

A New Method for the Investigations of Spiders Living in Flooded Areas of Hungarian Wetlands

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Abstract – We have developed and tested a new method for the investigation of spiders living on wetland plants in the flooded areas of the reeds. The occupation of the new reed traps varied between 28 and 85% depending on the different collection points and collection periods (summer, winter). More than 80% of the collected arthropods were spiders. The different zones of reeds, and also the differences due to different reeds management (eg harvesting, burning) and the seasonal periods could be effectively and quantitatively investigated using this new method.

Keywords: foliage-dwelling spiders / reeds / reed trap / flooded areas / trapping methods

1. INTRODUCTION

In the last years, research of reeds, as typical marshland habitats, received special attention in Europe (DITLHOGO et al. 1992, RUZICKA – HOLEC 1998, OSTENDORP 1999, KOMPOSCH 2000) and in Hungary too (SZINETÁR 1993, SZATHMÁRY 1995, VÁSÁRHELYI 1995, SZINETÁR 2000, SZITA et al 2002, SZINETÁR – EICHARDT 2004, KANCSAL et al. 2007, SZINETÁR – KANCSAL 2007). Several national parks had been established for the preservation of these habitats, and numerous international treaties were signed to ensure their survival. In spite of the intensive efforts, our knowledge, concerning some groups of animals, including spiders living in the reeds, is still incomplete; partially due to research-methodological reasons. In these habitats the collection of ground-dwelling species is hindered by permanent or periodic water coverage, whereas well established trapping methods developed for other habitats for the collection of foliage-dwelling spiders, such as sweep-netting and beating-netting, are not appropriate. For the elimination of the problems caused by water coverage different floating traps could be used (RUZICKA 1982, HOLEC 2000). We have successfully adapted these methods in our national studies (KANCSAL et al 2010). Although the intensive research resulted in many new findings (UHL et al 1992, SZINETÁR – KANCSAL 2007), it could be assumed that the introduction of a new and standardizable sampling method could lead to many further valuable discoveries. For this reason we have developed and tested a new sampling method for the collection of foliage-dwelling species. The idea of this new sampling method is based on the observation that spiders and other arthropods could often be found in the cavity of broken reeds; they use these holes as hiding place, for taking care of the offsprings or as wintering place etc. We hypothesized if the amount of these naturally broken reeds is limited in the habitat then the spiders will occupy artificial broken up reed parts (opened up, strategically placed and attached to the side of the natural reed). (Analogy: artificial cavities are preferred nesting places of birds in forests with limited hollow trees).

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2. METHODS

2.1. Study sites

Field testing was carried out in the Reeds of the three largest lakes in Hungary (lakes Balaton, Neusiedl and Velence) and a smaller fishing lake in West-Transdanubia (Sumony) in parallel between July of 2010 and August of 2011. Later we performed collections again at lake Neusiedl (in the Fall of 2011) and lake Velence (in the Winter of 2012).

2.2. Sampling

Reed traps were created by opening up the bottom part of short pieces (about 10 cm) reeds. This way a hollow, protected from above dwelling was formed which was ideal for the spiders and other species to spontaneously occupy. The reed traps were fixed to the reeds at predetermined sampling locations, which could be varied by the experimenter to sample different populations. Reed traps were collected and analyzed at site or in the laboratory after the sampling period. The trapped species were set free after the experiment, except some spiders which had to be conserved in 70% ethanol for further microscopic investigations. We compiled a collection from the collected species.

3. RESULTS AND DISCUSSION

We have placed out a total number of 671 Reed Traps in the reeds of 4 lakes of Hungary between July of 2010 and August of 2011. Out of these we have successfully collected 607 traps. This small number of trap loss was caused primarily by the ice in the winter and the larger waves on the lakes. 54% of the collected traps contained live occupants. Counting all of the traps with some signs of former occupation (skin */exuvium/*, food residues, excrement, webs, etc..) we could conclude that 75% of traps had occupants for some time in the sample period. The total number of collected live species was 590. 85% of these were spiders representing at least 12 species. From some species adult specimen was not found, yet; they are not included in the list below. Spider species collected with red traps according to frequency: *Clubiona phragmitis* C. L. Koch, 1843, *Donacochara speciosa* (Thorell, 1875), *Larinioides suspicax* (O. P. –Cambridge, 1876), *Mendoza canestrinii* (Ninni, 1868), *Larinia elegans* Spassky, 1939, *Clubiona juvenis* Simon, 1878, *Tetragnatha striata* L. Koch, 1862, *Singa nitidula* C. L. Koch, 1844, *Enoplognatha mordax* (Thorell, 1875).

