

NEW RECORDS OF *ACONTIA CANDEFACATA* (HUBNER, 1831) (LEPIDOPTERA: NOCTUIDAE) FROM CROATIA, SLOVENIA AND BOSNIA AND HERZEGOVINA

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Abstract

In this paper, we present new records of *Acontia candefacta* in Croatia, Slovenia and Bosnia and Herzegovina. From the time of the first records in Croatia in 2019, the species has spread across much of the country and has also become very common in its northern regions. The first observations have been reported for Slovenia and Bosnia and Herzegovina. In Slovenia, the species has been recorded at two localities near the Croatian border, while in Bosnia and Herzegovina, the species has been recorded in two far-apart regions, indicating that it is more widespread in the country.

KEY WORDS: owlet moths, distribution, spreading, *Ambrosia artemisiifolia*

Introduction

The olive-shaded bird-dropping moth *Acontia candefacta* (Hubner, 1831) is a small owlet moth (Noctuidae) native to North America (Stojanović *et al.*, 2017). It is similar to European members of the genus *Acontia*, but easily distinguished from them and recognized by its grey-green markings and a darker circular dot on its forewings.

Following the uncontrolled spreading across Europe of *Ambrosia artemisiifolia* L., its larval host plant from North America, this moth species was intentionally introduced in Russia in 1969 (Poltavsky & Artokhin, 2006). Afterwards, the spread of *A. candefacta* was noted across Russia (Poltavsky & Artokhin, 2006), Ukraine (Kljuchko *et al.*, 2004), Bulgaria (Beshkov, 2010), Hungary (Kelemen *et al.*, 2014), Serbia (Stojanović *et al.*, 2011; 2017) and only recently Croatia (Koren, 2019) and Poland (Hołowiński & Mazur, 2021).

Here we present new records of *A. candefacta* for Croatia and the first observations of the species in Slovenia and Bosnia and Herzegovina.

Materials and Methods

This survey was conducted from 2020 to 2022, mainly in Croatia. Two light-trapping sources were used. The primary method was triangular moth collecting tents consisting of a metal frame with UV lamps connected to a 12 V battery. During each visit, six tents were used, distanced about ten meters apart. The second method involved the use of a 6W 12V portable heath moth trap, which was left on site and then collected the following morning. Two-to-three portable heath moth traps were used per locality per night. Both methods were used at each locality, depending on weather conditions: the strong winds, a common occurrence in the area, do not allow for the use of standing light-tents. In some localities, moths were also observed during the day. In Bosnia and Herzegovina, only 6W 12V portable heath moth traps were used, while in Slovenia, moths were observed only during the day. The android application and digital platform Biologer was used to record field data during this research (Popović *et al.*, 2020). The specimens were set, identified, and stored in the private collection of the first author. For each record, the exact locality, coordinates, altitude and dates are provided.

Results

In total, *A. candefacta* has been recorded on 32 localities, 28 in Croatia, two in Slovenia and two in Bosnia and Herzegovina (Table I). The number of observed specimens varied between one and 15 per locality. The altitude ranged from 55 to 1,115 m a.s.l. In terms of activity, the moths were observed from May (19th) up to September (1st).

Table I. List of records of *Acontia candefacta* presented in this work with localities, dates, coordinates, altitudes, number of specimens and observers.

Locality	Date	WGS N	WGS E	Altitude (m a.s.l.)	N of specimen	Observer
Slovenia						
Lendava, Mala Polana, grasslands near the road	25.6.2022	46.576864	16.354451	165	1	Toni Koren
Lendava, W of Petišovci, forest near Petišovci lakes	27.6.2022	46.533409	16.43137	162	2	Toni Koren
Croatia						
Istra, SE of Valbandon, Ližnje more forest	21.8.2021	44.910268	13.835873	55	1	Filip Bužleta
Grabovac Drežnički, western part of Baračeve Spilje, forest path	30.8.2022	44.98546	15.684206	405	2	Toni Koren
Nova Kršlja, Baračeve Spilje, forest near the entrance	31.8.2022	44.984085	15.72347	348	1	Toni Koren
Stupnički Obrež, Obrežki Lug, edge of forest	23.7.2022	45.766173	15.827605	177	1	Đurđica Majetić
Sisačko-moslavačka county, Donji Dobretin, slopes and forest edge	12.6.2022	45.000495	16.291666	182	1	Toni Koren
Međimurska county, Hlapičina, edge of fishponds N of the village	10.8.2021	46.529325	16.393376	213	2	Toni Koren
Međimurska county, N of Domašinec, banks of Mura River	12.8.2021	46.464295	16.615802	195	2	Toni Koren

