

Short note

Some Data on the Terrestrial Isopods (Isopoda, Oniscidea) from a Wet Meadow near an Artificial Canal in North-Western Romania

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Abstract. We studied the terrestrial isopod fauna in a wet grassy area near an artificial canal in the northern part of the Western Plain, Romania, between April and September 2009. We identified five terrestrial isopod species: *Hyloniscus riparius*, *Trachelipus arcuatus*, *T. rathkii*, *T. nodulosus* and *Armadillidium vulgare*. The dominant species were *T. rathkii*, *A. vulgare* and *T. nodulosus*. Despite of the unforested character of the habitat, a sylvan species, *T. arcuatus*, was also present. This species could probably survive in the wet areas surrounding the canal following deforestation. The highest abundance was observed during the summer months, corresponding to the main activity period of females with marsupium.

Key words: wetland, praticalous and sylvan isopods, surface activity, pitfall trapping.

In the north-western part of Romania, terrestrial isopods have been observed both in opened habitats, poor in vegetation, as well as in forested areas, the most numerous populations being identified in the natural areas with dense vegetation (TOMESCU *et al.*, 2008). However, in opened habitats of wet areas there are favourable conditions for many terrestrial isopod species (WIJNHOFEN, 2000). In the north-western part of Romania, many natural swamps were eliminated (see in: ARDELEAN & KARACSONYI, 2005) or fragmented, reduced to areas neighbouring canals. Despite their decreased dimensions, these wet areas still shelter species of the initial swamps (COVACIU-MARCOV *et al.*, 2008). Thus, we have proposed to verify if this situation is also valid in the case of isopods, analysing

assemblages from a wet area that border an artificial canal from north-western Romania. Moreover, the fact that the samples were taken monthly, allowed analysing the dynamics of the isopod assemblages.

The investigated habitat is located in north-western Romania, in Somes Plain, near Caraseu locality (47°43'41.33"N / 23°06'24.41"E) at 131 m a.s.l. A wet area formed along an artificial canal represents it. The vegetation is represented by a dense grassland (coverage almost 100%). The habitat is situated near a road, at approximately 500 m from the locality, presenting a high degree of anthropogenic disturbance. The neighbouring areas were used as pastures and agricultural fields. The study took place in 2009, from April to September. The samples were taken by

pitfall traps, three of them being placed in each study month. These were positioned near the water, at approximately 7 m from each other, in areas with rich vegetation and high humidity. Traps were emptied monthly (at the beginning of each month), from May to October, reflecting the isopods' surface activity during the previous month. The method allowed collecting only the terrestrial isopod species with high mobility (e.g. TOMESCU *et al.*, 2008). Species were identified in the laboratory using the keys (e.g. RADU, 1983, 1985) in accordance with the present nomenclature (SCHMALFUSS, 2003). The study aimed to get data on the dynamics of the terrestrial isopod assemblages. We calculated the relative abundance of the species and their

frequency in the traps during the study period. The diversity was estimated in different months, using Shannon-Wiever diversity index (SHANNON & WIEVER, 1949). The Kruskal-Wallis test (ZAR, 1999) was used in order to compare the differences between the periods.

We identified five terrestrial isopod species at Caraseu, belonging to several ecological categories (Radu 1983, 1985): paludicolous (*Hyloniscus riparius*), sylvan (*Trachelipus arcuatus*), euritope (*Trachelipus rathkii*) and praticolous species (*Trachelipus nodulosus* and *Armadillidium vulgare*). On a whole, we identified 194 individuals. *T. rathkii*, *A. vulgare* and *T. nodulosus* were the most abundant species (Table 1).

Table 1. The terrestrial isopod species' relative abundance (A%) and frequency (f%)

Species		<i>H. riparius</i>	<i>T. arcuatus</i>	<i>T. rathkii</i>	<i>T. nodulosus</i>	<i>A. vulgare</i>
Males	A%	0.94	7.54	48.11	11.32	32.08
	f%	7.14	7.14	85.71	42.86	64.29
Total females	A%	1.13	3.40	46.59	12.50	36.36
	f%	7.14	7.14	78.57	50.00	57.14
Females with marsupium	A%	1.13	2.27	23.86	2.27	10.23
	f%	7.14	7.14	35.71	14.29	7.14
Total	A%	0.94	5.18	46.23	12.26	35.38
	f%	7.14	7.14	92.86	57.14	64.29

Table 2. The terrestrial isopod species' relative abundance (A%) and diversity (H) depending on the study periods (A - % of all individuals from a species collected during the whole season)

