

Data on the terrestrial snails found in loess-formations of Mezőföld

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Abstract: The author investigated terrestrial snail assemblages of so far unknown loess formations of Mezőföld parallel to three consecutive phases of plant associations of the loess succession; in different facies of plant associations of *Aegopyro-Kochietum*, *Salvio-Festucetum*, *Amygdaletum nanae* and *Brachipodium pinnatum* formed in place of loess oak plantations. Mezőföld is the westernmost natural geographical unit in Hungary. Fourteen (12 living, 2 subrecons) species were found in the various associations of the loess plantation of the so far pointed out 31 species in Mezőföld.

Key-words: Mollusca, Gastropoda, Ecology, Hungary

Introduction

Mezőföld as one of the natural geographical regions of the Great Hungarian Plain has so far scarcely been searched from malacology points of view. (Marosi, Somogyi 1990) 34 species have altogether been pointed out by faunistic researchers (Bába 1991, Pintér et al 1979, 1979, 1980). The occurrence of these species in plant associations is extremely inadequate.

The author studied the malacological composition of loess plantations abundantly found in Mezőföld.

Material and method

The collecting of material was carried out in 10x10x25 quadrates in the years 1996 and 1998. Evaluation was carried out by means of species-groups: type of habitation (Ložek 1964): RU water side moisture preference, B bush habitation, HF forest habitation, St steppe habitation were the categories. Types of nourishment on the basis of Frömming's 1954 laboratory examinations: omnivor (O), herbivor (H) and saprophagus (Sp). In carrying out the animal geographical evaluation the areaanalytic method was applied. (Bába 1982) Continental fauna regions: 1.1 East-Sybirian, 1.2 West-Sybirian, 5.3 Ponto-pannon. Subatlantic fauna regions: 5.2.1 Thracial, 1.6 Adriatic-Mediterranean, 8. Holomediterranean.

Besides species groups juvenile individuals and mortality percentage (relying on living and dead units), Shannon-Weiner diversity (H') and Niclas 2 (Podani 1998) clusteranalysis were also taken into consideration.

The places of collection were as follows: (Table1) *Aegopyro-Kochietum prostratae agropyretosum Intermediae* Zólyomi 1957, Soós 1959. Paks S-SE side, 20–40° angle of slope 1996. 07. 05. A path accompanies it, antropogenous effect is to be felt W: 2,9 2. *Salvio-Festucetum rupicolae* fac *Dactylis glomerata* transition towards meadow-land. By means of medium-degraded mowing and weediness. Belsőbáránd 2. side walley foot 1998. 06. 19. W: 4,2. 3. *Salvio-Festucetum rupicolae* Zólyomi 1957, Soó 1959. Belsőbáránd, near the plateau

of disturbed settling *Crambe tatarica*. W:3.3. 4. *Salvio-Festucetum rupicolae Crambetosum tataricae* Horváth 1991. Leányvár Űrge valley. Towards E. Angle of slope 15-20° 1996. 07. 04. Medium degraded, W: 3,1. 5. *Salvio-Festucetum rupicolae* Zólyomi 1957, Soó 1959. Towards W, 25° angle of slope, transition between southern and northern valley sides. Plantation is rich in species W: 3,5. 6. *Amygdalaetum nanae* Soós 1959, Tallós 1960. 30' angle of slope towards NE-E. Gyűrűs valley 1976. 07. 04. Remarkable *Festuca rupicola* coverage, *Iris pumila*, *Vinca herbacea* can be found as well, W: 3,1. 7. *Salvio-Festucetum rupicolae brachypodietosum pinnati* Zólyomi 1950 clearing towards EW, angle slope 30-35°. With shrubby *Crataegus monogyra*. Kanacs plateau. Brachypodium can reach 80% coverage. W: 3,7. 8. *Salvio-Festucetum rupicolae brachypodietosum pinnati* Zólyomi 1950. Towards NW, angle of slope 20-25°. Belsőbáránd Ebvár. A bit mongled because of being near to valley bottom. Brachypodium is dominating. W: 3,6. W values were calculated on the basis of Borhidi's indications. (Borhidi 1995) The author wishes to express thanks for a help in selecting the plant associations and W values to András Horváth plant coenologist.

Species found

555 living examples of four species were found in the eight places of collecting. Of these *Succinea oblonga* and *Pupilla muscorum* were in subrecent state. They are also to be found in other loess soils of the Hungarian Plain.

It could be observed that the herbivorous *Helicella* in the *Agropyro-Kochietum* assemblage is not specialised in nourishing. It was found in *Artemisia campestris*, *Asparagus officinalis*, *Astragalum onobrychis* 5, *Lyceum barbatula* and *Fragopagon dubium*.

