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Hyles vespertilio (Esper, 1779), new to the Lepidoptera fauna of Hungary (Lepidoptera: Sphingidae)

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Abstract – A female *Hyles vespertilio* (ESPER, 1779) was collected at light at a limestone quarry at Fertőrákos (NW Hungary) on 7th June 2004. This species is new to the Hungarian Lepidopteran fauna. The authors also found two caterpillars (L3 instar) on *Chamaenerion* (*Epilobium*) *dodonaei* on 8th July 2004; one female imago emerged from the resulting bred pupae on 6th August 2004. This indicates that at Fertőrákos *H. vespertilio* has a second partial-to-full generation. It is still not known if *H. vespertilio* has a permanent population at Fertőrákos or if those found were the offspring of a migrant. One dubious earlier record is known from Hungary (forestry light trap, Kecskemét), but the specimen cannot be traced. All other 'Hungarian' records in earlier literature are from before 1914, from former parts of the Austro–Hungarian Monarchy (Zagreb, Rijeka, Karlovac in Croatia). In the recent faunal work on the Sphingidae of Hungary, it is mistakenly claimed that *Chamaenerion dodonaei* is not native to Hungary. However, this pioneer plant is widespread on warm rocky slopes, abandoned limestone and rubble-strewn mines and river banks in western Hungary. Other isolated populations of *H. vespertilio* may be found where this foodplant occurs.

Key words – Fertőrákos, Hungary, Sphingidae, *Hyles vespertilio*, *Chamaenerion dodonaei*.

INTRODUCTION

Until 2004, *Hyles gallii* (ROTTEMBURG, 1775) and *Hyles euphorbiae* (LINNAEUS, 1758) were the only confirmed resident members of the genus *Hyles* HÜBNER, [1819] known from Hungary. *H. euphorbiae* is common and widespread, while *H. gallii* is mainly restricted to wetlands, though it can be found in high numbers in some localities. *Hyles livornica* (ESPER, 1779) is a subtropical or

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Mediterranean migrant to Central Europe, including Hungary (VOJNITS *et al.* 1991). In some years it is common during the summer months in southern Hungary (SÁFIÁN & MALGAY 2004).

PITTAWAY (1993) alludes to the possibility of finding *Hyles hippophaes* (ESPER, [1793]) in Hungary based on the widespread occurrences of its foodplant (*Hippophae rhamnoides*).

In earlier entomological literature *Hyles vespertilio* (ESPER, 1779) is also recorded from Hungary, but these records refer to former Hungarian parts of the old Austro–Hungarian Monarchy; these localities are in modern-day Croatia (Zágráb = Zagreb, Fiume = Rijeka, Károlyváros = Karlovac) (ABAFI-AIGNER *et al.* 1896, ABAFI-AIGNER 1907).

There is only one (dubious) record of *H. vespertilio* from within the present boundaries of Hungary. This led to this species being added to the Hungarian species list in brackets in the comprehensive book on the hawk-moth fauna of Hungary by VOJNITS *et al.* (1991). The specimen was found in a pest monitoring light-trap at Kecskemét in the 1960s but, unfortunately, this individual has gone missing (L. RONKAY, *pers. comm.*). In the latest faunal work on Hungarian Sphingidae (BÁLINT *et al.* 2002) *H. vespertilio* is not listed.

In 2004, the addition of *H. vespertilio* to the Hungarian fauna was confirmed by the authors.

GENERAL DESCRIPTION OF THE SPECIES

A detailed description of the imago of *H. vespertilio* is given, in Hungarian, by VOJNITS *et al.* (1991). Images of the imago also can be found in the Hungarian literature (ABAFI-AIGNER 1907), but no larval description has been given.

Morphological description of the larva – Stages L1–L2. The freshly hatched larva is 3–4 mm in length. The body is naked and light green in colour, with lighter whitish-green, longitudinal, subdorsal and spiracular bands. The head and both the thoracic and abdominal legs are also light green. There is no anal horn.