Season		April	May	June	July	August	September
Total	A%	12.74	4.24	24.53	40.57	6.60	11.32
	H	0.74	0.31	0.91	1.09	0.52	0.68
<i>H. riparius</i>	A%	100.00	-	-	-	-	-
<i>T. arcuatus</i>	A%	-	-	100.00	-	-	-
<i>T. rathkii</i>	A%	17.35	5.10	28.57	41.84	5.10	2.04
<i>T. nodulosus</i>	A%	23.08	-	19.23	42.31	3.84	11.54
<i>A. vulgare</i>	A%	2.667	5.33	10.67	45.33	10.67	25.33

Differences in the species' relative abundance and frequency can be observed depending on time period. The values were slightly high during the first sampling period, after which they decreased, and then rose again during July and August. The highest relative abundance of individuals was observed in July. Regarding the species'

diversity, the highest values were registered in June and July (Table 2). Kruskal-Wallis test ($H=4.38$, $df=5$, $p>0.05$) proved that seasonal differences are not significant.

The number of identified species in the area was lower than in other studies from Romania (e.g. TOMESCU *et al.*, 2001, 2005, 2008), where also pitfall traps were used.

This fact is probably a consequence of the limited, homogenous and partially affected habitat. The presence of most of the isopod species identified at Caraseu is a consequence of the habitat's particularities. *H. riparius* is a common species in Romania (RADU, 1983), occurring in very wet areas (WIJNHOFEN, 2000). Thus, the habitat from Caraseu corresponds with its ecological requirements. *T. rathkii*, an euritope species, is found in very diverse habitats (TOMESCU *et al.*, 2011), even in ones without a wooden vegetation, where the number of isopod species is lower (SPUNȚIS, 2008). The ecological preferences of *H. riparius* and *T. rathkii* are similar and explain the frequent co-occurrence of these species (JASS & KLAUSMEIER, 2003). *T. nodulosus* is considered to be rather common in the Hungarian plains (FARKAS, 2010). It was also mentioned from the western part of Romania (TOMESCU *et al.*, 2008). The presence of the praticalous species, *A. vulgare* is also predictable from this habitat (RADU, 1985). Moreover, *A. vulgare* is a disturbance tolerant species and occurs regularly along roads (present case) and in antropogenic areas (Radu 1985).

The presence of *T. arcuatus* is especially remarkable. It is considered to be a sylvan species (TOMESCU *et al.*, 2005), recorded often in the forests from western Romania (TOMESCU *et al.*, 2008). However, the area from Caraseu lacks forests, the nearest one being at about 20 km far in Codru Hills. The occurrence of *T. arcuatus* might be explained by the phenomena experienced also in other groups of living organisms in the Western Plain: namely mountainous species are present in atypical habitats, they have been mentioned from the region in the past (COVACIU-MARCOV *et al.*, 2008, 2009). The situation also seems to be in the case of terrestrial isopods. Recently, some sylvan species (*Protracheoniscus politus* and *T. arcuatus*) were recorded in a nonforested swamp in north-western Romania (TOMESCU *et al.*, 2010). The explanation of *T. arcuatus*'s presence at Caraseu might have probably similar with the one previously described (TOMESCU *et al.*, 2010). The region

was covered by forests in the past and sylvan isopods could survive after deforestations in wet areas along the canals.

The surface activity of the mature terrestrial isopods fluctuates in time. It has been generally observed that after reproductive periods a high mortality may occur in terrestrial isopod populations (see in: WARBURG *et al.*, 1984). In our case, a slight decrease could be observed in the frequency and relative abundance of all species after the first sampled month. An increase of the abundance was observed at the common species (*T. rathkii*, *T. nodulosus* and *A. vulgare*), starting with June, which varies afterwards until the end of the study period depending on species. High abundance and species diversity was registered in the summer months (June, July) when females with marsupium were present. Females surface activity increases during reproduction when they are looking for shelters for their (marsupial) progeny (DANGERFIELD & HASSALL 1994). A higher density and species' richness was observed in the summer months also in other studies (SFENTHOURAKIS *et al.*, 2005). In case of *T. rathkii* and *T. nodulosus*, the relative abundance was high at the beginning of the study. On the contrary, the relative abundance increased at *A. vulgare* towards the end and was maintained high until the end of the study. This could be a result of the species' thermophilic character (RADU, 1983), having an increased tolerance towards high temperatures (TOMESCU & RADU, 1971).

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