SOOSIANA, 18: 17-29, 1990.

SZABÓ,S.:

Observations of the Morphology of Sadleriana pannonica (FRAUENFELD,1865) - Tapasztalatok a Sadleriana pannonica (FRAUENFELD, 1865) morfológiájával kapcsolatban

ABSTRACT: The morphological examination of Sadleriana pannonica results in the fact that in the territory examined all the 3 forms described in the scientific literature can be found, however the hannemanniana type represents but a small quantity. The dimensions of the encrusted, aged, deformed and confused samples and that of the mouths are influenced by ecological factors. Morphological researches are suitable for the ecological analysis of fossilised materials.

The ecology research of the water-snails living in springs and brooks of Hungary has resulted in a great number of data about the cenology of Sadleriana pannonica. During the course of the research I collected documentary amples of each item, taking also most care of protection of the species. All data below have been obtained from about 700 individuals of 23 places. In my present work I give an account of my observation about the morphology of Sadleriana pannonica.

The method of observation: I have grouped each individual from all places in accordance with quantitative and qualitative aspects. I have made drawings of the most typical individuals by the help of a microscope and I have measured their most important dimensions (height and width of the house; height, length and width of the mouth of 10 individuals in each group, a total number of 230 individuals).

I have typified the shapes of the houses and mouths. I have considered the ecology data of the collection places; first of all the water speed and the beds (v.tables,illustrations). I have also made a statistical analysis of the data obtained. I have calculated the biological productivity, the ratio of the surface and the tel tory of the mouths,the variance of height and width an' hei t/width and the ratio of height and width by a programme : Comodore C/plus 4 computer (ANTAL et alii.,1978).

The Observation:

A.)Types of houses: the species are of a great variety. The literature known by me divides them into 3 groups(RICHNOVSZKY-PINTÉR, 1979).

a.) The basic form: the shale is oval and conical, the size of mouth is nearly the half of the height of the house, the coil is equally growing. The width of a bend going upward takes the 3/4 of the lower bend. The ratio of height and width is between 1 and 1,2. Individuals of this group have found in the largest quantity (37,8 %). It is predominant in spring Szalajka (Szalajka-forrás) (90 %), in the lower spring of the Threewell Valley (Háromkut-völgy) (70 %) and in spring Ágnes (Ágnes-forrás) (60 %).

b.) The tornensis form: individuals in this group are longer oval and conical form. The height of the mouth gratly varies in comparison to the coil. The last bend of the coil is narrower and stretched. The ratio of the height and the width is more than 1,2. The tornensis type contains 35,6 % of all individuals collected. This form is predominant in spring Esperantó (Eszperantó-forrás) (100 %), in the brook Bigvalley 3.(Nagy-völgy-patak)(70 %) and in the upper spring of the Threevell Valley (Háromkut-völgy)(60 %).

c.) The hannemanniana form: they are of squat, oval and conical shape. The height of the moth is smaller than the half of the height of the house. The decreasa of bends of the coil is not equal. Only a small number of this type has been found (2,6 %). Beside the types described in literature I have discovered two more types.

d.) The deformed, confused form: individuals of this form gratly vary in form. Mainly the last bend is amorphous,somtimes coiling outward (PETRÓ,1984). I have observed a small quantity representing a transitional form from the basic, the tornensis and the deformed, confused groups.

e.) The Juvenile form: these individuals are almost ball-shaped. The ratio of the height and width is about 1 to 1 at. 4,78 % of all individuals.

Based on the examination of the number of bends, it can be stated that the basic form is transformed into another type in the course of growing. It is demonstrated well by the research of spring Szalajka (Szalajka-forrás). During the collection in July the basic form dominant, while, as a significant change,in August the tornensis form grew to a great excent, drawing the basic form back. I have observed that individuals with 2 bends, dominant for the basic form (62,06 %) decreased nearly to the half in 3 bend types (34,48 %). An inverse ratio can be observed in individuals of the tornensis group (2 bend type - 29,26 % and 3 bend type - 68,29 %). No more than 2 bends have been observed in the juvenile group.