Malacologically the places of collecting show different grades of transformation, parallel to the plant mixage of areas of habitation. This mixed character is also shown by species found in subrecent state, especially at places 2, 4, 8. Shrubbing is exemplified by the increased frequency of *Vitrina pellucida* and *Cepaea vindobonensis* at No 3 and mainly at No 7 places which latter is a clearing of *Bradypodium pinnatum* overgrown by *Crataegus* bushes. In the *Anygdalaetum* shrubbery the disappearance of steppe and bushland species is a consequence of the closure of leafage. (Table 1) The transformation processes are the effect of cutting and weeding, the changing values of species density are the juvenile percentage at places 2, 3, 4, 8 and the extremely high mortality percentage at places 3, 8. Diversity values are also low. (Table1)

Changes in the number of species represent the different states of the places of collecting in the order of increasing W values at places of collecting arranged to successive connections (Figure 1), where the strongly degraded 2 and 7, 8 clearings are markedly different from the initial 1 and rather loose slightly mixed *Crambe tatarica*-covered 3 and from place 5 which is relatively in the best state. *Crambetosum tataricae* is a dry subassociation at place 4. Similarly the *Amygdalaetum nanae* thicket, formed from loess fields; is a dry place of collecting.

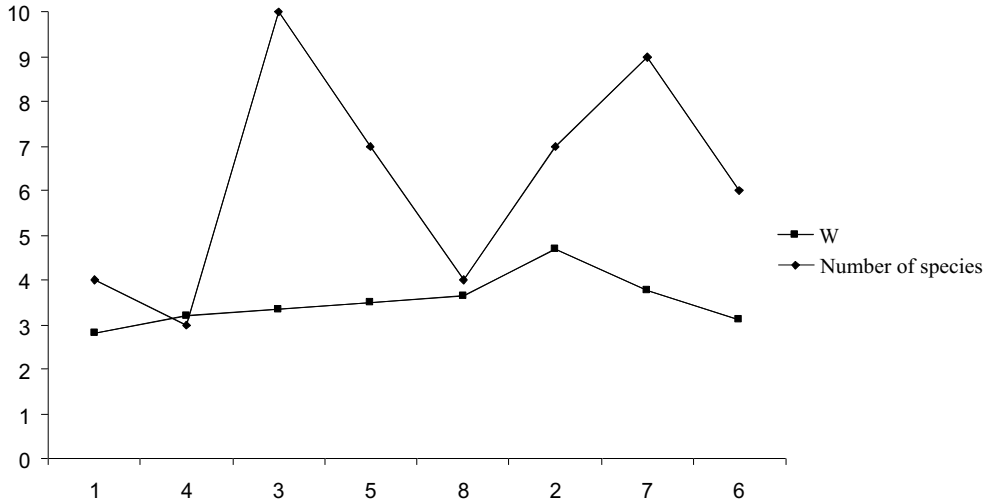


Fig. 1. Changes in number of species and W values

1. Paks *Agropyro-Kochietum*, prostratae *agropyretosum intermediae* D, 1996. 07.05
2. Belsőbáránd 2. valley foot *Salvio-F. fac. Dactylis glomerata* 1998. 06.19.
3. Belsőbáránd 1. loess hill N. peak *Salvio-F. Crambe tatarica* 1998. 06. 17.
4. Leányvári valley K. *Salvio-Fr. Crambetosum tatariae*, *Cornus sanguineus* 1996. 07. 04.
5. Belsőbáránd 1. loess hill W 20-25° *Salvio-F. rupicolae*
6. Gyűrűsvölgy N *Amygdaletum nanae* 1996. 07. 04.
7. Kanacs plateau NW 35-40° *Brachypodium pinnatum* *Crataegetosum* 1996. 07. 03.
8. Belsőbáránd Ebvár NE *Brachypodium pinnatum* 1998. 07. 18.

Snail associations and distribution of species groups

Different phases of changes are affected by extension towards south and north. In the northern territories clearings can be found (7, 8 places of collecting). In both fields the frequency and dominance of *Granaria frumentum* is high. (Table 1) The initial association of the succession (1 place of collecting) abounds in characteristic species of *Helicella obvia-Granaria frumentum*. The characteristic species of 4. *Crambetosum* association is *Granaria frumentum*, similarly to place 2, containing *Crambe tatarica*. The characteristic species of 3, 5 loess field is *Cochlicopa lubricella-Granaria frumentum*, that of the *Amygdalaetum* thicket *Vallonia costata*.

At the places of collecting the distribution of habitation is characterised by remarkable spreading of steppe-settling corresponding to the open and close fields. (Fig. 2) In fields 3, 5 and bushy *Brachypodietum* (7 place of collecting) the ratio of dwellers in bushy forests is high.

