Pleso nad Skokem, 147 = Biela Voda, 148 = Mlynica, 149–151 = West Tatra, Jamycky Stream. **Poland**: 152–153 = Gorce Mts, **Romania**: 154 = Lacu Rosu, 155–156 = Bucegi Mts, 157–158 = Fagaras Mts, 159 = Cibin Mts, 160 = Tarcu Mts, **Kosovo**: 161 = Lepenc, 162 = Prevall. **Albania**: 163–164 = Ostrovice Mts

C. Ciubuc (1♂, CCPC). Cindrel Mts, Râul Mic afl. stg. am Cabana Forestrierã, N45°40’26”, E23°49’15”, 22-23.06.2009, C. Ciubuc (4♂,1♀, CCPC). Cindrel Mts, Râul Mic afl. stg. am Cabana Forestrierã, N45°40’26”, 23°49’15”, 24-25.06.2009, C. Ciubuc (6♂, CCPC). Cindrel Mts, Crãciuneasa, Râul Mare, N45°40’22”, E23°51’53”, 28-29.07.2009, C. Ciubuc (1♂, CCPC). Cibin Mts, Crãciuneasa, Râul Mare, N45°40’22”, E23°51’53”, 29-30.07.2009,



Figs 165–190. *Drusus discolor* (Rambur, 1842) left paramere sections in lateral view. **Czech Republic**: 165–176 = Kralicky Snéznik Mts, 177–182 = Krusné Hory Mts, 183–188 = Jizerské Hory Mts, 189–190 = Sumava Mts

C. Ciubuc (2♂, CCPC). Cindrel Mts, Crãciuneasa, Râul Mare, N45°40’22”, E23°51’53”, 07-08.06.2010, C. Ciubuc (4♂, CCPC). Cibin Mts, Crãciuneasa, Râul Mare, N45°40’22”, E23°51’53”, 08-09.06.2010, C. Ciubuc (107♂, CCPC). Cibin Mts, Crãciuneasa, Râul Mare, N45°40’22”, E23°51’53”, 09-10.06.2010, C. Ciubuc (226♂, 21♀, CCPC; 3♂, 2♀, OPC). Fãgãraş Mts, Sâmbãta de Sus, N45°40’06.5”, E24°47’32.5”, 12-13.07.2011, C. Ciubuc (10♂, CCPC; 2♂, OPC). Fãgãraş Mts, Sâmbãta de Sus, N45°40’06.5”, E24°47’32.5”, 13-14.07.2011, C. Ciubuc (2♂, CCPC). Fãgãraş Mts, Sâmbãta de Sus, N45°40’06.5”, E24°47’32.5”, 14-15.07.2011, C. Ciubuc (2♂, CCPC). Bucegi Mts, Lalomiţa stream, N45.416957°, E25.416958°, 1837 m, 15.07.2015, Z. Baczó, J. Kecskés (4♂, 7♀, OPC). Bucegi Mts, Lalomiţa stream, N45.402125°, E25.443147°, 1680 m, 16.07.2015, Z. Baczó, J. Kecskés (3♂, 12♀, OPC). **Slovakia**, Mlynica stream, 21.07.1966, J. Oláh (1♂, OPC). Pleso nad Skokom, 21.07.1966, J. Oláh (1♂, OPC). Biela voda, 22.07.1966, J. Oláh (1♂, OPC). West Tatra, Jamnicky stream, 12.07.1978, light trap, Nagy (4♂, OPC). **Slovenia**, Julian Alp, Vrsic Pass, Soca spring, 22.06.1988 (4♀, OPC). Julian Alp, Radovna stream, 23.06.1988 (15♂, 2♀, OPC).

Drusus ferdes **sp. n. Oláh et Coppa (Figs 191–237)**

Diagnosis – The divergence of this new incipient sibling species is realized in the speciation trait of the modified paraproct. The lateral profile of the paraproctal head is characterized by the slant serrated dorsoapical margin that is sloping downward obliquely from posterad to

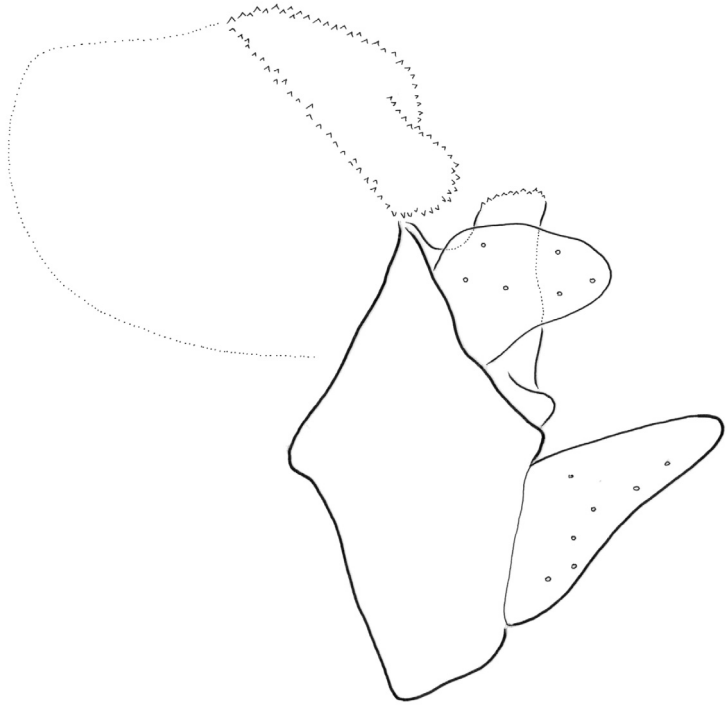
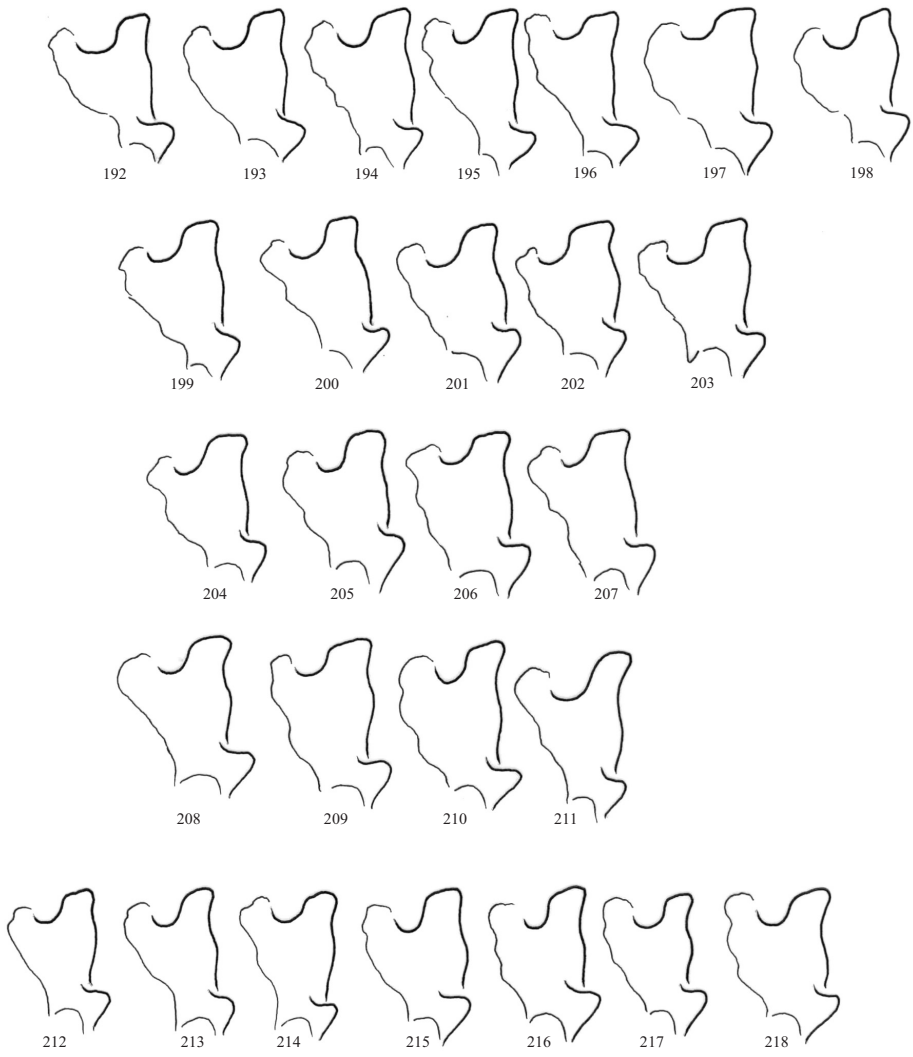
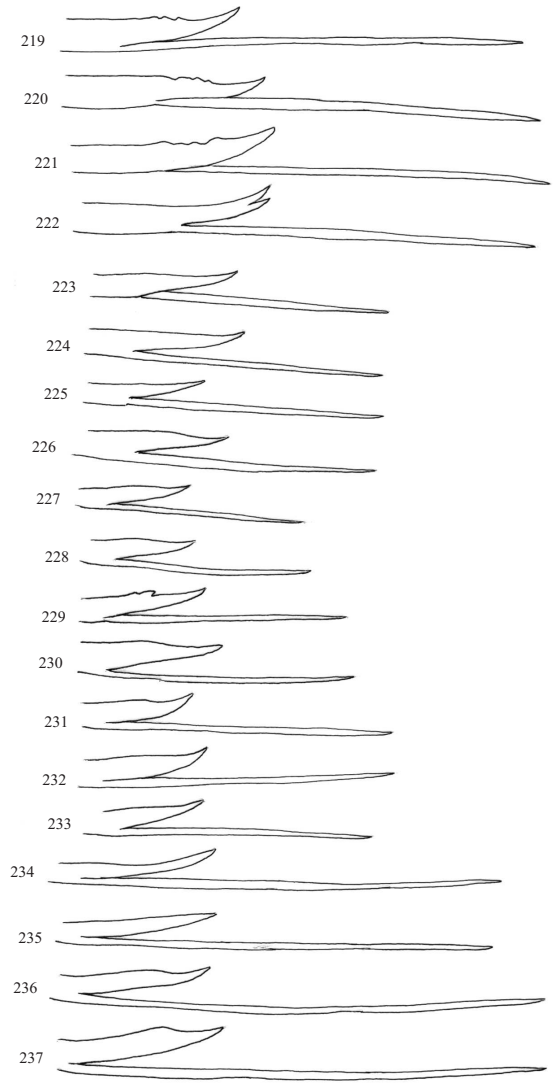


