

## Providing a base for conservation of true bugs (Insecta, Heteroptera) and their saline habitats in Vojvodina (northern Serbia)

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### Abstract

Saline habitats of the Pannonian region are recognised as conservation priorities by EU legislation, and represent rare semi-natural habitats in mostly agricultural lowland of northern Serbia. Saline habitats have a key role in conservation of numerous plant and animal species in Vojvodina, as well as characteristic communities of true bugs. These insects belong to one of the most diverse insect groups in saline habitats. Species *Henestaris halophilus* (BURMEISTER, 1835), *Conostethus hungaricus* WAGNER, 1941 and *Solenoxyphus fuscovenosus* (FIEBER, 1864) are saline specialists and can be found only in these habitat types. True bugs have great qualities for future biomonitoring projects concerning habitats such as saline grasslands and wetlands. During the study, species *Hydrometra gracilentata* HORVÁTH, 1899 and *Solenoxyphus fuscovenosus* (FIEBER, 1864) are recorded for the first time in Serbia.

**Key words:** Hemiptera, salt steppes, salt marshes, alkaline lakes, Pannonian plain

Saline or halophytic habitats in Serbia are mostly situated in the northern part of the country, in Vojvodina Province, and these habitats are listed among the priority habitats by the Annex I of the EU Habitat Directive – 1530 \*Pannonic salt steppes and salt marshes (COUNCIL DIRECTIVE 92/43/EEC). The majority of these areas in Serbia have the status of Important Plant Area (IPA) (OFFICIAL GAZETTE OF REPUBLIC OF SERBIA, NO. 102/2010), further, some salt marshes and alkaline lakes are Important Bird Areas (IBA) and Ramsar Sites of high international value for migratory birds (PUZOVIĆ, 2009). Unlike plants and birds, the insect fauna of saline habitats in Serbia is poorly known, even though invertebrates have a basic role in trophic relationships in these areas and represent the majority of its zoocenosis (BOROS, 2003).

Extreme environmental conditions in saline habitats, such as long periods of drought during summer and

floods in spring (BOROS, 2003; TÖRÖK ET AL., 2011), are apparently not favourable for many groups of insects, but the true bugs are among the most abundant and the most diverse insects in them. The composition of true bug communities and the diversity of life forms reflect ecological complexity, as well as quality and authenticity of the habitats and ecosystems they inhabit (TORMA ET AL., 2010, 2014, KÖRÖSI ET AL., 2012). The most prominent researcher of true bug fauna in Vojvodina Province was a Hungarian heteropterologist dr Géza Horváth who published papers that also included specimens from saline habitats in Vojvodina Province (HORVÁTH, 1897, 1907), the former territory of the Austro-Hungarian Empire. The true bugs collected by Dr. Horváth are deposited in the Hungarian Natural History Museum in Budapest, on the other hand, the Natural History Museum in Belgrade holds just a few specimens from saline habitats in Banat (eastern part of

Vojvodina) (PROTIĆ, PERS. COMM. 2016). Considering that the Heteroptera fauna of saline habitats in northern Serbia is poorly studied and records of true bugs related to halophytic vegetation are scarce, our research is the first systematic research of this kind, realized through a project supported by the Rufford Foundation. The project “True bugs (Heteroptera) of halophytic habitats in Vojvodina – Providing data for conservation and popularisation of a neglected insect group” was aimed to initiate studies on true bugs in saline habitats of Serbia.

In 2015, true bugs were collected from five localities in Vojvodina Province where various saline habitats are present (Gakovo-Kruševlje, Srpski Miletić, Žabalj, Special Nature Reserves “Slano Kopovo” and “Selevenjske pustare”). True bugs were collected by the standard method of sweep netting in grasslands, and by an aquatic net in wetlands and lakes. Aiming to observe species abundance changing during the season (from April to October), sampling was conducted at the same locations every 20-30 days. A fair amount of material is still waiting to be processed, but preliminary results are also informative and some general conclusions could be drawn.

