

# SURVEY OF PROTECTED AND/OR NATURA 2000 AQUATIC INVERTEBRATE SPECIES ALONG THE TUR RIVER

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**Summary.** The primary aim of inventory of aquatic invertebrates of the Tur River (ROSCI0214) site of community were to detect presents two dragonfly species (*Coenagrion ornatum*, *Ophiogomphus cecilia*) and one water beetle (*Graphoderus bilineatus*) by surveying the potential habitats. In the case of *Coenagrion ornatum* were examined oxbows of the river Tur, without positive results. In every sampled habitats *C. puella* and *C. pulchellum* were identified. *Ophiogomphus cecilia* were examined the most suitable potential habitats along the Tur and Talna river, but neither the larvae and adults have been identified. In these habitats we managed to identify larvae and adults of *Gomphus vulgatissimus*. Oxbows of the river Tur were examined in case of *Graphoderus bilineatus*, but the presence of this species was not proved, but individuals of aquatic predators of *Graphoderus cinereus* and *Hydaticus aruspex* were identified in one of these oxbows. Individuals of thick shelled river mussel (*Unio crassus*) were identified at 12 sampling points along the river, where we didn't register significant changes compared to results of the 2015 survey.

**Rezumat.** Prin cercetarea speciilor de insecte acvatice din corpurile de apă din situl de interes comunitar ROSCI0214 Râul Tur am urmărit în primul rând detectarea a două specii de libelule (*Coenagrion ornatum*, *Ophiogomphus cecilia*) şi o specie de gândac acvatic (*Graphoderus bilineatus*) prin inventarierea potenţialelor habitate. În cazul speciei *Coenagrion ornatum* am vizitat habitatele din bălţile şi braţele moarte ale râului Tur dar fără rezultat pozitiv. Din genul *Coenagrion* am identificat speciile *C. puella* şi *C. pulchellum* în toate habitatele vizitate. În cazul speciei *Ophiogomphus cecilia* am vizitat potenţialele habitate din râul Talna şi Tur, dar tot fără rezultat pozitiv. Am reuşit să identificăm de mai multe ori specia *Gomphus vulgatissimus*, atât adulţii de-a lungul râului Tur, cât şi larvele în apa Talnei. În cazul gândacului acvatic *Graphoderus bilineatus* am vizitat bălţile şi braţele moarte ale râului Tur dar specia nu a fost identificată. Într-unul dintre braţele moarte de lângă Terebeşti am identificat speciile de gândaci prădători acvatice *Graphoderus cinereus* şi *Hydaticus aruspex*. Specia de moluscă *Unio crassus* a fost identificat în 12 staţii vizitate, unde nu am constatat o schimbare semnificativă faţă de densitatea speciei înregistrată în anul 2015.

**Kivonat.** Vízi rovarfajok felmérésének a célja a ROSCI0214 Túr közösségi jelentőségű élőhelyen két szitakötő faj (*Coenagrion ornatum*, *Ophiogomphus cecilia*) és egy vízi bogár (*Graphoderus bilineatus*) faj felkutatása a potenciális élőhelyeik felmérésével. A *Coenagrion ornatum* faj lárváit és imágóit a Túr folyó holtmedreiben és holtágaiban, valamint a Vármegye Árokban kerestük. Bár valamennyi feltérképezett élőhelyen azonosítottuk a *Coenagrion* nemzetséghez tartozó *C. puella* és *C. pulchellum* fajokat, a keresett *C. ornatum* sem lárvá formájában nem került elő. Az *Ophiogomphus cecilia* faj esetében felkerestük a Talna és a Túr folyók potenciális élőhelyeit, de a fajt sem lárvá, sem imágó formában nem találtuk meg. Ezek az élőhelyeken sikerült azonosítanunk a *Gomphus vulgatissimus* faj lárváit és imágóit. A *Graphoderus bilineatus* bogár esetében a Túr holtágait és holtmedreit kerestük fel, azonban a faj nem került elő. A keresés során a *Graphoderus cinereus* és a *Hydaticus aruspex* vízi ragadozó bogarak egyedeit sikeresen azonosítottuk. A tompa folyamkagyló *Unio crassus* egyedeit 12 ponton azonosítottuk a folyó mentén, amelyeken nem találtunk jelentős eltérést a 2015-ös állománybecslés eredményeihez viszonyítva.

## Introduction

Regarding dragonfly and damselfly species present in the Tur river area 18 species were assessed before 2011 (Szállassy 2008). The damselfly *C. ornatum* was surveyed in a three-year period during 2015-2017 along lowland creeks. Between 06.10.2018 and 30.06.2019 there were surveyed the following species: *Coenagrion ornatum*, *Ophiogomphus cecilia*. The species *Graphoderus bilineatus* was surveyed in the period of highest probability of adult catching (Cuppen et al. 2006). The beetle (Insecta: Coleoptera) fauna of Satu-Mare county was studied especially at the end of the 19<sup>th</sup> and the beginning of 20<sup>th</sup> century (e.g., Bíró 1884). In recent decades, few works have appeared regarding the beetles of Satu Mare county (e.g., Balog et al. 1997). The presence of the species *Graphoderus bilineatus* was already surveyed in the Tur river catchment area, but the species was not found (Anghiuş et al. 2016).

