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Carnidae

Jindřich Roháček, Štěpán Kubík, Miroslav Barták

Introduction

This family is represented by 40 species in Europe and adjacent island areas, including Macaronesian subregion (39 species listed by Ozerov 2004, plus *Meoneura pseudoflavofacies* Papp, 1997 treated here as valid species); three genera and 21 species are currently known from the Czech Republic (Roháček 1997, 1999b). Larvae of all species are saprophagous and mostly develop in excrement or carrion. Some species are specialized either as copropagous or necrophagous, others are polysaprophagous, and can also be found on decayed fungi or vegetation (some *Meoneura* spp.). Adults usually occur on or near the breeding media of larvae, both in open (in pastures in particular) and woodland habitats, but can also be found on flowers (e.g. on umbellifers and *Crataegus* spp.). Several species are associated with bird's nests, e.g. *Meoneura neottiophila* Collin, 1930, *Meoneura prima* (Becker, 1903); *Carnus hemapterus* Nitzsch, 1818 has larvae developing in nest debris and adults feeding semiparasitically on skin secretions or even blood of nestlings. The biology and habitat of *Hemeromyia* species are largely unknown.

Four species of *Meoneura* are classified by Roháček (2005) as vulnerable species in the Czech Republic. One of them, *M. moravica* Gregor & Papp, 1981, was described from Podyjí NP (see below).

Four species of Carnidae were formerly recorded from Podyjí NP by Gregor & Papp (1981), viz. *Meoneura freta* Collin, 1937, *M. hungarica* Papp, 1977, *M. triangularis* Collin, 1930 and *M. moravica*, the latter described as a species new to science, all from Vranov nad Dyjí.

List of species

Hemeromyia longirostris Carles-Tolrá, 1992. Probably a South European species, hitherto only recorded from Spain, Croatia (Ozerov 2004) and Hungary (Papp 2003) but plausibly more widespread in the area, because some of the former records of *Hemeromyia remotinervis* (Strobl, 1902) probably also refer to this species (L. Papp, pers. comm. 2004). The biology of *H. longirostris* is unknown; the holotype was caught on the flower of *Achillea filipendulina*. Because of great rarity and probable northern limit of occurrence, this thermophilous species is suggested to be treated as vulnerable in the Czech Republic. Locality data: Pod Šobesem, 270 m, meadow + floodplain wood, sweeping, 25.vii.2001 1m, M. Barták leg. First record from the Czech Republic and a new northernmost distribution limit.

Meoneura atoma Papp, 1981. Hitherto only known from Switzerland, Austria and the Czech Republic; in the latter it was reported from three localities in Bohemia (Roháček 1996). Although originally described from the Alps, it does not seem to be restricted to montane altitudes. This is also demonstrated by new records from Podyjí NP. Habitat preference of *H. atoma* has not been determined owing to scarce previous records. Adults were swept from vegetation, caught in *Crataegus* flowers or collected by means of baited fly traps (cf. Roháček 1996), in the study area most frequently in pan traps exposed in steppe-heathland, forest-steppe and *Quercetum* forest. Localities in Podyjí NP: 1/01, 2/01, 5/01, 4/02, on dates ranging from March to August. The first records from Moravia.

Meoneura carpathica Papp, 1977. Probably a widespread European species. A common, frequent (in the Czech Republic), habitat and altitude tolerant species, adults of which can be found on flowering umbellifers as well as on excrement. In the study area it was chiefly found by means of pan traps on steppe or forest-steppe habitats. Localities in Podyjí NP: 1/01, 5/01, 4/02, sampled in March-June.

Meoneura exigua Collin, 1930. Temperate and South European species, in the Czech Republic only known from Bohemia (Roháček 1996). Probably a thermophilous and necrophagous species (most often caught in meat-baited traps). In Podyjí NP, a single male was caught in a Malaise trap in the locality Havraníky. Locality in Podyjí NP: 4/02; collecting date: July. The first records from Moravia.

Meoneura flavifacies Collin, 1930. Holarctic species, common also in the Czech Republic. It preferably occurs in open habitats (mainly on pastures) and seems to be predominantly coprophagous. It is infrequent in the study area due to the absence of suitable habitats. Localities in Podyjí: 4/01, 6/02. Sampling dates: June, August.

Meoneura freta Collin, 1937. Palaearctic species but hitherto recorded from only a few countries. It seems to be necrophagous-coprophagous and rather thermophilous. In the Czech Republic it was recorded from more localities in southern Moravia but from only one in Bohemia (Roháček & Barták 2001). Localities in Podyjí NP: 3/03; collecting date: July. Also recorded from Vranov nad Dyjí (Gregor & Papp 1981) and recently found in Havraníky (B. Mocek leg.).