A total of 136 true bug species from 25 families were identified. About 70 % of the recorded species belongs to the Euro-Siberian faunal complex and most of them are typical residents of the Eurasian steppe fauna. Even in a partially examined true bug material, some important species are recorded. A rare semiaquatic species *Hydrometra gracilentata* HORVÁTH, 1899 (Fig. 1) and saline habitat specialist *Solenoxyphus fuscovenosus* (FIEBER, 1864) are recorded for the first time in Serbia in SNR “Selevenjske pustare” near Horgoš. Two specimens of *H. gracilentata* were collected in May and June in a small salt marsh pond at the locality of Stočni pašnjak. Five specimens of *S. fuscovenosus* were collected at the beginning of September at localities Stočni pašnjak and Kilapoš. Two more species typical for Eurasian saline habitats, *Henestaris halophilus* (BURMEISTER, 1835) (Fig.

2) and *Conostethus hungaricus* WAGNER, 1941 (Fig. 3), were also recorded during our research. *C. hungaricus* has been seen only in May and June on a few localities, but unlike the previous one, *H. halophilus* has been present on all studied localities for almost the whole season. Limited distribution and constant pressure on saline habitats in Europe make its inhabitants such as *S. fuscovenosus*, *C. hungaricus* and *H. halophilus* vulnerable, so in countries like Czech Republic (KMENT & VILÍMOVÁ, 2005), Slovakia (ŠTEPANOVIČOVÁ & BIANCHI, 2001) and Slovenia (OFFICIAL JOURNAL OF REPUBLIC OF SLOVENIA, NO. 82/02 & 42/10) these species are included in national Red Lists of true bugs. The completion of species identification could bring a new insight into the richness of the national entomofauna, complete the collection of true bugs in the national Natural History Museum in Belgrade and improve the legal status of most vulnerable taxa, since no species from saline habitats are included in the list of protected true bugs of Serbia (cf. OFFICIAL GAZETTE OF REPUBLIC OF SERBIA, NO. 5/2010 & 47/2011).



Figure 1. *Hydrometra gracilentata* (head) (photo: J. Šeat)



Figure 2. *Henestaris halophilus* (photo: J. Šeat)



Figure 3. *Conostethus hungaricus* (photo: J. Šeat)

As the legal status of the true bugs is not satisfactory, their saline habitats need protection on the national level as well. The majority of these habitats in Vojvodina are not situated within the borders of protected areas, and this is mostly the case with small patches of salt steppes and meadows. These isolated patches and their inhabitants are often endangered by drainage, overgrazing, ploughing and pesticide pollution originating from surrounding arable land.

Table 1. The most frequent true bug species in saline habitats of northern Serbia.

FAMILY	SPECIES
Tingidae	<i>Agramma (Agramma) confusum</i> (Puton, 1879)
Miridae	<i>Acetropis (Acetropis) carinata</i> (Herrich-Schäffer, 1841)
	<i>Acetropis (Acetropis) longirostris</i> Puton, 1875
	<i>Adelphocoris lineolatus</i> (Goeze, 1778)
	<i>Capsus ater</i> (Linnaeus, 1758)
	<i>Criocoris crassicornis</i> (Hahn, 1834)
	<i>Halticus apterus</i> (Linnaeus, 1758)
	<i>Notostira elongata</i> (Geoffroy, 1785)
	<i>Polymerus (Poeciloscytus) brevicornis</i> (Reuter, 1879)
	<i>Polymerus (Poeciloscytus) unifasciatus</i> (Fabricius, 1794)
	<i>Polymerus (Poeciloscytus) vulneratus</i> (Panzer 1806)
	<i>Stenodema (Brachystira) calcarata</i> (Fallen, 1807)
	<i>Stenotus binotatus</i> (Fabricius, 1794)
	<i>Trigonotylus caelestialium</i> (Kirkaldy, 1902)
	<i>Trigonotylus pulchellus</i> (Hahn, 1834)
Lygaeidae	<i>Henestaris halophilus</i> (Burmeister, 1835)
	<i>Ischnodemus sabuleti</i> (Fallen, 1826)
	<i>Lygaeosoma sardeum</i> Spinola, 1837
	<i>Pterotmetus staphyliniformis</i> (Schilling, 1829)
Rhopalidae	<i>Chorosoma schillingii</i> (Schilling, 1829)
	<i>Myrmus miriformis</i> (Fallen, 1807)
Scutelleridae	<i>Eurygaster maura</i> (Linnaeus, 1758)
Pentatomidae	<i>Aelia acuminata</i> (Linnaeus, 1758)
	<i>Neottiglossa leporina</i> (Herrich-Schäffer, 1830)

