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The Orthoptera fauna of Cserhát Hills and its surroundings (North Hungary)

Gergely Szövényi, Krisztián Harmos & Barnabás Nagy

Abstract

Cserhát is an orthopterologically relatively less studied region of the North Hungarian Mountains. After a faunistic research conducted here, the Orthoptera fauna of the Cserhát region is summarized. The pool of formerly known 33 species is raised to 67, which is about 53% of the total Orthoptera fauna of Hungary. Seven of them (*Acrida ungarica, Isophya modesta, Leptophyes discoidalis, Polysarcus denticauda, Poecilimon fussii, Saga pedo, Tettigonia caudata*) are legally protected and two (*Isophya costata, Paracaloptenus caloptenoides*) strictly protected in Hungary. Others (*Aiolopus thalassinus, Chorthippus dichrous, Oedaleus decorus, Pachytrachis gracilis, Pezotettix giornae, Platycleis affinis, Rhacocleis germanica, Ruspolia nitidula, Tessellana veyseli*) are zoogeographically also valuable here, near their northern-northwestern areal limit.

Zusammenfassung

Der Orthopteren-Fauna der nördlichen Mittelgebirge Ungarns ist ziemlich gut erforscht, aber die Hügellandschaft Cserhát, in den westlichen Teil der Nördlichen Mittelgebirge, bildete bisher eine Ausnahme. Basierend auf unsere Untersuchungen, durchgeführt zwischen 1963 und 2011, hat sich die Artenzahl hier auf 67 erhöht (= 53% der Orthopteren-Arten Ungarns). Sieben Arten davon stehen in Ungarn unter gesetzlichem Naturschutz (*Acrida ungarica, Isophya modesta, Leptophyes discoidalis, Polysarcus denticauda, Poecilimon fussii, Saga pedo, Tettigonia caudata*), zwei sogar unter noch strengerem Naturschutz (*Isophya costata, Paracaloptenus caloptenoides*). Es gibt noch auch weitere, zoogeographisch interessante Arten (*Aiolopus thalassinus, Chorthippus dichrous, Oedaleus decorus, Pachytrachis gracilis, Pezotettix giornae, Platycleis affinis, Rhacocleis germanica, Ruspolia nitidula, Tessellana veyseli*), von denen manche hier am nördliche Rand ihres Verbreitungsgebiet vorkommen.

Introduction

The Orthoptera fauna of Hungary is relatively well known but the level of knowledge shows high variations geographically. Most comprehensive faunistic works deal with the grasshoppers of different typical grasslands which dominate the Pannonian lowland landscapes, mostly under nature protection (e.g. NAGY 1983, 1990, RÁCZ 1986a, NAGY & SZÖVÉNYI 1998, NAGY & SZIRÁKI 2002, SZÖVÉNYI 2007), and of several mountain ranges covered partly by variable grassland habitats, most of which are also at least partly under nature protection (e.g. NAGY 1948, NAGY & RÁCZ 1996, NAGY & SZÖVÉNYI 1997, NAGY et al. 1999, SZÖVÉNYI &

NAGY 1999, NAGY & NAGY 2000, SZÖVÉNYI et al. 2007, KENYERES 2010 etc.). The North Hungarian Mountains are a part of the inner periphery of the Northern Carpathians' arch. It forms the highest and largest, about 250 km long rangeland in Hungary. The orthopterological investigations here used to be concentrated on the eastern half (Bükk Mountains: NAGY & RÁCZ 1996, Zemplén (Tokaj) Mountains: NAGY et al. 1998, Aggtelek Karst: NAGY et al. 1999, NAGY 2008). From the western chains (Börzsöny, Cserhát and Mátra Mountains) rather scattered data were published (e.g. NAGY 1981, RÁCZ 1986b, KOLICS et al. 2008, NAGY et al. 2010), except for the isolated, mainly limestone and dolomite composed block of the Naszály Mountain (SZÖVÉNYI et al 2010) in the west.

The Orthoptera fauna of Cserhát, which is the lowest rangeland among the North Hungarian Mts., is only sporadically documented. The first publication about this region mentions *Saga pedo* (NAGY 1965) without any exact location. Five data were listed in an overview of the Orthoptera collection of the Natural History Museum in Gyöngyös, Hungary (RÁCZ 1986b) and 78 data of 29 species in two publications about the Orthoptera collection of the Natural History Museum in Budapest (RÁCZ 1992, RÁCZ et al. 2005). A recent review of the Hungarian distribution of Catantopinae species (NAGY et al. 2010) and of *Saga pedo* (KENYERES et al. 2002) contains some data from the Cserhát as well. Finally a description of a protected area near the Ipoly River (KŐVÁRI 2007) mentions the presence of *Acrida ungarica*. Thus altogether 97 distribution data of 33 species have been published from this area until now, but no comprehensive faunistical investigation was conducted here before.

Materials and methods

The study area

Cserhát forms the second member of the North Hungarian Mts. from west to the east lying between the Börzsöny and Mátra Mts., forming a part of the North Western Carpathians' inner volcanic belt. The average elevation in this relatively large, mainly hilly district is below 300 m a.s.l and only few percents of its total area exceed 500 m (LÁNG 1967). However, its relief and geological construction are both various. Eroded Miocene volcanic formations, low hills composed by Oligocene sediments and hillfoots covered be Quaternary sediments are all to be found here (HORVÁTH 1997). This hilly landscape is bounded by sandy and pebbly sediment-covered small basins of the Ipoly river valley in the North (HORVÁTH 1997). Geographically the Cserhát region also includes the volcanic Karancs Mountain in the east and the island-like Naszály Mountain on its western edge, but the latter is, both geologically and biogeographically, considered to be rather the easternmost edge of the Transdanubian Mountains separated by the river Danube. The sediment-covered Gödöllő Hills form the southern corner of Cserhát. It is considered as a transitional zone towards the Great Hungarian Plain and strongly differs from the other parts of the region.

The studied area was the Cserhát Hills and the neighbouring parts of the Ipoly and the Zagyva rivers' valleys and their basins (fig. 1). Naszály Mountain and Gödöllő Hills were excluded because of their peripheral position and considerably different character.

The continental climate of the study area is mainly affected by its position in the lee of the Northern Carpathians and the close neighbourhood of the Hungarian Plain (LÁNG 1967). The annual average temperature varies between 8 and 10 °C which is similar to the other hilly regions of the Carpathian Basin, but the average annual precipitation, except for the highest mountainous parts (600-700 mm), is mostly relatively low (500-600 mm) in comparison with the other parts of the North Hungarian Mts. (PAPP-VÁRY 1999).

The potential natural vegetation of Cserhát forms part of the continental European oak forest zone (BORHIDI 1961). Originally most of the area was covered by Turkey oak forests and other, acidophilous oak forests in the hilly and mountainous parts, and by alluvial gallery forests and marshes in the river valleys and basins (ZÓLYOMI 1967). The relatively low average elevation of the area resulted in a dense network of human settlements and intensive human land use for a long time. The lack of large natural forested areas, the relatively high coverage of locust tree (*Robinia pseudoacacia*) plantations and the high proportion of other, agriculturally intensively used landscapes can be explained by these features (KÁRPÁTI 1952, KUN et al. 2006). However in the Ipoly valley vegetation is actually mainly affected by the natural dynamics of river-floodplain system and the pasture-land farming. The most important types of vegetation for Orthopterans in the study area were the rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*), semi-natural dry grasslands and scrubland on calcareous substrates (*Festuco-Brometalia*), sub-pannonic steppic grasslands, pannonic sand steppes and alluvial meadows of river valleys of the *Cnidion dubii* associations (MOLNÁR et al. 2008).

