Published October 31, 2001

Klapalekiana, **37**: 49-52, 2001
ISSN 1210-6100

A record of *Pyrausta coracinalis* (Lepidoptera: Pyralidae) from Bohemia and several considerations on the alpine insect element in the Bohemian Karst

Nález zavíječe *Pyrausta coracinalis* (Lepidoptera: Pyralidae) v Čechách a několik úvah o alpinském hmyzím prvku v Českém krasu

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Biogeography, Lepidoptera, Pyralidae, *Pyrausta coracinalis*, Bohemian Karst, alpine element, dealpine distribution

Abstract. A female of the alpine pyralid moth, *Pyrausta coracinalis* Leraut, 1982 was recently captured on a limestone slope above the village of Svatý Jan pod Skalou in the Bohemian Karst, representing a further representative of the alpine faunistic element in this territory. Its presence there is discussed. It is the first record of this species north of the Alps and the first reliable record from the Czech Republic.

On July 25, 1999 a female of the pyralid *Pyrausta coracinalis* Leraut, 1982, was swept from herbaceous vegetation on a slope above the village of Svatý Jan pod Skalou (6050) (D. Povolný leg.) in the Bohemian Karst near Prague. The above habitat ("Dlouhá stráň" or "Na Mramoru") is a south-facing rocky slope of a limestone cliff (fold) situated to the southwest (on the right shore) of the Kačák brook in a valley opposite to the "Skála" (or "U Kříže") rock with a wooden cross on its top. This area also supports a very local colony of *Phyllonorycter helianthemella* (Herrich-Schäffer, 1861), an overall endangered mining gracillariine moth (e.g. Gregor & Povolný 1950, Soldát & Starý 1978). Other remarkable species of diurnal Lepidoptera known from this habitat are also worth mentioning, such as the burnets *Zygaena osterodensis* (Reiss, 1921), *Z. ephialtes* (Linnaeus, 1767) including its famous polymorphic local population (Povolný 1999), *Z. carniolica* (Scopoli, 1763), the foresters *Rhagades pruni* (Denis et Schiffermüller, 1775), *Jordanita globulariae* (Hübner, 1793) and *Adscita geryon* (Hübner, 1813), the clearwing *Pennisetia bohemica* (Králíček et Povolný, 1974) endemic to the warmest parts of the Prague Basin and its adjacent valleys (Novák & Liška 1997), and the butterflies *Melitaea didyma* (Esper, 1761) and *Pyrgus carthami* (Hübner, 1813). The deep valleys of this area (especially under the neighbouring Koda Nature Reserve) are colonized by *Limenitis camilla* (Linnaeus, 1764) showing repeated high population densities (occasionally with hundreds of individuals) in July (Soldát 1978 and our own recent observations). These few examples characterize this habitat as a rather thermophilic (submediterranean) limestone association of Lepidoptera.

That situation contrasts with the unique phenomenon of the dealpine occurrence of several insects showing alpine or arctoalpine (boreomontane) distributional pattern. This fact was first discussed by Povolný (1989, 1993) after the discovery of two species of flesh-flies on limestone cliffs in this territory: *Heteronychia bezziana* (Böttcher, 1913) and *H. vicina* (Macquart, 1833). *H. bezziana* accompanies limestone habitats in the Alps (Switzerland, Italy, Bavaria, Austria,

Slovenia, Croatia), the Carpathians (Slovakia, Romania) and the Balkans (Bulgaria, Greece), and limestone cliffs in Scandinavia (especially in southern Norway and Sweden). *H. vicina* shows a similar distributional pattern, but its range also includes northern Caucasus and Abkhasia (cf. Povolný & Verves 1997). These two species were registered from rather low altitudes (about 360-450 m a.s.l.) in the Bohemian Karst (Povolný 1989, 1993) and from "Muschel-Kalk" formations in Thuringia, Germany (Herrenberg, Baropturm near Bad Blankenburg and Jenzig near Jena between 420-550 m a.s.l.) (see Povolný & Znojil 1990). These facts evidenced the dealpine occurrence of *H. bezziana* and *H. vicina* for the first time (Povolný 1993).

