Cucullia argentina (Fabricius, 1787) and *Saragossa porosa porosa* (Eversmann, 1854) from the steppes of Dobrogea, Romania (Noctuidae)

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Abstract. *Cucullia argentina* (Fabricius, 1787) and *Saragossa porosa porosa* (Eversmann, 1854) are reported from the steppes of Dobrogea (south-eastern Romania). *Cucullia argentina* is new for the country's entomofauna while *S. p. porosa* is reported for the first time in Dobrogea and for the second time in Romania. Given the current data, both taxa reach in Dobrogea their south-western distribution limit in Europe. The relationship between *S. p. porosa* and *S. p. kenderesiensis* (Kovács, 1968) is discussed. The lack of clear morphological differences between the two taxa combined with their diminished range disjunction may require reconsidering the status of the subspecies *kenderesiensis*. The actual and potential distribution, ecology and conservation of *C. argentina* and *S. p. porosa* in Romania are discussed.

Résumé. *Cucullia argentina* (Fabricius, 1787) et *Saragossa porosa porosa* (Eversmann, 1854) sont rapportés des steppes de la Dobroudja (sud-est de la Roumanie). *Cucullia argentina* est une nouvelle espèce pour l'entomofaune du pays tandis que *S. p. porosa* est rapportée pour la première fois de la Dobroudja et pour la seconde fois de Roumanie. Les deux taxons atteignent donc dans la Dobroudja leur limite sud-occidentale en Europe. Le lien entre *S. p. porosa* et *S. p. kenderesiensis* (Kovács, 1968) est discuté. L'absence de différences morphologiques claires entre les deux taxons en combinaison avec la diminution de la disjonction de leurs aires de distribution pourraient signifier une nécessaire révision du statut de la sous-espèce *kenderesiensis*. La distribution actuelle et potentielle, l'écologie et la conservation de *C. argentina* et *S. p. porosa* en Roumanie sont commentées.

Rezumat. *Cucullia argentina* (Fabricius, 1787) şi *Saragossa porosa porosa* (Eversmann, 1854) sunt semnalate din stepele Dobrogei (sud-estul României). *Cucullia argentina* este specie nouă pentru fauna României, în timp ce *S. p. porosa* este semnalată pentru prima dată din Dobrogea şi pentru a doua oară în România. Având în vedere datele actuale, ambii taxoni ating în Dobrogea limita sud-vestică a distribuţiei în Europa. Relaţia dintre *S. p. porosa* şi *S. p. kenderesiensis* (Kovács, 1968) este comentată. Lipsa unor diferenţe morfologice clare între cei doi taxoni precum şi disjuncţia de areal mult diminuată ridică semne de întrebare asupra statutului subspeciei *kenderesiensis*. Distribuţia actuală şi potenţială precum şi aspecte legate de ecologia şi conservarea lui *C. argentina* şi *S. p. porosa* în România sunt comentate.

Introduction

Dobrogea is a historical region of ca. 15,500 km^2 which belongs to the Balkan Peninsula, the Danube representing the northern border of the Balkans (Fig. 1).

The first lepidopterist in Dobrogea was Josef Mann (1804–1889) from Vienna. In 1866 he published the first noticeable work on the Lepidoptera of Dobrogea province (Mann 1866), which at that time still belonged to the Ottoman Empire. During the XXth century, the Lepidoptera fauna of Dobrogea was studied by many Romanian lepidopterists. After 1980 research became even more intense through the efforts of a new generation of entomologists who turned Dobrogea into one of the best studied regions of Romania from the point of view of the Lepidoptera fauna.

The uniqueness of the Lepidoptera assemblages from Dobrogea is mainly determined by its geographic position, lying at the intersection of the faunal elements from Central