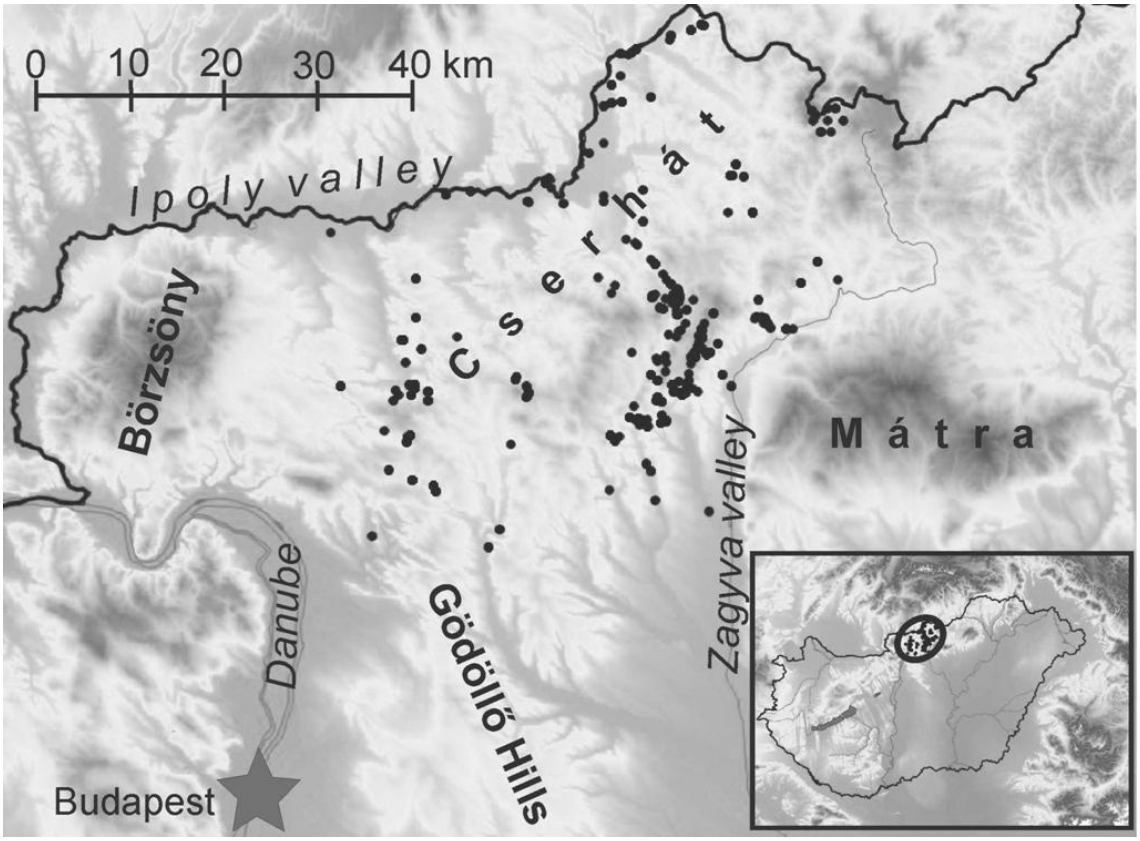

Figure 1: The study area with the sampling sites (black dots) in Cserhát, North Hungary.

Sampling methods

Authors have collected materials in the Cserhát since 1963. After a dozen data form the 1960's, the first more intensive study period was conducted from 1980 to 1993 (222 data), and most of the data have been collected in the last ten years (from 2002, 713 records). On the contrary, 67 of the 97 published data are at least 50 years old and only 12 of them were collected in the last ten years. Grasshoppers were collected by the authors using different methods. Sweep netting, visual searching and acoustic detection (partly using ultrasound detector) were used. Individuals easy to determine were partly identified and released in the field, especially in the protected areas. Others were preserved and identified in laboratory. Specimens were determined using the taxonomic keys of HARZ (1969; 1975) and VEDENINA & HELVERSEN (2009). The nomenclature and system of EADES et al. (2013) was used. The collected materials are deposited in the collections of the authors. Beside our own unpublished data, all accessible published records were added to this overview. In cases of published data codes were used (NAGY 1965: N65; RÁCZ 1986b: R86; RÁCZ 1992: R92; KENYERES et al. 2002: K02; RÁCZ et al. 2005: R05; KŐVÁRI 2007: K07; NAGY et al. 2010: N10), while in case of unpublished data, the abbreviation of the collectors' name were used in the list (Harmos K.: H; Joó M.: J; Nagy B.: N, Szövényi G.: S).

All data were geographically identified as accurately as possible, and they were added to a GIS database. The maps were composed using the relief layer of JARVIS et al. (2008).

Results

934 new data of 65 species were added to the formerly known 97 data of 33 species. Thus altogether 1031 data of 67 species from 218 localities in the Cserhát are summarized. The occurrence of 34 Orthoptera species, several among them rare in Hungary, are first published here. Both published and unpublished data are presented hereinafter. For each species data are given in alphabetical order 1.) of settlements, 2.) of locality names (if known) and 3.) data /year/ (only in 10 formerly published data was the year of collection not mentioned). Separate data from different sampling sites and habitat types under the same settlement and locality names, year and collector for the same species were listed as one record. After the name of each species its fauna type /ft./ after RÁCZ (1998), modified (abbreviations: Af: African; An: Angarian; Ba: Balkanic; Ca: Caspian; Da: Dacian; Eu: European; Il: Illyrian; M: mountain; Ma: Manchurian; Med: Mediterranean; Moe: Moesian; N: north; Pan: Pannonian; Pc: Polycentric; Po: Pontic; Sib: Siberian) and the relative frequency /fr./ in percent (amount of data records of that species divided by the all data collected for the database) are given.

Ensifera
Tettigonioidea
Tettigoniidae
Bradyporinae
Ephippiger ephippiger (Fiebig, 1784) - ft : Po-Med; fr.: 2.23%

Alsótold: Nagy-Mező-hegy 2010 (H); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Csővár**: Vas-hegy 2010 (S); **Felsőtold**: Kis-Zsunyi-hegy 2010 (H); Kozicska 2010 (S-H); **Hollókő**: Gomb-hegy 2010 (H); Ófalu 2010 (H); Túlsó-mező 2010 (H); Vár-hegy 2010 (H); **Kozárd**: Acsád 2010 (H); Barát-hegy 2010 (H); Rózsamály 2010 (H); village 2010 (H); **Litke**: Kopasz-hegy 2010 (H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Gombás 2010 (H); Mészkemencék 2006 (H); Tepke 2009 (S-H); **Mátraverebély**: Hencse 2010 (H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: Rárόspuszta 2010 (H); **Ságújfalu**: Magas-tető 2005 (N); **Somoskőújfalu**: sandhill 1964 (N);

Conocephalinae
Conocephalus dorsalis (Latreille, 1804) - ft.: Po-Ca; fr.: 0.19%

Litke: Koromrét 2010 (S-H); **Nógrádszakál**: Kutykás 2010 (S-H);

Conocephalus fuscus (Fabricius, 1793) - ft.: Sib-Pc; fr.: 2.42%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bánk**: 1944 (R92); **Bátonyterenye**: Cigányvölgy 2002 (N); **Buják**: Bokri-hegy alja dűlő 2009 (S-H); S foot of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Cserhátszentiván**: (R92); **Ecseg**: 1975 (R86); Csordanyom 2009 (S-H); Oláhlapos 2009 (S-H); **Felsőtold**: Nagy-nyilasok 2010 (S-H); Zsunyi-patak valley 2010 (H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Pohánka 2009 (S-H); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: 1957 (R92); Nógrádszakáll, Bussa-rét 2010 (S-H); **Nógrádszakál**: Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Rárόspuszta 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); **Rád**: 1926 (R92); **Romhány**: Disznó-völgy 1988 (N); **Szécsény**: 1957 (R92); Káprások 2010 (H);

Ruspolia nitidula (Scopoli, 1786) - ft.: Af; fr.: 1.75%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bátonyterenye**: village 2010 (H); **Ecseg**: Csordanyom 2009 (S-H); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Kozárd**: Rózsamály 2010 (H); village 2010 (H); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Nézsa**: lakeside 2010 (S); **Nógrádszakál**: Bussa-rét 2010 (S-H); Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Rárόspuszta 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); Kavicsbányák 2010 (S-H); **Szécsény**: Káprások 2010 (H);

Meconematinae
Meconema thalassinum (De Geer, 1773) - ft.: Extra-Med; fr.: 0.19%

Buják: SE side of Csirke-hegy 2009 (S-H); **Pásztó**: Tepke 1991 (N);

Phaneropterinae
Barbitistes constrictus (Brunner von Wattenwyl, 1878) - ft.: Ba (Moe); fr.: 0.19%

Ipolytarnóc: Nature conservation area 2010 (H); **Nógrdszakál**: Bertece-patak valley 2010 (H)

Barbitistes serricauda (Fabricius, 1798) - ft.: Po-Pan; fr.: 0.1%

Garáb: Macska-hegy 1989 (N);

