

# MUSKRATS (ONDATRA ZIBETHICA L. 1766) IN THE MUREȘ(MAROS) RIVER VALLEY

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## Introduction

Today muskrats are generally widespread in all the available biotopes in Romania. This species was imported in 1905 from the United States by Colloredo-Mansfield and put out at the estate of Dobrisch, south of Prague (Hoffmann, 1958). It adapted to local conditions and spread speedily in Central Europe. In Romania it arrived in the basin of the Tisza River and the first three specimens were caught by a fisherman in the waters of Aranca (Nadra, 1947). It can be supposed although, that it was present previously on this territory.

Here at the lower flow of the Mureș River, the river flux is slow and the dead river branches assure excellent life conditions for the species, and it seems that this expansion became a little slower. As it is concluded by the literature, it reached approximately in 20 years the area of the Tîrnava River estuary (Teodoreanu, 1973). Its expansion followed the flow of the Mureș, and it the mid 1970s reached the city of Tîrgu-Mureș. Although Marches (1960) published a table in which there were reported four muskrat skins were donated to the wild animal skin collecting center, it could not be proven that these skins came from the neighbourhood of the town. (There was a similar case in București, where 21 skins were donated, although the muskrat was not found in the area. No further skins were donated in subsequent years.)

At the upper flow of the Mureș River, it seems that the expansion of the species gained momentum. In 1976 it was found at Răstolița in the estuary of the Iod creek, in 1980 we found it at Voșlobeni, only some kilometers south from the river. Naturally the muskrat was looking for side waterflows of the river and through them settled also in the southern territories of the Cîmpia Transilvaniei. So it appeared in 1976 at lake Fărâgău, after that in the Sar creek's valley first-breeding lakes also. Beginning from 1983 we caught specimens from the Comlod creek. It can be supposed that it had existed there earlier.

## Material and methods

The base of the present study is formed by 160 collected muskrat specimens. To this are added our observations in the field, and the published data dealing with the territory. Based on it we tried to estimate the expansion of the species in the Mureș River Valley. Of the most part of the collected specimens, we took the following measures: weight (with a precision to grams); total length (from the tip of the nose to the end of the tail); body

length (from the tip of the nose to the base of the tail); tail length; length of the posterior leg (from the Achilles heel to the end of the longest foot-finger, without the claw); length of the ear (from the lower half of the aperture to the peak, without the tuft of hair). These measures of length were recorded in mm, in the case of the posterior leg and of the ear with a tenth mm precision. We grouped the biometrical values separately for sexes and we calculated the next parameters:

- number of individuals (n)
- minimum size (min)
- maximum size (max)
- arithmetic average ( $\bar{x}$ )
- middle error of the  $\bar{x}$
- standard deviation of the arithmetic average (s)
- variation coefficient (VC)

### Results and discussion

Table 1 summarizes the most important collected data of specimens, marking at every place the year of the first collecting. Based on our data and on those references to the literature that deal with the Mureş valley, there can be stated the spreading of the species in the surveyed territory, and we can draw conclusions on the speed of expansion of muskrats in the watershed of the Mureş River, as it is presented also on Fig. 1.