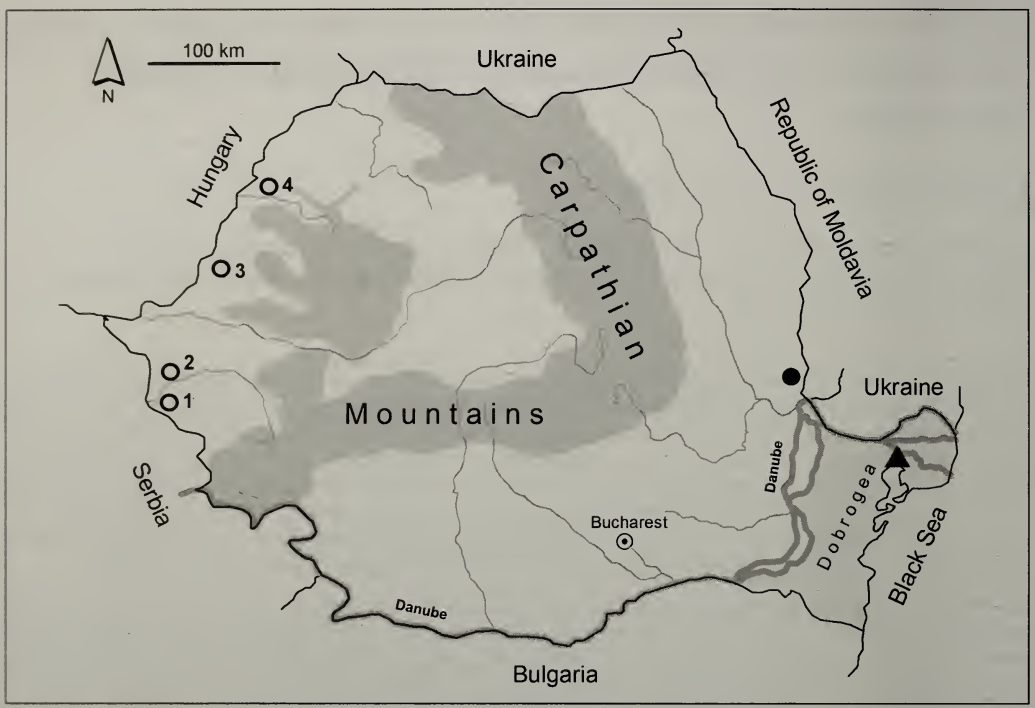

Fig. 1. Map of Romania indicating the position of Dobrogea and the distribution of *Cucullia argentina*, *Saragossa porosa porosa* and *S. porosa kenderesiensis*. ▲: New records of *C. argentina* and *S. p. porosa*: Sarinasuf-Plopu, Tulcea county (this paper); ●: *S. p. porosa*: Gârboavele forest, Galați county (Olaru & Nemeș 1969); O: 1, 2 – *S. p. kenderesiensis*: the area Peciu Nou – Diniaș – Cruceni – Giera, Timiș county (Rákosy 1996, Neumann 1997); 3 – Nădab, Arad county (Neumann 1997, 1998); 4 – ca. 5 km N of Oradea, Bihor county (Rákosy 1996).

Fig. 2. Map of Dobrogea indicating the collecting site (Sarinasuf-Plopu, Tulcea county – black triangle) of *Cucullia argentina* and *Saragossa porosa porosa*.

Fig. 3. Sarinasuf-Plopu (Tulcea county, northern Dobrogea) (26.viii.2007). The *Artemisia* steppe is the optimal habitat for *Cucullia argentina* and *Saragossa porosa porosa*. Photo L. Székely.

Fig. 4. Steppe area at Sarinasuf-Plopu (Tulcea county, northern Dobrogea). 27.viii.2008. Photo L. Székely.

Europe, the west-asiatic steppes, Asia Minor and the east of the Balkan Peninsula. Therefore, Dobrogea represents the western distributional limit for several Lepidoptera taxa being characteristic for the south Ukrainian steppes, for example *Megaspilates mundataria* (Stoll, 1782), (Geometridae), *Cucullia biornata* Fischer v. Waldheim, 1840, *Saragossa siccanorum* (Staudinger, 1870) (Noctuidae).

On the other hand, several southern taxa typical of the Balkan Peninsula reach their northern European distributional limit in Dobrogea, for example *Lemonia balcanica* Herrich-Schäffer, 1847 (Lemoniidae), *Asovia maeoticaria* (Alphéraky, 1876) (Geometridae), *Polyphaenis subsericata* Herrich-Schäffer, 1861, *Episema korsakovi* (Christoph, 1885), *Dichagyris melanura* (Kollar, 1846).

According to the most recent publications (e.g. Rákosy & Székely 1996; Rákosy & Wieser 2000; Székely 2006), Dobrogea has recorded almost 900 species of macrolepidoptera. However, recent research (e.g. Dincă & Vila 2008; Székely & Dincă 2008; Dincă et al. 2009; present paper) continue to deliver valuable results including the discovery of new taxa for Dobrogea and/or Romania, many of them of high zoogeographical significance for the fauna of Europe. Such examples are *Cucullia argentina* (Fabricius, 1787) and *Saragossa porosa porosa* (Eversmann, 1854), both reaching in Dobrogea their south-western limit of distribution in Europe.

Material and methods

The steppes of northern Dobrogea were investigated during 2007–2008: 25–27.viii.2007, 25–29.v.2008, 24–27.viii.2008, and 18–19.x.2008. The material was collected using classical methods: a 125 W mercury vapor bulb placed in front of a white sheet and powered by a portable gasoline generator. In addition, three to seven light traps with 8 W white and black light tubes were used during each collecting event.