Stage L3. With the second moult the larva changes in both colour and patterning. The body becomes light grey (or rarely olive green) with a pattern of smaller and larger dark greyish maculae. The subdorsal bands are pinkish with a row of orange spots (one per segment) except the prothoracic shield and the head. The spiracular bands are also whitish-pink with orange spots. The stigmas are small and grey. Laterally, the abdomen and prolegs are flesh-coloured; the head is greenish-grey, the labrum, the antennae are bright green and the mandibles are black (Fig. 1). The size is 30–35 mm.

After the third moult the larva acquires its final coloration and patterning. The body becomes gleaming pinkish-grey with a dark grey or pink coloured head. The subdorsal bands are interrupted by pink, round shaped, black-encircled eye-spots, except on the anal segment, where the spots are elliptical. Dorsally, there is a network of fine blackish lines of variable width and scale. Even wholly blackish caterpillars can be found. Laterally, the abdomen and legs are usually pinkish, the spiracular bands are lighter or missing. The spiracles are darker grey or light brown encircled by a black line. The anal horn is missing. The size of a full-fed larva is 70–75 mm.

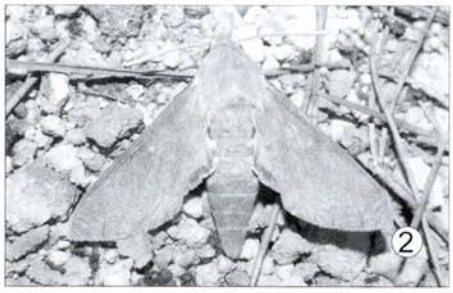
Distribution and biology – Hyles vespertilio belongs to the Mediterranean /Holomediterranean/ Western Asiatic faunal type (VARGA *et al.* 2005). Its distribution is essentially bi-centric, and restricted to the Western Palaearctic. Although widespread in south-eastern and central Europe, it is rarely found north of the Alps, though it reaches Slovakia and the southern Czech Republic and Poland in the north via eastern Austria. It is common in Slovenia, Croatia and Italy. Eastern and south-eastern France is the westernmost range of *H. vespertilio*. There is also a geographically separate but large population in Asia Minor and Middle East, from Turkey, through the Caucasus, Iraq and Iran up to South Russia. In the high mountains of Lebanon there is a further isolated population.

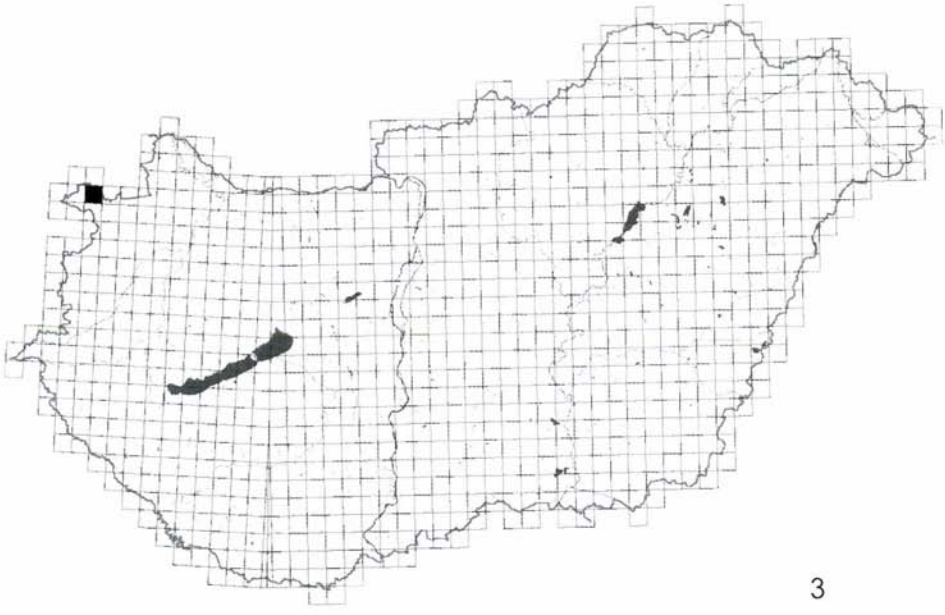
H. vespertilio occurs in hot and dry habitats, like south-facing gravel-slopes or bare mountain slopes, south-facing hot valleys, and river banks, where its primary foodplant, *Chamaenerion* (*Epilobium*) *dodonaei* (VILLARS) HOLUB = *angustissimum* (GRAUER) SOSN. grows. There are several minor foodplants, such as *Epilobium*, *Oenothera* and *Galium* species. It is an altoherbosa (tall-forb) faunal component (VARGA *et al.* 2005).