Fig. 191. *Drusus ferdes* sp. n. male holotype genitalia without phallic organ and with eight tergite profile in left lateral view

anterad. This divergence is stable in all of the examined population from Massif Central and from Alpes-de-Haute-Provence. It seems that the function of this modification on the serrated head of the paraproct works effectively alone or in combination with other premating barriers in mate recognition or in postmating prezygotic barriers of cryptic female choice or others, like gametic isolation. We have found no contact zone populations with hybrid effect.



Figs 192–218. *Drusus ferdes* sp. n. paraproct (superanal complex without cercus) in lateral view. **France**: 192–198 = Chambon sur Lac, Ru Derriere la Dent de la Rancune Ru Granit, 199–207 = Chambon sur Lac, Couze de Chaudefour Cascade Aval Reserve, 208–209 = Cantal, Brezons, 210–211 = Lozere, Meyrueis, 212–214 = Chastreix, 215–216 = Alpes de Haute Provence, Uvernet Fours, 217–218 = Alpes de Haute Provence, Larche



Figs 219–237. *Drusus ferdes* sp. n. left paramere sections in lateral view.
France: 119–222 = Chambon sur Lac, Ru Derriere la Dent de la Rancune Ru Granit, 223–226 = Chambon sur Lac, Couze de Chaudefour Cascade Aval Reserve, 227–228 = Cantal, Brezons, 229–230 = Lozere, Meyrueis, 231–233 = Chastreix, 234–235 = Alpes de Haute Provence, Uvernet Fours, 236–237 = Alpes de Haute Provence, Larche

The gonopod is rather slender relative to the ancestral species, *Drusus discolor*, but the range of variability is rather high compared to the selective speciation trait and very plane sensitive in drawing process.

The spur formation, the actual terminal ending of the paramere is developed into a slightly upward curving and narrowing pointed structure with few dorso-subapically produced uprising.

The variation within or between populations is almost the same, due to dominating stochastic processes including fluctuating asymmetry, as it was discussed in the theoretical part.

Material examined – Holotype. **France**, Department Puy-de-Dôme, Chambon-sur-Lac, near la Dent-de-la-Rancune, 23.06.2012, G. Coppa (1♂, CPC). Paratypes. Same as holotype (3♂, CPC; 3♂, OPC). Department Puy-de-Dôme, Chambon-sur-Lac, pont de Sainte-Anne, 21.07.2012, G. Coppa (1♀, OPC). Department Puy-de-Dôme, Chambon-sur-Lac, Couze de Chaudefour, waterfall Nature Reserve, 25.05.2009, G. Coppa (8♂, OPC). Department Puy-de-Dôme, Chastreix, Ru du Névé, 22.08.2015, G. Coppa (4♀, OPC). Department Puy-de-Dôme, Chastreix, Ru du Névé, 24.09.2015, G. Coppa (3♂, 1♀; OPC). Department Cantal, Brézons, sur le Brézons, Saut de la Truite, 27.06.2010, G. Coppa (2♂, OPC). Department Lozère, Meyrueis, Combe de Else, 22.06.2014, G. Coppa (2♂, 1♀, OPC). Department Alpes-de-Haute-Provence, Uvernet-Fours, Torrent Braissette, 25.08.2009, G. Coppa (2♂, 5♀, OPC). Department Alpes-de-Haute-Provence, Larche, Torrent Ornaye, 2380 m, 27.07.2008, G. Coppa (2♂, 1♀, OPC).

Etymology – ferdes, from "*ferde*" oblique or slant in Hungarian, refers to the direction, to the deviation from horizontal of the serrated dorsal margin of the paraproctal head.

***Drusus kupos* sp. n. Oláh et Coppa (Figs 238–248)**

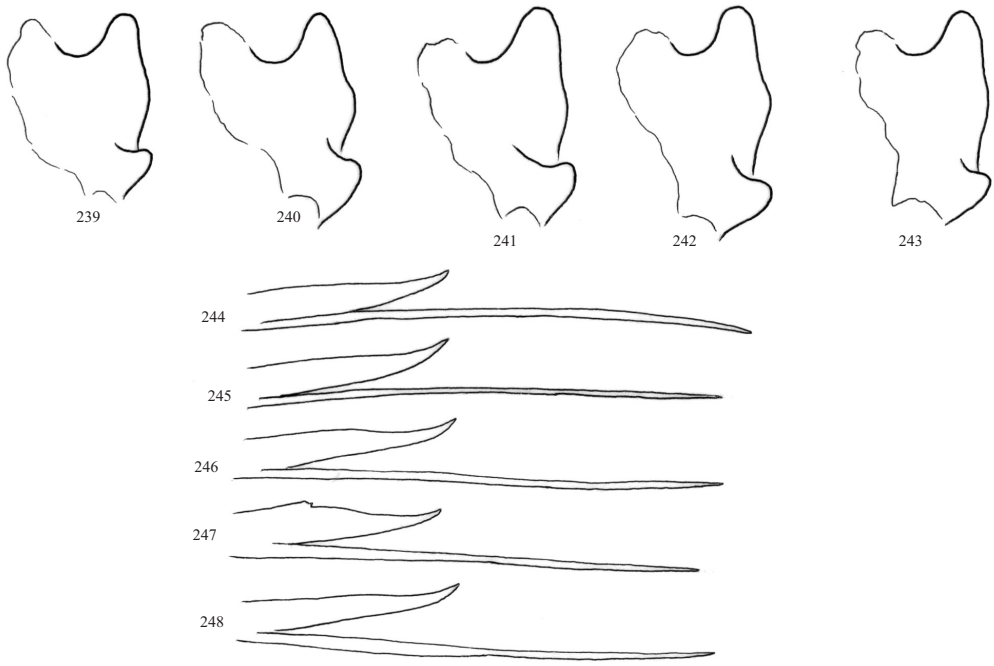
Diagnosis – The divergence of this new incipient sibling species is realized in the speciation trait of the modified paraproct. The lateral profile of the paraproctal head is characterized by narrowing conical dorsoapical margin. This divergence is stable in the single population

Fig. 238. *Drusus kupos* sp. n. male holotype genitalia without phallic organ and with eight tergite profile in left lateral view

examined. The spur formation, the actual terminal ending of the paramere is developed into a slightly upward curving and narrowing pointed structure. Some sign of dorso-subapically produced uprising present in a single paratype.