The collecting site lies on the north-eastern shore of Razelm lake, namely between the villages of Plopu and Sarinasuf (Tulcea county, northern Dobrogea) (Fig. 2). The area has a pronounced steppe character (Figs 3, 4) and the salty soil allows for the considerable development of vegetation assemblages dominated by *Artemisia* (Asteraceae) (Fig. 3). The steppe meadows are not used for agriculture and the vegetation is allowed to develop to a certain extent due to extensive grazing by sheep, goats and cattle. These animals avoid the *Artemisia* plants which grow freely in the area.

Results and discussion

Cucullia argentina (Fabricius, 1787)

Material. **Romania**: 3♂, Northern Dobrogea, Tulcea county, Sarinasuf-Plopu, 2 m, 24–27.viii.2008, leg. & coll. L. Székely & I. Juhász.

Taxonomic notes. The *argentina* species group of *Cucullia* is characterized by morphologically similar species with entirely allopatric distributions. Although sometimes considered only as geographic subspecies of the same taxon, the Palaearctic taxa in the *argentina* group are generally recognized as distinct species: *Cucullia argentina*, *Cucullia nokra* Rungs, 1952, *Cucullia bubaceki* Kitt, 1925 and *Cucullia biradiata* Kozhanchikov, 1925 (Ronkay & Ronkay 1994).

Cucullia argentina was described by Fabricius based on material originating from Sarepta (Kazakhstan). Subsequently, several subspecies have been described under

Fig. 5. Male of *Cucullia argentina*, Sarinasuf-Plopu (Tulcea county, northern Dobrogea), 2 m, 24–27.viii. 2008. Photo L. Székely.

argentina such as: *achalina* Pungeler, 1900 (type locality Ashabad, Turkmenistan) and *grisescens* Wagner, 1931 (type locality Akşehir, Turkey). The name *grisescens* Wagner, 1931 being preoccupied by *Cucullia grisescens* Leech, 1900, has been replaced by *anatoliensis* Koçak, 1980 (Ronkay & Ronkay 1994). The subspecies *anatoliensis* was subsequently treated as synonym of the nominotypical subspecies (Hacker 1990; Ronkay & Ronkay 1994, 2006). Concerning the subspecies *achalina*, recent data suggest that this is in fact a distinct species so that *C. argentina* appears in its nominotypical subspecies throughout all its range (László Ronkay, pers. comm. 2009).

Considering Europe, *C. argentina* (Fig. 5) is similar in external appearance only to *Cucullia bubaceki* Kitt, 1925. The two taxa are strongly allopatric, with the latter being endemic to the Iberian Peninsula (Ronkay & Ronkay 1994).

Cucullia argentina is a small sized member of the genus, with a wing-span of 28–36 mm (our specimens have a wing-span of 31–33 mm).

Distribution. *Cucullia argentina* is widely distributed in the steppe areas of the center of the Palaearctic region (western and central Asia), but it usually appears in isolated colonies scattered across its range. The species ranges from western Siberia (e.g. Kurgansk, Omsk, Tomsk, Novosibirsk) (Zolotarenko & Dubatolov 2000), to central Asia: Mongolia, eastern Kazakhstan (Dzharkent), Uzbekistan (e.g. Chimkent, Issyk-Kul), western China (e.g. Kuldja, Tien-Shan, Altyn-Tagh) (Ronkay & Ronkay 1994, 2006; Wiesert 1998; Ivinskis & Miatleuski 1999; Kravchenko et al. 2005). The southern limit of the distribution passes through Daghestan (Nikolaevitch & Vjatcheslavovna 2002), central Turkey, western Iran, Irak (Ronkay & Ronkay 1994) and Israel (El Rom – the upper Golan Heights) (Kravchenko et al. 2005). *Cucullia argentina* reaches Europe towards its western limit of distribution: the south of the Ural mountains (Nupponen

& Fibiger 2002), western Kazakhstan (Hacker & Miatleuski 2001), eastern (Lugansk) and southern Ukraine (Kljuchko 2006; Kljuchko et al. 2006) including Crimea (Efetov & Budashkin 1990), Slovakia and eastern Romania (the current records). The records from Slovakia were for a long time considered as requiring confirmation (Ronkay & Ronkay 1994). In the collections of the Hungarian National History Museum of Budapest there is a specimen collected in eastern Slovakia (Presov) (labeled "Eperjes, 1914, leg. Issekutz"). The species was rediscovered in 1981 by Reiprich on the Plesivka planina (Plesivec) (Ronkay & Ronkay 2006).