According to PITTAWAY (1993), *H. vespertilio* is not a regular migrant species like other members of the *Hyles* genus. Isolated colonies can be well demarcated within its range. In most southern Europe and in Hungary it is a bivoltine species (May–June and August–September), but populations with but one generation are reported from the higher mountains of southern Europe (Bulgaria).

The imago is active during the night. In the daytime it usually sits on the ground or hides among rocks or stones. Females, like other hawk-moths, lay their eggs singly or sometimes in pairs on the foodplant, but sometimes on stones next to it. The young larvae usually feed on the flowers or rest between the lower leaves of the foodplant. More mature caterpillars feed during the night and rest among stones on the ground by day. Caterpillars can be found in June-July and September and pupate among stones or in the ground just under the surface without spinning a cocoon. The pupa is light brown, very similar to that of *H. euphorbiae*.

Natural hybrids between *H. vespertilio* and *H. hippophaes* (*H. hippophaes* ♂ × *H. vespertilio* ♀ = *H. 'vespertilioides'*) have been reported from south-eastern France and Switzerland. The caterpillars of such hybrids are like *H. hippophaes* and bear a horn on the last segment, but feed on *Ch. dodonaei*. The adults are morphologically intermediate between the two species (Lepidopterologen-Arbeitsgruppe 1997, PITTAWAY 1997).





Figs 1–3. 1 = The first caterpillar (L3 instar) of *Hyles vespertilio* collected at a limestone mine at Fertőrákos (photo T. HADARICS). 2 = The first Hungarian specimen of *Hyles vespertilio* (Hungary, Győr–Moson–Sopron County, Fertőrákos limestone, 07.VI.2004 leg.: SZ. SÁFIÁN & T. HADARICS) (in coll. HNHM, Budapest) (photo SZ. SÁFIÁN). 3 = The locality of the first known population of *Hyles vespertilio* in Hungary.

The first known occurrences of *Hyles vespertilio* in Hungary

About midnight on 7th June 2004 a worn female of *H. vespertilio* came to a 125 W mercury-vapour lamp at an abandoned limestone quarry at Fertőrákos (Fig. 3). The specimen was sitting on the ground at the edge of the lit area. Photographs were taken of this first Hungarian specimen (Fig. 2), which was then deposited in the Lepidoptera Collection of the Hungarian Natural History Museum (locality: Hungary, Győr–Moson–Sopron County, Fertőrákos limestone; 47°43'53.371"N, 16°38'41.622"E; 07.VI.2004, leg.: SÁFIÁN, SZ., HADARICS, T.).

At first it was thought that it represented a vagrant specimen carried by the wind into Hungary, since the locality is only about 1 km from the Austrian border. Nevertheless, a study of the biology and ecology of the species indicated that the climate of the locality was very similar to that of known sites farther south. The hills in the vicinity of the village of Fertőrákos (Fertő-melléki Hills) are south-facing, short grassed, open, rocky-steppes on a Miocene "lajta-limestone" foundation. Nowadays, only small patches of this natural plant community can be found; however, there are huge man-made open limestone flats around Fertőrákos due to previous limestone mining, which was started in the late Roman Age. These large white areas of pure limestone reflect solar radiation to such an extent that the area gets extremely hot in summer. The meso-climate of these limestone mines is probably much warmer than the surrounding areas, which are covered by soil and close vegetation.