Material examined – Holotype. **France**, Department Pyrénées-Orientales, Err, Ru d'Err Aiguanein, 24.08.2011, G. Coppa (1♂, CPC). Paratypes. Same as holotype (2♂, CPC; 2♂, OPC).

Etymology – kupos, from "*kúpos*" conical in Hungarian, refers to the narrowing conical shape of the serrated dorsal margin of the paraproctal head.



Figs 239–248. *Drusus kupos* sp. n. 239–243 = Paraproct (superanal complex without cercus) in lateral view. **France:** Department Pyrénées Orientales, Err. 244-248 = Left paramere sections in lateral view. **France:** Department Pyrénées Orientales, Err.

Drusus leker sp. n. Oláh (Figs 249–281)

Diagnosis – The divergence of this new incipient sibling species is realized in the speciation trait of the modified paraproct. The lateral profile of the paraproctal head is characterized by the rounded serrated dorsoapical margin. This divergence is stable. It seems that the function of this modification on the serrated head of the paraproct works effectively alone or in combination with other premating barriers in mate recognition or in postmating prezygotic barriers of cryptic female choice or in others, like in gametic isolation. We have found sign of contact zone populations with possible hybrid effect.

The spur formation, the actual terminal ending of the paramere is developed into a slightly upward curving and narrowing pointed structure with or without few dorso-subapically produced uprising.

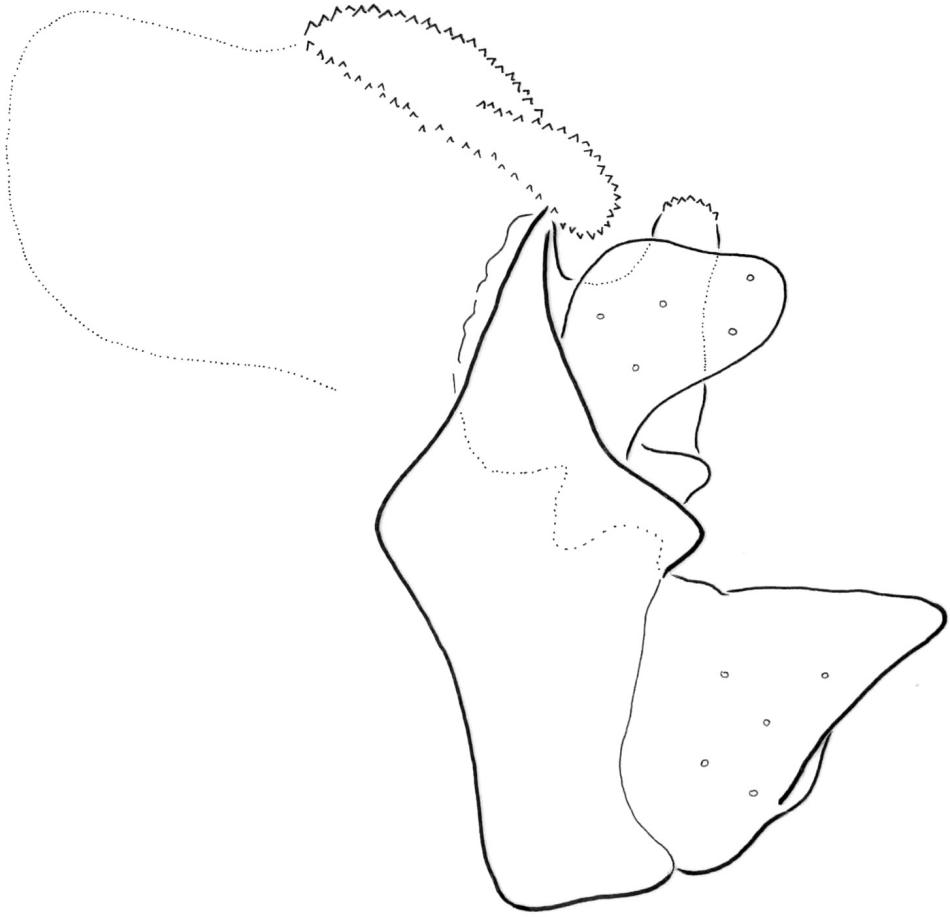
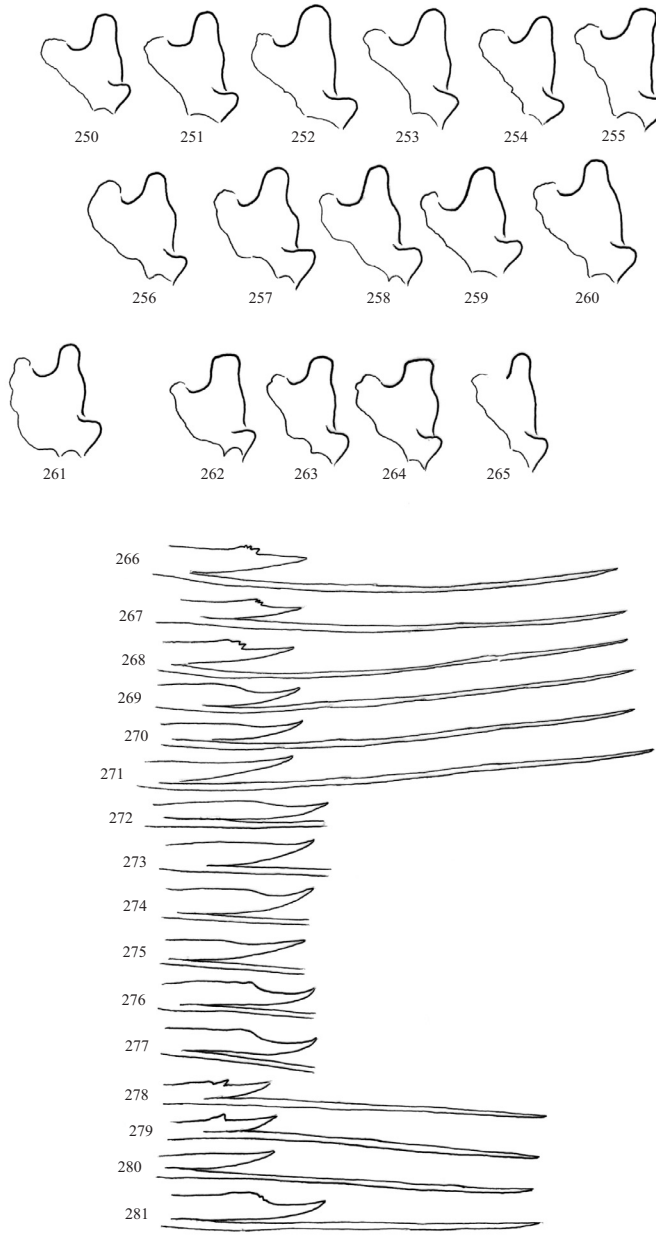


Fig. 249. *Drusus leker* sp. n. male holotype genitalia without phallic organ and with eight tergite profile in left lateral view

Material examined – Holotype. **Italy**, Piemonte, Vinadio (CN), 2250 m, Col de la Lombarda lago, N44.20°, E7.14°, 18.08.1964, A. Viganò (1♂, MCSNBG). Paratypes. Same as holotype (2♂, 2♀, MCSNBG; 3♂, 2♀, OPC). Piemonte, Vinadio (CN), Santuario di S. Anna, 1880 m, N44.238°, E7.106°, 19.07.2012, G. Pezzi, I. Bendazzi (3♂, 1♀, MCSNBG; 2♂, OPC). **France**, Department Alpes-de-Haute-Provence, Saint-Paul-sur-Ubaye, Affluent Ubaye, 2000 m, 27.06.2008, G. Coppa (1♂, 3♀, OPC). Department Alpes-de-Haute-Provence, Uvernet-Fours, Sanguinerette Amont, 25.08.2009, G. Coppa (4♂, 2♀, OPC; contact population with *D. discolor*).

Etymology – leker, from "*lekerekített*" rounded in Hungarian, refers to the rounded shape of the serrated dorsal margin of the paraproctal head.