The deformed, confused forms appear mostly under autecological conditions, such as high water speed (Nagy-völgy-patak 1. Sebesviz-völgy) and beds containing a large amount of calc stuff (Sebesviz-völgy, Ámor-forrás). In the places with much calc stuff lime is serarated on the shells too and it may cause an entirely extreme apperance by influencing body wight (ROTARIDES,1932).The encrusted, aged samples take 17,82 % of all individuals. They have been found at each type of houses and sizes, in a greater number at deformed, confused forms (59,02 %). They also indicate an autecological extremity higher water speed (Nagy-völgy-patak 1.,Sebesviz-völgy 1.) or a bed of drifting small stones (Bán-pa-

tak, Sebesviz-völgy, Köpüs-forrás, Ágnes-forrás). Usually smaller variance of dimensions has been observed on each spot. The relatively small increase of the variance of height indicates longer, tornensis forms (DOMOKOS, 1982-83).

B.) Types of the mouths: the mouth of Sadleriana pannonica show a great variety, similarly to shells. The largest number is given by drop-shaped moths (60,43 %) being dominant in Szalajka-forrás, Bán-patak (100 %), Helyiipari-forrás, Harica-forrás (90 %), Szikla-forrás, Ferenc-forrás (80 %). Beside the drop-shaped mouths the ellipse form takes 19,13 %. It is only dominant in the Nagy-völgy-patak forrás (spring of Bigvalley brokk) (60 %). The egg-shaped type, a variety of ellipse form (18,09 %) can be found in leger amounts at the game show in Szalajka-patak (60 %). I have also observed completely amorphous mouths in some individuals (1,7 %).

In each sample I have examined the connection between the types of houses and mouths. These connections vary and in spite of the big number of data, no statistical connection can be proved. In the house forms representing a larger mass (basic and tornensis forms) the dropshaped mouths are dominant (78,4 %, 62,96 %).

I have examined the connection between the dimension of mouths and water spedd. For the more accurate appreciation I considered the surface of the shells as a cone, and the territory of the mouths as an ellipse. I have compared the quotient of the surface and the territory to the value of the water speed. I have found that at a favourable water speed (SZABÓ, 1982-83) the quotient of the shell surface and the territory of the mouth is near the value of 0,09. This value is growing over 0,10 with the rise of the water speed. This rate is always smaller than 0,09 in very slow and oozing waters. Thus the dimensions of the mouths are to be proportional to the water speed, supporting the sticking surface of the animal.

C.) The biological productivity: in lack of convinient gauges, in the collection places I counted the biological productivity of Sadleriana pannonica indiractly, by Haarlow index (height x width x abundance, BALOGH, 1953). A salient productivity has been shown by samples from all spots in Szalajka-patak with the exeption of Rock spring (Szikla-forrás). It is due to the high value of abundance. For comparison of abundance with productivity values the dimensions of the houses are undoubtedly the determinant factors.

I have also had the opportunity to make researches of samples obtained from the foddilised sediment of Szalajka Valley (Szalajka-völgy) (FÜKÖH, 1990). I have taken only exactly identifiable individuals into consideration. A great number of samples are unapt for morphological analysis. Basic form is dominant in all layers of the fossilised material (74,7 %). It reaches the highets value in sample K/3 (91 %), while sample K/10 contains the smallest quantity (37,5 %). Tornensis from takes an average of 25,5 %. It

can be found to the largest extent in sample K/10 (62,5 %) and samples K/3 a - b - c give the smallest value. Examination of layers K/3 a - b - c shows however that tornensis form has been driven back considerably in layer K/3 b. It must be related to the sharp change of the enviroment described by FÜKÖH (a fauna typical of open country). The confused type can be found to the greatest extent in sample K/6 (11,6 %), but in a small number at other layers. It is easy to understand because this type must be dominant in the unidentified samples. Hannemanniana type can be found in layer K/7 only (5,1 %).

We can possibly conclude the former water speed from the mouth dimensions and the recent material. Layers K/1, K/7 and K/10 must have been in water of higher speed then the ordinary living place of Sadleriana pannonica. Water speed at layer K/10 must have definitely high(min. 60 cm/s). Layers K/3 - b and K/6 must have in very slow, oozing water. (I am grateful to L.FÜKÖH for permission to use the data and the fossilised material collected by him.)