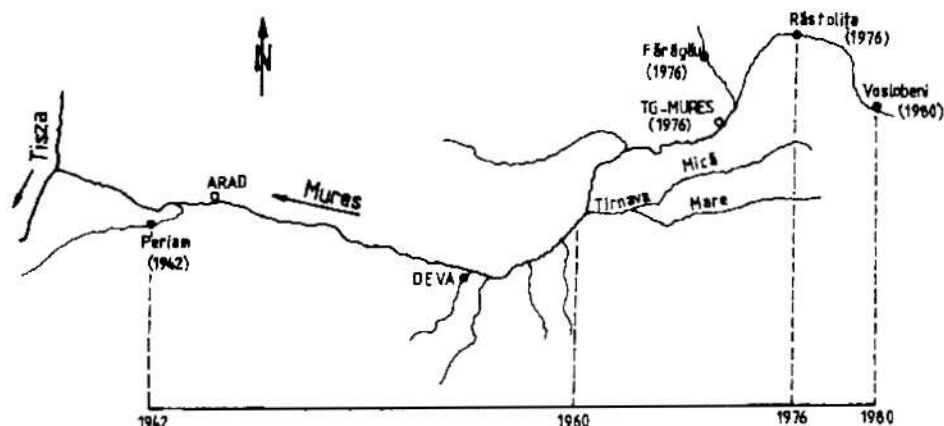


Fig. 1. The expansion of *Ondatra zibethica* in the Mureş River valley

Teleguţ (1963) examining the appearance of muskrats in Banat, inquires the settlement of the species and evaluates that its expansion to the internal territory of the country will not be considered. Our findings do not confirm this supposition, for we found

specimens in 1976 from Țirgu Mureș, Fărăgău and Răstolița and in 1980 from Voșlobeni (from the river-head of the Mureș River). In 1982 muskrats are still present in all the habitats available in the Mureș valley, in the silent-flow parts of the river (especially in the Gheorgheni basin), in dead beds, lakes, side moors. The number of individuals had been increasing explosively till 1984-85. For example, at the fish pond from Iernut, in 1981-82 and in 1983 at the time of spring breeding season, at evening observations (approx. 3 hours long) we frequently saw 10-15 individuals, but after 1985, only 3-5 were seen every evening. A similar situation has emerged at the Iut brook, where a hunter shot 4-5, sometimes 6 specimens in a hunting in the years 1982-1983, but since 1985 one or two individuals have been considered a good catch. One or two years later a similar situation arose in the whole watershed of the Mureș River.

Table 1. Data on the *Ondatra zibethica* collected in the watershed of Mureș River in the period of 1957-1991.

	Collection Site	Year of the first collection	Number of individuals collected
1	Senctea	1980	1
2	Ciumani	1982	5
3	Joseni	1982	11
4	Răstolița	1976	2
5	Aluniș	1983	1
6	Brincovenesti	1986	4
7	Idecu de Jos	1979	5
8	Suseni	1990	7
9	Reghin	1979	13
10	Dedrad	1980	1
11	Apalina	1981	6
12	Petelea	1978	2
13	Gornești	1980	1
14	Dumbravioara	1977	2
15	Viovodeni	1983	2
16	Glodeni (r. Țar)	1981	12
17	Glodeni (r. Mureș)	1983	1
18	Păingenii	1982	14
19	Băla	1982	3
20	Poarta	1982	5
21	Fărăgău	1976	20
22	Țirgu Mureș	1976	4
23	Riciu	1983	15
24	Berghia	1979	1
25	Cipău	1980	5
26	Iernut	1980	17
27	Ogra	1983	1
28	Arad	1957	1

Based on the biometrical data (Table 2.), there exists a difference between sexes, males are bigger, but this is not significant statistically, for the size of the body depends also on the age (the old, big individuals are rare due to over-hunting). From the

individuals of our county (Teodoreanu, 1973) we do not find a marked difference. In comparison with the average weight of the North American populations (Hoffmann, 1958) our specimens are smaller (200-300 g), and it is the same situation with body length, tail length, ear and posterior leg.

In the specimens descending from dense populations, during dissection we often found intestinal liver-parasites. Unfortunately because of improper storage, the collected parasites have been damaged.

Our observations referring to the life, activity and behaviour of the individuals and on those of the populations were carried out parallel with the collection, during several years. Most parts of our results coincide with the literature data (Hoffmann, 1958; Teodoreanu, 1977), therefore we present only those which are different from them or are less known. In the summer of 1978 in a dead branch above the barrier in Tirgu-Mureş, muskrats built 11 castles of sedge. In January we opened two such castles with a silure-saw in such a manner that we pushed one half away on the ice, and we took measures on the nest-building (Fig. 2.) At the entrance (underwater) with an iron trap we caught one individual, then we moved the trap away, and the muskrat-castle was resettled in its original position. The two muskrat-castles examined by us had only one entrance, the others being frozen; our observations were carried out at  $-25^{\circ}\text{C}$ .

