



HABITAT DISTRIBUTION OF THE LAND SNAILS IN ONE VILLAGE AREA OF THE UPPER THRACIAN VALLEY (BULGARIA)

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Abstract. The land snail species diversity in the area studied was relatively high – 24 species. The lowland villages surrounded by intensively farmed lands are specific refuges for native species and a new habitat for invasion of non-indigenous ones. River bank forests showed the richest snail species diversity while pastures (grass or bush areas) – the lowest.

Key words: malacofauna, anthropogenic, species diversity.

INTRODUCTION

First study on the Bulgarian urban malacofauna was carried out by DEDOV & PENEV (2000) for the city of Sofia. This investigation was followed by IRIKOV & GEORGIEV (2002) studying the land snails of Stara Zagora town. Despite these investigations there were no any detailed malacological studies on the village areas in the country, having some different habitat conditions as pasture of domestic birds, cattle and high levels of chemical treatment on plants.

MATERIALS AND METHODS

The material was collected during 2002-2008 in the area of Trankovo village (Upper Thracian Valley, Bulgaria). The mollusks were studied by means of the standard procedures (DAMJANOV & LIHAREV, 1975). The material collected was identified following mainly DAMJANOV & LIHAREV (1975), WIKTOR (1983), and HAUSDORF (2000).

Snails were studied in the following habitats:

1. Short grass vegetation on open pasture areas, some times with patches of bush vegetation (OG)
2. Tall grass vegetation used for domestic birds pasture (TG)
3. House yards (Y)
4. Park forests (PF)

5. Small *Ulmis* sp. forest in the north of the village (UF)
6. River bank forest dominated by *Salix* sp. and *Ulmus* sp. (RF)

Material was collected and from the village vicinities: agricultural habitats, pastures and a xeric *Quercus* spp. forest.

RESULTS AND DISCUSSION

We found a total of 24 land snail species in the whole village area studied (Table 1). The terrestrial malacofauna was distributed in the various habitat types as follows:

1. *Short grass vegetation on open pasture areas, some times with patches of bush vegetation (OG)*. This habitat was very dry during the summer and flooded during the winter. It was used for pasture of cows, sheep, horses, donkeys and domestic birds as hens, turkeys, geese and ducks. Five snail species were registered here: *Cochlicopa lubrica*, *Vallonia pulchella*, *Chondrula tridens*, *Xerolenta obvia* and *Monacha cartusiana*. The first three we found in samples taken from the soil near/under stones, concrete stuff (e.g. the stripe beneath curb stones and dry canals), and artificial materials. *M. cartusiana* was found under stones. *X. obvia* was registered only as one season temporarily living population at the north of the village where it could be transported but did not survive long. The snails occupied the grass vegetation near a road. In the same areas but outside the village only *Ch. tridens* and *V. pulchella* were found. We consider the main factors for low species diversity of the snails were the drought, floods and the land rammer by the pasturing cattle.

2. *Tall grass vegetation used for domestic birds pasture (TG)*. These were small fragments of land near walls of houses and yards, occupied mainly by vegetation as *Urtica* sp. There were some moisture sites beneath the walls or close to small ditches where the snails could survive the dry periods. Mainly hens, turkeys and geese were the pasture animals in these areas. Possible negative factors affecting the snail species diversity were generally the fragmentation of the habitats and the pasture of the omnivorous domestic birds. Ten land snail species were found: *Cochlicopa lubrica*, *Pupilla muscorum*, *Vallonia costata*, and *Vallonia pulchella* (in detritus and soil samples, under stones and tiles on the ground), *Succinea oblonga* (under stones and tiles on the ground), *Limax flavus* (under stones and tiles, in house wall crevices), *Deroceras reticulatum* (under a bark of dead wood), *Helix lucorum* (in soil), *Monacha cartusiana* (under stones and tiles on the ground), and *Monacha carascaloides* (under a brick).

3. *House yards (Y)*. In the house yards a variety of “micro habitats” for the land snails could be found. Except the dominated flower and vegetable beds, there were also patches of short and tall grass vegetation, bushy sites or areas occupied by trees, walls, mounds of wood, stones, compost, a variety of artificial materials, ditches, wells and shafts. Often the grown plant species were treated with pesticides. Some times owners removed and some slug species by hand from the crops (e.g. *Deroceras* sp. from the strawberries). Following ten land snail species we found here: *Cochlicopa lubrica* (in detritus and soil, under stones and bricks), *Chondrula tridens* (on the plant species *Armoracia rusticana*), *Pupilla muscorum*, *Vallonia costata*,

Vallonia pulchella, and *Succinea oblonga* (all in detritus and soil samples), *Vitrina pellucida* (in detritus and soil, under bricks), *Tandonia kusceri* (under dead wood, stones, linoleum remains, on the plant species *Armoracia rusticana*), *Limax graecus* (crawling on dead wood), *Limax flavus* (on walls of wells and shafts, under dead wood, stones, tiles, in house wall crevices), *Deroceras sturanyi* (on plant species as strawberry *Fragaria* sp. and *Armoracia rusticana*) and *Deroceras turcicum* (under stones and artificial materials, on plant species as strawberry, lettuce *Lactuca sativa* and *Armoracia rusticana*), *Helix lucorum* (in soil and among vegetable beds), *Monacha cartusiana* (in soil and on plant species as *Saponaria* sp., *Rosa* sp., *Lactuca sativa*, *Armoracia rusticana*, *Melissa officinalis*, *Mentha spicata*, *Pimpinella anisum*, *Helianthus tuberosus*, *Atriplex* sp., *Primula* sp., undetermined flower and bush species).