ÖSSZEFOGLALÁS

A Sadleriana pannonica morfológiai vizsgálatának tapasztalatai azt mutatják, hogy a területen az irodalomban leírt mindhárom alaktipus előfordul, de a hannemaniana tipus nagyon kis mennyiségben. A berakodott, kopott, deformált, konfuziális példányok és a szájadék nagyságát ökológiai tényezők befolyásolják. A morfológiai vizsgálatok alkalmasak a fosszilis anyagok ökológiai értékeléséhez.

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Tabelle 1. Places:

1. Szalajka-forrás (spring Szalajka) 27.07.1988.
2. Szalajka-forrás (spring Szalajka) 08.08.1988.
3. Szalajka-patak:Szikla-forrás (Szalajka brook:spring Rock) 26.07.1988.
4. Szalajka-patak (Szalajka brook) 27.07.1988.
5. Nagyvölgy-patak, forrás (Bigvalley brook,spring)15.07.1984.
6. Nagyvölgy-patak (Bigvalley brook) 15.07.1984(1st).
7. Nagyvölgy-patak (Bigvalley brook) 15.07.1984(2nd).
8. Háromkut-völgy (Threewell valley) 09.08.1988(3th).
9. Háromkut-völgy (Threewell valley) 09.08.1988(2nd).
10. Háromkut-völgy (Threewell valley) 09.08.1988(1st).
11. Bán-patak (Bán brook) 27.07.1988.
12. Bán-patak (Bán brook) 24.09.1988.
13. Sebesviz-patak (Speedwater brook) 26.07.1988(1st).
14. Sebesviz-patak (Speedwater brook) 28.07.1988(2nd).
15. Helyiipari-forrás (spring Localindustrial) 10.08.1988(1st).
16. Helyiipari-forrás (spring Localindustrial) 27.07.1988(2nd).
17. Eszperantó-forrás (spring Esperanto) 10.08.1988.
18. Köpüs-forrás (spring Socked) 10.08.1988.
19. Ferenc-forrás (spring Francis) 09.08.1988.
20. Szilvia-forrás (spring Sylvia) 10.08.1988.
21. Ágnes-forrás (spring Agnes) 09.08.1988.
22. Harica-forrás (spring Harica) 08.08.1988.
23. Ámor-forrás (spring Amor) 10.08.1988.

Tabelle 2 : data:

Spot	abund.	prod.	ht - wd / wd - wd diff.	mouth/suri.	ht v^2	wd v^2	ht/wd v^2	a	b	c	d	e. /house form/
1	117,8	214,98	o,8/o,5	o,111	o,o56	o,o27	o,oo5	9o	1o	-	-	-
2	1o5,6	163,48	1,4/1,1	o,o82	o,137	o,o48	o,o24	2o	4o	2o	1o	1o
3	7,32	21,o6	o,6/o,3	o,1oo	o,o63	o,oo7	o,o28	4o	4o	-	-	2o
4	41,8	114,69	1,2/o,6	o,o93	o,o91	o,o78	o,oo5	3o	5o	-	2o	-
5	o,52	1,36	o,5/o,5	o,1o6	o,o42	o,o33	o,oo9	-	-	1o	3o	1o
6	3,61	7,64	1,3/1,2	o,o9o	o,175	o,155	o,o1o	4o	1o	2o	3o	-
7	9,25	27,33	1,4/o,9	o,o9o	o,146	o,o74	o,o16	1o	7o	-	2o	-
8	27,64	65,64	o,7/o,4	o,o92	o,o62	o,o2o	o,oo6	4o	6o	-	-	-
9	1o,24	28,1o	o,3/o,5	o,o94	o,oo7	o,o14	o,oo9	3o	2o	-	3o	-
1o	11,72	28,19	o,3/o,5	o,oo1	o,o3o	o,o13	o,o23	7o	1o	-	2o	-
11	3,6	9,25	o,3/o,3	o,o91	o,o12	o,o19	o,o37	4o	4o	-	2o	-
12	5,94	13,53	o,9/o,7	o,o73	o,o71	o,o22	o,o1o	3o	4o	1o	2o	-
13	5,8	11,91	o,5/o,6	o,1o6	o,o56	o,o44	o,oo4	6o	1o	-	2o	1o
14	27,6	62,o7	o,7/o,5	o,o88	o,o71	o,o32	o,oo5	4o	3o	-	3o	-
15	3,5	1o,9o	o,6/o,5	o,1o9	o,286	o,o36	o,oo3	2o	6o	-	-	2o
16	5,4	1o,28	o,3/o,3	o,1o6	o,o13	o,o13	o,o13	6o	4o	-	-	-
17	4,26	11,15	o,5/o,5	o,12o	o,o29	o,o12	o,oo9	1oo	-	-	-	-
18	37,9	83,26	o,7/o,4	o,11o	o,o48	o,o29	o,oo5	6o	3o	-	-	-
19	5,84	14,52	1,2/o,4	o,1o7	o,193	o,o5	o,o13	4o	3o	-	1o	2o
2o	33,63	85,68	o,8/o,4	o,1o1	o,o73	o,o42	o,oo2	4o	4o	-	1o	1o
21	32,7	46,2	o,4/o,2	o,117	o,oo4	o,oo3	o,oo4	6o	1o	-	1o	2o
22	2o,o2	42,19	o,8/o,6	o,o96	o,o64	o,o45	o,oo6	4o	5o	-	-	1o
23	4,45	2o,53	o,4/o,3	o,o81	o,1o5	o,o2o	o,o13	4o	1o	-	5o	-

