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Description of recent discovery of *Anthocharis damone* Boisduval, 1836 in Serbia and its distribution in Europe (Lepidoptera: Pieridae)

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Abstract

Anthocharis damone Boisduval, 1836 is known from southern Italy, Greece, Republic of Macedonia, Albania and further in the Middle East. At the end of May and beginning of June 2015 it was recorded for the first time in Serbia. A single isolated colony was found 170 km NW from the northernmost known locality in Europe. This record made us review *A. damone* distribution in Europe, suggested its possibly wider range over the Balkans and increased the list of butterflies recorded in Serbia to a total of 200 species.
KEY WORDS: Lepidoptera, Pieridae, *Isatis tinctoria*, conservation, Red List, Serbia.

Descripción del reciente descubrimiento de *Anthocharis damone* Boisduval, 1836 en Serbia y su distribución en Europa (Lepidoptera: Pieridae)

Resumen

Anthocharis damone Boisduval, 1836 es conocida del sur de Italia, Grecia, República de Macedonia, Albania y más lejos en el Medio Oriente. A finales de mayo y principios de junio de 2015, fue registrado en Serbia por primera vez. Una colonia aislada fue encontrada a 170 km NW de la localidad más al norte en Europa. Este registro nos ha hecho revisar la distribución de *A. damone* en Europa, nos indica una posible presencia más amplia en los Balcanes e incrementó la lista de mariposas registradas en Serbia a un total de 200 especies.
PALABRAS CLAVE: Lepidoptera, Pieridae, *Isatis tinctoria*, conservación, Lista Roja, Serbia.

Introduction

The eastern orange-tip, *Anthocharis damone* Boisduval, 1836, is known as a local butterfly in the European part of its range, found only in southern Italy and southern parts of the Balkan Peninsula. In Asia the distribution extends further over the Middle East to south Transcaucasia, Iran and Iraq (TOLMAN & LEWINGTON, 2008; TSHIKOLOVETS, 2011).

Habitats of this species in Europe are open grasslands or scrub places on steep, rocky, south-facing slopes and usually on limestone. Its range is linked to the presence of the larval host plant from the genus *Isatis*, primarily *Isatis tinctoria* L., as caterpillars feed on their flowers and seeds (VAN SWAAY *et al*., 2010b). Since it is considered a Mediterranean species, found at the very southern tip of the Balkans and limited to the places with a warm climate, the presence of *A. damone* was not expected in Serbia. Against all odds, it was discovered in south-western part of the country and here we described and illustrated the first observations and attempted to summarise the knowledge on its distribution in

Europe. In addition we presented some thoughts about the origins of the butterfly host plant in the south of Europe and commented on the butterfly threat status in Serbia.

The discovery of *Athocharis damone* in Serbia

Anthocharis damone was initially discovered in Serbia by E. D. who collected 5 ♂♂, 2 ♀♀ on 22-V-2015 and provided photos from his collection to Serbian butterflies interest groups. Butterflies were at first identified as *A. gruneri* Herrich-Schäffer, 1851, a taxon recently recorded for Serbia (POPOVIĆ & MILENKOVIĆ, 2012), although their size and colouration were noticeably different. The same locality was revisited on 30-V-2015, photographing live specimens that were shortly and undoubtedly recognized as *A. damone* (Fig. 1). On this occasion some 40 specimens were seen in just a short time period.

After the initial discovery of *Anthocharis damone*, we organised a short joint expedition in order to confirm the presence of this species in Serbia, take photographs of the butterfly and inspect its habitat. In three days we visited several localities surrounding Sjenica, with special attention to open, rocky habitats favoured by *A. damone* elsewhere in Europe. Despite great effort, the species was only recorded on the already known locality close to the village of Trijebine, in the foothills of Giljeva Mt. (Table 1). Although the search for the butterfly on this occasion was more intensive, we only saw some 15 males and five females, which might indicate its flight period was almost over. Male butterflies were usually seen in a brisk flight close to the ground or flying over the steep rocky slopes. Some individuals were found feeding on the flowers and a single female was observed ovipositing on *I. tinctoria*. After close inspection of the host plant flower buds, a single caterpillar was also recorded (Fig. 2).

Table 1.– The observations of *Anthocharis damone* in Serbia in the foothills of Giljeva mountain (Sjenica).