Isophya costata Brunner von Wattenwyl, 1878 - ft.: Pan; fr.: 1.07%

Buják: weedy oldfield and cereals 2010 (S-H); Alsó-rét 2010 (H); Bokri-hegy alja dűlő 2010 (H); foot of Bokri-hegy 2010 (H); Hényel-puszta 2010 (H); Katona mál 2010 (H); Nyuga 2010 (H); Sereg-hegy 2010 (H); Zsellérföldek 2009 (S-H); 2010 (H); **Jobbágyi**: Gyúri-dűlő 2009 (H);

Isophya kraussii Brunner von Wattenwyl, 1878 – ft.: Ba(Il); fr.: 2.23%

Alsópetény: bushy roadside 1982 (N); **Buják**: Csirke-hegy 2010 (H); SE side of Csirke-hegy 2009 (S-H); **Cserhátszentiván**: foot of Bézma 2010 (H); **Felsőtold**: foot of Kecske-hegy 2010 (H); Garábi-patak valley 2010 (H); Purga 2010 (H); **Garáb**: Garábi-patak valley 2010 (H); Macska-hegy 1989 (N); 2009 (H); 2010 (H); Nagy-kő-tető 2007 (H); **Kozárd**: Majorsági-hegy 2010 (H); Rózsamály 2010 (H); **Mátraszőlős**: Gombás 2010 (H); **Mátraszőlős**: Tepke 2009 (H); 2010 (H); **Nógrádsipek**: foot of Kerek-domb 2010 (H); **Rimóc**: Nyerges-hegy 2010 (H); **Romhány**: Romhányi-erdő 1982 (N); **Somoskőújfalu**: Karancs peak 1963 (N);

Isophya modesta (Frivaldszky, 1867) - ft.: Ba(Moe); fr.: 1.16%

Sámsonháza: Bassadi-rét 2010 (H-J); Erdőbirtokosság-dűlő 2010 (H-J); Fűz-kút-lapos 2010 (H-J); Kis-Zagyva valley 2010 (H-J); Krisztina-dűlő 2010 (H-J); Krisztina-hegy 2010 (H-J); Peres-oldal 2010 (H-J); Rigó-völgy 2010 (H-J); Stroma bócsa 2010 (H-J); Tó-rét 2010 (H-J); Ürgés 2010 (H-J); Zsellér-földek 2010 (H-J);

Leptophyes albovittata (Kollar, 1833) - ft.: Po-Med; fr.: 4.46%

Bánk: 1944 (R92); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Buják**: weedy oldfield and cereals 2010 (S-H); Hényeli-rét 2009 (H); S foot of Csirke-hegy 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Cserhátszentiván**: (R92); **Ecseg**: Bézma, western side 2009 (S-H); Csordanyom 2009 (S-H); Vármellék 2009 (S-H); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Macska-hegy 1989 (N); 1991 (N); **Hollókő**: hill S from village 1989 (N); Szár-hegy 1989 (N); Vár-hegy 1980 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nagylóc**: Kő-kapu 2009 (H); **Nógrádszakál**: Rárósi kubiktó 2010 (S-H); **Romhány**: 1944 (R92); bushy road-side 1988 (N); Disznó-völgy 1988 (N); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); Magas-tető 2005 (N); **Somoskőújfalu**: (R92); Kiskarancs ridge 1991 (N); **Szanda**: Szandavár 1982 (N); **Szátok**: Kotlik 1993 (N);

Leptophyes discoidalis (Frivaldszky, 1867) - ft.: Da; fr.: 0.1%

Kozárd: Pohánka 2009 (S-H);

Phaneroptera falcata (Poda, 1761) - ft.: Sib-Pc; fr.: 2.42%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bánk**: 1944 (R92); **Bátonyterenye**: Cigányvölgy 2002 (N); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Ecseg**: Erős oldal 2009 (S-H); Oláh-lapos 2009 (S-H); **Etes**: Árnyékalja 2002 (N); **Felsőtold**: Kozicska 2010 (S-H); **Hollókő**: Vár-hegy 1980 (N); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Litke**: Hallgató 1957 (R92); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Tepke 2009 (S-H); **Nagylóc**: Kőkapu 2009 (H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: Bussa-rét 2010 (S-H); Ráróspuszta 2010 (S-H); **Romhány**: Kétbodony 1993 (N); **Romhány**: Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Somoskőújfalu**: Kiskarancs ridge 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N);

Phaneroptera nana Fieber, 1853 - ft.: Holo-Med; fr.: 0.48%

Kozárd: Rózsamály 2010 (H); **Mátraszőlős**: Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R92); Rárόspuszta 2010 (S-H);

Poecilimon fussii Brunner von Wattenwyl, 1878 - ft.: Po-Pan; fr.: 0.19%

Buják: S foot of Csirke-hegy 2009 (S-H); SE side of Csirke-hegy 2009 (S-H);

Polysarcus denticauda (Charpentier, 1825) - ft.: Po-Med; fr.: 2.52%

Cserhátszentiván: foot of Bézma 2010 (H); Szőlők alja 2010 (H); Zsunyi-patak valley 2010 (H); **Felsőtold**: foot of Kis-Zsunyi-hegy 2010 (H); foot of Majorsági-hegy 2010 (H); Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Hollókő**: Csontorok 2010 (H); foot of Szár-hegy 2010 (H); Szállások 2010 (H); Zsunyi-patak valley 2010 (H); **Hugyag**: Káposztás 2010 (H); **Ludányhalászi**: Száraz-rét 2008 (H); **Nagylóc**: Diós-lapos 2010 (H); foot of Borókás-tető 2010 (H); foot of Kerek-domb 2010 (H); foot of Kis-Zsunyi-hegy 2010 (H); foot of Zsunyi-hegy 2010 (H); Herencsény 2010 (H); Nádas 2010 (H); Sangyi 2010 (H); Veres-oldal 2010 (H); Zsunypuszta 2010 (H); **Nógrádsipek**: Puszta-falu 2010 (H); **Sámsonháza**: Kis-Zagyva valley 2010 (H);

Saginae

Saga pedo (Pallas, 1771) - ft.: Po-Ca; fr.: 0.29%

Garáb: Macska-hegy 1989 (K08); 2009 (S-H); **Pásztó**: Tepke 1964 (K08);

Tettigoniinae

Decticus verrucivorus (Linnaeus, 1758) - ft.: An; fr.: 1.94%

Alsópetény: 1944 (R92); **Buják**: Bokri-hegy alja dűlő 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); 2010 (H); **Cserhátszentiván**: (R92); **Csővár**: Vas-hegy 2010 (S); **Debercsény**: Bakosi-rét 2010 (H); **Ecseg**: Csordanyom 2009 (S-H); **Felsőtold**:, Kis-Zsunyi-hegy 2010 (H); Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Hollókő**: hill S from village 1989 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); **Szanda**: Szandavár 1982 (N); Szandavár 1982 (N);

Metrioptera bicolor (Philipi, 1830) - ft.: An; fr.: 2.72%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Buják**: weedy oldfield and cereals 2010 (S-H); Bokri-hegy alja dűlő 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Ecseg:** Csordanyom 2009 (S-H); **Ecseg**: Várdomb 2009 (S-H); **Felsőtold**: Kozicska 2010 (S-H); **Hollókő**: Szár-hegy 1989 (N); Vár-hegy 1980 (N); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Jobbágyi**: Gyúri-dűlő 2009 (H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nógrádszakál**: Kutykás 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H); **Romhány**: Kók-hegy 1988 (N); **Ságújfalu**: Magas-tető 2005 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Szanda**: Szandavár 1982 (N);

Metrioptera roeselii (Hagenbach, 1822) - ft.: Po-Ca; fr.: 1.45%

Alsópetény: (R92); **Bánk**: 1944 (R92); **Buják**: weedy oldfield and cereals 2010 (S-H); Hényeli-rét 2009 (H); **Ecseg**: Csordanyom 2009 (S-H); Oláh-lapos 2009 (S-H); Vármellék 2009 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Pohánka 2009 (S-H); **Litke**: Koromrét 2010 (S-H); **Mátraszőlős**: Tepke 2009 (H); **Nagylóc**: Kőkapu 2009 (H); **Nógrádszakáll**: Bussa-rét 2010 (S-H); Kutykás 2010 (S-H); Rárόspuszta 2010 (S-H);