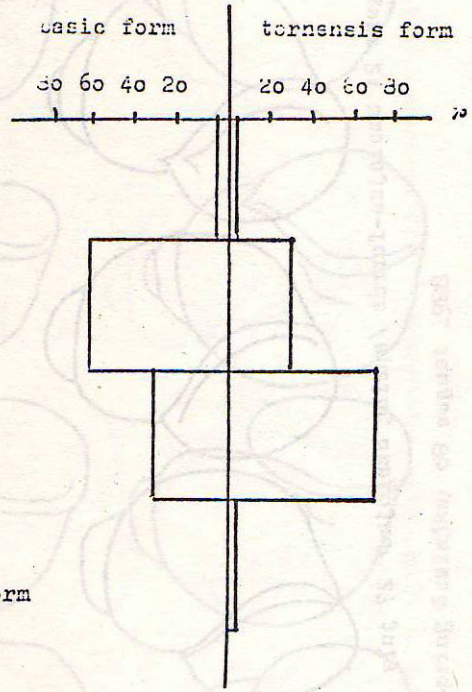
Figure 1: Types of houses

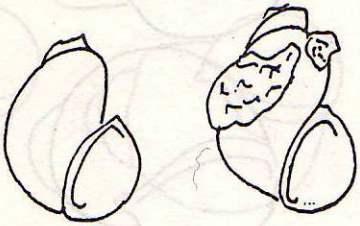
Sd. basic form

Sd. tornensis form

Sd. heldemanniana

confused form





deformed form

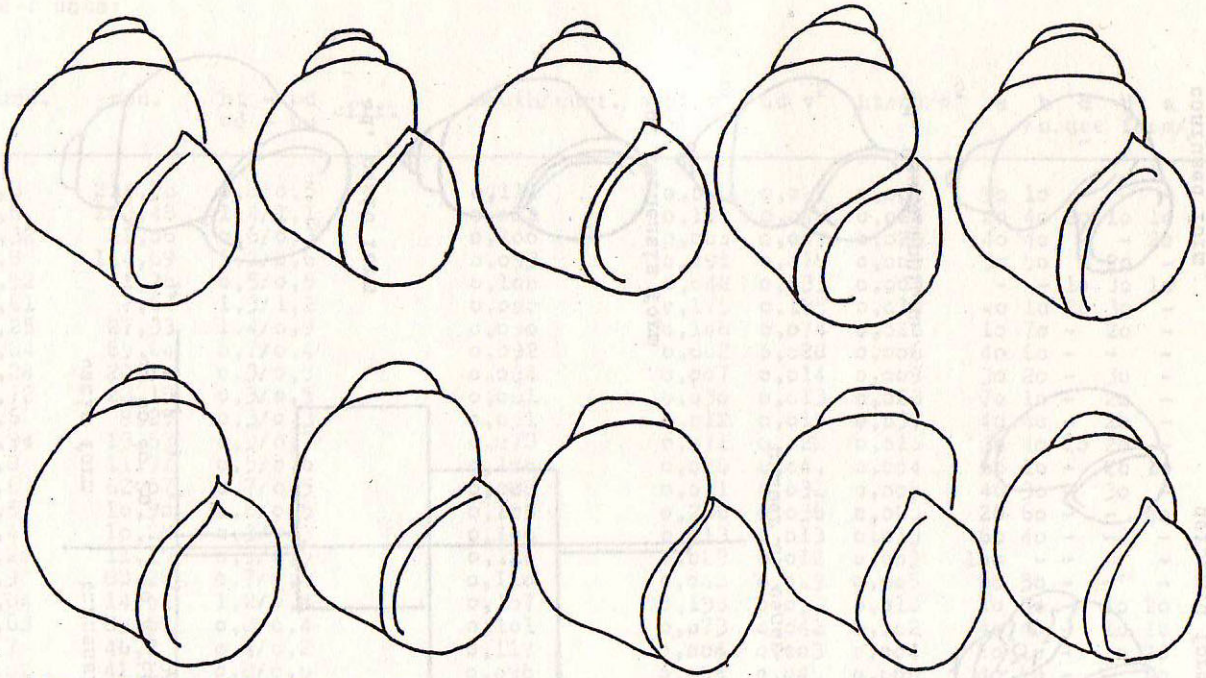


Figure 2: Szalajka-forrás /spring Szalajka/ 27 july 1983

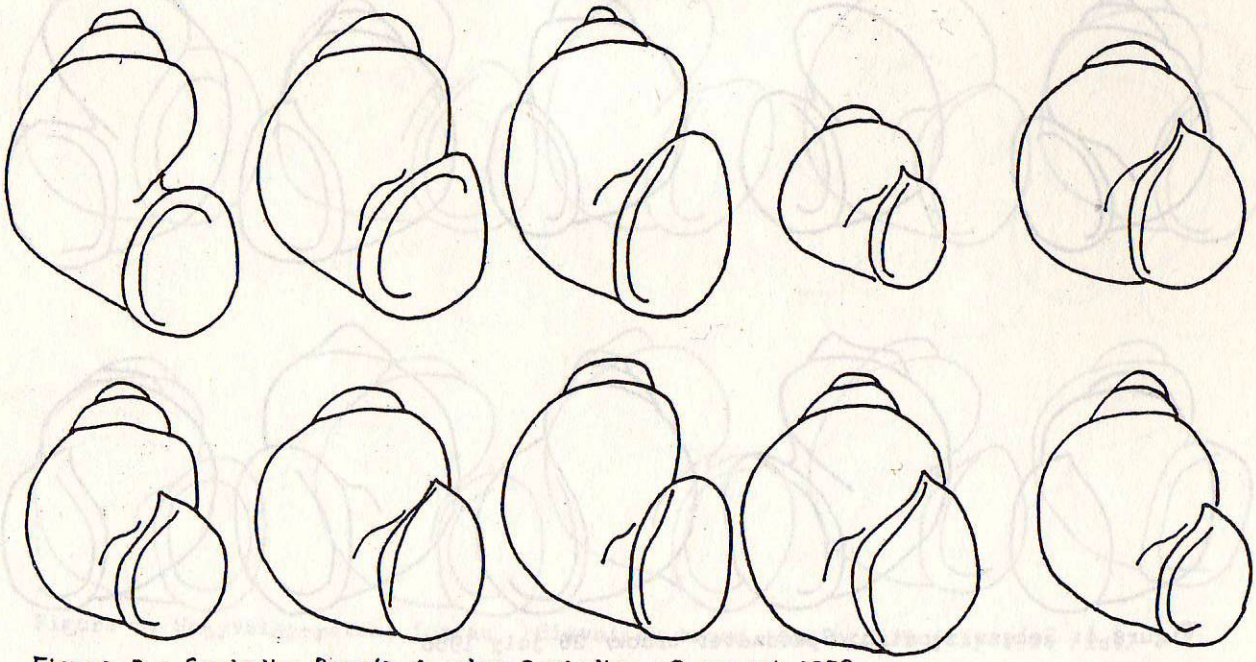


Figure 3 : Szalajka-forrás /spring Szalajka/ 08 august 1988