Figs 250–281. *Drusus leker* sp. n. 250-265 = Paraproct (superanal complex without cercus) in lateral view. **Italy:** 250–255 = Piemonte, Vinadio, 2250 m, 256-260 = Piemonte, Vinadio, 1880 m, **France:** 261 = Alpes de Haut Provence, Saint Paul sur Ubaye, 262–265 = Alpes de Haut Provence, Uvernet Fours (contact population with *D. discolor*). 266–281 = Left paramere sections in lateral view. **Italy:** 266–271 = Piemonte, Vinadio, 2250 m, 272–276 = Piemonte, Vinadio, 1880 m, **France:** 277 = Alpes de Haut Provence, Saint Paul sur Ubaye, 278–281 = Alpes de Haut Provence, Uvernet Fours (contact population with *D. discolor*)

***Drusus visas* sp. n. Oláh et Coppa (Figs 282–310)**

Diagnosis – The divergence of this new incipient sibling species is realized in the speciation trait of the modified paraproct. The lateral profile of the paraproctal head is characterized by backward, anterad directed anterior corner of the serrated head of the paraproct. This divergence is stable in the examined populations. It seems that the function of this modification on the serrated head of the paraproct works effectively alone or in combination with other premating barriers in mate recognition or in postmating prezygotic barriers of cryptic female choice or others, like gametic isolation. We have found no contact zone populations with hybrid effect.

The gonopod is rather slender relative to the ancestral species, *Drusus discolor*, but the range of variability is high compared to the selective speciation trait and very plane sensitive in drawing process.

The spur formation, the actual terminal ending of the paramere is developed into a slightly upward curving and narrowing pointed structure with or without few dorso-subapically produced uprising. The variation within or between populations is almost the same, due to dominating stochastic processes including fluctuating asymmetry, as it was discussed in the theoretical part.

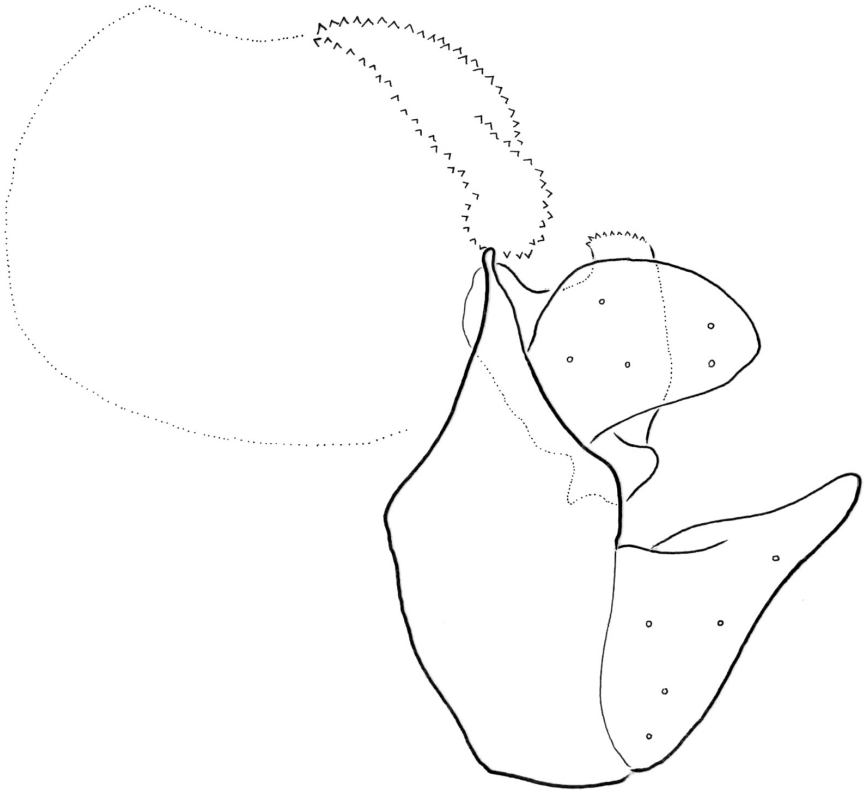
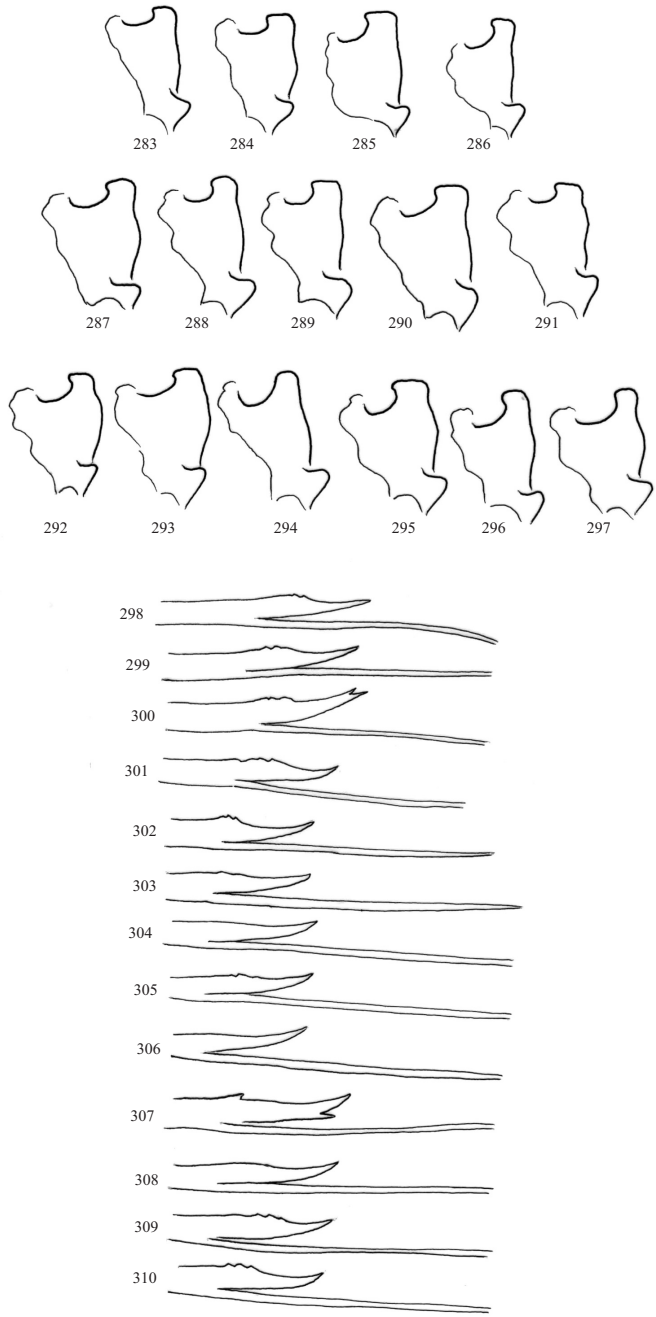


Fig. 282. *Drusus visas* sp. n. male holotype genitalia without phallic organ and with eight tergite profile in left lateral view



Figs 283–310. *Drusus visas* sp. n. 283–297 = Paraproct (superanal complex without cercus) in lateral view. **France:** 283–286 = Department Pyrénées Orientales, Port Puymorens, 287–291 = Department Pyrénées Orientales, Cauterets, 292–297 = Haut Pyrenées, Gedre. 298–310 = Left paramere sections in lateral view. 298–301 = **France:** Department Pyrénées Orientales, Port Puymorens, 302-306 = Department Pyrénées Orientales, Cauterets, 307–310 = Haut Pyrenées, Gedre

Material examined – Holotype. **France**, Department Pyrénées-Orientales, Porte Puymorens, Ru de l'Orris, 21.08.2011, G. Coppa (1♂, OPC). Paratypes. Same as holotype (3♂, 4♀, OPC). Department Hautes-Pyrénées, Cauterets, Gave Cambasque, 16.07.2010, G. Coppa (5♂, OPC). Department Hautes-Pyrénées, Gèdre, Pont Sauge, Gave, 27.07.2010, G. Coppa (6♂, OPC).

Etymology – *visas*, from "*vissza*" back in Hungarian, refers to the backward, anterad directed anterior corner of the serrated dorsal margin of the paraproctal head.

