

Diptera reared from nests of *Vespa crabro* in Hungary

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**Diptera reared from nests of *Vespa crabro* in Hungary** — 8225 dipterous specimens of 19 species were reared from two *Vespa crabro* nests collected in the Börzsöny Mts (central N Hungary). Several species were found for the first time in this type of microhabitat.

**Key words:** Diptera, larval medium, nests of Hymenoptera, *Vespa crabro*, Hungary.

In the course of the project “Dipterous guilds of the small sized feeding sources in Hungarian low mountains” we were to collect a greater number of data on the species composition and frequencies of the guilds on small-sized sources by regular samplings and by simple but safe methods.

One of our aims was to make an estimation: what is the contribution of those guilds feeding on small-sized sources to the species richness of the forest ecosystems?

Some of the sampling sites were selected in low mountain forests also in the Börzsöny Mts (central North Hungary: Szendehely: Keskenybükki-patak valley and forests around it, Szokolya: Kő-hegy, above the Les-völgyi-patak valley and other sites). Among others, two *Vespa crabro* nests were found in this area, one of them early in 1997 and another one in 1999 (nests detected in late summer of the previous year), whose debris was transferred into laboratory vessels and adult flies were reared out in the laboratory at  $20 \pm 1^\circ$ . Their data and short description are as follow.

**Nest No. 1:** Szendehely: Nagy-rét, February 9, 1997. Wild plum tree on the edge of a forest clearing, an old hollow cracked at its upper part (originally made by *Dendrocopos major*) at a height of 1.80 to 2.20 m. The outer diameter of tree at the hollow was 26 cm, diameter of the hollow was 15 cm; it was cut out in its entire height and the hornet's nest with the debris beneath to a depth of 20–21 cm (ca. 4 litres) were taken and transferred into a laboratory vessel (10 l). Altogether 1295 dipterous flies of 16 species were reared.

**Nest No. 2:** Szokolya, Kő-hegy, January 31, 1999. An X-shaped oak tree, i.e. with two trunks and two main roots, slightly domed between the two trunks, this dome and all the four parts are hollowed both underground and above ground; the entrance hole was on ground amidst of that X (slightly larger than a mouse-hole otherwise). The volume of the hollow was ca. 20 litres, which was half filled with wood debris, particles of hornet's nests and acorns collected by mice. Wasps nested there in two consecutive years, and, later in the autumn *Apodemus* mice must have lived there. About the half of that content,

i.e. 9–10 litres of material was collected and transferred into the laboratory in three vessels, 10 litres each. Altogether 6930 specimens of 15 species were reared.

The vessels were amplified by a photoelector-type head but dead adults were also collected by an aspirator when cover was removed while watering the material.

Diptera species	<i>Vespa</i> nests	
	No. 1	No. 2
<i>Tinearia alternata</i>	0	1
Cecidomyiidae sp. 1	12	3
Cecidomyiidae sp. 2	56	0
<i>Lycoriella cellaris</i>	429	6017
Sciaridae sp.	3	5
<i>Coboldia fuscipes</i>	25	200
<i>Drapetis assimilis</i>	10	1
<i>Megaselia</i> sp. 1–3	143	sp.1–2 2+9
<i>Eccoptomera obscura</i>	0	75
<i>Tephrochlamys tarsalis</i>	7	119
<i>Gymnochiromyia inermis</i>	0	1
<i>Telomerina flavipes</i>	1	0
<i>Phyllomyza longipalpis</i>	6	187
<i>Desmometopa sordida</i>	44	219
<i>Fannia aequilineata</i>	4	0
<i>Fannia scalaris</i>	99	28
<i>Potamia littoralis</i>	456	63
Total of 19 species	1295	6930

Nests are well-known breeding media for several groups of dipterous flies, including wasps nests, or somewhat more widely, nests of the social Hymenoptera. The literature is rather rich also on them (see e.g. in Ferrar (1987)), so below only a limited number of works is mentioned.

Ferrar (1987) summarizing data on life habits of flies tabulated “Commensal associations of larvae of Cyclorrhapha”, where the following families are shown as breeding in nests of wasps (families, whose representatives were found also in this study are italicized): *Anthomyiidae*, *Chloropidae*, *Fanniidae*, *Heleomyzidae*, *Muscidae*, *Phoridae*, *Sarcophagidae*, *Sphaeroceridae*, *Syrphidae*. In his Text-figure 8 (analysis of breeding media of Diptera Cyclorrhapha) “Nests” are originated from “Detritus” (and the latter one from the “Original medium” of rotting vegetable matter). Indeed, most of the species reared now are expected to develop in detritus materials of the nests.

