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## ***Acontia melanura* (Tauscher, 1809) (Lepidoptera: Noctuidae) - very rare species in the fauna of Serbia**

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**Abstract:** *Acontia melanura* (Tauscher, 1809) is an Eurasian noctuids species. It is present in Eastern Romania (Bleak Sea coastal area) and Bulgaria, as well as in southeastern European part of Russia, including the southern Urals. In 2019 and 2020, *A. melanura* was found in northeastern Serbia at the locality Korn in the Special Nature Reserve "Deliblatska peščara", and this was the westernmost finding of this species in Europe. *A. melanura* is considered as a vulnerable species in the Red List of Noctuidae of Serbia. However, it is mistakenly confused (due to disputed taxonomic affiliation) with *Acontia urania* (Frivaldsky, 1835), which was declared as the one of two extinct species in this list. This research proves the existence of *A. melanura* in Banat, with presented overview of the localities and dates of findings of the species. Also, the similarity of the spread of *A. melanura* and related species *Ponemetia candefacta* (Hübner, [1831]) in the Republic of Serbia in the light of climate change was pointed out.

**Keywords:** *Acontia melanura*, Special Nature Reserve "Deliblatska peščara", fauna Lepidoptera, distribution, morphology.

### **1. Introduction**

*Acontia melanura* (Tauscher, 1809) has been included into the list of fauna of Lepidoptera of Serbia as *Acontia titania* (Esper, 1798) (Zečević, 2002), a member of the subfamily Jaspidiinae (Acontiinae, Erastrinae) within the family Noctuidae.

*A. titania* is a synonym of the species *A. melanura* and in the list of Lepidoptera of Serbia is characterized as "possibly exists in Banat" (Zečević, 1996), which means that there is no reliable evidence and findings for this species that it is a member of our fauna. As the member of the fauna of Noctuidae of the Republic of Serbia, *A. melanura* and its sister species *A. titania* come from earlier sources (Stojanović and Ćurčić, 2011).

*A. melanura* is considered as a vulnerable species in the Red List of Noctuidae of Serbia (Stojanović et al. 2013). However, it is mistakenly confused (due to disputed taxonomic affiliation) with *Acontia urania* (Frivaldsky, 1835), which was declared as one of two extinct species in this list. However, an insight into the European distribution maps of these related and sister species indicates the resolution of the enigma (Fibiger et al. 2009). Similar distribution of these species is also represented later by Leraut (2019). The distribution maps of *A. urania* given by both Fibiger et al. (2009) and Leraut (2019), show its presence in the southern part of the Republic of Serbia, almost entire Northern

Macedonia, southwestern and central Bulgaria, and east to the western Romania, nearby Black Sea, Ukraine, and Russia. However, the reference for a small area in Serbia, north of North Macedonia, was not cited.

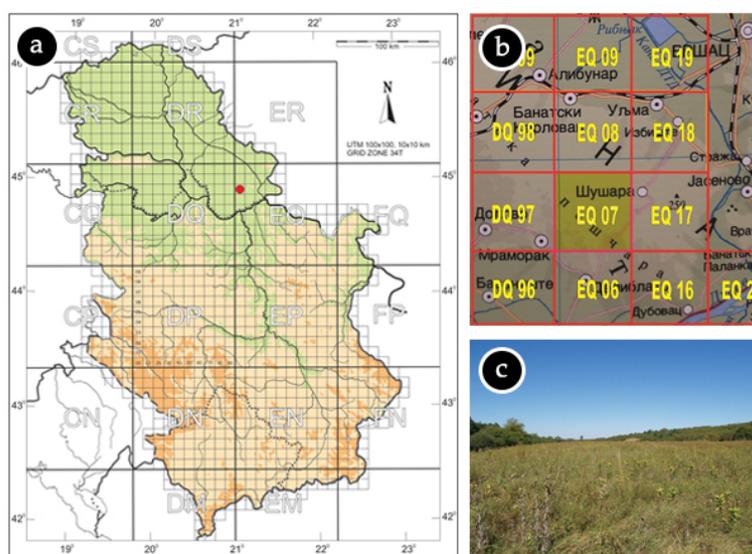
*A. urania* is included in the list of the Noctuidae of Serbia according to the findings in the area of Peć, Metohija, in June 1975 (Vasić, 2002). However, in the PhD Dissertation of Vulević (1988), which also contains the data from southern Serbia (including Kosovo and Metohija), the finding from Vasić (2002) was not reported. Vasić (1975) cited the presence of third species from this genus, *A. malvae* Esper, 1796. However, due to the absence of his specimen and the disputed taxonomic affiliation, this finding is not considered in further analysis. *A. melanura* was not recorded in the previous researches of Lepidoptera (Živojinović, 1950; Zečević and Radovanović, 1974; Zečević, 2002; Stojanović and Ćurčić, 2014).