After these mines were abandoned they were colonised by plants but, probably due to good drainage and excessive summer heat, little soil developed for decades and only open grasslands were initially formed here. Many thermo-xerophilus plant species characteristic of limestone areas, like *Buphthalmum salicifolium*, *Jurinea mollis*, *Sanguisorba minor* are very common (KIRÁLY 2001). The pioneer species *Chamaenerion dodonaei* is also to be found in such habitats.

In the faunal work on Hungarian Sphingidae cited above (VOJNITS *et al.* 1991), the foodplant of *H. vespertilio* (*Epilobium dodonaei*) is treated as a non-native plant for Hungary. The possible reason for this mistake was probably that Hungarian floral works used to use the name *Chamaenerion angustissimum* (SOÓ & KÁRPÁTI 1968). To avoid further confusion it is worth noting that other synonyms for *Ch. dodonaei* were used in different works. The first faunal work on Lepidoptera by ABAFI-AIGNER (1907) used two names (*Chamaenerium palustre* = *Epilobium rosmarinifolium*); and *Chamaenerion palustre* is used in the Iconographia of the plants of Central Europe (JÁVORKA & CSAPODY 1991). According to SIMON (2000), the current valid name of the foodplant is *Chamaenerion dodonaei* (VILLARS) HOLUB.

Known localities for *Ch. dodonaei* in Hungary are: Zemplén Hills, Börzsöny Hills, Buda Hills, Tétény Plateau, Gerecse Hills, Velence Hills, Bakony Hills, Balf Hills, Szigetköz (BARTHA 1999). Fertőrákos lies in the Balf Hills, where *Ch. dodonaei* can be found at high densities around limestone and gravel quarries. Nationally important populations of this plant grow here (FRANK *et al.* 1998). *Ch. dodonaei* was found close to the lamping place, so the possibility of *H. vespertilio* breeding locally was suspected.

On the 8th of July 2004, during systematic examination of *Ch. dodonaei* plants at the limestone mine of Fertőrákos, two L3 instar caterpillars were found. One died after some days and has been placed, as a voucher specimen, in the Lepidoptera Collection of the Hungarian Natural History Museum. The other caterpillar pupated on 20th of July 2004 and the first verified Hungarian bred specimen of *H. vespertilio* emerged on 6th August 2004 (in coll. SÁFIÁN).

Although larvae of *H. vespertilio* were also sought at other limestone and gravel mines in the vicinity of Fertőrákos, none were found in 2004. Other, *vespertilio*-like light green caterpillars with whitish longitudinal stripes were collected from *Ch. dodonaei*, but these all proved to be of *Proserpinus proserpina* (PALLAS, 1772).

The occurrence of *Hyles vespertilio* at this locality raises further questions. Could the specimens found be the result of range expansion or the result of a vagrant finding an optimal habitat to lay some eggs, i.e. a small colony developing from one parent? Could this colony become permanent or will it become extinct within a few years? It is also possible that this isolated colony has existed for centuries because old records prove that *Ch. dodonaei* has been present locally for a long time at high densities (GOMBOCZ 1906, SZONTAGH 1864).

Further surveys of the species are needed because the size and stability of the population are still unknown.

There is a possibility of other colonies existing in places where the foodplant occurs. In the Bakony Hills, at an abandoned limestone quarry, there are tens of thousands of individuals of *Ch. dodonaei*, but *H. vespertilio* has yet to be found there.

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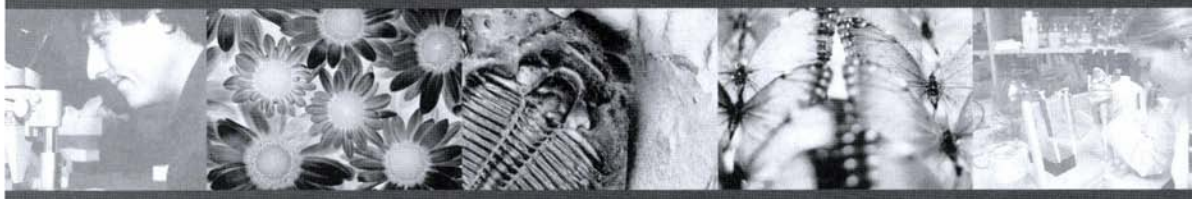

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