Coordinates	Dates	Observers
19º 88’ 75.71” E; 43º 18’ 50.93” N	22-V-2015; 30-V-2015	E. D.
19º 90’ 28.36” E; 43º 19’ 16.07” N	3-VI-2015	E. D., Đ. R., M. M., M. Đ., M. P.
19º 89’ 11.89” E; 43º 19’ 04.86” N	3-VI-2015	E. D., Đ. R., M. M., M. Đ., M. P.

The suitable habitat for *Anthocharis damone* in Serbia is found over the rocky terrain along a rarely used macadam road (Fig. 3). Geological strata are made of serpentinite, which is usually covered with sparse vegetation and sometimes hosts a different butterfly species in comparison to the nearby areas (eg. GASCOIGNE-PEES *et al*., 2014; VEROVNIK *et al*., 2014). All the butterflies were recorded on approximately 2 km long stretch of the macadam road, at an altitude of 1200-1300 m. Higher parts were not surveyed, while the species was not observed below 1200 m of altitude, although the habitat remained visually similar. Larval foodplant was relatively abundant near the road and on the steep road margins. Slopes above the road were covered in planted trees of *Pinus nigra* J. F. Arnold, and a few males were seen flying into those woods. As the wider area consists of similar geological strata we suppose that suitable habitats could be found in the vicinity and further surveys should be made to get a more precise picture of the butterfly’s distribution. Additional new records can be expected from Trijebine village all the way westwards to the Lim River. In general, the habitat in Serbia is similar to those in the rest of the Balkans, characterised by sparse grasses and bushes on a rocky terrain from sea level up to 1300 m of altitude (MICEVSKI *et al*., 2015; TSHIKOLOVETS, 2011; VAN SWAAY *et al*., 2010b).

Distribution of *Anthocharis damone*

Antocharis damone is known to form three subspecies: *A. damone damone* Boisduval, 1836 in Sicily and southern Italy, *A. damone eunomia* (Freyer, [1851]) in the Balkans, Turkey, Armenia, Georgia, Azerbaijan and the Russian Federation and *A. damone syra* (Verity, 1911) in Lebanon, Syria and Israel (TSHIKOLOVETS, 2011). It is interesting to note that the butterfly hostplant, *Isatis tinctoria*, is famous for its practical use as a natural dye dating since the prehistoric period and was

introduced into many parts of the European continent (GUARINO *et al*., 2000; SPATARO *et al*., 2007; ZECH-MATTERNE & LECONTE, 2010). The centre of distribution of the host plant is in Asia, and its distribution in the Balkans is considered autochthonous (YORDANOV, 1970). However, the autochtonous origin of the plant is questionable for some other parts of Europe including southern Italy (GUARINO *et al*., 2000). A distinctive subspecies of the butterfly (if perceived correctly) suggests both the butterfly and its host plant were present here and evolved before *I. tintoria* was introduced for cultivation (see also: BOLLINO *et al*., 1996).

In order to summarise butterfly distribution in the Balkans, we gathered literature records from the various sources and processed them in QGIS software 2.10 (www.qgis.org). We used geographic WGS 84 projection in order to be consistent with PAMPERIS (2009) where the majority of data came from (Fig. 4). With the exception of Italy and Greece (JUTZELER *et al*., 1998; PAMPERIS, 2009; TOLMAN & BERNHARD, 1994), the distribution of *A. damone* in Europe remained insufficiently studied. Although the butterfly is well known from the Republic of Macedonia, most published records come from old literature or from collections (JAKŠIĆ, 1988; KRPAČ *et al*., 2011; SCHAIDER & JAKŠIĆ, 1989). On the contrary, for Albania the species has only recently been mentioned by TSHIKOLOVETS (2011) without detailed explanation, and was confirmed for this country only in 2014 (MICEVSKI *et al*., 2015). In the European part of Turkey, it is now considered extinct taxa (VAN SWAAY *et al*., 2010b). The unexpected discovery of *A. damone* in Serbia close to a national border suggests this species might also be present in the neighbouring Montenegro. Flying early in the season it is easily overlooked during butterfly surveys and might be more widespread in the Balkans. This specially refers to Albania, due to the lack of systematic faunistic surveys (VEROVNIK & POPOVIĆ, 2013).

