AGROCHOLA LUTEOGRISEA (WARREN, 1911) NEW FOR BULGARIA AND SERBIA AND DRYOBOTODES SERVADEII PARENZAN, 1982 (LEPIDOPTERA: NOCTUIDAE) NEW FOR SERBIA WITH TAXONOMIC NOTES ON DRYOBOTODES SERVADEII AND DRYOBOTODES MONOCHROMA (ESPER, [1790])

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Abstract
Agrochola luteogrisea (Warren, 1911) and Dryobotodes servadeii Parenzan, 1982 are reported for a first time for Serbia from the Vranje Region, in the south. Agrochola luteogrisea is also new for Bulgaria from the Kresna Gorge. This is a significant range extension for both species. Taxonomic notes on D. servadeii and D. monochroma (Esper, [1790]) are presented, along with illustrations of genitalia and critical comments about the interpretation of D. servadeii/D. monochroma in Noctuidae Europeae Vol. 5. It is likely that A. luteogrisea has been overlooked in Europe due to confusion with A. litura. Keywords: Bulgaria, Serbia, faunistics, taxonomy, Noctuidae, Lepidoptera.

Introduction
In 2015, the author collected Lepidoptera intensively in Serbia during the late summer and autumn mostly in the south near Preševo and in the Pčinja River Valley, Vranje Region.

Three types of light trap were used:
- Three portable traps each with one 8 watt actinic (368 nm) tube and one 8 watt “blacklight” tube, powered by a 12 volt battery;
- 20 watt, 368 nm, energy saver lamp, over the funnel and catching chamber.
- Finish type “tent” trap with 160 watt mv bulb at the top and 20 watt, 368 nm), energy saving lamp suspended below;

The distance between the traps was several hundred metres; all traps ran throughout the entire night. Material was collected by S. Beshkov & A. Nahirnić; for brevity, the collectors names do not appear later in this text.

Genitalia slides were prepared for the A. luteogrisea specimen and for 13 specimens of D. servadeii. These were compared with the closely related species Agrochola litura (Linnaeus, 1758) collected in Bulgaria and among this material were found two males of A. luteogrisea from the Kresna Gorge. They are illustrated with genital armature and everted vesica, together with Agrochola litura from Bulgaria.

Parts of the genitalia preparations, where necessary, were photographed in alcohol before mounting in Euparal. Genitalia were photographed with Zeiss
stereo microscope Stemi 2000-C with AxioCam E Rc 5s. Insects were photographed with Sony DSC-HX400V digital camera. Trips were self-financed by the author.

**Agrochola luteogrisea (Warren, 1911)**

Material collected: S. Serbia, Vranje Region, Mt. Starac, “Turski Grob” above Pčinja River Valley, N42°20’39” E021°53’02”, 799 m, 11.xi.2015, 1 male (Plate 1a), Gen. prep. 1/12.i.2016 S. Beshkov, male genitalia (Plate 3a) with everted vesica on glass in Euparal (Plate 3, e - h). Habitat there is meadow of *Chrysopogon gryllus* on sandy soil with *Juniperus oxycedrus* and *Quercus-Carpinus* (Ostryo-Carpinion aegeicum) forest around. This species was collected together with *Asteroscopus syriaca* (Warren, 1910) (Beshkov & Nahirnić, unpublished); SW Bulgaria, Struma Valley, Kresna Gorge, Stara Kresna Railway Station, 17.x.1987, 1 male (Plate 1a), Gen. prep. 3/04.vi.2016, S. Beshkov, male genitalia (Plate 3 b) with everted vesical on glass in Euparal; ibid, 28.x.1994 1 male (Plate 1c), Gen. prep. 2/04.vi.2016, S. Beshkov, male genitalia (Plate 3c) with everted vesical on glass in Euparal (Plate 4a - c).

In appearance *Agrochola luteogrisea* (Plate 1a - c) is very similar to *A. litura* (Plate 1 d), sometimes with only slight differences in the wing colouration. According to Ronkay, Yela & Hreblay (2001) *luteogrisea* may represent either the eastern (i.e. western Asian) subspecies of *A. litura* or a distinct, presumably allopatric species. For positive identification examination of the genitalia is necessary, including the everted vesica. However, the illustrations of male genitalia in Derra & Schreier (1990) of both *litura* from Germany and *luteogrisea* Warr. (as subspecies (?) of *litura*) from Turkey are not adequately informative. Here, therefore, I present the genital armature with fully everted vesica of both *A. luteogrisea* and *A. litura* in several natural positions in alcohol, photographed before mounting.

Female genitalia of both taxa are also illustrated (in monochrome) in Derra & Schreier (1990) with *A. litura* from Serbia (Niš) and of *A. luteogrisea* from Asiatic Turkey (Erzincan).