Pholidoptera aptera (Fabricius, 1793) - ft.: Extra-Med-M; fr.: 0.48%

Ecseg: Bézma 2010 (H); **Garáb**: Macska-hegy 1989 (N); 2009 (S-H); **Mátraszőlős**: Gombás 2010 (H); Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Nagylóc**: Nagy-Zsunyi-hegy 2010 (H); **Nógrádsipek**: Kőszál 2010 (H); **Pásztó**: Tepke 1964 (N); 1991 (N); **Somoskőújfalu**: Karancs peak 1963 (N); 1991 (N); Kiskarancs ridge 1991 (N); S foot of Karancs 1963 (N);

Pholidoptera fallax (Fischer, 1853) - ft.: Po-Med; fr.: 0.39%

Alsótold: foot of Nagy-Mező-hegy 2010 (H); **Mátraszőlős**: Purga-nyereg 2009 (S-H); Tepke 2009 (H); **Mátraverebély**: Kőszirt-hegy 2009 (H);

Pholidoptera griseoaptera (De Geer, 1773) - ft.: Po-Ca; fr.: 5.14%

Bánk: 1944 (R92); **Bátonyterenye**: Cigányvölgy 2002 (N); :Szupatak, Meszes-tető 2009 (H); **Buják**: SE side of Csirke-hegy 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Felsőpetény**: S side of Kő-hegy 2010 (S); **Felsőtold**: Kis-Zsunyi-hegy 2010 (H); Kozicska 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1989 (N); 1991 (N); 2009 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Acsád 2010 (H); Barát-hegy 2010 (H); Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); village 2010 (H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Purga-nyereg 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: Rárós puszta 2010 (H); Bussa-rét 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H); **Pásztó**: Galéria 1991 (N); Nagy-Cseri 2010 (H); Pogányvár 2010 (H); Purga 1991 (N); Tepke 1991 (N); **Romhány**: bushy roadside 1988 (N); Disznó-völgy 1988 (N); Málnás 1982 (N); Romhányi-erdő 1982 (N); **Somoskőújfalu**: forest edge 1963 (N); Karancs peak 1963 (N); Karancs peak 1991 (N); Kiskarancs ridge 1991 (N); S foot of Karancs 1963 (N); 1991 (N); sandhills 1964 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szanda**: Szandavár 1982 (N); Szandavár 1982 (N);

Platycleis affinis Fieber, 1853 - ft.: Po-Ca; fr.: 0.39%

Bánk: 1944 (R92); **Cserhátszentiván**: (R92); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H);

Platycleis albopunctata grisea (Fabricius, 1781) - ft.: Po-Ca; fr.: 2.91%

Buják: Zsellérföldek 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); **Ecseg**: Csordanyom 2009 (S-H);Erős oldal 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); **Felsőtold**: Nagy-nyilasok 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 2009 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Purga-nyereg 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R92); Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); **Pásztó**: Tepke 1991 (N); **Püspökhatvan**: 1961 (R92); **Ságújfalu**: Festékes-hegy 2002 (N); Magas-tető 2005 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N);

Rhacocleis germanica (Herrich-Schäffer, 1840) - ft.: Po-Med; fr.: 3.39%

Bánk: 1944 (R92); **Buják**: SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); Cserhátszentiván: (R92); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Csordanyom 2009 (S-H); Várdomb 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); S side of Kő-hegy 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1991 (N); 2009 (S-H); **Hollókő**: Vár-hegy 1980 (N); **Kozárd**: Kacsás-tó 2009 (S-H); Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R92); **Pásztó**: Külső Tepke 1991 (N); Purga 1991 (N); Tepke 1991 (N); **Romhány**: Kók-hegy 1988 (N); **Ságújfalu**: Magas-tető 2005 (N);

Somoskőújfalu: Karancs peak 1991 (N); S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szente**: bushy-grassy hilltop 1985 (N);

Tessellana veyseli (Koçak, 1984) - ft.: Po-Ca; fr.: 0.39%

Buják: edge of oldfield 2009 (S-H); **Rád**: 1926 (R92); **Szanda**: Szandavár 1982 (N); **Szandaváralja**: sheep-run 1985 (N);

Tettigonia caudata (Charpentier, 1842) - ft.: Po-Ca; fr.: 0.1%

Buják: weedy oldfield and cereals, 2010 (S-H);

Tettigonia viridissima Linnaeus, 1758 - ft.: Sb-Pc; fr.: 1.45%

Buják: edge of oldfield, 2009 (S-H); weedy oldfield and cereals, 2010 (S-H); **Csővár**: Vas-hegy, 2010 (S); **Felsőtold**: Kozicska, 2010 (S-H); Nagy-nyilasok, 2010 (S-H); **Hollókő**: degraded mesic meadow, 1989 (N); Szár-hegy, 1989 (N); **Hugyag**: Zsombékos, 2010 (S-H); **Ipolytarnóc**: Nature conservation area, 2010 (S-H); **Kozárd**: Kacsás-tó, 2009 (S-H); Pohánka, 2009 (S-H); **Litke**: Koromrét, 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly, 2010 (S-H); **Nógrádszakál**: Rárόspuszta, 2010 (S-H); **Romhány**: Rákóczi memorial tree, 1982 (N);

Grylloidea
Gryllidae
Gryllinae
Gryllus campestris Linnaeus, 1758 - ft.: Af; fr.: 1.26%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Ecseg**: Csordanyom 2009 (S-H); **Felsőpetény**: S foothills of Kő-hegy 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Macska-hegy 1991 (N); **Hollókő**: degraded mesic meadow 1989 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kisbágyon**: Alsó-rét 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Purga-nyereg 2009 (S-H); **Mátraszőlős**: Tepke 2009 (S-H); **Szanda**: Szandavár 1982 (N);

Melanogryllus desertus (Pallas, 1771) - ft.: Po-Med; fr.: 0.48%

Buják: Bokri-hegy alja dűlő 2009 (S-H); Zsellérföldek 2009 (S-H); **Ecseg**: Csordanyom 2009 (S-H); **Hollókő**: hill S from village 1989 (N); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H);

Modicogryllus frontalis (Fieber, 1844) - ft.: Po-Med; fr.: 0.19%

Hollókő: hill S from village 1989 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H);

Oecanthinae
Oecanthus pellucens (Scopoli, 1763) - ft.: Po-Med; fr.: 3.1%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Buják**: Bokri-hegy alja dűlő 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Csordanyom 2009 (S-H); Oláh-lapos 2009 (S-H); Várdomb 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); S foothills of Kő-hegy 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); Kacsás-tó 2009 (S-H); Pohánka 2009 (S-H); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Tepke 2009 (S-H); **Nézsa**: lakeside 2010 (S); Szele-hegy 2010 (S); **Nógrádszakál**: Rárósi kubiktó 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); Külső Tepke 1991 (N); **Romhány**: bushy roadside 1988 (N); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); sandhills 1964 (N); **Szátok**: Kotlik 1993 (N); **Szirák**: village 2010 (S);

Gryllotalpidae
Gryllotalpa gryllotalpa (Linnaeus, 1758) - ft.: Eu-Pc; fr.: 0.1%

Kisbágyon: Alsó-rét 2010 (S-H);

Caelifera
Tetrigoidea
Tetrigidae
Tetrix bipunctata (Linnaeus, 1758) - ft.: Sib-Pc; fr.: 0.48%

Csővár: Vas-hegy 2010 (S); **Felsőpetény**: Kő-hegy peak 2010 (S); **Garáb**: Macska-hegy 2009 (S-H); **Hollókő**: hill S from village 1989 (N); **Mátraszőlős**: Külső-Tepke 2009 (S-H);

Tetrix subulata (Linnaeus, 1758) - ft.: Eu-Pc; fr.: 0.39%

Felsőtold: Nagy-nyilasok 2010 (S-H); **Nógrádszakál**: 1957 (R05); Bussa-rét 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H);

Tetrix tenuicornis Sahlberg, 1893 - ft.: Sib-Pc; fr.: 1.16%

Ecseg: Csordanyom 2009 (S-H); **Felsőpetény**: S foothills of Kő-hegy 2010 (S); **Felsőtold**: Nagy-nyilasok 2010 (S-H); **Hollókő**: hill S from village 1989 (N); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Nógrádszakál**: Bussa-rét 2010 (S-H); Rárósi kubiktó 2010 (S-H); **Romhány**: Rákóczi memorial tree 1982 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Szanda**: Szandavár 1982 (N);