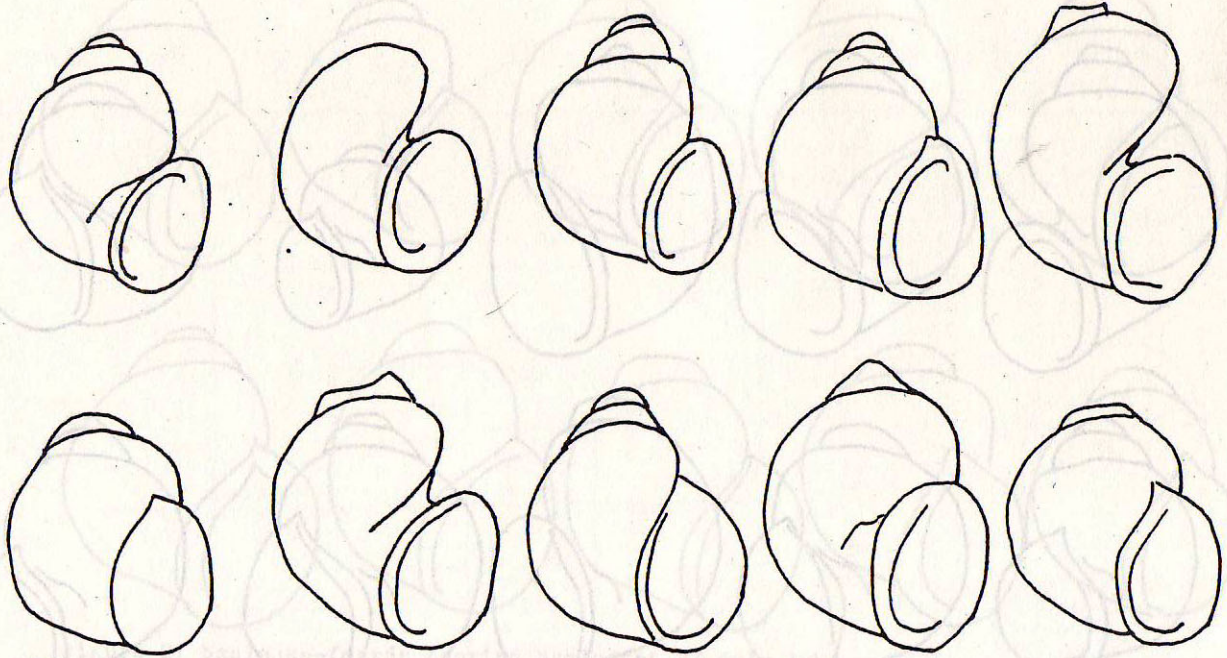


Figure 4: Sebesvíz-patak /Speedwater brook/ 26 july 1988

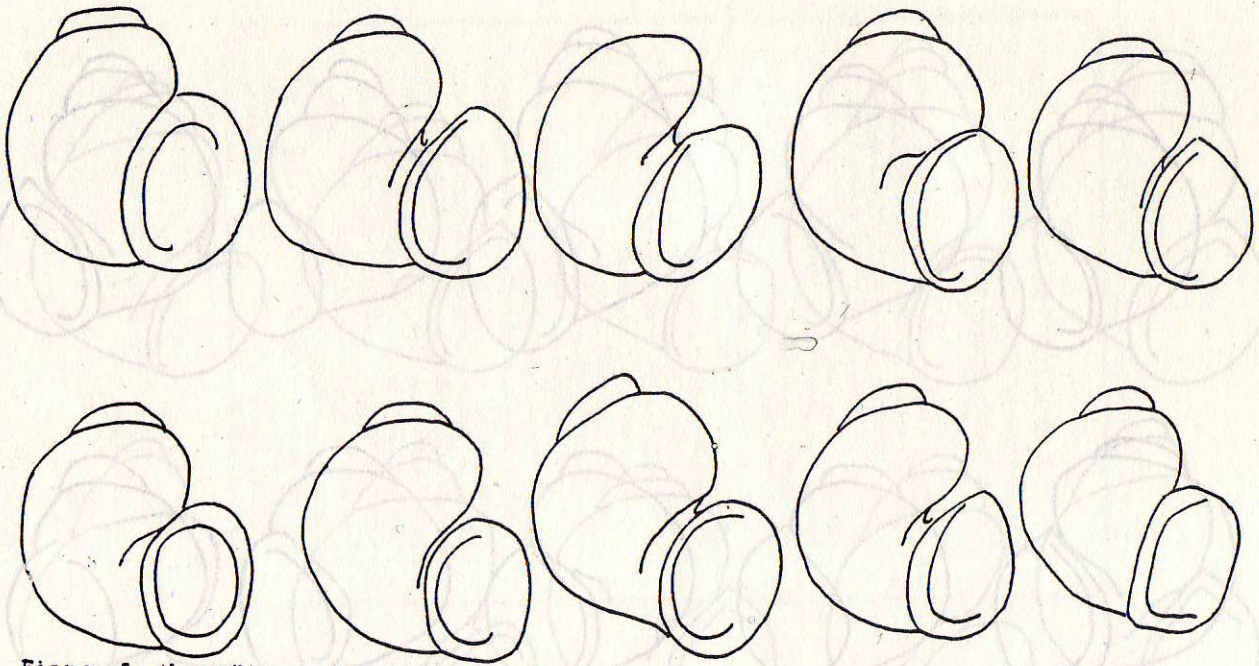


Figure 5: Nagyvölgy-patak, forrás /Bigvalley brook, spring/ 15 july 1984 /1st/

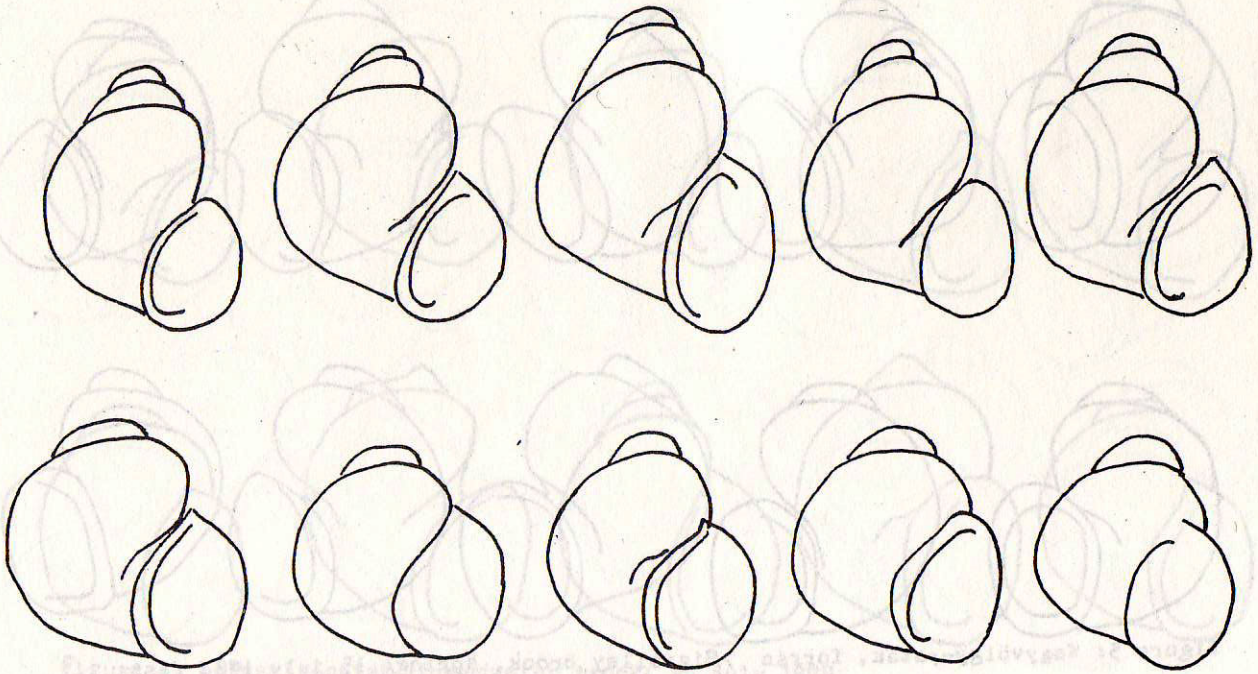


Figure 6: Nagyvölgy-patak /Bigvalley brook/ 15 July 1984 /2nd/

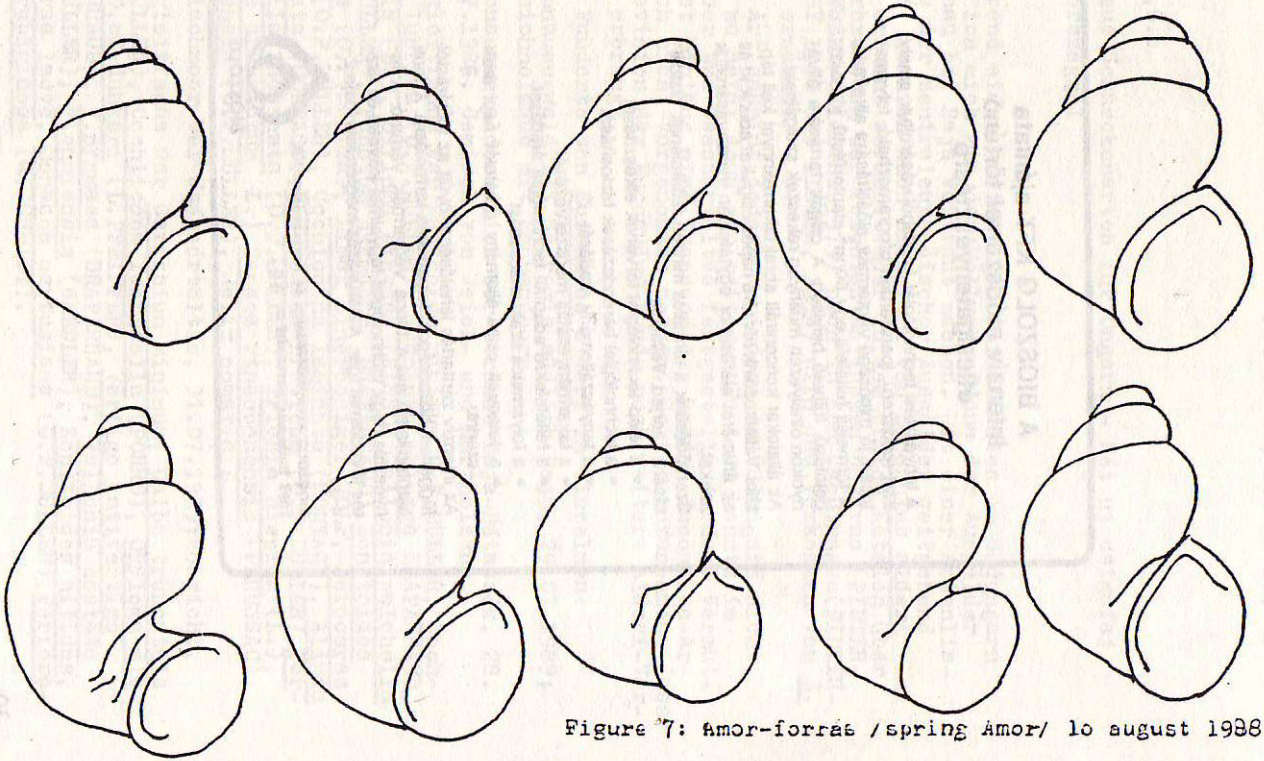


Figure 7: Amor-forrás /spring Amor/ 1o august 1988

