

On the presence of *Pontia chloridice* (Lepidoptera: Pieridae) in the Republic of Macedonia

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Abstract. The Small Bath White, *Pontia chloridice* (Hübner, 1813), is a rare species in the Balkan Peninsula and has been known only by two reliable historical records from the Republic of Macedonia. Its presence was therefore considered a result of rare long distance migrations to the country. In the last three years the species was observed on several occasions in the wide alluviums of the tributaries of the Vardar River in the south-eastern part of the country. The larval host plant *Cleome ornithopodioides* and larvae of *P. chloridice* were also discovered indicating that the species is a resident in this region. Although the suitable habitats are limited, there is currently no immediate threat to the species.

Samenvatting. Over de aanwezigheid van *Pontia chloridice* (Lepidoptera: Pieridae) in de Republiek Macedonië *Pontia chloridice* (Hübner, 1813) is een zeldzame soort in het Balkanschiereiland en werd slechts tweemaal vermeld uit de Republiek Macedonië. De aanwezigheid in dat land van deze soort werd daarom beschouwd als het gevolg van zeldzame migraties over grote afstanden. De laatste drie jaar echter werd de soort verscheidene malen geobserveerd in de uitgestrekte alluviale valleien van de rivier Vardar in het zuidoosten van het land. Ook de voedselplant van de rups, *Cleome ornithopodioides* en rupsen van *P. chloridice* werden daar waargenomen, wat duidt op een permanente aanwezigheid van de soort in dit gebied. Hoewel er slechts weinig geschikte biotopen zijn, is er geen onmiddellijke bedreiging voor deze soort.

Résumé. De la présence de *Pontia chloridice* (Lepidoptera: Pieridae) en République de Macédoine *Pontia chloridice* (Hübner, 1813) est une espèce rare dans les Balkans et elle était connue seulement par deux observations historiques de la République de Macédoine. Sa présence dans ce pays était considérée comme le résultat de migrations rares sur une longue distance. Pendant les trois dernières années, l'espèce fut observée plusieurs fois dans les vallées des tributaires de la rivière Vardar, situées dans le Sud-Est du pays. De plus, la plante nourricière de la chenille, *Cleoma ornithopodioides*, ainsi que des chenilles de *P. chloridice*, furent trouvées, ce qui démontre la présence permanente de ce papillon en République de Macédoine. Bien que le nombre de biotopes satisfaisants soit limité, il n'y pas de danger immédiat pour cette espèce.

Key words: *Pontia chloridice* – Pieridae – Faunistics – Biology – Republic of Macedonia.

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Introduction

The Small Bath White, *Pontia chloridice* (Hübner, 1813), is considered generally rare and local in Europe with records extending from southern Finland (Marttila *et al.* 1992), Latvia (Brandt 1985), through southern parts of Russia, Ukraine, Caucasus region (Tshikolovets 2003, Nekrutenko & Tshikolovets 2005), Turkey (Hesselbarth *et al.* 1995), Cyprus (Makris 2003) and southern Balkan Peninsula (Tolman & Lewington 2008). Although most of its range seems contiguous, the presence of the species in southern Finland, Latvia and western Ukraine is evidently disjunct and the records have been attributed to migrations from southwest Russia (Brandt 1985, Nekrutenko & Tshikolovets 2005). In Turkey the records are widely scattered from the European part of the country to the far eastern provinces, with higher densities in the East. The range is fragmented also in the Balkan Peninsula with the majority of records from the eastern part of Greece and neighbouring part of Bulgaria (Abadijev 2001, Pamperis 2009) and isolated records from northern Albania (Rebel 1913), Republic of Macedonia (Back 1976, Lorković 2009) and Greek Macedonia (Pamperis 2009). These isolated occurrences have been mostly explained as records of migratory specimens not forming permanent populations in this region (Back 1976, Tolman & Lewington 2008).

In the Republic of Macedonia there are only two reliable published records of *P. chloridice*. One is from

Gevgelija, where the species was collected in 1938 by Zdravko Lorković, the record being published after the authors death from notes written in 1954 (Lorković 2009). The second record comes from Demir Kapija in Vardar Valley, where a single female was collected in April 1975 (Back 1976). There are two records further upstream in Vardar Valley at Gradsko and Veles (Tolman & Lewington 2008), but these records require clarification.