Acridoidea
Acrididae
Acridinae
Acrida ungarica (Herbst, 1786) - ft.: Af; fr.: 0.1%

Dejtár, Páskom-legelő 2007 (K07)

Calliptaminae
Calliptamus italicus (Linnaeus, 1758) - ft.: An; fr.: 4.07%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Buják**: edge of an oldfield 2009 (S-H); Bokri-hegy alja dűlő 2009 (S-H); Hényeli-rét 2009 (H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); Csordanyom 2009 (S-H); Erős oldal 2009 (S-H); Várdomb 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); S side of Kő-hegy 2010 (S); **Felsőtold**: Nagy-nyilasok 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1989 (N); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: lakeside 2010 (S); Szele-hegy 2010 (S); **Nógrádszakál**: Kutykás 2010 (S-H); Rárópuszta 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H); **Pásztó**: Galéria 1991 (N); Tepke 1991 (N); **Romhány**: Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szandaváralja**: sheep-run 1985 (N);

Paracaloptenus caloptenoides (Brunner von Wattenwyl, 1861) - Ba; 0.19%

Garáb: Macska-hegy 1991 (N); 2009 (S-H);

Pezotettix giornae (Rossi, 1794) ft.: Po-Med; fr.: 1.45%

Buják: Bokri-hegy alja dűlő 2009 (N10); Csirke-hegy 2009 (N10); S foot of Csirke-hegy 2009 (N10); SE side of Csirke-hegy 2009 (N10); Zsellérföldek 2009 (N10); **Ecseg**: Bézma, western side 2009 (N10); Csordanyom 2009 (S-H); Erős oldal 2009 (N10); Oláh-lapos 2009 (S-H); **Kozárd**: Kacsás-tó 2009 (N10); Pogányvár 2004 (N10); 2009 (N10); Pohánka 2009 (N10); **Mátraszőlős**: Külső-Tepke 2009 (S-H);

Gomphocerinae

Chorthippus apricarius (Linnaeus, 1758) - ft.: An; fr.: 2.23%

Buják: Bokri-hegy alja dűlő 2009 (S-H); Zsellérföldek 2009 (S-H); **Cserhátszentiván** 1957 (R05); **Csesztve**: curch garden 1985 (N); **Ecseg**: Csordanyom 2009 (S-H); Oláh-lapos 2009 (S-H); **Felsőpetény**: S foothills of Kő-hegy 2010 (S);**Hugyag**: Zsombékos 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Purga-nyereg 2009 (S-H); Tepke 2009 (S-H); **Nógrádszakál**: Rárósi kubiktó 2010 (S-H); Pásztó, foothills of Tepke 1991 (N); Galéria 1991 (N); **Romhány**: 1944 (R05); Disznó-völgy 1988 (N); Kók-hegy 1988 (N); **Szanda**: Szandavár 1982 (N);

Chorthippus biguttulus (Linnaeus, 1758) - ft.: Po-Ca; fr.: 2.63%

Acsa: 1961 (R05); 1967 (R05); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Buják**: SE side of Csirke-hegy 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); Erős oldal 2009 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1991 (N); 2009 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); **Pásztó**: Purga 1991 (N); Tepke 1991 (N); **Püspökhatvan**: 1961 (R05); **Romhány**: 1944 (R05); Disznó-völgy 1988 (N); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Somoskőújfalu**: (R05); S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N);

Chorthippus brunneus (Thunberg, 1815) - ft.: An; fr.: 3.3%

Buják: edge of oldfield 2009 (S-H); weedy oldfield and cereals 2010 (S-H); Bokri-hegy alja dűlő 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Csordanyom 2009 (S-H); **Felsőpetény**: S foothills of Kő-hegy 2010 (S); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Nagylóc**: 1947 (R05); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Ráróspuszta 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); Kavicsbányák 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); Külső Tepke 1991 (N); **Püspökhatvan**: 1961 (R05); **Romhány**: 1944 (R05); **Romhány**: alfalfa field 1988 (N); bushy roadside 1988 (N); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Sámsonháza**: castle 1974 (R86); **Somoskőújfalu**: acidophilous grassland 1963 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szanda**: Szandavár 1982 (N); **Szandaváralja**: sheep-run 1985 (N); **Szátok**: Kotlik 1993 (N); Vér-hegy tető 1993 (N);

Chorthippus dichrous (Eversmann, 1859) - ft.: An; fr.: 0.19%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Hugyag**: Zsombékos 2010 (S-H);

Chorthippus dorsatus (Zetterstedt, 1821) - ft.: Sib-Pc; fr.: 5.04%

Bánk: 1944 (R05); **Bátonyterenye**: Cigányvölgy 2002 (N); **Csesztve**: curch garden 1985 (N); **Ecseg**: Bézma, western side 2009 (S-H); Csordanyom 2009 (S-H); Erős oldal 2009 (S-H); **Etes**: Árnyékalja 2002 (N); **Felsőpetény**: Kő-hegy peak 2010 (S); S foothills of Kő-hegy 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1991 (N); 2009 (S-H); **Hollókő**: Vár-hegy 1980 (N); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: hill-

side near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Purga-nyereg 2009 (S-H); **Nézsa**: lakeside 2010 (S); **Nógrádszakál**: 1957 (R05); Bussa-rét 2010 (S-H); Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Ráróspuszta 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); Kavicsbányák 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); Galéria 1991 (N); **Püspökhatvan**: 1961 (R05); **Romhány**: 1944 (R05); bushy roadside 1988 (N); Disznó-völgy 1988 (N); Kétbodony 1993 (N); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szandaváralja**: swamp meadow 1985 (N); sheep-run 1985 (N); **Szátok**: Kotlik 1993 (N); **Szécsény**: 1957 (R05); **Szente**: bushy-grassy hilltop 1985 (N);

Chorthippus mollis (Charpentier, 1825) - ft.: An; fr.: 2.91%

Acsa: 1961 (R05); **Bánk**: 1944 (R05); **Csesztve**: curch garden 1985 (N); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); Erős oldal 2009 (S-H); **Felsőpetény**: S foothills of Kő-hegy 2010 (S); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); **Litke**: Hallgató 1959 (R05); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); Kavicsbányák 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); **Romhány**: 1944 (R05); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); **Somoskőújfalu**: (R05); S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szandaváralja**: sheep-run 1985 (N); **Szátok**: Kotlik 1993 (N); Vér-hegy tető 1993 (N);

Chorthippus oschei Helversen, 1986 - ft.: Po-Pan; fr.: 1.07%

Bánk: 1944 (R05); **Buják**: edge of oldfield 2009 (S-H); Hényeli-rét 2009 (H); **Felsőtold**: Nagy-nyilasok 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); **Romhány**: 1944 (R05); alfalfa field 1988 (N); bushy roadside 1988 (N); Kétbodony 1993 (N); Kók-hegy 1988 (N); **Szátok**: Kotlik 1993 (N);

Chrysochraon dispar (Germar, 1834) - ft.: An; fr.: 0.68%

Bátonyterenye: Cigányvölgy 2002 (N); **Buják**: Hényeli-rét 2009 (H); S foot of Csirke-hegy 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); **Nagylóc**: Kőkapu 2009 (H); **Romhány**: Disznó-völgy 1988 (N);

Dociostaurus brevicollis (Eversmann, 1848) - ft.: Po-Ca-Tur; fr.: 0.29%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Hugyag**: Zsombékos 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H);

Euchorthippus declivus (Brisout de Barneville, 1849) - ft.: N-Med, Pc; fr.: 2.91%

Balassagyarmat: dike of Ipoly 2010 (S-H); **Bánk**: 1944 (R05); **Buják**: Bokri-hegy alja dűlő 2009 (S-H); Zsellérföldek 2009 (S-H); **Csesztve**: curch garden 1985 (N); **Ecseg**: Csordanyom 2009 (S-H); Várdomb 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Köves -tető 2009 (S-H); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Pohánka 2009 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Nógrádszakál**: Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Ráróspuszta 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); Kavicsbányák 2010 (S-H); **Pásztó**: Galéria 1991 (N); **Romhány**: 1944 (R05); Kók-hegy 1988 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szandaváralja**: sheep-run 1985 (N); **Szátok**: Kotlik 1993 (N);