Male (with everted vesica) and female genitalia of *A. litura* and *A. meridionalis* are illustrated in Ronkay, Yela & Hreblay (2001), along with *A. litura*, *A. luteogrisea* and *A. meridionalis* (in colour). In Fibiger, Ronkay, Yela & Zilli (2010), *A. luteogrisea* is also illustrated in colour and the differences in the wing colour and pattern from *A. litura* are described. *A. meridionalis* however can be more easily split from the others by the shape of the genitalia, especially males. According to Ronkay, Yela & Hreblay (2001) genital differences between *A. litura* and *A. luteogrisea* are easily recognisable, but rather slight, with a certain amount of variation and are the main cause for uncertainty in the taxonomic interpretation of these two taxa. Fibiger, Ronkay,
Yela & Zilli (2010) also express the opinion that the genital structures of the *litura*-line are highly conservative and the differences in the genitalia are much smaller, sometimes subtle. The most important feature of the male genitalia is the shape of the valva, with the curved distal part, the more pointed apex and the more dentate ventral margin before the tip being characteristic of *A. luteogrisea* (Plate 3a - c), whilst in *A. litura* the valvae are with more straight in the distal part, less pointed and with less dentate ventral margin (Plate 3d). In the vesica of *A. luteogrisea* (Plate 3e- h; Plate 4) the shape and the size of the apical cornutus is specific in comparison with *A. litura* (Plate 5). A leg from the specimen from Kozhuh has been sent for DNA Bar Coding (Bar Code: BC SB LEP 0222).

The range of *A. luteogrisea* is restricted to Island of Samos, Turkey, Northern Syria, Northern Iraq and Armenia (Fibiger, Ronkay, Yela & Zilli, 2010, Fritsch, Stangelmaier, Top-Jensen & Bech, 2014). It is also confirmed for Northern Greece by Wegner (2011), who illustrates single male specimen, as well as the habitat in Greece, near Esemi Village in the Eastern Rhodopes. Fritsch, Stangelmaier, Top-Jensen & Bech (2014) also illustrated in colour a single [male] specimen from Samos Island, as well as the habitat. Amongst the material collected by the present author in Bulgaria, *A. luteogrisea* was found only in Kresna Gorge. Laszlo Ronkay also tried to find *A. luteogrisea* from south-west Bulgaria but was unsuccessful (L. Ronkay, pers. comm. January, 2016), but its presence in other places in south-west Bulgaria nevertheless seems very possible, perhaps in the Eastern Rhodopes and in the Republic of Macedonia and the Western Balkans. It is likely that *A. luteogrisea* has been overlooked in the Balkans and elsewhere in Europe due to confusion with *A. litura*.

**Dryobotodes servadeii Parenzan, 1982**

Material collected: S. Serbia, Vranje Region, Mt. Starac, “Turski Grob” above Pčinja River Valley, N42°20’39”": E021°53’02”, 799 m, 26.viii.2015, 1 male, Gen. prep. 1./14.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal. Habitat as described above for *A. luteogrisea*; S. Serbia, Preševo Region, above Trnava Village, 696 m, N42°16’33”": E021°36’57”, 18.ix.2015, 2 males, Gen. preps 3./14.i.2016 and 4./15.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal and 1 female, Gen. prep. 1./01.ii.2016, S. Beshkov, on glass in Euparal. Habitat is serpentine steppes in the forest belt of *Quercus pubescens* and *Q. petraea*; S. Serbia, Pčinja River Valley, Vražji Kamen near Trgovište Village, 663 m, N42°23’06”": E022°03’06” 21.ix.2015, 7 males, Gen. preps. 2./15.i.2016, 4./18.i.2016, 1./19.i.2016, and 2./19.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal. Habitat is *Carpino orientalis-Quercetum mixtum* near Molasse rocks with *Fraxinus ornus*, *Crataegus monogyna*, etc. For comparison 6 male specimens of *Dryobotodes*


monochroma (Esper, [1790]) were also examined: S. Serbia, Vranje Region, Mt. Starac, “Turski Grob” above Pčinja River Valley, N42°20’39”; E021°53’02”, 799 m, 26.viii.2015, 2 males, Gen. preps 1., 2. and 3./18.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal; Ibid, 19.ix.2015, 3 males, Gen. preps 2./14.i.2016 and 1./15.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal; E. Serbia, Pirot Region, Mt. Vidlič, near Crni Vrh top, 1046 m, N43°10’51”; E022°38’52”, 25.viii.2014, 1 male, Gen. prep. 3./15.i.2016, S. Beshkov, male genitalia with everted vesica on glass in Euparal. Habitat: EUNIS: E1.21 Helleno-Balkanic [*Satureja montana*] steppes. Limestone slopes with *Artemisia alba*, *Corothamnus procumbens*, etc. Last specimen is illustrated and published by Beshkov (2015). In Serbia, correctly identified *D. monochroma* are known from only two other localities in central western and in eastern Serbia (Stojanović and Dodok, 2007).