The most common non-spider species were the followings in the traps: beetles, hymenopteras, earwigs, acari, amphipods and snails.

Preliminary Conclusions

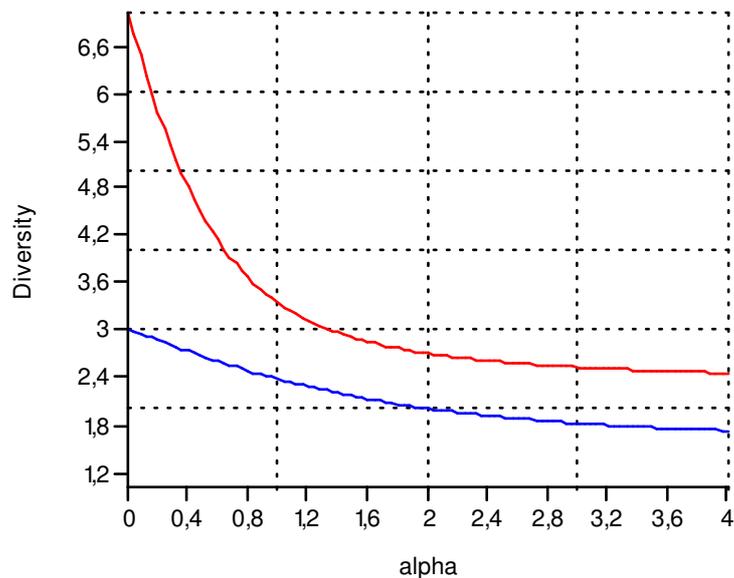
Reed trap method proved to be very effective, much exceeding our preliminary expectations.

Recognized benefits of the method:

- It causes only a minimal disturbance of the habitat
- The species are captured alive
- Species can be released after analysis
- The opened up (lengthwise split) trap could be reclosed again allowing further development/observation of the occupant species. For example development of a cocoon, shedding, molting, a species infected by a parasite, a species in the middle of

development, larva stage of an insect, etc.. The trap could be opened up any time again (and again) and the development/fate of the occupant could be reinvestigated or followed

- A wide range of information could be collected concerning a number of rare, habitat specialist species (such as: *Larinia elegans*, *Donacochara speciosa*)
 - Presence – absence
 - Abundance
 - Phenology
 - Mating and parental care habits
 - Shedding
 - Wintering
 - Interaction of different species (joint wintering or pray-predator relationships)
- The different zones of Reeds, and also the differences due to different reeds management (eg harvesting, burning) and the seasonal periods (summer-winter - see the figure 1.) could be effectively and quantitatively investigated using this new method.



1 Figure Diversity ordering of the spider community at the Fertő Lake
Red: summer samples; Blue: winter samples (Rényi-diversity ordering method)

It was an interesting observation that some species occurred at different frequencies at different heights. *Larinia elegans* was twice as common at a height of 90 cm as at 60 cm. In contrast, the night hunter *Clubiona phragmitis* occurred with the same incidence at the two investigated heights.

Recognized problems with the method:

- Selective collection. Some species with proven habitat in the reeds do not use the reed traps or get in it only by chance (for example as prey). For example, based on our observations, the *Tetragnata* species living in the reeds (*T. striata*, *T. shoshone*, *T. reimoseri*) are definitely underrepresented in the obtained samples. Thus, this method is not appropriate for the detection or abundance measurements of these species.
- If the reed traps were placed not on reed but on other plants standing in water such as *Schoenoplectus litoralis*, which does not offer a hiding place for *Tetragnatha* species neither among the leaves nor under the leaves, then these species typically occupied the inside of the reed traps.

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