Locality	Date	WGS N	WGS E	Altitude (m a.s.l.)	N of specimen	Observer
Čazma, Suhaja village, forest edge	19.5.2020	45.720072	16.627646	127	1	Dražen Pal
Legrad, Donja Dubrava, Struga, banks of Drava River	1.9.2021	46.309213	16.78856	164	1	Toni Koren
Novska, south of the settlement, Bročke Jasenine willow forest	15.7.2022	45.294001	16.946973	143	1	Toni Koren
Donji Bogičevići, forest Podložje, forest edge	16.7.2022	45.211047	17.264164	144	1	Toni Koren
Dolina, forest Poljice north of the settlement, edge of Lutinja river	17.7.2022	45.159319	17.38282	145	2	Toni Koren
Siče, south of the village, Poljice forest	16.7.2022	45.148894	17.610534	127	15	Toni Koren
Branjina, Bansko Brdo, grasslands Nad Mlinom	3.6.2021	45.812771	18.693565	195	1	Toni Koren
Branjina, Bansko Brdo, grasslands Nad Mlinom	24.6.2021	45.812822	18.694425	194	2	Toni Koren
NP Kopački Rit, SE of Grabovac village, Siget forest	21.6.2022	45.692281	18.764018	157	4	Toni Koren
Zmajevac, north of the settlement, Bansko Brdo east of Kraljev Stol	23.6.2022	45.825987	18.797484	222	2	Toni Koren
Otok, west of the settlement, Vranjevo, forest edge	3.7.2022	45.142565	18.827961	137	2	Toni Koren
NP Kopački Rit, NE of Kopačevo, near lake "Četverokut"	23.6.2021	45.626385	18.840972	131	3	Toni Koren
NP Kopački Rit, NE of Kopačevo, near lake "Četverokut"	3.8.2021	45.627165	18.841315	130	3	Toni Koren
NP Kopački Rit, NE of Kopačevo, near lake "Četverokut"	23.6.2022	45.625844	18.840172	132	5	Toni Koren
NP Kopački Rit, Šarkorede, near Čarna stream	4.8.2021	45.63797	18.849569	138	2	Toni Koren
NP Kopački Rit, N of Batsiger, grasslands	4.8.2021	45.647569	18.857424	134	3	Toni Koren
NP Kopački Rit, NE of Kopačevo, toward Čošak Šume	22.6.2022	45.640908	18.867541	134	10	Toni Koren
Drenovci, NW of the settlement, forest Radiševo	30.6.2022	44.950167	18.883429	127	5	Toni Koren
Otok, south of the settlement, forest Zapadna Gradina	2.7.2022	45.117519	18.904046	135	4	Toni Koren
Otok, south of the settlement, forest Južna Gradina	1.7.2022	45.083934	18.914666	110	12	Toni Koren
Otok, north of the settlement, forest Grede	2.7.2022	45.197301	18.916186	118	15	Toni Koren
Vrbanja, north of the settlement, forest Boljkovo	2.7.2022	45.031042	18.924418	133	4	Toni Koren
Drenovci, NE of the village, forest Zvezdan Grad, flooded forest	25.8.2021	44.9814	19.033595	86	2	Bruno Schmidt
Drenovci, E of village, forest Volić	27.8.2021	44.958844	19.05238	87		Bruno Schmidt
Bosnia and Herzegovina						
Glamoč, Hrast lake, forest edge and grasslands around the lake	20.8.2021	44.030078	16.873212	1115	1	Toni Koren
Matinski Vis, mountain meadow surrounded with black pine trees and mixed deciduous forest on nearby slopes	31.7.2021	44.468367	17.985137	748	1	Dejan Kulijer