Of the types of nourishment (Fig. 3) that of herbivorous is dominating. In a complementing manner this alters with the omnivorous type. In 3, 5 fields 6 thicket the herbivorous type is rare.

The distribution of animal geographic fauna is that initial *Agropyro-Kochietum* at 3, 5 field and 6 shrubbery are of continental dominancy, and 4. *Crambetum* and degraded 2 as well as *Bradyodic* 7, 8 clearing are mostly dominated by subatlantic fauna association.

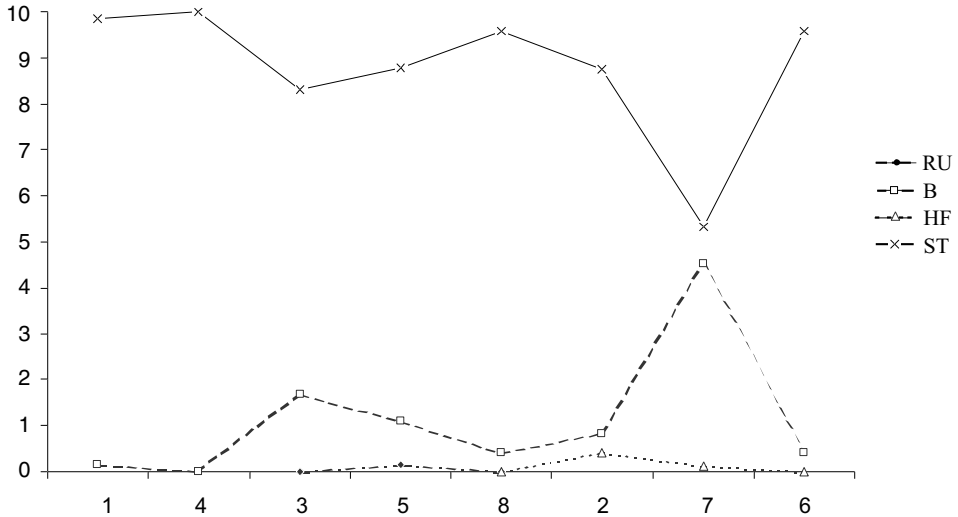


Fig. 2. Distribution of habitat type

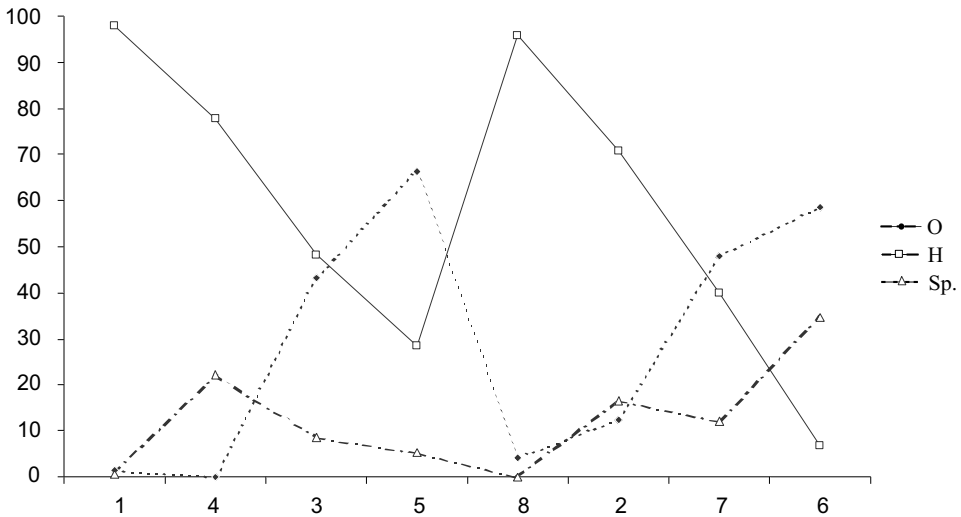


Fig. 3. Distribution of feeding habit

The not clear character of the places of collecting is shown by the fact that there are no east and west Sybirian fauna areas. (1.1, 1.2) The continental dominancy is caused by the high participation of the 1.4 ubiqvista holarctic fauna area and by the Turkestan (2.2) fauna area, accompanied by the 1-4% values of the caspi sarmata, ponto-pannon fauna areas. In initial *Agropyro-Kochietum* only is the ponto-pannon fauna area constituting 72,99% of continentality. Of the subatlantic fauna area that Thrazic yields dominating percentage values (5.2.1). The highest values of the holomediterranean fauna area are to be found at places of