Acknowledgements: We highly appreciate the material provided to our studies by the Museo Civico di Scienze Naturali "E. Caffi", Bergamo, Italy, and we are especially thankful to our cooperating colleagues Director Marco Valle and Omar Lodovici for their permanent support.

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FOLIA HISTORICO-NATURALIA MUSEI MATRAENSIS
2015 39: 131–141

On the Trichoptera of Batanta Island (Indonesia, West Papua, Raja Ampat Archipelago) IV.

JÁNOS OLÁH & TIBOR KOVÁCS

ABSTRACT: This paper, the fourth in the Batanta Island series on Trichoptera, contains 29 new records of 12 caddisfly species collected during our systematic and concentrated diversity survey on the Batanta Island. The monobasic macronematine genus *Leptopsyche*, known only from a single lost male specimen, is discovered in the island and represented by two new species: *Leptopsyche kormos* sp. n., *Leptopsyche vilagos* sp. n. A new hydropsychine genus *Batantapsyche* with *Batantapsyche juhaszi* sp. n. type species is described. The differential diagnosis of the new genera in the *Hydropsyche* genus subcluster of the *Hydropsyche* genus cluster is elaborated in a matrix table. A large and dark hydropsychine species, *Hydropsyche sotet* sp. n. is described as a sibling of *Hydropsyche lapos* Oláh, 2015 described from Arfak Mts of the main island.

Introduction

Our Trichoptera collecting effort on the Batanta Island of New Guinea faunal region that is on the last unexplored biodiversity region of the world has produced already 3 papers (OLÁH 2012, 2013, 2014) and further species records and descriptions are presented in this paper. We have installed UV light traps as well as collected specimens from white sheet illuminated either by Honda generator or by battery powered lamps.

The material including all holotypes and paratypes is preserved in 70–80% alcohol and is deposited in the collection of the first author (Oláh Private Collection = OPC) under protection by the Hungarian Natural History Museum (Budapest).

Taxonomical part

HYDROPSYCHIDAE Curtis, 1835

Macronematinae Ulmer, 1905

Baliomorpha barna Oláh, 2012 – **Indonesia**, West Papua, Batanta Island, valley of Kalijakut River, 00°52’49.1”, 130°38’4.9”, 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1♂, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52’52.0”, 130°38’8.0”, 16.02.2015, at light, T. Kovács, P. Juhász, Kris (1♂, OPC). West Papua, Batanta Island, valley of Weras Stream, 00°49’51.2”, 130°38’00.0”, 300 m, 08.02.2015, at light, T. Kovács, P. Juhász (1♂, OPC).

Baliomorpha mariannae Oláh, 2012 – **Indonesia**, West Papua, Batanta Island, Teluk Warai, stream, 00°50’51.0”, 130°35’14.0”, 11.02.2015, at light, T. Kovács, P. Juhász (5♂, 7♀, OPC). West Papua, Batanta Island, valley of Waridor River, 00°51’51”, 130°33’41”, 04.02.2015, at light, T. Kovács, R. Horváth, P. Juhász (1?, OPC). West Papua, Batanta Island, valley of Warmon Creek, between the lower and upper waterfall, (00º50’04.50”, 130º42’54.01”-00°50’23.25”, 130°42’35.18”), 21.01.2014, T. Kovács, R. Horváth, P. Juhász (2♂, OPC). West Papua, Batanta Island, valley of Weras Stream, 00°49’51.2”, 130°38’00.0”, 300 m, 08.02.2015, at light, T. Kovács, P. Juhász (3♂, OPC).

Leptopsyche McLachlan, 1866 – McLachlan (1866): 266–267. Type species: *Leptopsyche gracilis* McLachlan, 1866 (monobasic). „Habitat in insula Dorey (Wallace). In Mus. Saundersiano".

Leptopsyche McLachlan, 1866 – Brauer (1868): 408. Included in his genus determination table of the Hydropsychidae family.

Leptopsyche McLachlan, 1866 – Ulmer (1905): 88. Included in his genus determination table of the Macronematinae subfamily.

Leptopsyche McLachlan, 1866 – Ulmer (1907a): 33–34. Included in Macronematinae Monograph. McLachlan's original wing venation redrawn as right side wing mirror of the original left wings. The type specimen according to the The Natural History Museum, London is not available, not seen and not examined.

Leptopsyche McLachlan, 1866 – Ulmer (1907b): 160. Brief genus description with redrawn wing venation.

Notes – Leptopsyche with very long antennae and open discoidal cell on forewing is a monobasic macronematine genus described and still known only from a single male specimen collected in West Papua, Dorey and deposited originally in Mus. Saundersiano. Probably the deposited type specimen is lost. We have collected several male and female specimens of two new *Leptopsyche* species from Batanta Island, West Papua and describe them here.

As characterized in the original genus description the antennae, legs and gonopods are very slender. Probably this inspired Robert McLachlan, the author to name this genus, ("*leptos*" thin, fine, slender, weak in Greek) as well as the new species ("*gracilis*" slender, thin, scarce, slim in Latin). The anterior wing is very peculiar with open discoidal cell, usually closed in most hydropsychine genera. The open discoidal cell is combined with stalked fork III on forewing. This character combination gives a clear generic character. In the key to the Old World genera of Macronematinae Barnard (1984) has distinguished the *Leptopsyche* genus by discoidal cell absent in forewing and fork III stalked in both wings.

Leptopsyche gracilis McLachlan, 1866 – McLachlan (1866): 267.

Notes – The description of the genus *Leptopsyche* and the species *Leptopsyche gracilis* is based on a single male specimen collected by Alfred Russel Wallace in Insula Dorey (Dorey now called Manokwari, the capital of West Papua) during his stay there from April through June 1858 and deposited in "Mus. Saundersiano." According to the information provided by Benjamin Price, Curator of Small Orders, The Natural History Museum London (25.02.2014), "Mus. Saundersiano seems to mean the private collection of W. W. Saunders, Esq., F.R.S., V.P.L.S. We have a large number of Saunders' specimens in our beetle collection but I have looked for *Leptopsyche gracilis* and cannot find any specimens in our collection or the associated database."

According to the original short species description in Latin and in English, the forewing has apex slightly brownish-ochreous; forewing length is 12 mm. Description is accompanied by a simple genital drawing in lateral view. We have experienced that Robert McLachlan's drawings are very precise even if they are simple due to intact, but dry state of the genitalia without clearing (Oláh et al. 2015). He characterized the genital structure: "superior appen-

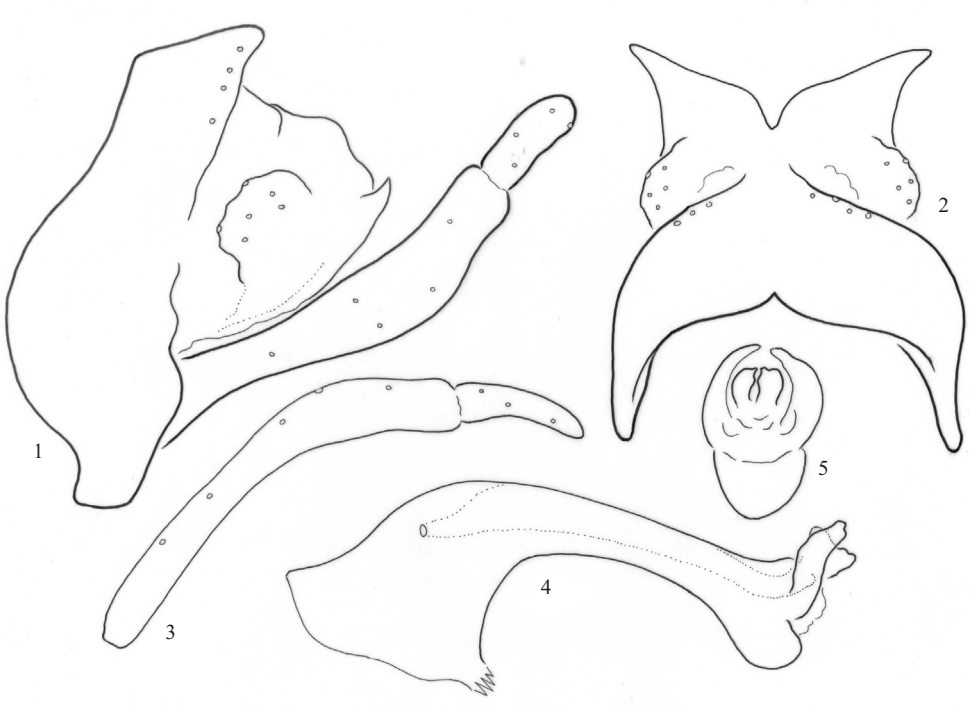
dices (segment X) very small, quadrate; inferior appendices (gonopods) long and slender, curved upwards and approximating at the tips, apparently bisarticulate, but the first joint is short and nearly concealed, penis (phallic organ) thick".