4. *Park forests (PF)*. It was a small xeric park forest in the village center occupied mainly by *Populus* sp., *Acer negundo* and *Hedera helix*. Some times a pasture of domestic birds occurred. In the leaf detritus among ivy we found *Truncatellina cylindrica*, *Vallonia pulchella*, *Chondrula tridens*, *Cepaea vindobonensis*, *Helix lucorum*, and *Monacha cartusiana*.

5. *Small Ulmis sp. forest in the north of the village (UF)*. It was a xeric patch of forest with bushes and thick leaf detritus on the ground. No pasture of domestic animals was registered there. Nine land snail species were found: *Cochlicopa lubrica*, *Cochlicopa lubricella*, *Vallonia pulchella*, *Vallonia costata*, *Succinea oblonga*, *Chondrula tridens*, *Helix lucorum*, *Cepaea vindobonensis*, *Monacha cartusiana*.

6. *River bank forest dominated by Salix sp. and Ulmus sp. (RF)*. Wet bank forest with tall grass and bush vegetation. The river was moderately polluted by organic matter from domestic animal farms. Pasture of hens, turkeys, geese and ducks occurred. It was the richest habitat on snail species from all studied. Fifteen land snail species were found (see Table 1), mostly among the river deposits and detritus. The size of the river, its very slow current, flat banks and its damming upstream the village was excluding the transportation of shells from outer areas. Here the rich species diversity could be explained basically with the high air and soil humidity, and less with the rich food base brought by waters. **Remarks:** in the river we found and the freshwater snails *Galba truncatula* (O. F. Muller, 1774), *Anisus spirorbis* (Linnaeus, 1758) and *Gyraulus albus* (O. F. Muller, 1774).

7. *Habitats of the village vicinities*. The snail species diversity out of the village was very low. In the open pasture areas only *Ch. tridens* and *V. pulchella* were found. The xeric *Quercus* spp. forest was a habitat for *Acanthinula aculeata* (O. F. Muller, 1774) and *Aegopinella minor* (Stabile, 1864) not found in anthropogenic influenced village areas. We collected also and *Cepaea vindobonensis* specimens from this forest. No land snails we found at the agricultural lands. So the total number of the snail species of the vicinities was five, five times poorer than in the village.

CONCLUSIONS

The land snail species diversity of the area studied was relatively high – 24 species. River bank forests showed the richest snail species diversity (15 species) while short grass pastures – the lowest (5 species).

The lowland villages surrounded by intensively farmed lands are possibly specific refuges for native species and a new habitat for invasion of non-indigenous ones (e.g. *Limax flavus*), and in the same time not a proper environment for some typical forest species which in the area studied were *Acanthinula aculeata* and *Aegopinella minor* found only in the nearby woods.

This study showed that village areas, neglected in a lot of regional malacological studies, in fact are very important especially when a complete notion of the fauna in given area is needed.

Table 1. Habitat distribution of the land snails in the village area studied in the Upper Thracian Valley (Bulgaria). The habitat abbreviations correspond with those mentioned in the text.

Таблица 1. Хабитатно разпространение на сухоземните охлюви в проучения селски район на Горнотракийската низина (България). Съкращенията на хабитатните типове са посочени в текста.

Snail species	OG	TG	Y	PF	UF	RF
<i>Cochlicopa lubrica</i> (O. F. Muller, 1774)	*	*	*		*	*
<i>Cochlicopa lubricella</i> (Rossmassler, 1835)					*	*
<i>Vertigo pygmaea</i> (Draparnaud, 1801)						*
<i>Truncatellina cylindrica</i> (Ferussac, 1821)				*		*
<i>Pupilla muscorum</i> (Linnaeus, 1758)		*	*			*
<i>Vallonia costata</i> (O. F. Muller, 1774)		*	*		*	*
<i>Vallonia pulchella</i> (O. F. Muller, 1774)	*	*	*	*	*	*
<i>Chondrula tridens</i> (O. F. Muller, 1774)	*		*	*	*	*
<i>Succinea oblonga</i> (Draparnaud, 1801)		*	*		*	*
<i>Cecilioides acicula</i> (O. F. Muller, 1774)						*
<i>Vitrina pellucida</i> (O. F. Muller, 1774)			*			
<i>Vitrea pygmaea</i> (O. Boettger, 1880)						*
<i>Zonitoides nitidus</i> (O. F. Muller, 1774)						*
<i>Tandonia kusceri</i> (H. Wagner, 1931)			*			
<i>Limax graecus</i> Simroth, 1889			*			
<i>Limax flavus</i> Linnaeus, 1758		*	*			
<i>Deroceras sturanyi</i> (Simroth, 1894)			*			
<i>Deroceras turcicum</i> (Simroth, 1894)			*			
<i>Deroceras reticulatum</i> (O. F. Muller, 1774)		*				
<i>Cepaea vindobonensis</i> (Ferussac, 1821)				*		
<i>Helix lucorum</i> Linnaeus, 1758		*	*	*	*	*
<i>Xerolenta obvia</i> (Menke, 1828) ?	*					
<i>Monacha cartusiana</i> (O. F. Muller, 1774)	*	*	*	*	*	*
<i>Monacha carascaloides</i> (Bourguignat, 1855)		*				*

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ХАБИТАТНО РАЗПРОСТРАНЕНИЕ НА СУХОЗЕМНИТЕ ОХЛЮВИ В ЕДИН СЕЛСКИ РАЙОН НА ГОРНОТРАКИЙСКАТА НИЗИНА (БЪЛГАРИЯ)

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(Резюме)

Проучена е сухоземната малакофауна (*Mollusca: Gastropoda*) на с. Трънково и неговите околности (Горнотракийска низина, България). Това е първото детайлно проучване на тази група в селски район в България. Установени са 24 вида сухоземни гастроподи. Най-богати на видове са крайречните върбови гори, а най-бедни – откритите пасищни райони.