The population discovered by us in south-eastern Romania (northern Dobrogea) lies at about 200 km from the nearest populations from southern Ukraine (area of Odessa) (see the distribution map from Kljuchko 2006). The species was not listed in the latest version of the Romanian Lepidoptera Catalogue (Rákosy et al. 2003) and is recorded hereafter for the first time in the Romanian entomofauna. There is no confirmed record of *C. argentina* from Bulgaria (S. Beshkov pers. comm.), so that the population from northern Dobrogea currently represents the south-western range limit of this taxon in Europe.

Biology and ecology. *Cucullia argentina* is a xerophilous species typical of the *Artemisia* steppes and can be found from dry semi-desert lowlands (e.g. our collecting locality is at 2 m above sea level) to arid mountain areas, up to 3000 m (Ronkay & Ronkay 1994).

The adults fly during the night, the specimens from Dobrogea being collected at light between 23:00 and 24:00.

With few exceptions (e.g. the Ural region), the species has two yearly broods (Ronkay & Ronkay 1994, 2006) extending over April–May and July–August, according to geographical position and local climate. In northern Dobrogea the moths most probably fly during May and August. The larval development takes place during June–July and September–October (Ronkay & Ronkay 1994). The adults overwinter as pupae (Ronkay & Ronkay 2006).

The reported larval food plants are various species of *Artemisia* (Asteraceae) (Ronkay & Ronkay 1994, 2006) among which *A. campestris* L. (Nupponen & Fibiger 2002; Kljuchko 2006) and *A. scoparia* Waldst & Kit (Kljuchko 2006). Although in the area of Sarinasuf-Plopu we observed high densities of *Artemisia* (Fig. 3), no larvae have yet been found, and the larval food-plant of *C. argentina* in Romania is yet unknown. The *Artemisia* plants could not be identified to species level because at the end of August (when *C. argentina* was collected) they did not have any leaves, which are critical for an exact determination.

Saragossa porosa porosa (Eversmann, 1854)

Material. Romania: 27♂, 12♀, Northern Dobrogea, Tulcea county, Sarinasuf-Plopu, 2 m, 26.viii.2007 (1♂); 25–29.v.2008 (14♂, 8♀); 24–27.viii.2008 (12♂, 4♀), leg. & coll. L. Székely & I. Juhász.

Taxonomic notes. The species was described by Eversmann from the south of the Ural Mountains (Orenburg). The subspecies *kenderesiensis* Kovács, 1968 was described from the Pannonian plain (Hungary) (Kovács, 1968), the collecting locality

Figs 6–7. *Saragossa porosa porosa*. **6**. Male of *Saragossa porosa porosa* Sarinasuf-Plopu (Tulcea county, northern Dobrogea), 26.v.2008. Photo L. Székely. **7**. Holotype of *Saragossa porosa kenderesiensis*, Kenderes (Hungary), 20.v.1964. In coll. Hungarian Natural History Museum. Photo L. Székely.