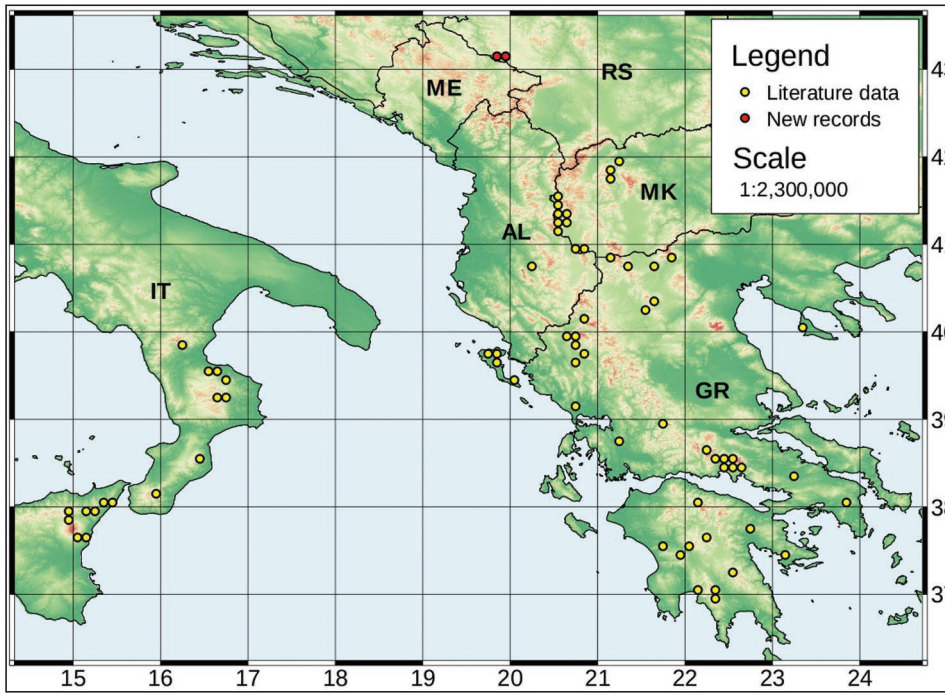

Fig. 4.– Distribution of *Anthocharis damone* in Europe given in WGS 84 projection. The observation points are given in resolution of 0.1 degree. Names of the countries are written as ISO2 codes.

Conservation of *Anthochris damone* in Serbia

It should be noted that the insect fauna of Sjenica was not studied in details and most data concerning butterflies come from just a few short surveys in 2007 and 2008 (JAKŠIĆ, 2008). These surveys produced a total of 68 butterfly species recorded in the wider region of Sjenica, promoting Pešter plateau to one of the Prime Butterfly Areas of Serbia. In our study around 130 species were recently found here (E. D., unpublished data; MILJEVIĆ & POPOVIĆ, 2014), making it one one of the richest regions in Serbia (JAKŠIĆ, 2008; POPOVIĆ & ĐURIĆ, 2014). The threats to this area do not seem to be acute and even high mountain pasturing is still well preserved in comparison to other regions of Serbia. This traditional grazing system sustain meadows and pastures required for survival of many butterfly species (SUTCLIFFE *et al*., 2014; VAN SWAAY *et al*., 2010a). The only threats that could be recognised are possible habitat overgrowth by coniferous trees, human activities along the road and uncontrolled fires, traces of which were observed in the field.

Anthocharis damone is listed as least concern (LC) on both global and European level (VAN SWAAY *et al*., 2010b). With current knowledge on its distribution in Serbia, this species could be considered vulnerable (VU) on a national level applying the criteria D2 (AOO = 8 km^2, single location) (IUCN, 2012; IUCN STANDARDS AND PETITIONS SUBCOMMITTEE, 2013). However, we should note that the critically endangered (CR) category could also be assigned using criteria B if any sign of fluctuations or continuing decline were found.

Conclusions

The record of *Anthocharis damone* brings the list of Serbian butterflies to 200 species: Papilionidae 6, Pieridae 23, Hesperiidae 23, Riodinidae 1, Lycaenidae 55, Nymphalidae 92 and expands the distribution limits of this species some 170 km from the nearest populations close to Skopje in the Republic of Macedonia. In total, nine new butterfly species were recorded over the last ten years in Serbia (POPOVIĆ *et al*., 2014) proving that interesting records can still be expected in the region. The threat status in Serbia and distribution gaps on *A. damone* distribution in Europe urge detailed studies on this species in near future.

