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Notes on bionomics of *Kessleria alpicella* (Lepidoptera: Yponomeutidae), with confirmation of its occurrence in Bohemia

Poznámky k bionomii druhu *Kessleria alpicella* (Lepidoptera: Yponomeutidae) a potvrzení jeho výskytu v Čechách

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Abstract. *Kessleria alpicella* (Stainton, 1851) has been found in association with its host plant *Saxifraga paniculata* Miller in the Český kras (= Bohemian karst) protected landscape area in central Bohemia. The larva is a leaf miner that hides among withered ground leaves of the host plant. Larvae of the first generation probably live from August to April. Their development continues at low temperatures during autumn and winter. Adults emerge in May within two weeks of pupation. Larvae of the second generation live from June to July, and adults emerge at the end of July and in August. The finding near the village Svatý Jan pod Skalou confirms the occurrence of *K. alpicella* in Bohemia 129 years after the first record and represents the lowest altitude (280 m a.s.l.) so far known for this mountain moth species.

Kessleria alpicella (Stainton, 1851) was first mentioned from Bohemia by Nickerl (1894: 18) as *Swammerdamia alpicella* H. S. without further details. Sterneck & Zimmermann (1933: 81) referred under the same name to the same specimen by "St. Iwan e. l. 30. April, 1868, 1 Stück aus *Saxifraga aizoon* erzogen". The locality name probably denotes the Svatý Jan pod Skalou village (grid mapping square code 6050) in the Český kras karst in central Bohemia.

During a field work conducted with the permission of the Ministry of Environment of The Czech Republic, I have found a number of *Saxifraga paniculata* Miller plants with grey leaf mines within their rich population on hardly accessible, northward exposed cliffs near the village Svatý Jan pod Skalou on 9.ix.1997. The locality could be identical with or very close to the place where Ottokar Nickerl colected his specimen. The mined leaves of the infested plants were tied by a whitish silk network with entangled dead ground leaves. About 3 mm long, olive-green caterpillars actively moved inside the silk. It is obvious that the larvae of *K. alpicella* are miners that use silk network as a shelter.

Twenty infested plants were taken for laboratory breeding. The caterpillars grew in the laboratory during the first month until they reached a size of ca 7 mm. They subsequently hid in the silk among the dead ground leaves and were prepared for hibernation as I have verified by a disassembly of some leaf formations. The caterpillars were then placed into a container and exposed to the outside temperature on 2.xi.1997. The moisture condition in the container were kept by frequent applications of a fine water spray.

In addition, approximately 20 malnourished plants of *Saxifraga paniculata* Miller were collected at the same locality in February 1998 (it is highly difficult to distinguish between healthy and infested plants in the field at this time of year). A detailed inspection of leaf formations detected a presence of the caterpillars whose size agreed well with that of the

caterpillars collected in autumn and bred in the laboratory for two months at higher temperatures. As confirmed by subsequent direct field observations in the winter 1998-1999, the caterpillars develop in nature even at low temperatures during autumn.

On 14.ii.1998, the caterpillars collected in September 1997 were set again in the laboratory. Feeding began after one week and in some cases resulted in complete mining out of leaf tissues of the host plant. As was later discovered, many more caterpillars were found than was apparent during the collection. They ceased feeding on about 20.ii.1998 and first adults emerged on 8.iii.1998. The first individuals were almost entirely males, during ten days the rate of both sexes was almost balanced.

Plants collected in February 1998 were set in the laboratory on 7.iii.1998. The adults from this sample emerged very soon (about 20.iii.1998), only ten days later than the individuals from the autumnal collection. This result further supports the statement that the acceleration of the development of the caterpillars by laboratory incubation has an insignificant effect and the caterpillars develop in nature irrespectively of the temperature falling to freezing point.

Altogether 85 adults emerged from all of about 40 leaf formations collected and picked more or less without verification of the presence of the caterpillars, and no parasites emerged. The sex ratio (males to females) was about 1.06 : 1, i.e., nearly balanced. The dissection of the leaf formations after the hatching showed that the caterpillars pupate in dense whitish cocoons between ground leaves outside the tangled silk where they lived as larvae. The pupal exuviae are amber yellow and very fragile.

During a visit at the same locality on 25.vi.1998, about 10 adults of the first generation were registered. Seven pieces of the host plant were taken for a laboratory breeding again. Eleven adults (3 males, 8 females) of the second generation emerged from 15.vii. to 30.vii.1998.

Kessleria alpicella is known to occur in central and south-eastern Europe at altitudes of 1000-2000 m a.s.l., in the Alps (Austria, Switzerland, Italy and Germany), the High Tatras (Slovakia and Poland), the Pieniny Mts and in mountains of Croatia, Bosnia, Serbia, Macedonia, Albania, Rumania and Bulgaria (Huemer & Tarmann 1991). The locality in the Český kras karst in central Bohemia presented in this article is by far the lowest known. The species only occurs azonally at one additional locality in the Swabian Alps near Ulm (550 m a.s.l.) in Germany (collected by Axel Scholz, material deposited in his collection and in collection of R. Sutter, Germany, unpublished data).

The record of *K. alpicella* at such an extremely sea level confirms the extremity of some parts of the Český kras karst as regards mesoclimatic conditions. Another mountain moth, *Entephria nobiliaria* (Herrich-Schäffer, 1852) (Geometridae) that had only been previously collected at elevations of about 2000 m a.s.l., was discovered at the same locality in 1998. More dealpine species may be thus assumed to live in this area.

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SOUHRN

Kessleria alpicella (Stainton, 1851) byla nalezena ve stadiu housenek na živné rostlině *Saxifraga paniculata* Miller na lokalitě poblíž Svatého Jana pod Skalou v Chráněné krajinné oblasti Český kras. Housenka žije velice skrytě mezi odumřelými listy živné rostliny, odkud vychází za potravou mezi živé listy, které minuje. Housenky první generace žijí pravděpodobně od srpna do dubna, dospělci se líhnou převážně v květnu. Housenky druhé generace se vyvíjejí v červnu a červenci, dospělci se líhnou koncem července a v srpnu. Vývoj housenek první generace pokračuje i za nízkých teplot v průběhu podzimu a zimy, což bylo potvrzeno terénním pozorováním v zimním období 1998-1999. Imaga obou generací se líhnou do čtrnácti dnů po zakuklení.

Nález potvrzuje výskyt druhu v Českém krasu po 129 letech od nálezu O. Nickerla, a to zřejmě na téže lokalitě. Jde o významný nález horského druhu v nízké nadmořské výšce ve vazbě na výskyt dealpinní živné rostliny *Saxifraga paniculata*. Potvrzení výskytu druhu *Kessleria alpicella* dává tušit, že zmíněná lokalita v Českém krasu a zřejmě i mnohé další lokality s obdobnými mezoklimatickými podmínkami mohou být stanovištěm dalších motýlích druhů s převažujícím alpínským rozšířením. Naznačuje to i nález dalšího horského druhu *Entephria nobiliaria* (Herrich-Schäffer, 1852) (Geometridae) na této lokalitě v roce 1998.