In 1997 adults emerged were taken from the vessel in every second day, later once or twice a week. This way we can give some impression on the dynamics of emergence of the dominant-subdominant species. There were only the *Megaselia* species, which emerged within two weeks in the laboratory. The second phase is from ca. 16th–20th day

to the 40th day. Within this period the majority of the specimens of *Potamia littoralis*, *Fannia scalaris*, *Lycoriella cellaris*, Cecidomyiidae sp. 1, *Coboldia fuscipes* emerged. Finally, there is a third period from ca. the 40–42 day (seventh week), when Cecidomyiidae sp. 2 and *Desmometopa sordida* dominated the emerging adults, which were found in low numbers by that time. It is difficult and risky to say anything about the less abundant species but *Tephrochlamys tarsalis* seems to emerge in the intermediate period between the second and third ones, and *Drapetis assimilis* emerged in the last period.

Twelve species are common in the two lists, which is a rather high overlap (the value of the Jaccard-index is  $12/19 = 0.63$ ). Although the two nests were not very far from each other (less than five air kilometres), two samples are too few for any generalisation; so below only remarks according to the dipterous species are given.

**Tephrochlamys tarsalis** (Zetterstedt, 1847) (Heleomyzidae, or Heteromyzidae) was formerly known also from wasp's nests (Skidmore 1962). *Eccoptomera obscura* (Meigen, 1830) (Heleomyzidae) develops in small mammal burrows as well as in caves. Since *Apodemus* mice were active in the hollow No. 2, their emergence is not a surprise.

New records from wasp's nests are for the following species: *Tinearia alternata* (Say, 1824); *Coboldia fuscipes* (Meigen, 1830) (very common in sporophores of fungi); *Drapetis assimilis* (Fallén, 1815), *Gymnochyromyia inermis* (Collin, 1933) (*G. flavella* (Zetterstedt, 1848), as *G. minima* (Becker, 1904), was reared from elm wood debris in Britain, see Perry and Stubbs (1978)); *Telomerina flavipes* (Meigen, 1830) (regarded as a predominantly necrophagous species but develops also in various excements and found also in burrows of small mammals and birds (Roháček 1983)); *Phyllomyza longipalpis* (Schmitz, 1924) (an extremely rare species found now in high numbers); *Desmometopa sordida* (Fallén, 1820) (numerous records from rotting vegetable material and dung, incl. my own data (Papp 1992); *Fannia aequilineata* Ringdahl, 1945 (known to breed in dung, in nests of birds (Lyneborg 1970) but also from tree holes with rotting wood (Skidmore 1973)).

**Lycoriella cellaris** (Lengersdorf, 1934) has not been recorded from wasp's nests either. Buck *et al.* (1997) reared numerous specimens from beef baits, other records are from cellars and on rotting vegetable material; they regard this species as "eurytopic saprophage" together with the other necrophagous sciarids they found in their rearing experiments. Buck *et al.* (1997) think the larvae probably feed on fungal mycelia. This species is new for the Hungarian fauna.

**Fannia scalaris** (Fabricius, 1794) larvae are very polyphagous (see Ferrar 1987: Table 34.1). *Potamia littoralis* Robineau-Desvoidy, 1830 is one of the commonest forest species breeding in birds nests in hollows (e.g. Skidmore 1965) – reared from them several times also by me –, but known also from nests of social Hymenoptera (Ferrar 1987: Table 51.2).

Unfortunately, no comparison can be made for the Cecidomyiidae species and for the *Megaselia* species, since they were not actually identified.

To sum it up, one can say that an extremely high number of flies of medium diversity (19 spp.) were reared from the two hornet's nests. Four litres of hollow medium produced 1295 dipterous specimens, while 9–10 litres in the other nest was a medium for 6930 flies. These data may contribute to a more realistic image of the abundance of the forest flies. Nests of social Hymenoptera are among those small-sized feeding sources, which maintain a high diversity of forest flies, although the forest plants and litter themselves are media for a limited number of species.

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