A BIOSZOLG KFT ajánlata Intenzív módszerrel történő étcsigatenyésztésre

A tenyésztési technológiát Angliából vásároltuk, amely zárt rendszerű, iparszerűen programozható, folyamatosan, jó minőségű végtermék előállítására alkalmas. A termelés feltétele egy 60 m^2 alapterületű, jó hőszigetelésű, fűthető helyiség. A csigák tartására állványokon elhelyezett műanyag rekeszek szolgálnak.
Az állatokat koncentrált abraktakarmánnyal kell táplálni. Vállalkozóink részére napos csigákat adunk ki és az áruméret elérésekor egytételben visszavásároljuk azokat.
Szerződésünk a termelés minden feltételének biztosítására kiterjed. Vállaljuk:

- a telep technológiai tervének elkészítését
- a technológiai berendezések biztosítását
- a tenyészállomány átadását
- a takarmányellátás megszervezését
- a feltételekre adaptált technológia átadását
- a folyamatos szaktanácsadást
- a felnevelt csiga-állomány átvételét napi árak szerint.

Az intenzív zárttartás lehetőséget nyújt az időjárástól független, biztonságos, folyamatos termelésre. A fenti alapterületen évi 4 tonna végtermék várható. A tenyésztés nagy technológiai fegyelmet követel és tisztes jövedelmet ígér. A beruházás megtérülési ideje 2–4 év.

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