***Leptopsyche kormos* sp. n. (Figs 1–5, 11, 13)**

Diagnosis – The largest species of the genus and distinguished from the other two species by the sooty black forewing apex; easily differentiated from *Leptopsyche vilagos* sp. n. by the rounded undivided cercus, by the more curved and more bulky gonopods, by the very high phallobase and by the different pattern of the endothecal and phallotremal sclerite complex.

Description – Male (in alcohol). Large animal. Antennae slender about three times the length of the wings. Maxillary palp formula I-III-IV-II-V. Forewing length 18 mm; the apex of forewing sooty black, except one light, unicolor pharate male without any pattern; forewing venation with open discoidal cell and fork III is stalked on both wings.

Male genitalia. Segment IX short. Segment X high and short in lateral view with lateroapical pointed process; in dorsal view this lateroapical pointed process narrowing gradually. Cerci rounded both in lateral and dorsal view. The coxopodite of the gonopods is arching both in lateral and ventral view and bulking subapicad. Phallic organ with rather high vertical basal section; the horizontal stem has straight dorsum and concave ventrum in lateral view; the



Figs 1–5. *Leptopsyche kormos* sp. n. holotype male: 1 = genitalia in left lateral view; 2 = genitalia in dorsal view; 3 = left gonopod in ventral view; 4 = phallic organ in left lateral view; 5 = phallic apex in caudal view

apex of the stem with a very produced and rounded ventroapical ending in lateral view; the pair of endothecal processes elongated and freely projecting dorsad, slightly S-forming in lateral and half-circled in caudal view; a pair of phallotremal sclerite located between them. The sclerotized complex of the endothecal and phallotremal sclerites is less distinct.

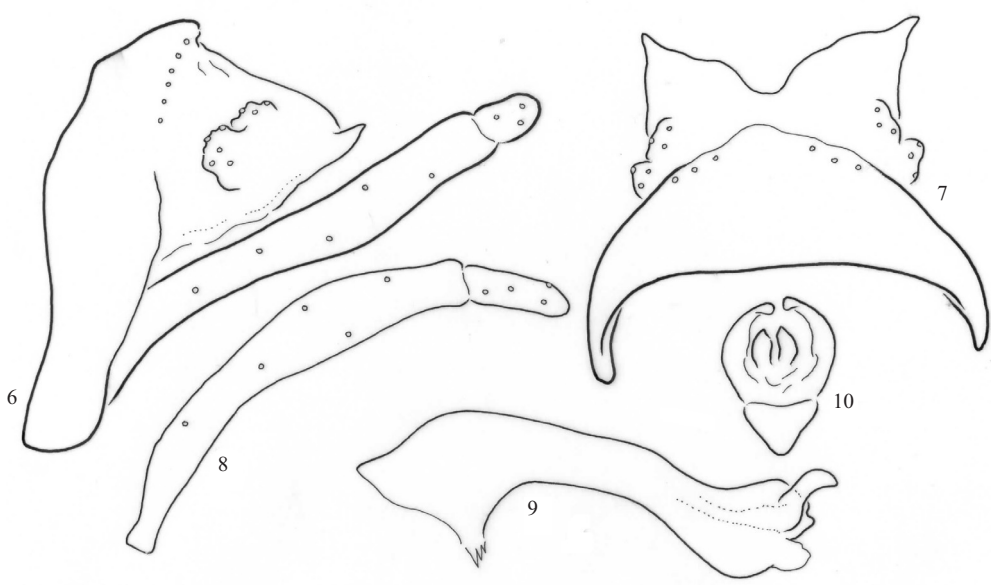
Type material – Holotype: **Indonesia**, West Papua, Batanta Island, Welebed, valley of Kalijakut River, 00°53'12.88", 130°38'16.40", 23.01.2014, at light, T. Kovács, R. Horváth, P. Juhász (1♂, OPC). Paratypes: same as holotype (1♂, 2♀, OPC). West Papua, Batanta Island, Welebed, valley of Kalijakut River, 00°53'12.88", 130°38'16.40", 23.01.2014, UV light trap, T. Kovács, R. Horváth, P. Juhász (1♀, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52'49.1", 130°38'4.9", 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1 pharate ♂, OPC).

Etymology – kormos, from "kormos" sooty black in Hungarian, refers to the dark black colour of the forewing apex.

***Leptopsyche vilagos* sp. n. (Figs 6–10, 12, 13)**

Diagnosis – Middle sized species of the genus and distinguished from the other two species by the light forewing apex without any pattern; easily differentiated from *Leptopsyche kormos* sp. n. by the divided cercus, by the less curved and less bulky gonopods, by the low phallobase and by the different pattern of the endothecal and phallotremal sclerite complex.

Description – Male (in alcohol). Large animal. Antennae slender about three times the length of the wings. Maxillary palp formula I-III-IV-II-V. Forewing length 14 mm; the apex of forewing light; forewing venation with open discoidal cell and fork III is stalked on both wings.



Figs 6–10. *Leptopsyche vilagos* sp. n. holotype male: 6 = genitalia in left lateral view; 7 = genitalia in dorsal view; 8 = left gonopod in ventral view; 9 = phallic organ in left lateral view; 10 = phallic apex in caudal view

Male genitalia. Segment IX short. Segment X high and short in lateral view with lateroapical pointed process; in dorsal view this lateroapical pointed process narrowing gradually then abruptly, this result in a convex apical margin of both lobes in dorsal view. Cerci subdivided visible both in lateral and dorsal view. The coxopodite of the gonopods is almost straight in lateral and slightly arching in ventral view and bulking subapicad. Phallic organ with low vertical basal section; the horizontal stem downward curving subapicad in lateral view; the apex of the stem less produced ventroapicad; the pair of endothecal processes elongated and freely projecting dorsad, slightly S-forming in lateral and half-circled in caudal view; a pair of phallotremal sclerite located between them. The sclerotized complex of the endothecal and phallotremal sclerites is less distinct.

Type material – Holotype: **Indonesia**, West Papua, Batanta Island, valley of Waridor River, 00°52'09.66", 130°32'11.54", 18.01.2014, at light, T. Kovács, P. Juhász, R. Horváth (1♂, OPC). Paratypes: West Papua, Batanta Island, Teluk Warai, stream, 00°50'51.0", 130°35'14.0", 11.02.2015, at light, T. Kovács, P. Juhász (1♂, 3♀, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52'49.1", 130°38'4.9", 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1♂, OPC). West Papua, Batanta Island, right side stream of Forum River, 00°52'22.7", 130°27'45.1", 13.02.2015, at light, T. Kovács, R. Horváth, P. Juhász (1♀, OPC).

Etymology – vilagos, from "világos" clear, light, plain in Hungarian, refers to the light colour of the forewing apex.

Macrostemum auriferum Neboiss, 1984 – **Indonesia**, West Papua, Batanta Island, between Arefi and Teluk Warai, valley of „dried estuary of a strem" (= valley of Weras Stream), 00°49'29.03", 130°38'28.68", 27.01.2014, UV light-trap, T. Kovács, R. Horváth, P. Juhász, (1♀, OPC). West Papua, Batanta Island, valley of Weras Stream, 00°49'51.2", 130°38'00.0", 08.02.2015, at light, T. Kovács, P. Juhász (19♂, 5♀, OPC).
Macrostemum warmon Oláh, 2013 – **Indonesia**, West Papua, Batanta Island, valley of Weras Stream, 00°49'51.2", 130°38'00.0", 08.02.2015, at light, T. Kovács, P. Juhász (2♂, 1♀, OPC).

Hydropsychinae Curtis, 1835

Abacaria sima Oláh, 2013 – **Indonesia**, West Papua, Batanta Island, valley of Kalijakut River, 00°52'49.1", 130°38'4.9", 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1♂, OPC).

Batantapsyche gen. n.

