

A second generation of *Coenonympha arcania* (LINNAEUS, 1761) in northern Bohemia, Czech Republic

(Lepidoptera, Satyrinae)

by

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Summary: The authors report their observation of a putative second generation of *Coenonympha arcania* (LINNAEUS, 1761) in the Czech Republic. In 2003 and 2006 several fresh ♂♂ and ♀♀ were reported from both south-eastern Moravia and from the Ceske Stredohori Hills, in northern Bohemia. The recently increasing frequency of second-generation records seem to be related to an increasingly warm climate.

Zusammenfassung: Es wird über die Beobachtung einer vermeintlichen 2. Generation von *Coenonympha arcania* (LINNAEUS, 1761) in der Tschechischen Republik berichtet. In den Jahren 2002 und 2006 wurden mehrere frische ♂♂ und ♀♀ im südöstlichen Moravia und in den Ceske Stredohori Hills/ Nordböhmen beobachtet. Die steigende Zahl an Beobachtungen von Faltern einer 2. Generation scheint im Zusammenhang mit der beginnenden Erderwärmung zu stehen.

It is increasingly observed that recent climate changes influence the distribution and phenology of local butterfly faunas (for example PARMESAN et al., 1999; ROY & SPARKS, 2000; KONVICKA et al., 2003). Laboratory studies also document increasing developmental rates at higher temperatures (JAROSIK et al., 2002). As a consequence, shifts from univoltine development towards multiple generations per year are an expectable phenological response (TRAENKNER & NUSS, 2005).

Here we report on observations of a second generation of the butterfly *Coenonympha arcania* (L.) from the Ceske Stredohori Hills, Louny district, northern Bohemia, in the Czech Republic (50°23' - 50°28' N and 13°43' - 13°50' E, 180 - 560 m a.s.l.). Although situated in the north, the region is situated in the warmest part of the country (thermophytikum) owing to its low height, basaltic bedrock, and because it lays in the rain shadow of the nearby Krusne Hory Mts. (= Erzgebirge). Typical *C. arcania* (L.) habitats are scrubby forest-steppes on warm slopes of volcanic hills.

On 20 September, 2003, Zbynek Havelda recorded two male *C. arcania* (L.) on the scrubby eastern slope of Mila hill, north-west of the town of Louny. In 2006, while carrying out a detailed mark-recapture study of another satyrid, *Chazara briseis* (LINNAEUS, 1764), we also recorded three *C. arcania* (L.) during the middle of the same month - two ♀♀ on 13 and 14 September, and a ♂ on 17 September, all on Rana Hill, north of Louny. The butterflies were all in good condition, either fresh or with only slightly worn wings, and were found in scrubby, semi-open, xerothermic biotopes. Wing patterns, as well as the biotope

preference, were the same as in the butterflies from the first generation (BENES et al., 2002). Both 2003 and 2006 were unusually warm (data from the Czech Hydrometeorological Institute).

It is highly unlikely that the butterflies belonged to a prolonged first generation. We spent the entire 2006 season in the area, recording all butterflies on a daily basis, and the last first-generation records of *C. arcania* (L.) (which concerned worn ♀♀) were on 18 July. Also, the presence of ♂♂ in good condition in September does not correspond with the protandry of the species (ZIMMERMAN, 2003).

Until recently the literature mentioned just one generation per annum for *C. arcania* (L.) (EBERT & RENNWALD, 1991; TOLMAN & LEWINGTON, 1997; BINZENHOFER et al., 2005) but then late-season individuals were observed in Hessen in 2006 (ERNST, 2006). In the Czech Republic, adults normally fly from the beginning of May to the first half of August (BENES et al., 2002). However, recent database entries in the Czech butterfly database [CBD] contain two further records that can be attributed to a second generation: these were dated 25 August 2004 (Lhanice, 49°06' N and 16°13' E, recorder J. HEPP, < 10 individuals) and 4 September 2005 (White Carpathian Mts., 48°51' N and 17°35' E, recorder J. NEMY, < 10 individuals). In contrast to our own observations, these records originated in the south-eastern region of the Czech Republic (Moravia), a region from which second generation of *C. arcania* (L.) had been previously reported as a rare event (SCHWARZ, 1948).

The relatively high number of recent observations of a second generation of butterflies in a usually univoltine species is consistent with the effects of climatic warming. These processes could dramatically change butterfly phenology and species compositions in their communities.

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