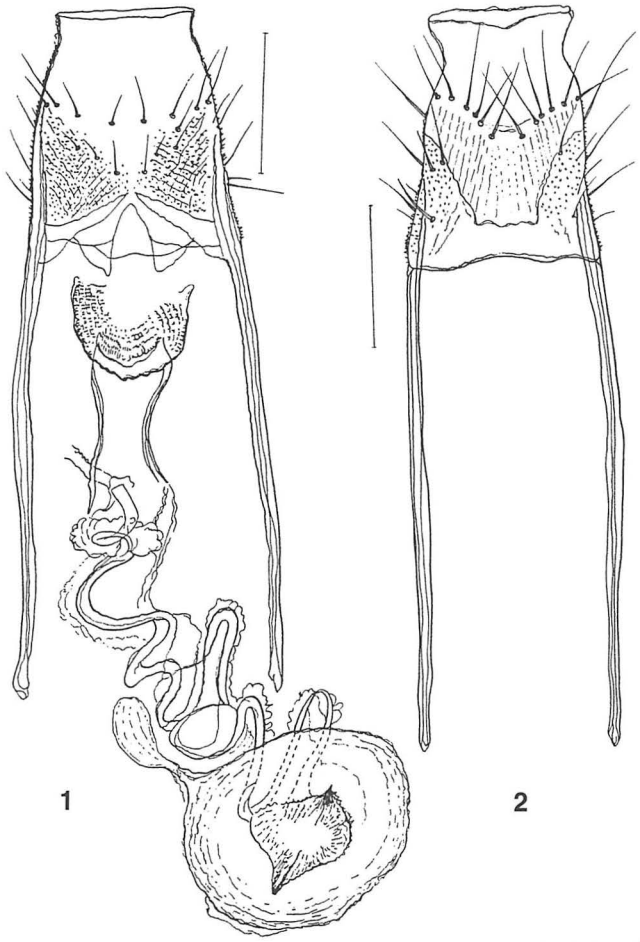
Similarly, Vávra (1999) registered two species of Lepidoptera with an essentially alpine distributional pattern, viz. *Kessleria alpicella* (Stainton, 1851) of Yponomeudidae and *Entephria nobiliaria* (Herrich-Schäffer, 1852) of Geometridae (see also Vávra et al. 2001), in the neighbourhood of Svatý Jan pod Skalou. Whereas *Kessleria alpicella* was rediscovered after 129 years (Nickerl 1894, Vávra 1999), the record of *Entephria nobiliaria* is new for Czech Republic, and Vávra (1999) suggested that additional alpine Lepidoptera might survive in the Bohemian Karst.

Pyrausta coracinalis Leraut, 1982 is thus the next representative of the alpine element in this territory. This pyralide is generally interpreted (e.g. Hannemann 1964, Slamka 1995) as a montane species inhabiting alpine meadows and bushy slopes in the Bavarian and Austrian Alps, some Hungarian mountains (Mátra Mts., Jósfavó) and the Romanian Carpathians. Hannemann (1964) writes: „Von den Bayerischen Alpen südwärts". The larva of *P. coracinalis* feeds on Lamiaceae. No records of this species are available from the western and northern Carpathians. This might indicate that the species should be absent from Slovakia and Poland. Wawerka (1911) and Janovský & Vaněk (1984) recorded this species (as *Pyrausta nigralis* Hübner, 1793) from the environs of Ostrava (Moravian Silesia), but no authentic specimens were available. It is obvious that this record was either erroneous, based on misidentified individuals (M. Janovský, pers. comm.), or on confused nomenclature (with *Pyrausta nigrata* auct. nec Scopoli, 1763).

The above female of *Pyrausta coracinalis* from the Bohemian Karst thus appears to be the first record of this species north of the Alps. Moreover, it was collected at an altitude of about 380 m a.s.l., whereas it lives at 900-2000 m a.s.l. (or higher) in the Alps and Balkans. The species identity is corroborated by the attached figure of its genitalia (Figs 1, 2), excluding the above misidentifications of this specimen and completing an authentic figure of the female genitalia of *P. coracinalis* in the literature. The specimen is preserved in the collection of J. Marek, Brno.