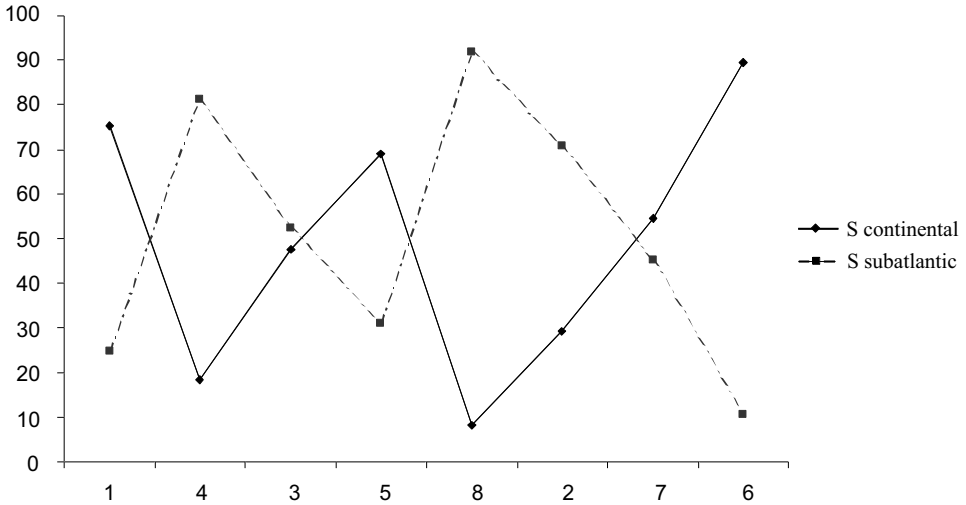


Fig.4. Distribution of continental and subatlantic fauna areas

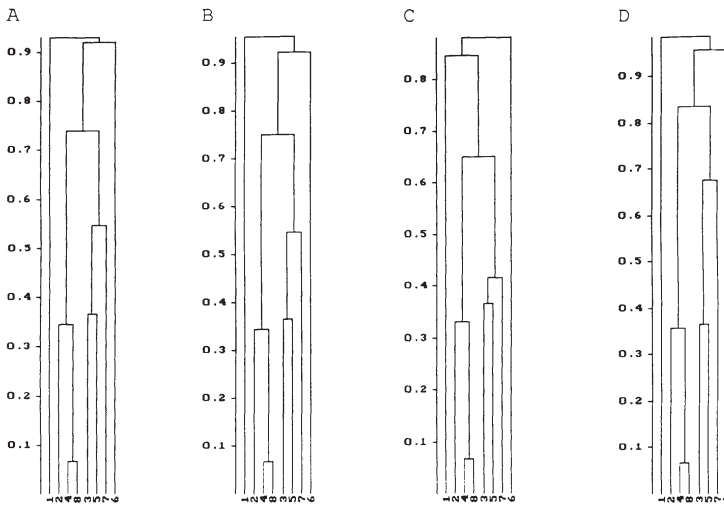


Fig. 5. Nicias 2 cluster analysis

A – average linkage, B – simple average, C – single linkage, D – complete linkage

collecting No 2 and 7: 20,83-9-33%. At 2, 7 places the adriato-mediterranean fauna shows a percentage value of 4,12-0,12.

The Cluster analysis yielded the same result both in reference to group average (A), simple average (B) as well as to single chain (C) and whole chain (D). We can distinguish between four cluster nuclei. Initial (1) and shrubby (6) places of collecting are separated. The other two cluster nuclei on the one hand contain mixed, dry and secondary places of collecting with lower number of species and units (2, 4, 8) and the slightly mixed 3, 5 place with higher number of species and units as well as No 7 place with shrubby *Bradypodium*.

Summary

Of the examined Mezőföld loess formations it was possible to point out 14 species (among them 2 in subrecent state). Besides 35 species known in Mezőföld *Vitrina pellucida* proved to be a newer element. Loess formations are more or less mixed. Places of collecting No 1, 3, 5, 6 exhibit certain mixed character as regards composition of species, distribution of group of species and animal geography.

Malacologically the *Crambetum* subassociation (4) represents a dry stationary association. In contrast to the enlisted associations the highly degraded 2 and clearings 7, 8 markedly differ from the previous in their composition of species, the ratio of mortified species and in the dominance of the high subatlantic fauna areas. The open stationary 4 association also shows a dominance of the subatlantic fauna area. In the Mezőföld loess formations the dominating frequent species is *Granaria frumentum*, to which in the initial phase *Helicella obvia*, in fields in a better state *Cochlicopa lubricella* can be associated. *Vallonia costata* is the dominating species of the shrubby phase. Similarly *Granaria* is the dominating element in clearing fields and strongly degraded assemblages (7, 8, 2).

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