Euchorthippus pulvinatus (Fischer de Waldheim, 1846) - ft.: Po-Ca-Tur; fr.: 0.19%

Ecseg: Bézma, western side 2009 (S-H); **Garáb**: Macska-hegy 1991 (N);

Euthystira brachyptera (Ocskay, 1826) - ft.: An; fr.: 3.01%

Bátonyterenye: Cigányvölgy 2002 (N); Szupatak, Meszes-tető 2009 (H); **Buják**: SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Ecseg**: Csordanyom 2009 (S-H); Erős oldal 2009 (S-H); **Etes**: Árnyékalja 2002 (N); **Felsőpetény**: Kő-hegy peak 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); **Garáb**: Macska-hegy 1989 (N); 2009 (S-H); **Hollókő**: hill S from village 1989 (N); Szár-hegy 1989 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Purga-nyereg 2009 (S-H); Tepke 2009 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nézsa**: lakeside 2010 (S); **Nógrádszakál**: Kutykás 2010 (S-H); **Romhány**: Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); Magas-tető 2005 (N); **Somoskőújfalu**: Kiskarancs ridge 1991 (N); **Szanda:** Szandavár 1982 (N);

Gomphocerippus rufus (Linnaeus, 1758) - ft.: An; fr.: 1.75%

Bánk: 1944 (R05); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); S side of Kő-hegy 2010 (S); **Garáb**: Köves -tető 2009 (S-H); Macska-hegy 1991 (N); 2009 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); **Pásztó**: Purga 1991 (N); **Pásztó**: Tepke 1991 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Szente**: bushy-grassy hilltop 1985 (N);

Myrmeleotettix maculatus (Thunberg, 1815) - ft.: An; fr.: 0.1%

Sóshartyán: Kerékkötő-hegy 2002 (N);

Omocestus haemorrhoidalis (Charpentier, 1825) - ft.: An; fr.: 0.78%

Bánk: 1944 (R05); **Ecseg**: Csordanyom 2009 (S-H); **Hugyag**: Zsombékos 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Nógrádszakál**: Rárósi kubiktó 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); **Szátok**: Kotlik 1993 (N);

Omocestus rufipes (Zetterstedt, 1821) - ft.: An; fr.: 2.23%

Bánk: 1944 (R05); **Bercel**: 1957 (R05); **Buják**: edge of oldfield 2009 (S-H); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Macska-hegy 2009 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kisgéc**: Szarvas-hegy 1957 (R05); Kozárd: Pogányvár 2009 (S-H); **Litke**: Hallgató 1959 (R05); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Purga-nyereg 2009 (S-H); Tepke 2009 (S-H); **Nógrádszakál**: 1957 (R05); **Pásztó**: Galéria 1991 (N); **Püspökhatvan**: 1961 (R05); **Romhány**: Kók-hegy 1988 (N); **Sámsonháza**: castle 1974 (R86); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szécsény**: 1957 (R05);

Pseudochorthippus montanus (Charpentier, 1825) - ft.: An; fr.: 0.29%

Kisgéc: 1957 (R05); **Szandaváralja**: swamp meadow 1985 (N); **Szátok** 1993 (N);

Pseudochorthippus parallelus (Zetterstedt, 1821) - ft.: An; fr.: 4.75%

Alsópetény: 1944 (R05); **Balassagyarmat**: dike of Ipoly 2010 (S-H); **Bátonyterenye**: Cigányvölgy 2002 (N); **Buják**: weedy oldfield and cereals 2010 (S-H); Bokri-hegy alja dűlő 2009 (S-H); Hényeli-rét 2009 (H); S foot of Csirke-hegy 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Ecseg**: Csordanyom 2009 (S-H); Oláh-lapos 2009 (S-H); Vármellék 2009 (S-H); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Hollókő**: Vár-hegy 1980 (N); **Hugyag**: Zsombékos 2010 (S-H); **Ipolytarnóc**: sheep-run 2010 (S-H); Nature conservation area 2010 (S-H); **Kozárd**: Pohánka 2009 (S-H); **Litke**: Koromrét 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Mátraszőlős**: Tepke 2009 (H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nézsa**: lakeside 2010 (S); **Nógrádszakál**: Bussa-rét 2010 (S-H);

Kutykás 2010 (S-H); Rárósi kubiktó 2010 (S-H); Rárószpuszta 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H); **Pásztó**: foothills of Tepke 1991 (N); Galéria 1991 (N); Külső Tepke 1991 (N); **Romhány**: 1944 (R05); bushy roadside 1988 (N); Disznó-völgy 1988 (N); Kók-hegy 1988 (N); **Ságújfalu**: Magas-tető 2005 (N); **Somoskőújfalu**: (R05); Karancs peak 1991 (N); Kiskarancs ridge 1991 (N); **Sóshartyán**: 1943 (R05); **Szanda**: Szandavár 1982 (N); **Szandaváralja**: swamp meadow 1985 (N);

Stenobothrus crassipes (Charpentier, 1825) - ft.: Po-Med; fr.: 1.55%

Buják: Zsellérföldek 2009 (S-H); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Csordanyom 2009 (S-H); Erős oldal 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); **Kozárd**: Pogányvár 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nézsa**: lakeside 2010 (S); Szele-hegy 2010 (S); **Romhány**: Disznó-völgy 1988 (N); Kók-hegy 1988 (N); **Somoskőújfalu**: S foot of Karancs 1991 (N); **Sóshartyán**: Kerékkötő-hegy 2002 (N); **Szandaváralja**: sheep-run 1985 (N);

Stenobothrus lineatus (Panzer, 1796) - ft.: An; fr.: 3.59%

Bánk: 1944 (R05); **Bátonyterenye**: Szupatak, Meszes-tető 2009 (H); **Buják**: Bokri-hegy alja dűlő 2009 (S-H); SE side of Csirke-hegy 2009 (S-H); Zsellérföldek 2009 (S-H); **Cserhátszentiván**: 1957 (R05); **Csővár**: Vas-hegy 2010 (S); **Ecseg**: Csordanyom 2009 (S-H); Erős oldal 2009 (S-H); **Felsőpetény**: Kő-hegy peak 2010 (S); **Felsőtold**: Kozicska 2010 (S-H); Nagy-nyilasok 2010 (S-H); **Garáb**: Macska-hegy 1991 (N); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Kacsás-tó 2009 (S-H); Pogányvár 2009 (S-H); Pohánka 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Purga-nyereg 2009 (S-H); Tepke 2009 (H); Tepke 2009 (S-H); **Mátraverebély**: Kőszirt-hegy 2009 (H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); Kutykás 2010 (S-H); **Pásztó**: Purga 1991 (N); Tepke 1991 (N); **Romhány**: 1944 (R05); Kók-hegy 1988 (N); **Ságújfalu**: Festékes-hegy 2002 (N); Magas-tető 2005 (N); **Sámsonháza**: castle 1979 (R86); **Szanda**: Szandavár 1982 (N); **Szátok**: Kotlik 1993 (N);

Stenobothrus nigromaculatus (Herrich-Schäffer, 1840) - ft.: An; fr.: 0.68%

Ecseg: Csordanyom 2009 (S-H); **Felsőtold**: Nagy-nyilasok 2010 (S-H); **Hugyag**: Zsombékos 2010 (S-H); **Ludányhalászi**: hillside near the Ipoly 2010 (S-H); **Őrhalom**: sandy oldfield with Festuca 2010 (S-H); **Sámsonháza**: castle 1974 (R86); **Sóshartyán**: Kerékkötő-hegy 2002 (N);

Stenobothrus stigmaticus (Rambur, 1838) - ft.: Po-Ca; fr.: 0.29%

Bánk: 1939 (R05); **Romhány**: 1944 (R05); Kók-hegy 1988 (N);

Oedipodinae

Aiolopus thalassinus (Fabricius, 1781) - ft.: Af; fr.: 0.58%

Balassagyarmat: dike of Ipoly,,2010 (S-H); **Hugyag**: Halkutak 2010 (H), Zsombékos 2010 (H); **Ludányhalászi**: Száraz-rét 2010 (H); **Romhány**: alfalfa field 1988 (N); Szécsény, Várkert 1962 (R05);

Oedaleus decorus (Germar, 1826) - ft.: Pc; fr.: 0.1%

Balassagyarmat: dike of Ipoly 2010 (S-H);