In Romania, the thick shelled river mussel inhabits streams and rivers, being more common in the waters of the hilly and plateau sector than in the plain. It is a demanding species in terms of water and sediment quality conditions, requiring running water, well oxygenated and clean sediments, sandy or moderately muddy substrate (without excessive content of organic matter), with low salinity (Sârbu et al 2012). The freshwater mussel *Unio crassus* was sampled based on the sampling procedure developed in 2015.

## Methods

### Survey methods of *Graphoderus bilineatus*

We have surveyed the habitats of the species based on the available methodology and habitat descriptions (Cupper et al. 2006). There were examined oxbows of the river Tur but the presence of this species was not



proved. The only assessed *Graphoderus* species was *G. cinereus*. Sampling was performed with a standard macrofauna net (width 30 cm, mesh size 0.5 mm), which was pushed over the bottom and through the vegetation, or scraped against the banks in oxbows of Tur river.

#### Survey methods of Odonata species

One part of protected area (only the slow flowing creeks) was surveyed in a three years period between: 2015-2017. The survey of the two Odonata species has focused on the sampling of both larvae, exuviae and adult specimens. For the survey of Odonata larvae we have used a hand net (0.25 × 0.25 m frame size, 950 μm mesh size, 1.5 m long handle). The sampling of adult specimens was carried out on the whole flying period of the species. The sampling needed adequate weather conditions. There were sampled the following waters: Tur river, Talna river, Egherul Mare stream.

#### Survey methods of *Unio crassus*

The freshwater mussel *Unio crassus* was sampled based on the sampling procedure developed in 2015, to compare the distribution of the species resulted from that investigation. As the riverbed can change in the course of 5 years and mussels also can move to more favorable sites, the sampling points presented on the map are in fact 100 meter sections of the river where we searched for mussels. The riverbed was inspected by hand to the depth of 1-1.2 meter. When we found an individual, we placed a 1 m<sup>2</sup> sampling quadrat and searched for other individuals.

### Results

***Graphoderus bilineatus* (ENG: water beetle / HU: széles tavicsíkbogár / RO: gândacul de apă gulerat)**

**Description and habitat.** The water beetle *G. bilineatus* (De Geer, 1774) (Coleoptera: Dytiscidae) is a middle-sized extremely rare and endangered beetle with a length of 14-16 mm. The body is broadly oval with its maximum width posterior to the middle. The main color of the dorsal side is pale yellow and black, the ventral side is pale yellow. Adults and larvae are carnivorous, feeding on small invertebrates. When this resource is limited the young larvae spend more time near the bottom in search of other prey items, as do the older instars, which are also frequently hunting in dense submerged vegetation. Food preferences of the adult beetle are not known for certain as crop contents have never been investigated. Its lifecycle is probably univoltine, with adults dying after the reproduction period (Cuppen et al. 2006).

Sampling was performed with a standard macrofauna net (width 30 cm, mesh size 0.5 mm), which was pushed over the bottom and through the

vegetation, or scraped against the banks in oxbows of Tur river.

**Conservation status:** Habitats Directive 92/43/CEE, Annex II; Endangered regarding to IUCN Red List

#### Results of the survey:

We did not find the species *G. bilineatus*. All the captured specimens have belonged to the species *G. cinereus*.

***Coenagrion ornatum* (ENG: ornate bluet / HU: díszes légivadász / RO: ---)**

**Description and habitat:** The ornate bluet (Odonata, Zygoptera, Coenagrionidae, *C. ornatum* Selys, 1850) represents a threatened species of lowland headwater streams. *C. ornatum* is a small, robust species with relatively broad wings. Males have a very bright blue abdomen with the black pattern distinctive.

Flight period: from May to mid-July

Biology: Frequents small, shallow streams with a slow current. *C. ornatum* does not move far from its breeding sites.

**Conservation status:** Habitats Directive 92/43/CEE, Annex II, IV; in Romania - OUG 57/2007 Annex 3, 4A; Near threatened due to the IUCN Red List.

**Results of the survey:** We did not find larvae belonging to this species. There were surveyed the Tur river, Talna river, Egherul Mare stream in October 2018 for larvae

***Ophiogomphus cecilia* (ENG: green snaketail / HU: erdei szitakötő / RO: ---)**

**Description and habitat:** The green snaketail dragonfly (Odonata, Anisoptera, Gomphidae, *O. cecilia* (Fourcroy, 1785)) is a large gomphid with a pale ground-color of the thorax and green anterior abdominal segments in mature specimens. Pure yellow coloration is present on the more posterior abdominal segments and on the legs.