This research proves the existence of *A. melanura* in Banat, with presented overview of the localities and dates of findings of the species. Moreover, the similarity of the spread of *A. melanura* and related species *Ponometia candefacta* (Hübner, [1831]) in the Republic of Serbia in the light of climate change was pointed out.

## 2. Material and methods

The research has been conducted during warm, sunny days in July and August, in 2019 and 2020 in the Special Nature Reserve "Deliblatska peščara", near the settlement Šušara. The altitude of the locality is 150 m a.s.l.

The specimens were collected by the light source. The samples were collected near the xerothermic steppe-sand meadows, with sparse vegetation along forest clearings and along hard sandy roads. An UTM code (10×10 km) is given for investigated locality, which belongs to UTM squares EQ 07 (marked on Figure 1). The collected adults were afterwards prepared, labeled, determined, photographed, and stored as dry specimens in entomological boxes in the private collection of the first author. Identification was conducted according to Leraut (2019).



**Figure 1.** a, b) Map of localities in the Special Nature Reserve "Deliblatska peščara" with UTM grids, c) the locality Korn (150 m a.s.l.) (photo: Stojanović, D.V.).

The photographs of localities were made by using a Canon EOS 5D digital camera, equipped with CANON lens EF 50 mm, 1:1,8L. The photographs of insect specimens and genital armature were made by the same digital camera, equipped with CANON macro lens EF 100 mm, 1:2,8L. The

photographs of prepared specimens given below were taken in the laboratory of the Institute of Lowland Forestry and Environment, University of Novi Sad.

### 3. Results and discussion

One male and one female *A. melanura* were found between August 13<sup>th</sup> and August 15<sup>th</sup>, 2019, at the locality Korn (Figure 2), which belong to UTM squares EQ 07 (marked on Figure 1). Also, one male individual was found on the same locality on July 20<sup>th</sup>, 2020.

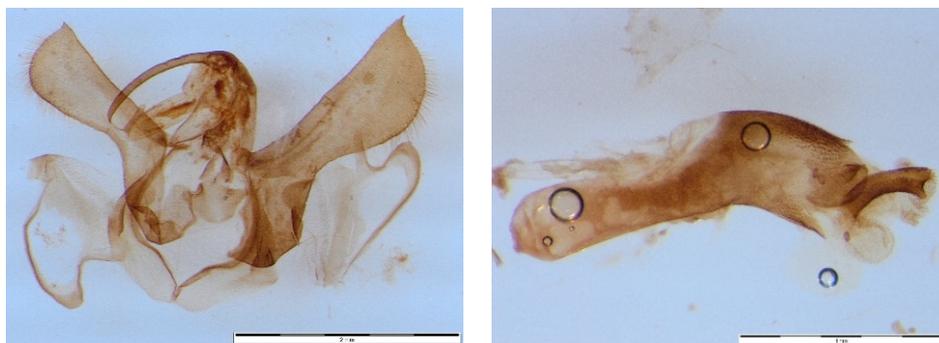
*A. melanura* is characterized by the flight period during July and August, during which it produces one generation. The wingspan of the species is 25-28 mm. The color of head, thorax, abdomen, basal wing area, discal area and costa distinctly white, whereas the darker parts are along the marginal belt, with wide belt along the outer part of the inner margin. Inside the dark part, plenty of blue scales follow the gray belt. Whitish belt on the lower side of the outer margin. On the lower wings along the inner and outer margins a wide dark belt and a short belt band along the disc area (Figure 2). Ventral side: The forewings are predominantly black with a white belt beside the postmedial line (Figure 3).



**Figures 2-3.** *A. melanura*, habitus of adults; 3 - with spread wings (dorsal view); 4 - with spread wings (ventral view) (photo: Stojanović, D.V.).