Oedipoda caerulescens (Linnaeus, 1758) - ft.: Pc; fr.: 1.56%

Csővár: Vas-hegy 2010 (S); **Ecseg**: Bézma, western side 2009 (S-H); **Ecseg**: Csordanyom 2009 (S-H); **Ipolytarnóc**: Nature conservation area 2010 (S-H); **Kozárd**: Pogányvár 2009 (S-H); **Mátraszőlős**: Külső-Tepke 2009 (S-H); Tepke 2009 (S-H); **Nézsa**: Szele-hegy 2010 (S); **Nógrádszakál**: 1957 (R05); Kutykás 2010 (S-H); **Őrhalom**: Kavicsbányák 2010 (S-H); **Pásztó**:

Tepke 1991 (N); **Püspökhatvan**: 1961 (R05); **Somoskőújfalu**: 1963 (N); S foot of Karancs 1991 (N); **Sóshartyán:** Kerékkötő-hegy 2002 (N); **Szátok**: Kotlik 1993 (N);

Stethophyma grossum (Linnaeus, 1758) - ft.: Ma; fr.: 0.1%

Bánk: 1944 (R05);

Discussion

Species richness and composition

According to the present knowledge, the diversity of Orthoptera in the Cserhát can be considered as relatively high despite the generally intensive agricultural land use. The 67 species found here count about the 53% of the total Hungarian fauna (see SZÖVÉNYI 2011a). Seven of them (*Acrida ungarica, Isophya modesta, Leptophyes discoidalis, Polysarcus denticauda, Poecilimon fussii, Saga pedo, Tettigonia caudata*) are legally protected and two of them (*Isophya costata, Paracaloptenus caloptenoides*) strictly protected in Hungary. The latter two and *Saga pedo* are listed in the annexes II and IV of Habitats' Directive (Council of Europe 1992) as well. However, in comparison with the well documented Bükk Mountains (76 species), Aggtelek Karst (77 species) or Zemplén-Slanské Mts. (69 species, together with the Slovakian part of that range) (NAGY & RÁCZ 1996, NAGY et al. 1998, 1999, NAGY 2008), Cserhát seems to be somewhat less diverse. A considerable difference is the lack of most of the real mountainous species here, which are present in all or at least one of the above mentioned mountains, and according to our unpublished data, partly in Börzsöny and Mátra Mts. as well (e.g. *Arcyptera fusca* (Pallas, 1773)*, Metrioptera brachyptera* (Linnaeus, 1761), *Pholidoptera transsylvanica* (Fischer, 1853), *Podisma pedestris* (Linnaeus, 1758)*, Pseudopodisma nagyi* Galvagni et Fontana, 1996*, Psophus stridulus* (Linnaeus, 1758)*, Stauroderus scalaris* (Fischer de Waldheim, 1846) and *Tettigonia cantans* (Füssli, 1775)). This is presumably due to the lack of the higher, real montane zone and the generally less humid climate of the Cserhát. However presumably thanks to its special climatic characters, on the foot of hills and in valleys several species characteristic to the Pannonian lowlands occur, which are partly absent from the other parts of the North Hungarian Mts. (e.g. *Acrida ungarica, Aiolopus thalassinus, Chorthippus dichrous, Oedaleus decorus, Platycleis affinis, Ruspolia nitidula, Tessellana veyseli*). The valley of Zagyva river seems to form a strict area limit in the case of the grasshopper *Pseudopodisma nagyi* which is common in mesic grasslands in the eastern part of the Northern Mountain Range at higher elevation, however, it is lacking from the western third of the Range, e.g. from the Cserhát Mts as well (NAGY et al. 2010).

The fauna types of grasshoppers occurring in the Cserhát can be pooled into five main groups: Southern (Af, Extra-Med, Holo-Med, N-Med-Pc, Po-Ca, Po-Ca-Tur, Po-Med, Po-Pan), Siberian (An, Ma, Sib, Sib-Pc), Balkanian-Dacian (Ba, Ba (Moe), Ba(Il), Da), Pannonian (Pa) and Polycentric (Eu-Pc, Pc). Most species proved to be Southern faunal elements, the second largest group was the Siberian fauna type, followed by few Balkanian-Dacian and Polycentric and a single Pannonian species (Table 1, for abbreviations see Results). When the proportion

of data records for each species was also considered, the first and second ranks (Southern and Siberian groups) changed places with each other. These results show that most species occurring here are of Southern fauna type (see Results), but in majority the widespread species are the members of Siberian fauna type (e.g. *Chorthippus dorsatus, Pseudochorthippus parallelus, Ch. brunneus, Stenobothrus lineatus, Euthystira brachyptera*). Floristic investigations match these results. Cserhát similarly differs from the neighbouring mountains from this point of view, it has a "unipolar" character, which means that the presence of mountainous plant species are limited here, however continental and submediterranean influences dominate the species composition (VOJTKÓ & HARMOS 2004).

In this manner the occurrence of several thermophilous species, mostly of Southern fauna type group, in or near the northern limit of their range is not surprising. Some of them (*Acrida ungarica*, *Chorthippus dichrous, Dociostaurus brevicollis, Oedaleus decorus, Tessellana veyseli, Platycleis affinis, Ruspolia nitidula* and *Phaneroptera nana*) are more or less widespread in most of the Hungarian Plain, but here, close to their northern areal limit (KRIŠTIN et al. 2004) proved to be rare. However, *Ruspolia nitidula* and *Phaneroptera nana* seem to penetrate northwards in Central Europe in the last decades (e.g. HOLUŠA et al. 2007, KOČAREK et al. 2008, SZÖVÉNYI et al. 2010). Others, like *Pezotettix giornae* and *Rhacocleis germanica*, which are extremely rare even in South Slovakia (KOČAREK 1999, HOLUŠA and KOČAREK 2008) are surprisingly common in the suitable habitats of the Cserhát.

Table 1: The proportion of different fauna type groups between Orthoptera species occurring in Cserhát (N-Hungary) considering the amount of species and weighted by their relative frequency in the whole database.

Group of fauna types	Species	Proportion of species (%)	Proportion wighted by relative frequency (%)
Balkanian-Dacian	5	7.5	3.9
Pannonian	1	1.5	1.1
Polycentric	4	6	2.2
Siberian	25	37.3	49.6
Southern	32	47.7	43.2

Species of special nature conservation value

Isolated occurrences of *Saga pedo* in the Cserhát have been known for decades (NAGY 1965, KENYERES et al. 2002) and that in the Macska-hill was verified recently.

The discovery of *Paracaloptenus caloptenoides* in this latter place is much more amazing. This species shows a very scattered distribution pattern in the Carpathian Basin, in its northern range, and is very rare in all of Hungary (fig. 2). It is strictly protected in Hungary, which means a much higher regard on it in habitat mamagement activities, in any types of its populations' protection and also

means an elevated goodwill value in comparison with the protected species. It is known from the Bakony region, but presumably extinct (KENYERES 2008), and in the Visegrádi Mountains in Transdanubia (NAGY 1987), and in the North Hungarian Mts. Most occurrences are published from Bükk Mts. (NAGY & RÁCZ 1996: 3 localities) and Aggtelek Karst (NAGY et al 1999, NAGY 2008: 12 localities), however it is also present in the neighbouring Börzsöny and Mátra Mts. (unpublished data of authors). In Slovakia it was only recently discovered (GAVLAS 2004) and is known only in a very restricted area in Southern Slovakia.

Isophya costata, which is considered a Pannonian endemism, is distributed in East Austria, Hungary, West Romania and North Serbia (SZÖVÉNYI 2011b). Its recently discovered occurrences in the southern part of the Cserhát draw the northern limit of its range in North Hungary. It has a high conservation value and it is strictly protected in Hungary.

The occurrence of *Isophya modesta* in the North Hungarian Mountains has been known for decades but until now only in a few places in Mátra and Bükk Mts. (NAGY 1981). Beside these, it occurs only in a few plots in Transdanubia (NAGY 1981, BAUER and KENYERES 2006) in Hungary (fig. 3). Recently it was found in Slovakia (GAVLAS and CHLADEK 2003). It has very isolated populations in the western half of the Carpathian basin, in the north western edge of its area, contrary to Transylvania, where it is relatively widespread (KIS 1960). In the eastern Cserhát a large population was detected, interestingly mainly in secondary and disturbed grassland habitats.