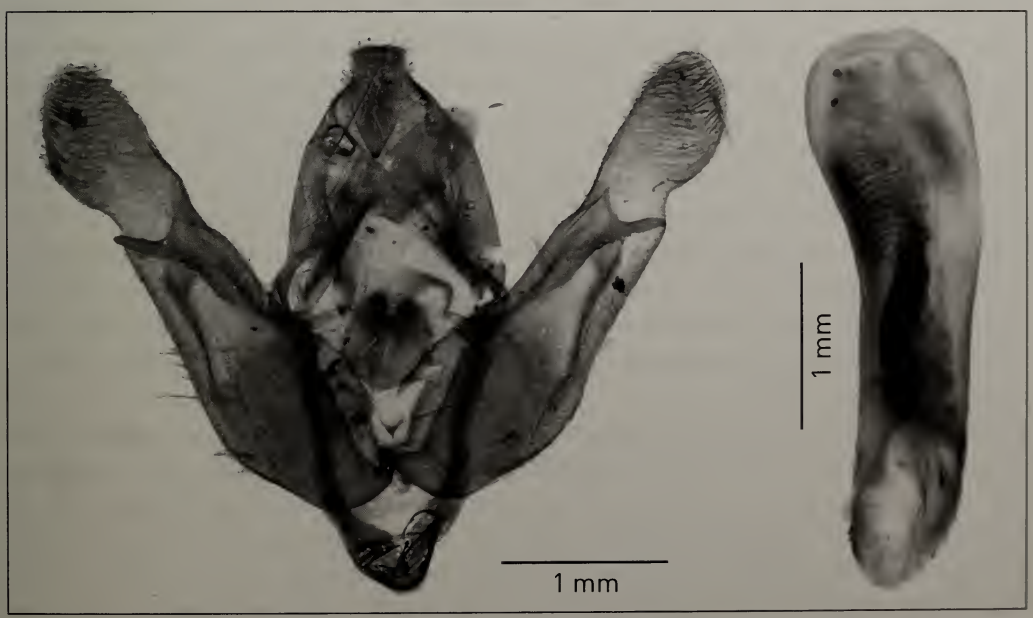

Fig. 8. Male genitalia of *Saragossa porosa porosa*, Sarinasuf-Plopu (Tulcea county), 24.viii.2008, prep. genit. 765/Dincă.

(Kenderes) lying far from the rest of the eastern European and west Asiatic populations. The taxonomic position of *S. porosa* changed repeatedly over time, the taxon being included in the genera *Orthosia* Ochsenheimer, 1816, *Hyssia* Guenée, 1852, *Sideridis* Hübner, [1821] or *Porosania* Beck, 2000 (Hacker et al. 2002). The species was placed within the genus *Saragossa* Staudinger, 1900 by Varga & Ronkay (1991) and Hacker et al. (2002).

Considering Europe, *S. porosa* (Figs 6, 7) is similar to *Hyssia cavernosa* (Eversmann, 1842), but a careful examination of the forewing pattern (and male antenna) allows for a safe separation. The two species can be easily separated based on both male and female genitalia (see Hacker et al. 2002).

According to the original description, the subspecies *kenderesiensis* (Fig. 7) differs from the nominotypical *porosa* through the darker and more brownish colour of the forewings that lack the violet tones. The wing span was reported to be slightly smaller in the case of *S. p. kenderesiensis* (19–33 mm) compared to *S. p. porosa* (29–35 mm) (Kovács 1968; Neumann 1997, 1998; Hacker et al. 2002; Kljuchko 2006). Our specimens have a wing span of 28–34 mm. All these data indicate that there is considerable overlap between the wing-span of the two subspecies.

Besides morphological differences, Kovács (1968) based his description of the subspecies *kenderesiensis* on the disjunct distribution of *S. porosa* which at that time was known to have eastern populations ranging only between the Volga and the Issyk-Kul and western populations restricted to the Pannonian Great Plain (Kovács 1968). Subsequently, new populations were discovered that considerably diminished the disjunction (see below under Distribution). It is also the case with the population recorded here from northern Dobrogea. With the new data, the disjunction becomes less pronounced, the current separation being of about 500 kilometers. Referring to the diagnosis of *S. p. kenderesiensis*, Hacker et al. (2002) mentioned the relative status of this subspecies that is only slightly differentiated from the nominotypical *S. p. porosa*. The male genitalia (Fig. 8) are reported to display insignificant differences between the two taxa (Hacker et al. 2002) (and see genitalia illustrations from Varga & Ronkay 1991; Rákosy 1996; Neumann 1997; Hacker et al. 2002).

The (1) slight wing pattern and size differences, (2) irrelevant distinction between the male genitalia and (3) considerably diminished range disjunction may require reconsideration of the status of the subspecies *kenderesiensis*. According to László Ronkay, *S. p. kenderesiensis* should not be considered as a distinct subspecies (L. Ronkay, pers. comm. 2009).

Distribution. *Saragossa porosa* has a wide distribution roughly following the presence of the western Asian and eastern European saline flats and *Artemisia* steppes. The nominotypical *S. p. porosa* is known from south-western Siberia (Novosibirsk) (Zolotarenko & Dubatolov 2000), southern Urals (Nupponen & Fibiger 2002, Ronkay & Ronkay 2006), Daghestan (Nikolaevitch & Vjatcheslavovna 2002, 2003), Kazakhstan, Kirghisia, across the northern shores of the Caspian Sea to the Aral Sea and the Issyk-Kul (Kyrgyzstan) (Hacker et al. 2002). In Europe, the species ranges from western Kazakhstan (Hacker & Miatleuski 2001) to eastern Ukraine (Lugansk) and southern Ukraine (Kljuchko 2006; Kljuchko et al. 2006).

The subspecies *kenderesiensis* seems to be endemic to the Pannonian Great Plain, being described and known initially from Hungary (Kovács 1968). More recently, *S. p. kenderesiensis* was discovered in western Romania. The first specimen was collected in 1994 at ca. 5 km north of Oradea (Bihor county, Crișana) (Rákosy 1996) and between 1995–1997 was found in a few other localities from western Romania (Timiș and Arad counties, Banat) (Neumann 1997, 1998) (Fig. 1).