Historical considerations. The presence of at least five insect species of alpine distributional pattern in the Bohemian Karst also seems to coincide with the Lower Holocene history (Boreal or Preboreal Phase) of this area. At that time, the landscape was deforested and dominated by growths of *Sesleria*, which are also characteristic of the northern limestone zone of the Alps. There are indications that these formations might have communicated through some corridors in the southwestern part of the Bohemian Hercynicum. The common character of all these formations appears to be their Suboceanic trend of climate. The territory of the Bohemian Karst near Beroun shows comparatively low mean annual precipitations (about 500 mm) of Subatlantic phenology, being distributed up to late summer and keeping the otherwise dry limestone habitats slightly humid. This contrasts with the limestone territory of e.g. the Slovak Karst, with its 600 mm annual mean precipitation concentrated, however, to late spring, so that the second half

of the year becomes extremely dry. This is reflected in the Continental character of the flora and fauna of the Slovak Karst. During the later Holocene periods, especially during the so-called Atlantic phase, the territory of Central Europe began to become forested, but warm enclaves, such as the Bohemian Karst with its limestones (similarly as the Northern Limestone Alps), have preserved their deforested character. This enabled ancient Holocene formations to survive, including at least some members of their floristic and/or faunistic element. This also involves the very steep and shady north-facing slopes of the canyons with individual trees or shrubs but without a continuous forest stand found in the Bohemian Karst. The dealpine occurrence of the above members of the alpine faunistic (and floristic) element appears to represent the survivors of early Holocene landscape (see also Povolný 1993).



Figs 1-2: *Pyrausta coracinalis* Leraut. 1 - eighth sternite, sterigma, ductus bursae, bursa with signum; 2 - eight tergite of female. The bars correspond to 0.25 mm.
Obr. 1-2: *Pyrausta coracinalis* Leraut. 1 - osmý sternit, sterigma, ductus bursae, bursa se signem; 2 - osmý tergit samice. Úsečky odpovídají délce 0,25 mm.

ACKNOWLEDGEMENTS. The authors wish to express their gratitude to Professor Dr. Zdeněk Laštůvka, Department of Zoology and Apiculture, Mendel University of Agriculture and Forestry, Brno, and Dr. Vojen Ložek, Prague, for critical comments on the manuscript and for additional information. Ing. Dr. Radoslav Obrtel, Brno was helpful with critical reading of the text.

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SOUHRN

Po nedávném potvrzení dealpinního výskytu horské předivky *Kessleria alpicella* (Stainton, 1851) a horské píďalky *Entephria nobiliaria* (Herrich-Schäffer, 1852) v okolí obce Svatý Jan pod Skalou v Českém krasu (Vávra 1999, Vávra et al. 2001) je nedávný nález zavíječe *Pyrausta coracinalis* Leraut, 1982 tamtéž (D. Povolný leg., coll. J. Marek) již třetím horským motýlem, který zde byl objeven. K témuž dealpinnímu výskytu se v Českém krasu řadí také přítomnost horských masařek *Heteronychia bezziana* (Böttcher, 1913) a *H. vicina* (Macquart, 1833), které tu byly poprvé pozorovány v osmdesátých létech (Povolný 1989, 1993). Oblast vápenců Českého krasu tak nabývá na významu nejenom jako známé útočiště poměrně teplomilného hmyzu, nýbrž zároveň jako izolovaná ostrovní enkláva dealpinního výskytu alpsko-karpatského horského prvku. Je možné, že tyto rostlinné formace a někteří jejich hmyzí průvodci tu přežívají jako zbytky staroholocénní krajiny. Tyto faunistické objevy podněcují další studium zřejmě nedostatečně známé a jedinečné stránky života hmyzu (možná i dalších bezobratlých) tohoto území.