It is suggested that saline habitats in the near future get adequate legal status and management, considering its fundamental role for the maintenance of local biodiversity in mostly agricultural landscapes of Vojvodina (TUCAKOV, 2011).

Grasslands on salty soils are recognizable by their distinctive vegetation appearance, mostly consisting of a

variety of grasses and rare flowering plants (TÖRÖK ET AL., 2011). Scarcity of flowers in combination with other environmental conditions in these areas resulting in a lack of insects such as butterflies and bees, widely considered as bioindicators of grasslands. Therefore, in biomonitoring programs of saline habitats where the aforementioned pollinators are absent, other insects like true bugs could play an important role (LENGYEL ET AL., 2008, TORMA ET AL., 2010, 2014, KÖRÖSI ET AL., 2012). In some future monitoring projects of saline habitats in Serbia, particular attention should be paid to species and communities exclusive for halophytic vegetation.

#### ACKNOWLEDGMENTS

We want to thank MILOVAN ILIĆ, TANJA TUNIĆ, MILOŠ POPOVIĆ, DAVID GRABOVAC, RANKO PERIĆ, the PUBLIC ENTERPRISE “PALIĆ-LUDAŠ” and the HUNTING ASSOCIATIONS “NOVI BEČEJ” who helped us in realisation of our project, to the RUFFORD SMALL GRANT FOUNDATION for the financial support of the project and to reviewers for valuable corrections of our manuscript.

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## **Postavljanje temelja za očuvanje stjenica (Insecta, Heteroptera) i njihovih slatinskih staništa u Vojvodini (sjeverna Srbija)**

### **Sažetak**

Zakonodavstvo Evropske unije prepoznaje slatine panonske regije kao konzervacijski prioritetna poluprirodna staništa, jer predstavljaju pravu rjetkost u ravničarskom dijlu sjeverne Srbije, prepoznatljivom po prostranim poljoprivrednim površinama. Slatine su ključna staništa za očuvanje brojnih vrsta biljaka i životinja u Vojvodini, kao i karakterističnih zajednica stjenica. Ovi insekti se ubrajaju među najraznovrsnije grupe na slatinskim staništima, a vrste kao što su *Henestaris halophilus* (BURMEISTER, 1835), *Conostethus hungaricus* WAGNER, 1941 i *Solenoxyphus fuscovenosus* (FIEBER, 1864) su slatinski specijalisti, te se mogu sresti samo na zaslanjenim staništima. Stenice posjeduju brojne kvalitete dobre indikatorske grupe, što bi se moglo primjeniti u budućim projektima biološkog monitoringa staništa kao što su zaslanjena travnata i vlažna staništa. Tokom istraživanja zabilježeni su i prvi nalazi vrsta *Hydrometra gracilentata* HORVÁTH, 1899 i *Solenoxyphus fuscovenosus* (FIEBER, 1864) u Srbiji.

**Ključne riječi:** Hemiptera, slane stepe, slane močvare, alkalna jezera, Panonska nizina