Nevertheless, *S. porosa* was recorded for the first time from eastern Romania as "*Orthosia porosa* Ev." (one male taken on July 7th, Gârboavele forest, Galați county) in the late 60's (Olaru & Nemeș 1969) (Fig. 1). The record was not accompanied by adult or genitalia illustrations and no comments were made concerning subspecific

status. Popescu-Gorj (1987) did not include the species in the list of the Romanian Macrolepidoptera while Rákosy (1996) referred only to the records of the subspecies *kenderesiensis* from western Romania. The latest version of the Romanian Lepidoptera Catalogue (Rákosy et al. 2003) included the record of Olaru & Nemeş (1969) and commented that the population from Gârboavele forest probably belongs to a different subspecies. Given the geographical position of the collecting site, the specimen collected by Olaru & Nemeş (1969) most probably belongs to the nominotypical subspecies. As a matter of fact, Gârboavele forest is relatively near (ca. 100 km) to our newly reported locality from northern Dobrogea (Sarinasuf-Plopu) (Fig. 1) and at less than 200 km from the nearest records in Ukraine. The area Sarinasuf-Plopu itself lies even nearer (about 150 km) to the Ukrainian records (area south-west of Odessa) (see map in Kljuchko 2006).

Biology and ecology. *Saragossa porosa* is a halobiont xerothermophilous species characteristic of steppe areas with *Artemisia*. According to Hacker et al. (2002), the nominotypical *S. p. porosa* is univoltine (June–July), while *S. p. kenderesiensis* is bivoltine (April–May, end of July–beginning of September). Published data support the bivoltine character of *S. p. kenderesiensis* (e.g. Rákosy 1996, Neumann 1997, 1998), but also indicate partial overlaps between broods (Neumann 1998). However, the voltinism of *S. p. porosa* is not so clear. Several reported collecting dates from the literature referring to *S. p. porosa* suggest that this taxon has a variable flight period according to locality and might be bivoltine at least in some parts of its range (possibly with short time separation or even partial overlap between broods). For example, in low altitude areas (100–350 m) from the south of the Ural Mountains, *S. p. porosa* was collected between the end of May, throughout June and until the end of July (Nupponen & Fibiger 2002). It was also collected at the end of June at low elevation (ca. 25 m) in western Kazakhstan (Dzhanibek) (Hacker & Miatleuski 2001) and at the beginning of July in Daghestan (Mount Salatau, 1300 m) (Nikolaevitch & Vjatcheslavovna 2003).

According to our data, in Dobrogea it appears that the adults of *S. porosa porosa* fly during May–June and August–September. Nevertheless, the collecting date (7th of July) of the specimen reported by Olaru & Nemeş (1969) from the Gârboavele forest suggests possible partial overlaps between broods as in the case of *S. p. kenderesiensis*. This is probably due to late or early emerged adults of the first and second broods respectively. According to some authors, the second brood is more abundant (Neumann 1997), although we could not observe this phenomenon in the case of the population from northern Dobrogea where slightly more adults were collected during May.

The moths seem to be active all night as specimens were collected from dusk until 0300 in the morning.

The known larval food plants are *Artemisia maritima* L., *A. pontica* L. and *Tanacetum* sp. (Kovács 1968, Nowacki 1998, Hacker et al. 2002, Ronkay & Ronkay 2006, Klujchko 2006). Although no larvae of *S. p. porosa* have been found yet in the area Sarinasuf-Plopu, they most likely feed on *Artemisia* (species unidentified for the same reasons presented in the case of *C. argentina*), the plant being well represented at the collecting site.

Conservation of the steppe area of Sarinasuf-Plopu (northern Dobrogea)

Besides the two species discussed above, several other eremic taxa were collected in the steppe area of Sarinasuf-Plopu: *Cucullia biornata* Fischer v. Waldheim, 1840, *Cucullia scopariae* Dorfmeister, 1853, *Mycteroplus puniceago* (Boisduval, 1840), *Lacanobia blenna* (Hübner, [1824]), *Hadula stigmosa* (Christoph, 1887), *Saragossa siccanorum* (Staudinger, 1870), *Gortyna cervago* Eversmann, 1844, *Ulochlaena hirta* Hübner, [1813], *Chelis maculosa mannerheimii* (Duponchel, 1836), *Microloxia herbaria* (Hübner, [1813]), *Narraga tessularia kasyi* Moucha & Povolný, 1957, *Dyscia innocentaria* (Christoph, 1885), *Eupithecia biornata* Christoph, 1867, and *Eupithecia variostrigata* Alphéraky, 1878.