Type species – Batantapsyche juhaszi sp. n. by original designation, from Batanta Island, West Papua, Indonesia.

Diagnosis – This new genus belongs to the *Hydropsyche* genus cluster without digitate cerci present in the *Hydromanicus* and *Cheumatopsyche* genus clusters as well as forewing crossvein m-cu is distant from crossvein cu, not close (Oláh & Johanson 2008). It forms a new subcluster together with the *Hydropsyche-Orthopsyche-Schmidopsyche* genera having 1,2,3,5 forks present on hindwing. By having both the discoidal and median cells open on hindwing, *Batantapsyche* gen. n. is most close to *Schmidopsyche*, only forewing median cell closed, not open (Table 1). However its genital structure is similar to *Orthopsyche*, an endemic hydropsychid genus distributed in New Zealand and New Caledonia (Oláh et al. 2006). *Batantapsyche* gen. n. has typical phallic structure far from the *Schmidopsyche* genus, and very similar to the *Orthopsyche* genus: (1) movable well-sclerotized endothecal process;

(2) well-developed phallotremal sclerite; (3) membranous ventral endothecal lobe. According to the trait combinations of the phallic organ *Batantapsyche* diverged from *Orthopsyche* in isolation far from the known distributional area of its ancestral genus.

Table 1. Differential diagnosis of genera in the *Hydropsyche* genus subcluster of the *Hydropsyche* genus cluster: 1 = forewing median cell; 2 = hindwing discoidal cell; 3 = hindwing median cell; 4 = hindwing crossvein m-cu; 5 = hindwing forks; 6 = male spur formula; 7 = female spur formula

	1	2	3	4	5	6	7
Batantapsyche	closed	open	open	present	1,2,3,5	144	?
Hydropsyche	closed	closed	closed	absent	1,2,3,5	244	244
Orthopsyche	closed	closed	open	absent	1,2,3,5	244	244
Schmidopsyche	open	open	open	present	1,2,3,5	144	244

Figs 11–12. *Leptopsyche kormos* sp. n. and *L. vilagos* sp. n. in lateral view: 11 = *L. kormos* sp. n. 12 = *L. vilagos* sp. n.

Fig 13. *Leptopsyche kormos* sp. n. and *L. vilagos* sp. n.

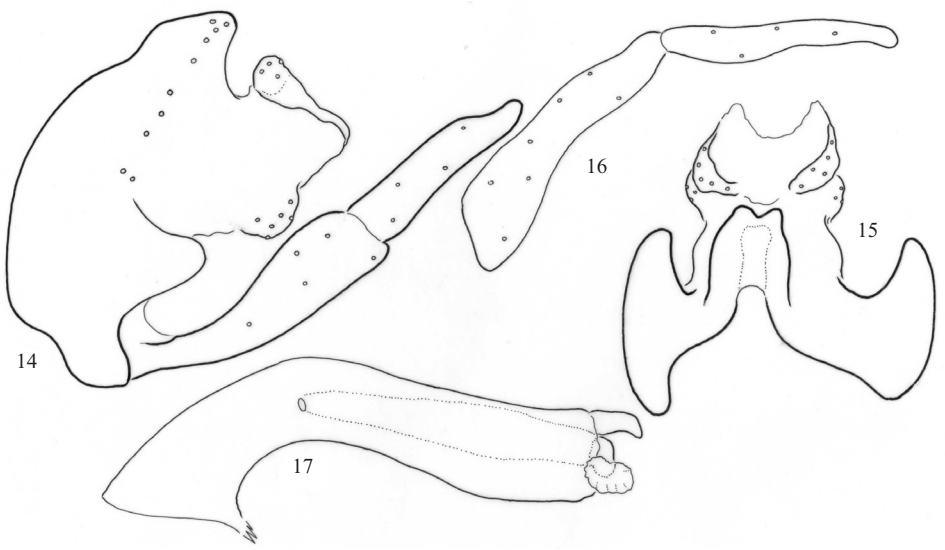
Schmidopsyche having almost identical phenotypic modifications at least in hindwing venation structures diverged in the Himalayas (Sikkim) from its ancestor of the widely distributed *Hydropsyche* genus. Similar hindwing modifications in *Schmidopsyche* and *Batantapsyche* are produced by random non-additive, epistatic polygenic interactions somehow regulated and realised in neoformation or in reversal of sleeping dormant or silenced gene complex fragments preserved in genome switched off or relegated to non-coding segments of DNA.

***Batantapsyche juhaszi* sp. n. (Figs 14–18)**

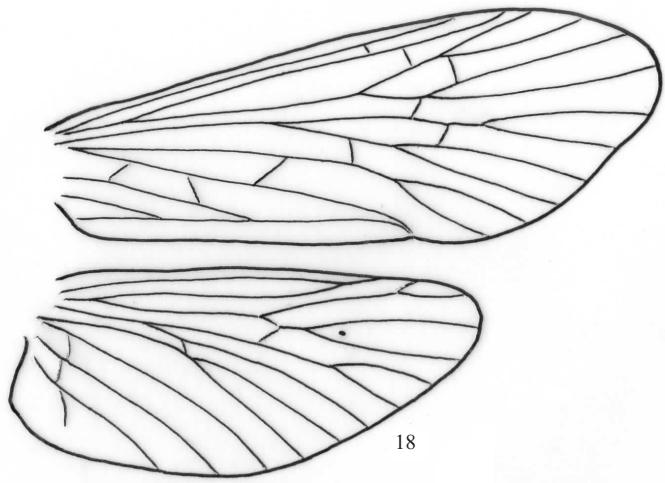
Diagnosis – Trait combinations of wing neuration and genital structure listed in genus diagnosis separate this hydropsychine from its relatives as a type species of a new genus.

Description – Male (in alcohol). Medium sized, dark-winged animal with bicolored body. Head, antennae, palps, prothorax, mesoscutellum and forelegs bright yellow; mesothorax, metathorax, midlegs, hindlegs and abdomen castanean dark brown. Hind wing discoidal and median cell open. Maxillary palp formula I-IV-II-III-V. Spur formula 144. Forewing length 7 mm.

Male genitalia. Segment IX fused annular and short; anterior margin rounded; its median keel short with granulose dorsal surface, sloping upward posterad; apical lobe on posterolateral margin rounded. Lateral intersegmental profile between the ninth and tenth segments forms deep excision. Segment X short and high; lateral setose area, the cerci much developed rounded hump located near ventroapical margin; dorsoapical setose lobes moved back toward intersegmental excision forming a pair of asymmetric setose crescent lateraql rim in dorsal view. The coxopodit of the gonopod shorter than the apex of segment X, harpago broad almost parallel-sided in lateral view, constricted dorsoapicad in lateral view. Phallic organ with downward turning phallobase, broad endophallus middle of the phallotheca; the head of phallotheca consists of a pair of vertically elongated rounded phallotremal sclerite, a pair of very low sclerotized endothecal process and a pair of membranous lateral rounded lobes on the ventroapical region.



Figs 14–17. *Batantapsyche juhaszi* sp. n. holotype male: 14 = genitalia in left lateral view; 15 = genitalia in dorsal view; 16 = left gonopod in ventral view; 17 = phallic organ in left lateral view



Figs 18. *Batantapsyche juhaszi* sp. n. holotype male: 18 = wing venation

Type material – Holotype: **Indonesia**, West Papua, Batanta Island, valley of Warmon Creck, upper waterfall, 00°50’23.25”, 130°42’35.18”, 20.01.2014, at light, T. Kovács, P. Juhász (1♂, OPC).