The habitat requirements and biology of the species have been relatively well studied, particularly in the south-western part of its range (Tolman 1992, John *et al.* 2008). Although the larvae have been reported to use a wide array of host plants: *Sisymbrium* spp., *Sinapis* spp., *Descurainia* spp., *Cymatocarpus* spp. in the Asian part of its range (Tuzov *et al.* 1997, Tolman & Lewington 2008), they seem to be linked entirely to *Cleome ornithopodioides* (L.) (Cleomaceae) in the Balkans (Tolman 1992) and Cyprus (John *et al.* 2008). This plant species is rather local throughout its range and usually present in disturbed habitats like rock debris at roadsides, waste grounds, alongside mountain tracks, and in dry streambeds with washed gravel (John *et al.* 2008). The latter habitat seems to be preferable in the southern part of the Balkan Peninsula, and dry river beds and gravels were targeted during our surveys in the Republic of Macedonia.

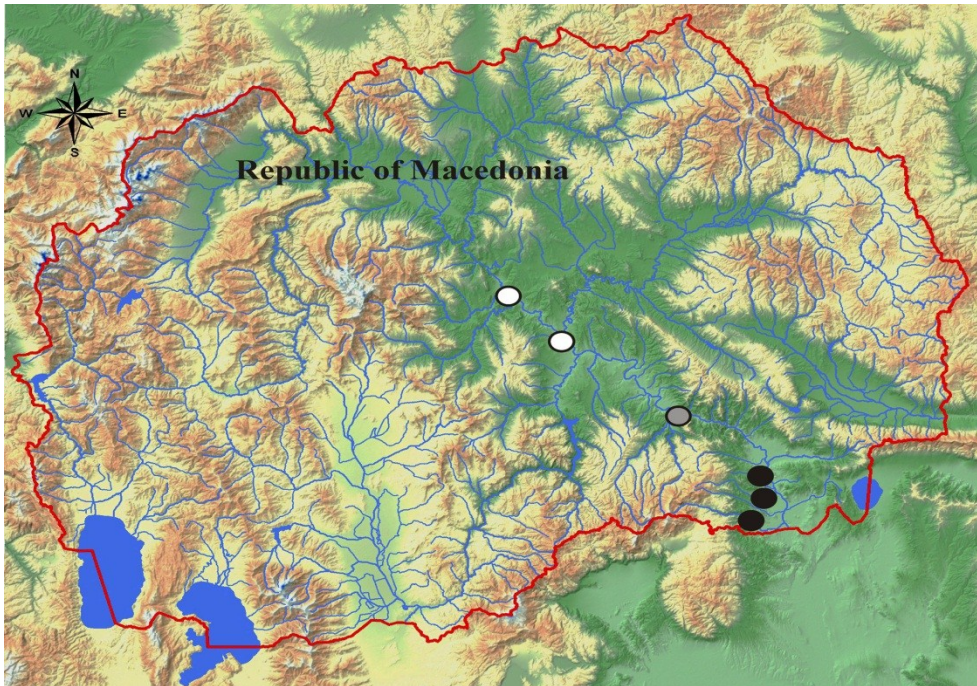


Figure 1: Distribution of the Small Bath White, *Pontia chloridice* (Hübner, 1813) in the Republic of Macedonia. Black circles show currently confirmed localities, the gray filled circle indicates the historical record from Demir Kapija, and white filled circles the questionable records from Tolman & Lewington (2008).



Figure 2: The habitat of the Small Bath White, *Pontia chloridice* (Hübner, 1813) at the Kovanska River bed north of the village Prdejci in south-eastern Republic of Macedonia.



Figure 3: Final instar larva of *Pontia chloridice* (Hübner, 1813) feeding on the host plant *Cleome ornithopodioides*.



Figure 4: *Pontia chloridice* (Hübner, 1813) adult male photographed at the Kovanska River bed north of the village Prdejci in south eastern Republic of Macedonia on 27.5.2010.