Many of these taxa are "rarities" in the Romanian entomofauna, often known based on only few specimens, while at Sarinasuf-Plopu they could be often observed in large numbers. Such examples are *H. stigmosa*, *M. puniceago* (30–50 specimens/night), and *N. tessularia kasyi* (more than 100 specimens/night).

These records point to the value of the steppe areas of Sarinasuf-Plopu, which were until now ignored by lepidopterists. Similar habitats where *Artemisia* is well represented are still to be found in several other parts of northern Dobrogea.

The main factor that could severely affect the investigated area is the ploughing of the land for agricultural purposes. Nevertheless, following the communist period (1989) intensive agricultural practices were much diminished and many areas were abandoned and naturally transformed into secondary steppes. This might allow a temporary recovery of the Lepidoptera fauna in open areas. Yet, the process risks being ephemeral as the natural trend of habitat closure (usually by vegetation successions leading to afforestation) might strongly affect such habitats in the medium and long term (Schmitt & Rákosy 2007).

Another significant disturbing factor in the area of Sarinasuf-Plopu is the burning of the vegetation over large areas. This method is still applied in the area, as even during August 2008 several hectares of burned vegetation could be observed.

The steppe area of Sarinasuf-Plopu could (and our data strongly indicate that it should) become a nature reserve with the mention that special attention should be paid to management aspects. Extensive and controlled grazing should be allowed in the area to maintain the steppe character and avoid habitat overgrowth by shrubs and trees.

Conclusions

The record of *C. argentina* from Sarinasuf-Plopu (Tulcea county) adds a new noctuid species to the check list of the Romanian Heterocera.

Saragossa porosa porosa is recorded for the first time from Dobrogea (Sarinasuf-Plopu) and for the second time in Romania, where it was known based on a single male.

The area of Sarinasuf-Plopu (the collecting site of both taxa) marks their south-western limit of distribution in Europe.

The slight external differences, irrelevant distinction between the male genitalia, and considerably diminished range disjunction between *S. p. porosa* and *S. p. kenderesiensis*

may require reconsideration of the status of the latter subspecies. Although insufficiently studied from a lepidopterological point of view, the steppe areas of Dobrogea already shelter many Lepidoptera taxa that are very localized in Romania and Europe.
Improving the knowledge of their natural capital and protecting such steppe areas is mandatory given their particular species assemblages and the fragility of the habitats, which are prone to various disturbances such as agriculture, excessive grazing, and land burning.

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References

Dincă, V. & R. Vila 2008. Improving the knowledge on Romanian Rhopalocera, including the rediscovery of *Polyommatus amandus* (Schneider, 1792) (Lycaenidae) and an application of DNA-based identification. – Nota Lepidopterologica **31** (1): 3–23.

Dincă, V., Cuvelier, S., Székely, L. & R. Vila 2009. New data on the Rhopalocera (Lepidoptera) of Dobrogea (south-eastern Romania). – Phegea **37** (1): 1–21.

Efetov, K. A. & Y. I. Budashkin 1990. Babochky Kryma – Tauria, Simferopol. 112 pp.

Hacker, H. 1990. Die Noctuidae Vorderasiens (Lepidoptera). – Neue Entomologische Nachrichten 27. Marktleuthen. 708 pp.

Hacker, H. & J. Miatleuski 2001. Noctuidae from the European part of Kazakhstan with first records of seven species for the European fauna (Lepidoptera). – Esperiana **8**: 811–824.

Hacker, H., Ronkay, L. & M. Hreblay 2002. Hadeninae I. Noctuidae Europaeae, vol. 4. – Entomological Press, Sorø. 419 pp.

Ivinskis, P. & J. Miatleuski 1999. Data on Noctuidae (Lepidoptera) of Turkmenistan. – Acta Zoologica Lituanica **9** (1): 201–208.

Kljuchko, Z. 2006. Sovky Ukrainy – The Noctuids of Ukraine. – Rajevsky Scientific Publishers, Kyiv. 248 pp.

Kljuchko, Z., Matov, A. Y. & I. G. Severov 2006. On the fauna of noctuids (Lepidoptera, Noctuidae s. l.) of Lugansk Area (Ukraine). – Eversmannia **5**: 24–35.

Kovács, L. 1968. Data to the knowledge of Hungarian Macrolepidoptera 3. New taxa from the subfamily Hadeninae. – Annales historico-naturales Musei nationalis hungarici **60**: 227–238.

Kravchenko, V. D., Fibiger, M., Muller, G. & L. Ronkay 2005. The Cuculliinae of Israel (Lepidoptera: Noctuidae). – SHILAP Revista de Lepidopterología **33** (129): 83–95.