Meoneura glaberrima Becker, 1910. Palaearctic species. It is uncommon in the Czech Republic but was recorded from both Bohemia and Moravia (formerly under the name *M. neglecta* Collin, 1930). It seems to be a polysaprophagous species occurring in a wide range of habitats. Localities in Podyjí NP: 1/01, 5/01. Range of dates: May to July.

Meoneura hungarica Papp, 1977. Probably Submediterranean species, known from central and southern Europe but also from northern Africa. In the Czech Republic it seems to be associated with steppe habitats and was caught by meat- as well as faeces-baited traps. It was not registered during the present study but was recorded from Podyjí NP by Gregor & Papp (1981: Vranov nad Dyjí).

Meoneura minutissima (Zetterstedt, 1860). Temperate and North European species. This probable coprophagous species is infrequent and never abundant in the Czech Republic, hitherto only recorded from Moravia. Its habitat demands are little known; it can occur at various altitudes. Localities in Podyjí NP: 6/02. Collected in July.

Meoneura moravica Gregor & Papp, 1981. Little known species. It was described from Podyjí NP based on two males and since only recorded from Spain. Most probably, *M. moravica* is of South European or Mediterranean origin. The type specimens were collected in fly traps baited by human faeces in the valley of the Dyje river (Gregor & Papp 1981). Because of its general rarity and thermophilous associations with steppe habitats, it was classified as a vulnerable species (Roháček 2005). Localities in Podyjí NP: Vranov nad Dyjí-Podhradí (type locality), see Gregor & Papp (1981).

Meoneura neottiophila Collin, 1930. West Palaearctic species (hitherto unrecorded from N. Africa), common also in the Czech Republic. It seems to be predominantly necrophagous but was also recorded from decaying fungi, reared from bird nests and caught in muddy pools of wild pigs (Roháček 1996). In Podyjí NP its was only caught in meat-baited emergence traps. Locality in Podyjí NP: 8/04. Sampling dates: May-July.

Meoneura pseudoflavifacies Papp, 1997. Only known from Austria, Switzerland, Czech Republic and Slovakia (Roháček 1999b). Ozerov (2004) overlooked the latter paper and treated the taxon as a subspecies of *M. carpathica* (as originally described) and listed for Austria only. However, Roháček (1999a,b) elevated this taxon to species status because it was found to live syntopically with *M. carpathica* in Slovakia. This is now also confirmed in Podyjí NP where both species were collected in the locality 1/01. Habitat preferences of *M. pseudoflavifacies* are not known, but it seems to be an altitude tolerant species associated with open biocoenoses. Localities in Podyjí NP: 1/01, 3/01. Collecting dates: May-June, August.

Meoneura triangularis Collin, 1930. Holarctic species, infrequent in Central Europe including the Czech Republic. Adults were found in traps baited both by meat and excrement but also on flowers (cf. Roháček 1996), both in open and woodland habitats, which is also true for the study area. Although formerly unrecorded from Podyjí NP, it was reported from close vicinity (Únanov nr. Znojmo – Gregor & Papp 1981). Localities in Podyjí NP: 1/01, 2/01, 5/01, 1/02. Sampled in March-July.

Meoneura vagans (Fallén, 1823). Holarctic species, in Europe not found southerly to Hungary. It is frequent in the Czech Republic, relatively eurytopic and probably widely saprophagous (necrophagous-coprophagous) as larva. It was recorded from the vicinity of Podyjí NP, from the same locality as the former species (Gregor & Papp 1981). Localities in Podyjí NP: 4/01, 1/02, 6/02, on dates ranging from March to June and August.

Discussion

Altogether 14 species (i.e. 63.6 % of the Czech fauna now containing 22 species) have been recorded from Podyjí NP. The regional fauna can be analysed biogeographically only insufficiently because the distribution of a number of carnid species is poorly known and it is formed by a mixture of various elements. Seven species (50 %) seem to be widespread in Europe (including 3 Holarctic, 2 Palaearctic, 1 West Palaearctic, 1 European species), the other may have more restricted distribution. One species is Temperate and North European, one Temperate and South European, two could be restricted to C. Europe (*M. atoma, M. pseudoflavifacies*) and three (21.4 %) are considered to be of South European, Submediterranean or Mediterranean origin (*H. longirostris, M. hungarica, M. moravica*). Thus, the local fauna contains a significant number of thermophilous elements having probable northern distribution limits in the study area. The records of *H. longirostris* (raising the number of Carnidae in the Czech Republic to 22 species) and of *M. moravica* [described from Podyjí NP by Gregor & Papp (1981) but not found during