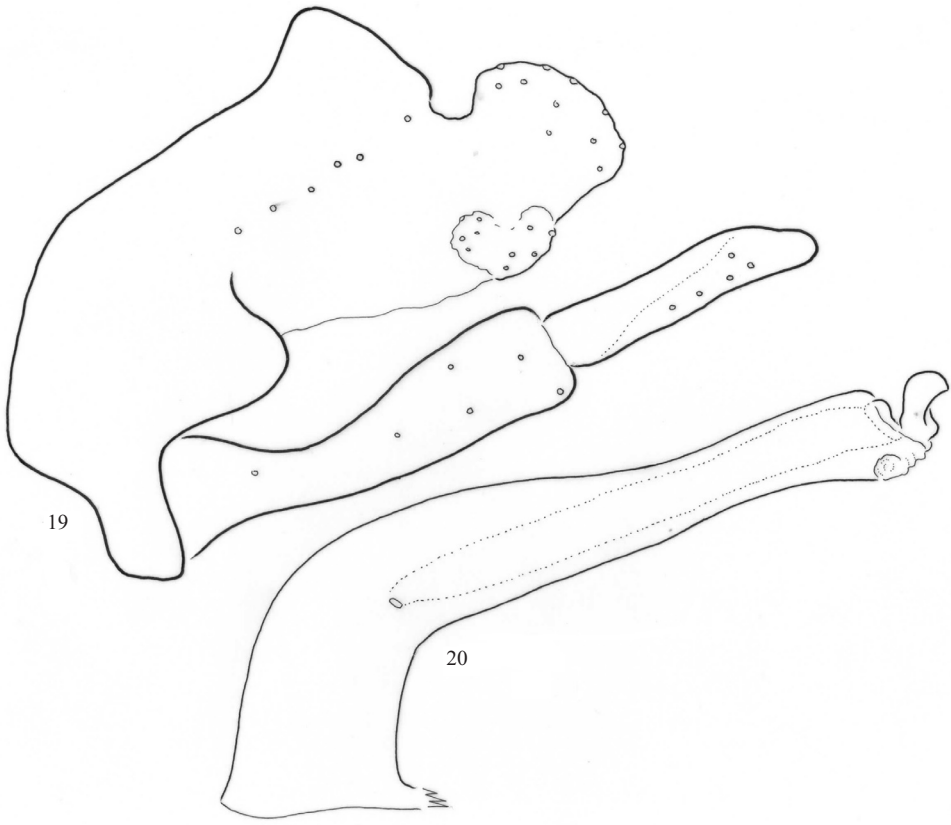
Etymology – The type species of *Batantapsyche* new genus is dedicated to the collector, Péter Juhász, who has participated in the organisation as well as in the field collections on the virgin and difficult terrain of the Batanta Island.

Cheumatopsyche sorra Oláh, 2013 – **Indonesia**, West Papua, Batanta Island, Welebed, valley of Kalijakut River, 00°53’12.88”, 130°38’16.40”, 23.01.2014, at light, T. Kovács, R. Horváth, P. Juhász (12♂, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52’49.1”, 130°38’4.9”, 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1♂, OPC).
Cheumatopsyche ronbata Oláh, 2012 – **Indonesia**, West Papua, Batanta Island, valley of Waridor River, 00°52’09.66”, 130°32’11.54”, 03.02.2015, UV light-trap, T. Kovács, R. Horváth, P. Juhász (12♂, OPC).
Hydropsyche sabronensis (Kimmins, 1962) – **Indonesia**, West Papua, Batanta Island, Welebed, valley of Kalijakut River, 00°53’12.88”, 130°38’16.40”, 138 m a.s.l., 23.01.2014, at light, T. Kovács, R. Horváth, P. Juhász (6♂, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52’49.1”, 130°38’4.9”, 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (12♂, OPC). West Papua, Batanta Island, Teluk Warai, stream, 00°50’51.0”, 130°35’14.0”, 11.02.2015, at light, T. Kovács, P. Juhász (2♂, OPC). West Papua, Batanta Island, valley of Waridor River, 00°51’51”, 130°33’41”, 04.02.2015, at light, T. Kovács, R. Horváth, P. Juhász (9♂, OPC).

Hydropsyche sotet sp. n. (Figs 19–20)

Diagnosis – This large dark animal is an incipient sibling species of *Hydropsyche lapos* Oláh, 2015 described from Arfak Mts (Oláh 2015), but differs by having dark, almost black wings, not brown; dorsal keel on segment IX short and posterad sloping, not flat; dorsoapical setose lobe more developed and rounded, not small and quadratic; phallic organ differently shaped in lateral view; fine structure pattern of the endothecal sclerite modified.

Description – Male (in alcohol). Large dark-winged animal; wings of the less pigmented pharate male paratype is brown. Body ochraceous, dorsal thoracic sclerites little darker. Wings almost black, with a few light pointed spots and large light window along M1♀2.



Figs 19–20. *Hydropsyche sotet* sp. n. holotype male:
19 = genitalia in left lateral view; 20 = phallic organ in left lateral view

Median cell on hind wing present. Maxillary palp formula I-III-IV-II-V. Spur formula 244. Forewing length 13 mm.

Male genitalia. Segment IX fused annular and short; its median keel short with granulose dorsal surface, sloping down posterad; apical lobe on posterolateral margin rounded. Lateral intersegmental profile between the ninth and tenth segments forms a short and deep excision. Segment X short and low; lateral setose area, the cerci crescent-shaped and located near apical margin; dorsoapical setose lobes dominating on the lateral profile of segment X as a pair of dorsad shifted rounded setose plate. The coxopodit of the gonopod shorter than the apex of segment X, harpago broad almost parallel-sided in lateral view, twisted flat in ventral view. Phallic organ with high downward turning phallobase, broad endophallus middle of phallotheca, a pair of vertically high phallotremal sclerite, a pair of S-shaped sclerotized endothecal process and a membranous subapical region ventrally with laterad directed small lobe.

Type material – Holotype: **Indonesia**, West Papua, Batanta Island, valley of Kalijakut River, 00°52’49.1”, 130°38’4.9”, 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (1♂, OPC). Paratypes: same as holotype (1♂, 1 pharate ♂, OPC).

Etymology – sotet from “sötét”, dark in Hungarian, refers to the wing colour.

Hydropsyche tuskes Oláh, 2013 – **Indonesia**, West Papua, Batanta Island, valley of Kalijakut River, 00°52'49.1", 130°38'4.9", 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (11♂, OPC). West Papua, Batanta Island, Teluk Warai, stream, 00°50'51.0", 130°35'14.0", 11.02.2015, at light, T. Kovács, P. Juhász (1♂, OPC). West Papua, Batanta Island, valley of Waridor River, 00°51'51", 130°33'41", 04.02.2015, at light, T. Kovács, R. Horváth, P. Juhász (1♂, OPC).

Calamoceratidae Ulmer, 1905

Anisocentropus horvathi Oláh, 2012 – **Indonesia**, West Papua, Batanta Island, Welebed, „waterwork", valley of Kalijakut River, 00°53'22.85", 130°38'25.91", 23.01.2014, UV light-trap, T. Kovács, R. Horváth, P. Juhász (2♂, 3♀, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52'49.1", 130°38'4.9", 16.02.2015, UV light-trap, T. Kovács, P. Juhász, Kris (4♂, 2♀, OPC). West Papua, Batanta Island, Teluk Warai, stream, 00°50'51.0", 130°35'14.0", 11.02.2015, at light, T. Kovács, P. Juhász (5♂, 3♀, OPC). West Papua, Batanta Island, valley of Weras Stream, 00°49'51.2", 130°38'00.0", 300 m, 08.02.2015, at light, T. Kovács, P. Juhász (25♂, 18♀, OPC). West Papua, Batanta Island, valley of Waridor River, 00°51'51", 130°33'41", 04.02.2015, at light, T. Kovács, R. Horváth, P. Juhász (1♂, OPC).

Anisocentropus illustris McLachlan, 1863 **– Indonesia**, West Papua, Batanta Island, valley of Waridor River, between 00°52'6.6", 130°31'30.0" and 00°52'09.66", 130°32'11.54", 03.02.2015, singled from stream canopy, T. Kovács, R. Horváth, P. Juhász (1♂, OPC).

Leptoceridae Leach, 1815

Triplectidinae Ulmer, 1906

Triplectides dombos Oláh, 2014 – **Indonesia**, West Papua, Batanta Island, Teluk Warai, stream, 00°50'51.0", 130°35'14.0", 11.02.2015, at light, T. Kovács, P. Juhász (1♂, OPC). West Papua, Batanta Island, valley of Kalijakut River, 00°52'52.0", 130°38'8.0", 16.02.2015, at light, T. Kovács, P. Juhász, Kris (2♂, OPC).

Acknowledgement: The field and laboratory expenses were sponsored by Sakertour Eastern Europe, Birdwatching and Hide Photography Company of the Carpathian Basin and Danube Delta, by the PapuaParadise EcoResort (Birie Island, Raja Ampat, West Papua), and by the Nature Discovery Fund (Kisar-Hungary).

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