Mann, J. 1866. Aufzählung der im Jahre 1865 in der Dobrudscha gesammelten Schmetterlinge. – Verhandlungen der k. k. zoologisch-botanischen Gesellschaft Wien **16**: 1–40.

Neumann, H. 1997. *Saragossa porosa kenderesiensis* Kovács, 1968 und *Cucullia dracunculi* Hübner, 1813 in Rumänien (Lepidoptera, Noctuidae). – Entomologica Romanica **2**: 85–88.

Neumann, H. 1998. Fauna de lepidoptere a zonelor sărăturoase din Câmpia Banatului. – Analele Banatului **4**: 185–212.

Nikolaevitch, P. A. & I. E. Vjatcheslavovna 2002. The Noctuidae (Lepidoptera) of the Daghestan Republic (Russia). – Phegea **30** (1): 11–36.

Nikolaevitch, P. A. & I. E. Vjatcheslavovna 2003. The Noctuidae (Lepidoptera) of the Daghestan Republic (Russia). II. – Phegea **31** (4): 167–181.

Nowacki, J. 1998. The Noctuids (Lepidoptera, Noctuidae) of Central Europe. – Pensoft. 51 pp., 65 pls.

Nupponen, K. & M. Fibiger 2002. Contribution to the knowledge of the fauna of Bombyces, Sphinges and Noctuidae of the Southern Ural Mountains, with description of a new *Dichagyris* (Lepidoptera: Lasiocampidae, Endromidae, Saturniidae, Sphingidae, Notodontidae, Noctuidae, Pantheidae, Lymantriidae, Nolidae, Arctiidae). – Phegea **30** (4): 121–185.

Olaru, V. & I. Nemeş 1969. Contribuţii la cunoaşterea lepidopterelor din pădurea Gârboavele. III. – Lucrările ştiinţifice ale Institutului Pedagogic Galaţi **3**: 126–133.

Popescu-Gorj, A. 1987. La liste systématique révisée des espèces de macrolépidoptères mentionnées dans la faune de Roumanie. Mise à jour de classification et nomenclature. – Travaux du Muséum National d'Histoire Naturelle „Grigore Antipa", Bucarest **29**: 69–123.

Rákosy, L. 1996. Die Noctuiden Rumäniens. – Staphia, Linz. 648 pp.

Rákosy, L. & L. Székely. 1996. Macrolepidopterele din sudul Dobrogei. – Entomologica Romanica **1**: 17–62.

Rákosy, L. & C. Wieser 2000. Das Macin Gebirge (Rumänien, Nord-Dobrudscha). Ein durch hohe Biodiversität gekennzeichnetes Refugium reliktärer Arten. Fauna und Flora, unter besonder Berücksichtigung der Schmetterlinge und der Vegetationsverhältnisse. – Carinthia II, Klagenfurt **190/110**: 7–116.

Rákosy, L., Goia, M. & Z. Kovács 2003. Catalogul Lepidopterelor României / Verzeichnis der Schmetterlinge Rumäniens. – Societatea Lepidopterologică Română, Cluj-Napoca, 446 pp.

Ronkay, G. & L. Ronkay 1994. Cuculliinae I. Noctuidae Europaeae, vol. 6. – Sorø, 282 pp.

Schmitt, T. & L. Rákosy 2007. Changes of traditional agrarian landscapes and their conservation implications: a case study of butterflies in Romania. – Diversity and Distributions **13**: 855–862.

Székely, L. 2006. Lepidopterele (Fluturii) din Delta Dunării. – Disz-Tipó, Săcele. 151 pp.

Székely, L. & V. Dincă 2008. *Cilix asiatica* O. Bang-Haas, 1907 (Lepidoptera: Drepanidae) in the Romanian entomofauna. – Entomologica Romanica **13**: 5–8.

Varga, Z. & L. Ronkay 1991. Taxonomic studies on the genera *Sideridis* Hübner, *Saragossa* Staudinger and *Conisania* Hampson (Lepidoptera, Noctuidae: Hadeninae). – Acta Zoologica Hungarica **37** (1–2): 145–172.

Wiesert, F. 1998. Beitrag zur Kenntnis der Lepidopterenfauna Zentralasiens. 2 Teil. – Zeitschrift der Arbeitsgemeinschaft der Österreichischen Entomologen **50**: 53–58.

Zolotarenko, G. S. & W. Dubatolov 2000. A check-list of Noctuidae (Lepidoptera) of the Russian part of the West Siberian plain. – Far Eastern Entomologist **94**: 1–23.