Leptophyes discoidalis, which is a Dacian faunal element with a very restricted distribution in the eastern part of the Carpathian Basin and the Balkans (KLEUKERS et al. 2010), is known from the eastern and north eastern part of Hungary (fig. 3). Until now, its western area limit was in Bükk Mts. (NAGY & RÁCZ 1996). It seems to be very rare in Cserhát, only one male and one female were found near Kozárd in the bushy part of a diverse calcareous grassland plot.

Poecilimon fussii has a Balkanian-Pannonian distribution and similarly to *Isophya modesta* it is widespread in Transylvania, while in Hungary and Slovakia it is rare. It was recently discovered in North Croatia as well (SZÖVÉNYI & PUSKÁS 2012). In Hungary it is known to be distributed in only few plots in the south west, in the Transdanubian Mountains and in the North Hungarian Mountains (fig. 2). In the eastern Cserhát it was found in a southern calcareous steppe slope and an abandoned vineyard with xero-mesic grassland vegetation near Buják.

Tettigonia caudata was relatively widespread in the Pannonian Basin decades ago, and could survive even in weedy rands or corn fields in agricultural landscapes. Presumably, due to the intensive chemical control and large homogenous lands used in agriculture, it mostly disappeared from Hungary, contrary to e.g. Eastern Austria, where it seems to be common nowadays especially in different corn fields and in their environment (ZUNA-KRATKY et al. 2009). In the last decade it was observed only very few times in Hungary (e.g. KENYERES & BAUER 2008, SZÖVÉNYI 2007), and it is also rare in Slovakia (KRIŠTIN et al. 2007). It was detected in a weedy cornfield bounded by oldfields and stepp like grasslands near Buják.

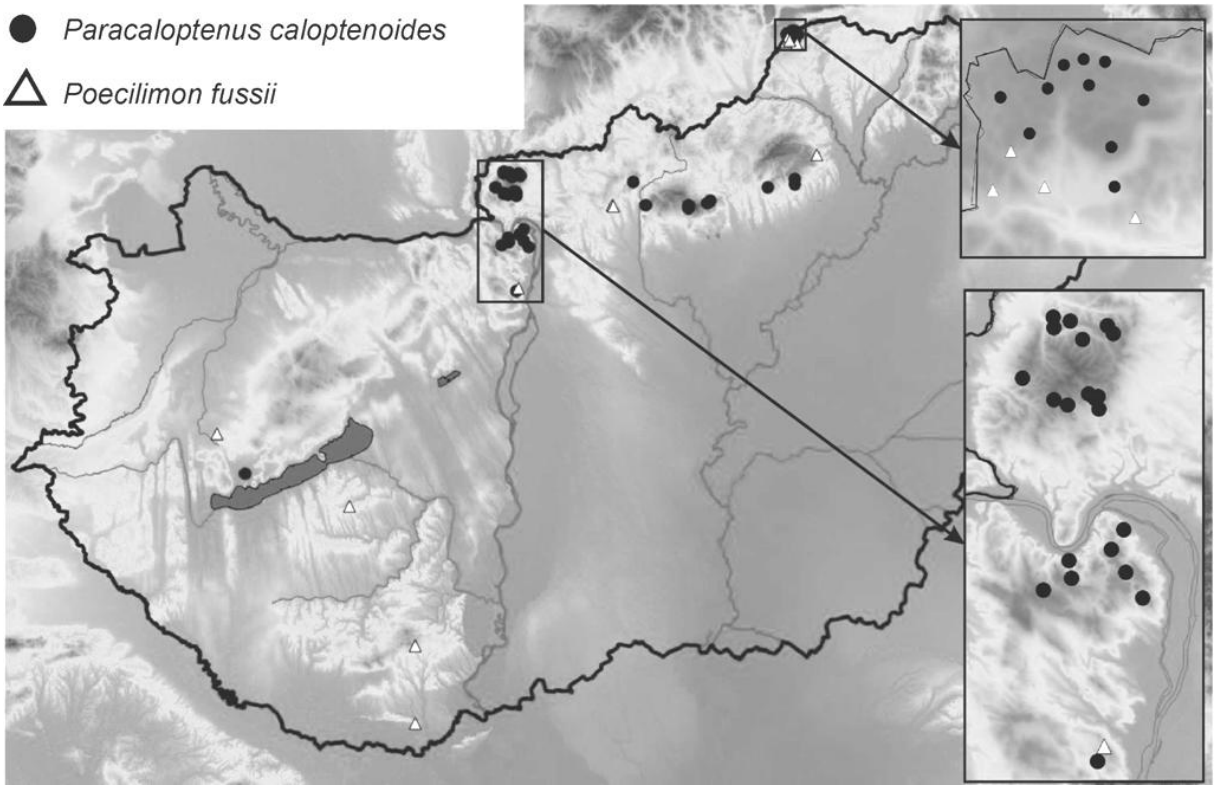

Figure 2: The known occurrences of *Paracaloptenus caloptenoides* (black circles) and *Poecilimon fussii* (white triangles) in Hungary (based on published and own unpublished data).

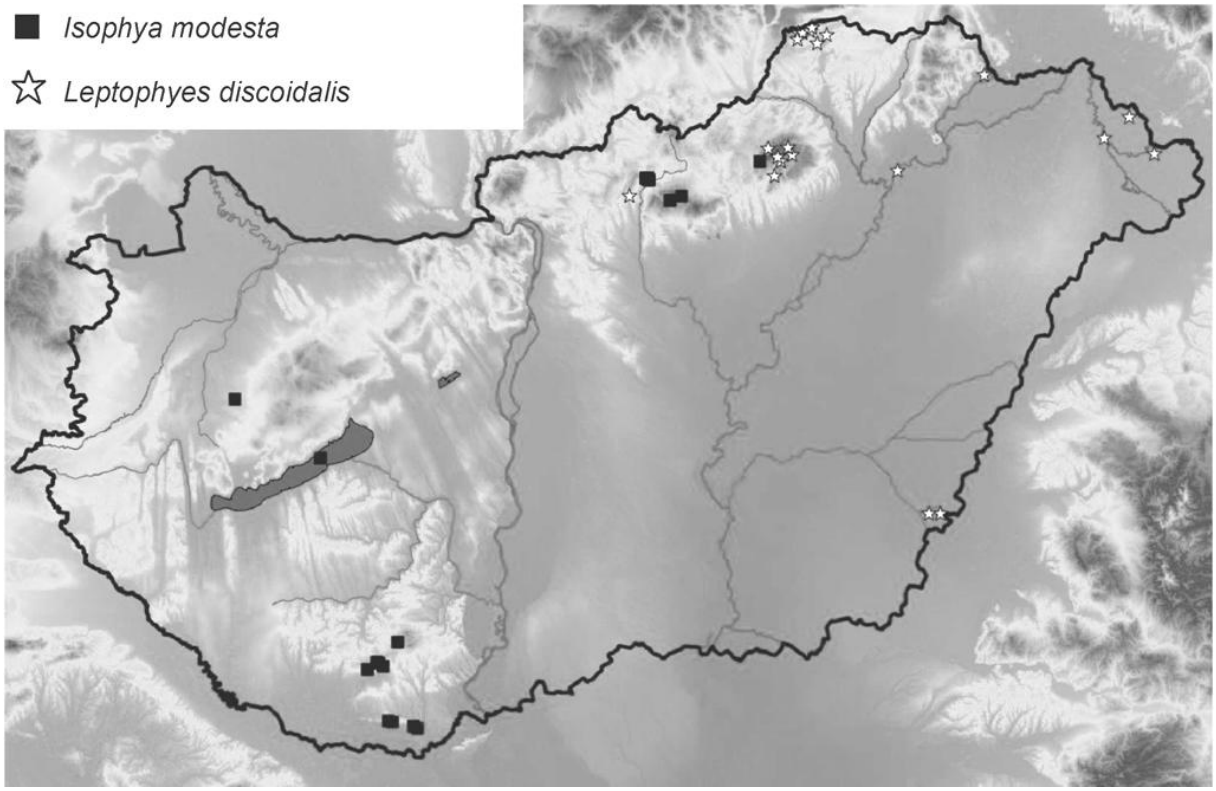

Figure 3: The known occurrences of *Isophya modesta* (black squares) and *Leptophyes discoidalis* (white asterisks) in Hungary (based on published and own unpublished data).

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