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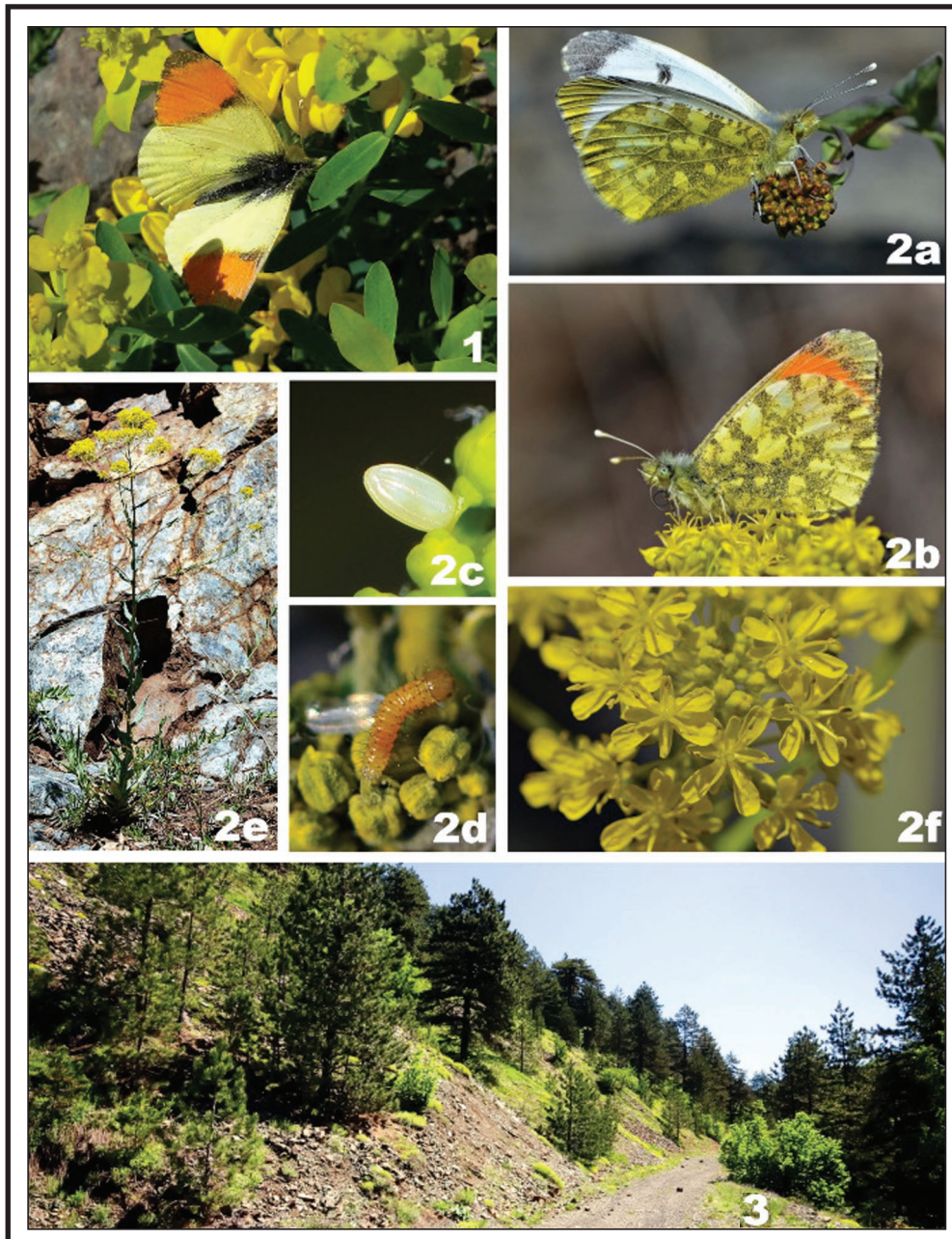

Figs. 1-3.– 1. The first photograph of *Anthocharis damone* in Serbia, ♂ resting on the larval host plant, E. D., 30-V-2015. 2. The life cycle of *Anthocharis damone* photographed in situ, M. M., 3-VI-2015. (a) ♀ resting on the larval host plant, *Isatis tinctoria*, (b) ♂ feeding on the larval host plant, (c) ovum, (d) caterpillar, (e) *I. tinctoria* growing on the road margins, (f) flowers of *I. tinctoria* plant. **3.** Habitat of *Anthocharis damone* in Sjenica, Trijebine, M. P., 3-VI-2015.