Table 1: List of localities with recent observations of *Pontia chloridice* in the Republic of Macedonia.

Date	Locality	Altitude	Latitude	Longitude
09.v.2007	Gevgelija, Prdejci, Kovanska River bed N of the village	60 m	41°12,848	22°29,937
26.iv.2010	Gevgelija, Konska River bed at village Moin	120 m	41°8,202	22°27,110
26.iv.2010	Gevgelija, Sermeninska River bed at village Mrzenci	75 m	41°9,817	22°29,652

Results and discussion

Based on the historical records the lower part of Vardar Valley was surveyed several times before Davkov finally succeeded to find the species at Prdejci village in lower Vardar valley. This triggered more deliberate surveys by Franeta, who visited a dry river bed in the vicinity of Prdejci village in the first week of May 2007. During this short visit he noticed a single specimen but it was not collected. The following year, in mid May 2008, the authors were informed by I. Sarić that several specimens of *P. chloridice* were collected in the vicinity of Gevgelija. In order to get more details about the life cycle of the species in the Republic of Macedonia, Franeta made another expedition to Gevgelija accompanied by I. Sarić on 27th May 2010. In the first locality near Prdejci on a gravel bed of the Kovanska River several specimens were observed, both males and females, some of which appeared severely worn, while others were freshly emerged. The adults were observed along the entire river bed, but very locally, being completely absent in some segments. The butterflies had a very swift flight, flying more hastily when disturbed, usually only upstream or downstream, and showing no signs of dispersal out of the river bed. The males were seen patrolling in search for females. Several females were followed and one was observed egg laying on a young plant of *Cleome ornithopodioides*. The egg was laid on the upper side of a leaf. The plant with the egg and several other plants were taken in order to attempt to breed the species. Later it was noticed that the host plant is present only in certain parts of the river bed, growing on the most disturbed gravel. The presence of the butterfly is associated with the host plant. On the same day another locality was visited near Mrzenci village. A similar river bed was explored and again several males and females were found. This time most of them were worn.

Independently, based entirely on the experiences with the species and its habitat in Greece and Cyprus, Verovnik surveyed the gravel areas around Gevgelija, Strumica and at Valandovo, all in southeastern part of Republic of Macedonia in April 2010. The surveys at Strumica and Valandovo were unsuccessful, but Kogovšek found the first specimens of *P. chloridice* at a large alluvium of Konska River west of Gevgelija. Only males were seen patrolling along the river bed, only occasionally sitting on barren ground (Figure 2). Most of them were already worn, but no females were seen. Similarly on a much smaller alluvium of Sermeninska River at village Mrzenci a maximum of 5 specimens, again

all males were seen patrolling along the stream. Feeding on *Sinapis* spp. growing on piles of gravel was also noted.

Breeding observations

A total of six small plants of *Cleome ornithopodioides* and an egg were brought home by Franeta. The plants were taken rooted but placed in water in an open enclosure without direct sunlight. After a detailed check, two small, probably 3rd instar, larvae were noticed. We suppose the larvae were hiding in the seed pods and for that reason were not noticed earlier. The breeding thus started on 29th May 2010. The larvae were active during the day, feeding regularly on the leaves of the host plant. In the first days the larvae were eating no more than 1–2 leaves each, preferring younger leaves and resting at the top of the host plant. On 1st June 2010 the larvae moulted in the next stage retaining the same behaviour and eating a relatively small amount of food. On 7th June 2010 the larvae entered their final instar and started to eat more conspicuously, culminating the day before pupating when a huge amount of leaves were eaten, the two larvae defoliated the entire available host plants. In the early morning of 10th June 2010 the larvae abandoned their host plant and started wandering, searching for a suitable pupating spot. The larvae accepted a given green polystyrene rock-like surface and pupated during the day. The imagoes, a male and a female, emerged after only five days, on the early morning of 15th June 2010. On 3rd June 2010 a third L2 larvae was noticed which was probably also hiding in the seed pods. However, after two days of active feeding this larvae disappeared. The egg was also lost, most probably eaten by the two larvae before it hatched.