Male genital armature (Figure 4 and 5): tegumen plate-like. Harpes asymmetric, with extended, semi-circular cucullus, as a rose thorn on the top of apex. On left harpe, there is a strengthened ampulla, like a finger; on right Harpe ampulla barely noticeable. Sacculus with a specific membrane and a thickened, semi-circular fingertip-like growth. Aedoeagus bent. Vesica has two scobinated areas, one half-rounded bubble and a part like small, curved bone.

Juxta with two horns. Uncus narrow, cylindrical, slightly curved, almost of equal width throughout, pointed at the top. Vinculum: wide and thickened.



**Figures 4-5.** *A. melanura* chitin fittings; 5 - male genital armature; 6 - aedoeagus (photo: Stojanović, D.V.).

Female genital armature (Figure 6): Lamellae postvaginalis bifurcated, with a socket and pedestal, like a grail, on appendix bursae.



**Figures 6.** *A. melanura*, the female genital armature (photo: Stojanović, D.V.).

Host plants: herbaceous species of xerothermic steppe-sand meadows.

*A. melanura* is Euroasian species. According to Fibiger et al. (2009) and Leraut (2019), it is present in Eastern Romania (Black Sea Coast) and Bulgaria, and the south-eastern European part of Russia, including the southern Urals.

Lepiforum <https://lepiforum.org> gives the data on finding in south-eastern Ukraine: area "Saporischschja, Rajon Saporischschja (also known as Saporoshje), Baburka, 49 m, 5. August 2012" and "Lugansk District, Melovoe, Streltsovskaya Step (Klyuchko Z. 19.07.2006)". These data were not cited in Fibiger et al. (2009) and Leraut (2019). Actually, these authors cited Ukraine, but without the aerial sketch in the European distribution maps.

The data on this species was not available on the website Fauna Europaea <http://www.faunaeur.org> in October 2021, but there is a disputable note on the website of Lepiforum <https://lepiforum.org>: "According to the Fauna Europaea, the species occurs in Bosnia and Herzegovina, Croatia, Greece, Macedonia, Moldova, Romania, southern Russia, Slovenia, Yugoslavia and in European Turkey" (last accessed on October 21<sup>st</sup>, 2021).

Outside Europe, findings from the Caucasus, Transcaucasia, Central Asia and southwestern Siberia have been reported (Fibiger et al. 2009).

By changing the temperature, relative humidity, insolation, and other climatic parameters in certain localities and in a longer time interval, the values that limit the behaviour of certain species of insects are changed. As a result of adapting to the new changes, some Lepidoptera have significantly expanded their distribution area (several hundred kilometres).

This was happened both with *A. melanura*, and a close species of *P. candefacta*. Both species entered the continent from the area around the Black Sea and became permanent members of the Serbian fauna.

According to the Köppen Climate Classification, extreme south of Russia, Balkans, and significant part of Central and even Western Europe has characterized by a warm, temperate humid climate with warm summers (Stojanović et al. 2011). During the last forty years, the area of distribution of *P. candefacta* has expanded from Europe's eastern areas (Stojanović et al. 2011, 2013, 2017) to the west and northwest. The list of existing and possible habitats of *P. candefacta* (assuming also for the related *A. melanura*) in the Republic of Serbia has been already identified (Stojanović et al. 2011, 2013, 2017), as well as the potential for spread.

#### 4. Conclusions

This finding confirms the assumption of Zečević (1996). In the same time, this is also the westernmost finding in Europe, which locality is cca. 200 km western from the nearest place of finding in Romania, i.e. Hinova, near Mehedinti, Oltenia.

*A. melanura* is considered a vulnerable species in the Red List of Noctuidae of Serbia. However, it is mistakenly confused (due to disputed taxonomic affiliation) with *A. urania* which was declared as the extinct species in this list. This finding of very rare European species *A. melanura* the Special Nature Reserve "Deliblatska peščara" implies reconsidering and re-evaluation the previous status of this species given in the Red List of Noctuidae of Serbia. It also implies a need for a comprehensive monitoring of the entire genus *Acontia* (*Urancontia*) in the Republic of Serbia, to determine the possibility and probability of threats, as well as the possible measures for species and their habitats protection.

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