Parenzan (1982) described a species morphologically similar to \textit{D. eremita} (Fabricius, 1775) from Italy (Taranto and Potenza), but with male and female genitalia similar to \textit{D. monochroma} (Esper, [1790]). He illustrated the male and female genitalia of these two species as he found some good differences, which are confirmed by the present author. He named this species \textit{D. servadeii}. Male genitalia of both \textit{D. servadeii} and \textit{D. monochroma} from Bulgaria, including everted vesicas are correctly illustrated in Beshkov (2000). In Ronkay, Yela & Hreblay (2001) the female genitalia of \textit{monochroma} are correctly illustrated, but those purporting to be males of \textit{monochroma} from Greece are in fact \textit{D. servadeii servadeii}. \textit{Dryobotodes servadeii} is represented by its subspecies from Cyprus –

D. servadeii zenonides Nilsson, Svendsen & Fibiger, 1999. Therefore the description of the genitalia of these two species and the highlighted differences there are not useful. A similar situation exists with the colour illustrations in Ronkay, Yela & Hreblay (2001); those in Plate 12 figs 1-4 are D. servadeii, figs 6, 7 and 10 are D. monochroma, figs 6, 8 and 9 are more likely D. servadeii whilst the rest are correct.

The present author dissected 7 males and 1 female of D. servadeii and 6 males of D. monochroma from Serbia, although these two species can be separated by the wings pattern and colouration. In the males of D. servadeii (Plate 2 a, b) the forewings are narrow, bright, more contrasting with rusty scales. There are also dark male specimens (Plate 2e), as dark as the females (Plate 2f), which are more similar to D. eremita. In D. monochroma (Plate 2c, d) the forewings are almost “monochrome”, wide, matt, ash-grey. The hindwings offer better diagnostic features – in D. servadeii (Plate 2 a, b) they are bright white, with dark veins and discal spot and with black marginal line, the subterminal area slightly darker, mostly because of the darker veins there. In D. monochroma (Plate 2 c, d) the hindwings are darker, ash-grey, with dark veins and discal spot and with much darker subterminal part.

Differences in male and female genitalia are presented in the original description, in Italian. These differences are confirmed here, with some more important and constant additions.

**Male genitalia:** The valves of D. servadeii (Plate 6a, b, & c) stay less open than in D. monochroma (Plate 6d, e). The valva of D. servadeii is very broad and curved distally, narrower at the cucullus, just before the corona and the cucullus is rectangular. In D. monochroma valva is more straight and wider at the cucullus and the cucullus is trapezoidal. The ventral extension of the cucullus is more robust and straight in D. servadeii whilst in D. monochroma it is slender; the harpe is much longer and more massive and the uncus is visibly wider than in D. monochroma. The clavus in D. servadeii is smooth, in D. monochroma it is pubescent. An important feature is apical process of the fultura inferior – in D. servadeii it is irregular, finger like, curved at almost right angles (Plate 7a, b) but in D. monochroma it is more regular, conic, nor constricted than angled (Plate 7c, d). In D. servadeii the aedeagus is longer with small apical slightly dentate carina (Plate 6a – c; Plate 8 a) compared with that of D. monochroma (Plate 6d, e; Plate 8 b) which is shorter and with a strong, laterally-curved and backward-dentate apical process. In the everted vesica of D. servadeii there is large sclerotised pocket-like diverticulum and a big cornutus on the main tube near the field with spiculi (Plate 6a, b; Plate 8a). In D. monochroma the pocket-like diverticulum is much smaller and the big cornutus is on the diverticulum away of the field with spiculi (Plate 6 d, e; Plate 8b). There are significant differences in the size of the spiculi field and spiculi
size between both species. In *D. servadeii* the field is 0.65 – 0.9 mm, length of the spiculi with bulbus is 0.2–0.24 mm, bulbus size is 0.06-0.08 mm (Plate 7e). In *D. monochroma* the spiculi field is 1.0 – 1.2 mm, the length of the largest spiculi with bulbus is 0.36-0.46 mm, bulbus size is 0.02-0.04 mm (Plate 7f). Differences in the female genitalia are discussed and illustrated in Parenzan (1982) and in Ronkay, Yela & Hreblay (2001). Here the genitalia of the only female Serbian specimen collected are illustrated (Plate 8c, d).

According to Ronkay, Yela & Hreblay (2001) only few populations are known and a relatively small number of specimens have been recorded from those localities. It seems that *D. servadeii* is not so rare in Italy and Central and the southern Balkans in Greece, southern Serbia, South Bulgaria and the Republic of Macedonia; it probably also occurs in the western Blakans. On the other hand, *D. monochroma* appears rare in both Bulgaria and Serbia, although both species are sometimes syntopic and synchronic. In some of the localities in Serbia, *D. servadeii* is also syntopic and synchronic to *Praestilbia armeniaca* Staudinger, 1892, *Agrochola gratiosa* (Staudinger, 1882), *Polymixis serpentina* (Treitschke, 1825), *Xestia cohaesa* (Herrich-Schäffer, [1849]) and others (Beshkov & Nahirnić, in press).

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**References**


Bad Staffelstein.