Flight period: from end of May-to end of September

Biology: Frequents rivers with sandy beds. Adults rest on the ground or on vegetation, and it is usually a difficult species to approach closely.

**Conservation status:** Habitats Directive 92/43/CEE, Annex II, IV; in Romania - OUG 57/2007 Annex 3, 4A; Least concern due to the IUCN Red List.

**Results of the survey:** We did not find larvae belonging to this species. There were surveyed the Tur river, Talna river, Egherul Mare stream in October 2018 for larvae

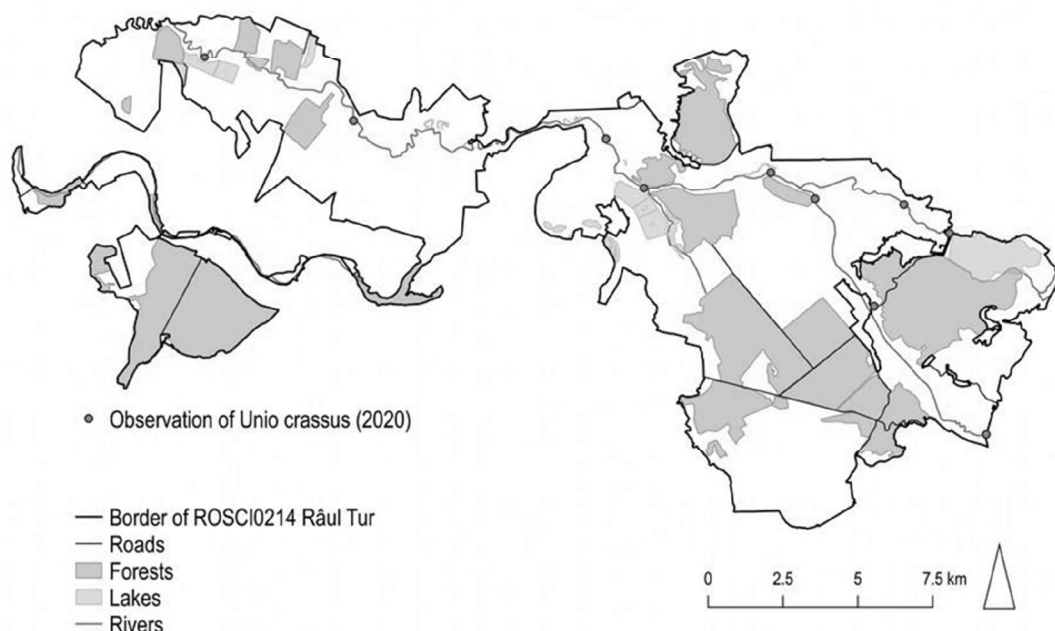
***Unio crassus* (ENG: thick shelled river mussel / HU: tompa folyamkagyló / RO: scoică mică de râu)**

**Description and habitat:** The thick shelled river mussel is 30-70 mm long freshwater species, in general is twice as long as high. Anterior region is well rounded, wide and short. Posterior part is often dilated, elongated. Colour varies from light green-brown with rays to dark brown to black. In Romania it is present in streams and rivers, being more frequent in the waters of the hilly and plateau sector than in the plain. It is sensitive to water quality conditions, requiring running water, well oxygenated and clean sediments; sandy or moderately muddy substrate (without excessive content of organic matter), with low salinity. Prefers sediment with sand, often mixed with gravel but also with mud, occasionally we can find it in

muddy structures among large stones. Reproduction period is in April-August, the larvae are ectoparasites on the gill of fish, after reaching cca 300  $\mu\text{m}$  length detaches from the fish. Sexual maturity is attained in the 2<sup>nd</sup>-5<sup>th</sup> year of life.

**Conservation status:** *Unio crassus* is listed in annexes II and IV of the EU Habitat Directive, and in the IUCN Red List is listed as Endangered (EN). Romania is also protected by appendixes III and IV.A of the Law no. 49/2011

**Results of the survey:** We checked 12 sampling stations on the main river and its tributary, the Talna River. The results are summarized on the **Figure 1**.



**Fig 1.** Observations of *Unio crassus*

### Pressure and threats

- the sudden change of water levels caused by the irregular opening and closing of the river dam at Călinești may cause a higher mortality rate among the mussels, who are settled close to the river edge. When the water level drops rapidly, they cannot follow, and will remain on the dry mud and facing a higher risk of predation by birds and mammals, apart of dying of deshidratation.
- the sediment is full of a large range of different garbage – mainly of plastic origin.
- trampling by cattle. Some long section of the river bends are used by cattle and sheep for daily water drinking. While sheep stays on the shore, cows enter into the water on the whole width of the river, sometimes even on 2-300 meter stretch. Examining the sediment, it is devastated by the small depressions

left by the cow's feet. This daily disturbance makes impossible the settlement of mussels. At the points where there were found mussel colonies in 2015, they totally disappeared because of these disturbance, or we found only a few juvenile individuals. We strongly recommend the limitation of sites used by cattle for daily drinking.

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