our investigations] seem to be the most important. From the nature conservancy point of view these species are also significant because *M. moravica* was classified as a vulnerable species in the Czech Republic (Roháček 2005) and for *H. longirostris* it is suggested here the same status. Interestingly, none of the species had higher frequency in the study area; the most frequent species (*M. atoma* and *M. triangularis*) were found in only four localities, and *M. carpathica* and *M. vagans* in three localities. The locality Havraníky with steppe-heathland habitat had the highest diversity (6 species), followed by the locality Liščí skála (4 species); four species were also recorded from Vranov nad Dyjí (Gregor & Papp 1981), but two of them (*M. hungarica* and *M. moravica*) were not found during recent biodiversity studies. In other localities no more than three species were registered. With respect to carnid species communities recorded in Podyjí NP, the most significant localities seem to be those inhabited by thermophilous and endangered species, i.e. Vranov nad Dyjí, Havraníky and Pod Šobesem.

In Podyjí NP higher number of species of Carnidae (14) were found than in the Pálava BR (11 species - Roháček 1999a) and much more than are known from the Bílina and Duchcov environs (8 species - Roháček & Barták 2001), but the Sörensen´s coefficients of similarity of these faunas with Podyjí NP are almost the same (56.0 % and 54.5 % respectively). This is caused by the fact that four species occurring in the Paláva BR, including two vulnerable ones associated with calcareous rocky steppes, were not found in Podyjí NP, the latter two due to absence of suitable habitats, although otherwise both areas host and share thermophilous species. On the contrary, the similarity of species spectrum found in the Bílina and Duchcov environs to that of Podyjí NP is only caused by shared widespread and common species. Both Podyjí NP and the Pálava BR seem to be equally important areas in terms of conservation because each hosts two vulnerable species (cf. Roháček 1999a).

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Milichiidae

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Introduction

The family is represented by nine genera and 43 species in Europe and adjacent islands (Carles-Tolrá 2004); in the Czech Republic 22 species belonging to seven genera have been known (Roháček 1997; Roháček & Barták 2001). Biology of Milichiidae is very diversified. The larvae are saprophagous and develop in various substrates, including decayed vegetation, wood detritus, bird's nests, nests of ants (many species are myrmecophilous) and other social insects, excrement and carrion (also of invertebrates). Adults of some species are commensalists of predatory insects, others can be collected on umbelliferous flowers or near the breeding media of larvae in a variety of open and forested habitats. Roháček (2005) classified one species of Milichiidae as endangered and 11 as vulnerable in the Czech Republic.

Only two species of Milichiidae have been recorded from Podyjí NP: *Milichia speciosa* Meigen, 1830 by Roháček (1985) and *Phyllomyza rubricornis* Schmitz, 1923 by Roháček (1996).

List of species

Desmometopa microps Lamb, 1914. Old World species, widespread in the Oriental, Afrotropical and southeastern Palaearctic Regions, also found (introduced recently ?) in central Europe. At present, it has become a common species in the Czech Republic and seems to substitute the formerly most frequent *Desmometopa sordida* (Fallén, 1820). Adults often occur on flowers like other *Desmometopa* species. Localities in Podyjí NP: 1/01, 1/03, 5/04 from July to September. Also swept in steppe near Havraníky (B. Mocek leg.)

Desmometopa sordida (Fallén, 1820). Holarctic species, common also in the Czech Republic. Larvae are polysaprophagous and adults can often be found on flowering umbellifers on meadows and other open habitats. Locality in Podyjí NP: 4/02; sampled in August. Also swept in steppe near Havraníky and in the forest-steppe in Čížov-Hardecké stráně (B. Mocek leg.)

Leptometopa latipes (Meigen, 1830). Cosmopolitan species, frequent in the Czech Republic. Its larvae are saprophagous-coprophagous and develop in nests of birds, manure and other debris. The species is habitat tolerant and often also occur in anthropogenous biocoenoses. Localities in Podyjí NP: 1/01, 2/01, 5/01, 4/02, 1/04. Collecting dates: March-September.

Madiza glabra Fallén, 1820. Holarctic species, very common in the Czech Republic. Because often living in human settlements, it is considered partly a synanthropic species. Localities in Podyjí NP: 1/01, 4/02, 6/02, 5/04. Collecting dates: March-June, August-September.

Milichia ludens (Wahlberg, 1847). Temperate and North European species. It is infrequent in the Czech Republic and seems to be associated with well-preserved woodland areas. Its larvae are xylosaprophagous and develop in rotting tree stumps. In Podyjí NP, several specimens were also caught in emergence traps installed over rotting wood. In the Czech Republic it is classified as a vulnerable species (Roháček 2005). Localities in Podyjí NP: 5/01, 1/03, 2/03, 1/04, 5/04. Sampling dates: April-August.