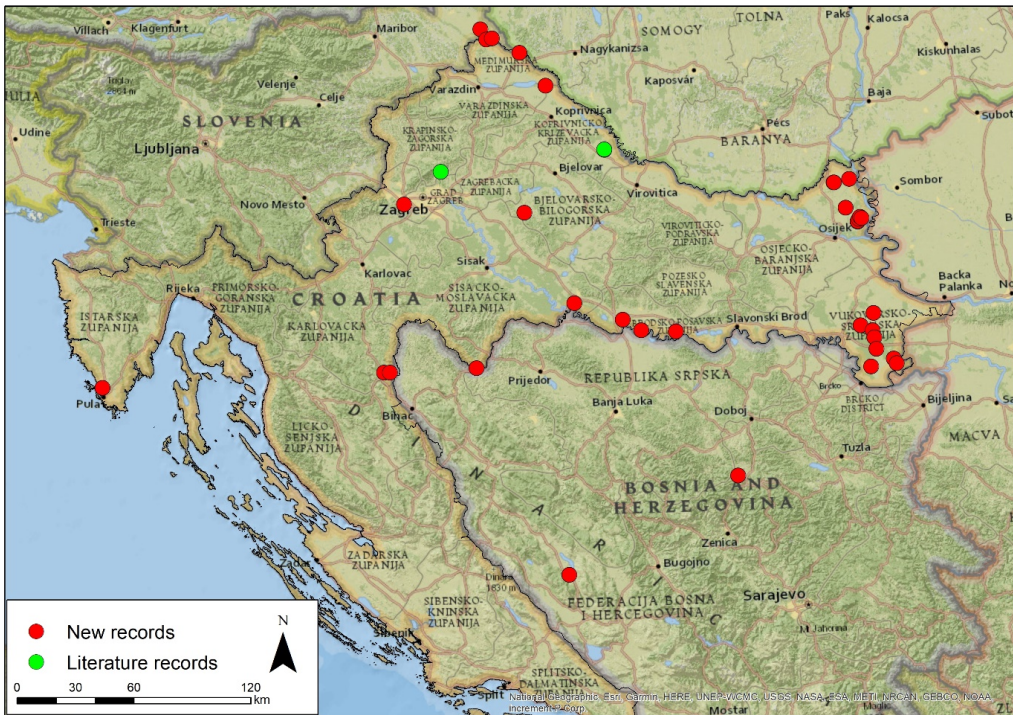


Figure 1. The distribution of *Acontia candefacta* in Slovenia, Croatia and Bosnia and Herzegovina following this survey and the existing literature observations (Koren, 2019).

Discussion

After the first observations of *A. candefacta* in Croatia (Koren, 2019), the species has significantly spread across the country (Fig. 1) and has also invaded Slovenia and Bosnia and Herzegovina. In Croatia, it is now present in all three biogeographical regions, with most records confirmed in the continental part of the country and only a handful of records from the Mediterranean and the alpine regions (European Environment Agency, 2017). This coincides with the current distribution of its larval host plant, *A. artemisiifolia*, in Croatia (Nikolić, 2022). Most of the records originate from forested areas, especially deciduous forests. Such areas are usually surrounded by agricultural land, which has in many cases been abandoned and taken over by invasive plant species, including *A. artemisiifolia*, thus providing a good habitat for this species.

In Bosnia and Herzegovina, the species has been recorded in two distant areas, in alpine and continental biogeographical regions. According to Stojanović *et al.* (2017), in Europe the species is mainly associated with lower altitudes and the presence of rivers or other waterbodies that serve as corridors for the spread of the species. Both sites in Bosnia and Herzegovina are at higher altitudes and far apart from each other, which could indicate that *A. candefacta* has already spread across the country. However, this can be only confirmed with additional surveys.

No records of this species in Slovenia are known to the authors, and the two new observations are located close to the border with Croatia. Accordingly, it is difficult to assess how wide the spread of the species has been so far. Nevertheless, the confirmation of the species in Slovenia may inspire others to search for it and

monitor its spreading in the country. These are the first observations of *A. candefacta* for Slovenia and Bosnia and Herzegovina.

The spreading of this species, probably from eastern parts, especially Serbia (Stojanović *et al.*, 2017), continues. In many previously surveyed localities, the species was only confirmed during this survey. For example, it is nowadays very common in the Nature Park Kopački Rit where we recorded it at several localities. It was not, however, recorded during the systematic moth survey of the area a decade ago (Vignjević *et al.*, 2010).

The spreading of this moth species coincides with the spreading of *A. artemisiifolia*, which is probably aided by climate change (Mazzi & Dorn, 2012). Accordingly, the range of *A. candefacta* may be expected to increase in the future, and new records from Croatia, as well as from neighboring countries, are expected soon.

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НОВИ НАЛАЗИ *ACONTIA CANDEFACATA* (HUBNER, 1831)
(LEPIDOPTERA: NOCTUIDAE)
ИЗ ХРВАТСКЕ, СЛОВЕНИЈЕ И БОСНЕ И ХЕРЦЕГОВИНЕ

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Извод

У овом раду су приказани нови налази врсте *Acontia candefacta* у Хрватској, Словенији и Босни и Херцеговини. Након првих налаза у Хрватској 2019, врста се проширила већим делом земље, а врло је честа у северним крајевима. За Словенију и Босну и Херцеговину први налази су наведени у овом раду. У Словенији је врста забележена на два локалитета у близини границе са Хрватском, док је у Босни и Херцеговини врста забележена на два међусобно удаљена подручја, што указује да је у земљи широко распрострањена.

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