This breeding experience showed that *P. chloridice* is able to conclude the life cycle in a very short time, eating a relatively small quantity of food. It is worth mentioning that the breeding temperature was very high, in some days reaching 30°C, and this could be another reason for such a fast development.

Conclusions

After several field trips in the Republic of Macedonia our observations led us to the conclusion that *P. chloridice* is not an occasional migrant in this country as Back (1976) suggested, but a permanent resident which forms two and possibly even up to three generations each year. The larvae feed on *Cleome ornithopodioides*, a localized plant found mainly on disturbed gravel areas in the lower Vardar River valley. The species seems to be confined to the dry river beds in that part of the country,

but additional surveys of similar habitats elsewhere in Macedonia could result in discoveries of new colonies. The current localities where the species is found are relatively small, but sustained by regular spring floods. There is currently very little human activity, such as gravel exploitation, therefore the habitat of the species seems secured at present. However, deepening of the river beds or even worse their regulation could swiftly result in the extinction of the butterfly.

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Literature

- Abadijev S. 2001. *An Atlas of the Distribution of the Butterflies in Bulgaria*. — Zoocartographia Balcanica Pensoft, Sofia-Moscow, pp. 335.
- Brandt F. H. 1985. Kommt *Pontia chloridice* Hübner auch in Bayern vor? (Lepidoptera, Pieridae). — *Nachrichtenblatt der Bayerischen Entomologen* **34**(1): 13.
- Hesselbarth G., van Oorschot H. & Wagener S. 1995: *Die Tagfalter der Türkei unter Berücksichtigung der angrenzenden Länder, vols. 1 – 3*. — Selbstverlag Sigbert Wagener, Bocholt, Germany. pp. 1354.
- John E., Russell P., Christofides Y. & Hall D. 2008. Notes on the life history, ecology and distribution of *Pontia chloridice* (Hübner, 1808) (Lepidoptera: Pieridae), and a first record of *Hyposoter ebenitor* (Aubert, 1972) (Hymenoptera: Ichneumonidae) from Cyprus. — *Entomologist's Gazette* **59**: 209–226.
- Lorković Z. 2009. The Rhopalocera fauna of Croatia with special respect to the fauna of Plitvice Lakes. — *Entomologia Croatica* **13**(1): 15–78 [in Croatian].
- Makris C. 2003. *Butterflies of Cyprus*. — Bank of Cyprus Cultural Foundation, Nicosia, pp. 327.
- Marttila O., Haahtela T., Aarnio H. & Ojalainen P. 1992. *Butterfly guide*. — Länsi-Suomi Publishers, Rauma, Finland, pp. 150 [in Finnish].
- Nekrutenko Yu. & Tshikolovets V. 2005. *The Butterflies of Ukraine*. — Rayevsky Scientific Publishers, Kyiv, pp. 231 [in Ukrainian].
- Pamperis L. N. 2009. *The Butterflies of Greece*. — Editions Pamperis, Athens, pp. 768.
- Rebel H. 1913: Studien über die Lepidopterenfauna der Balkanländer, III. Teil: Sammelergebnisse aus Montenegro, Albanien, Mazedonien und Thrazien. — *Annalen des Naturhistorischen Museum in Wien* **27**: 281–334.
- Tolman T. 1992: The larval host-plant of *Pontia chloridice* (Hübner, 1813) in Greece (Lepidoptera: Pieridae). *Phegea* **20**(3): 109–112.
- Tolman T. & Lewington R. 2008: *Collins Field Guide to the Butterflies of Britain and Europe*. — HarperCollins Publishers, London, pp. 384.
- Tshikolovets V. V. 2003. *Butterflies of Eastern Europe, Urals and Caucasus*. — Kyiv-Brno, pp. 176.
- Tuzov V. K., Bogdanov P. V., Devyatkin A. L., Kaabak L. V., Korolev V. A., Murzin V. S., Samodurov G. D. & Tarasov E. A. 1997. *Guide to the butterflies of Russia and adjacent territories (Lepidoptera, Rhopalocera)*. Volume I. *Hesperiidae, Papilionidae, Pieridae, Satyridae*. — Pensoft, Sofia-Moscow, pp. 480.