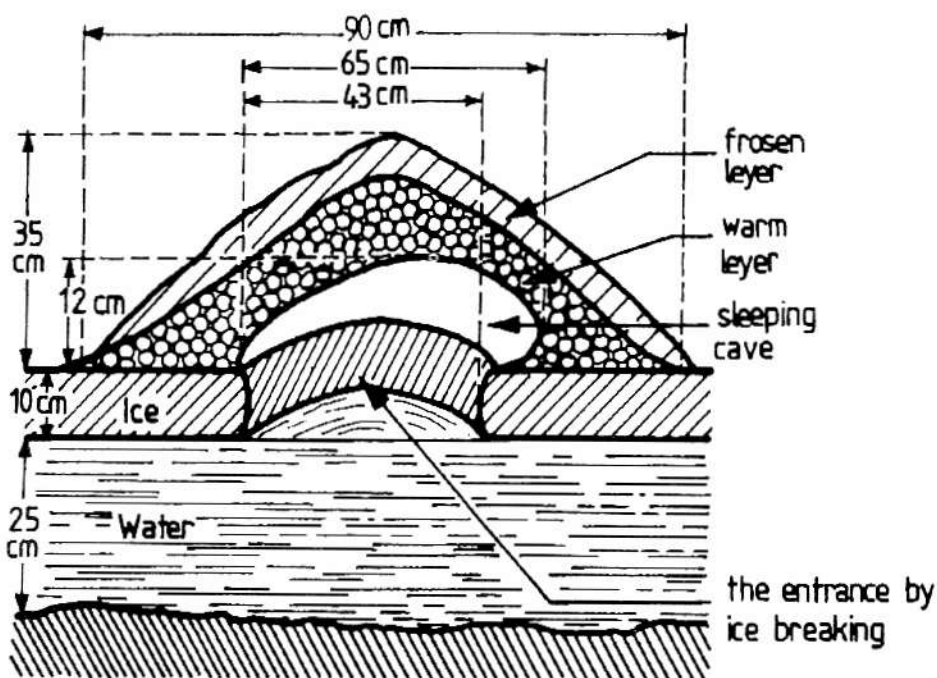


Fig. 2. The transsection of *Ondatra zibethica* nest building (Tg. Mures 01.17.1978)

Under the ice-crack we found 13 pairs of shells (Unionidae) of the following species composition: 8 *Unio pictorum*, 4 *Unio tumidus*, and 1 *Anodonta cygnea*. The species composition of the eaten mussels is highly similar to that of this habitat (Sárkány, 1977), as the muskrat eats the available food in the habitat without any selection. The shells are broken on their edges and the traces of pricks are clearly visible.

Table 2. Statistical data for some variables

Variable	Sex	n	min	$\bar{X} \pm m$	max	s	VC
Body weight	m	72	660	$1034.96 \pm 19.56$	1420	165.99	16.04
	f	38	730	$976.63 \pm 21.68$	1250	133.65	13.70
Total length	m	47	452	$526.22 \pm 3.72$	583	25.47	4.84
	f	32	458	$522.13 \pm 5.11$	566	28.89	5.53
Body length	m	46	262	$291.74 \pm 2.35$	325	15.95	5.47
	f	31	224	$287.36 \pm 3.59$	325	19.99	6.96
Tail length	m	51	190	$234.98 \pm 2.04$	274	14.58	6.21
	f	33	202	$234.68 \pm 2.99$	271	17.20	7.33
Length of posterior leg	m	51	57.3	$65.60 \pm 0.57$	84	4.07	6.20
	f	33	58.5	$64.39 \pm 0.40$	70	2.31	3.59
Ear-length	m	50	16	$20.94 \pm 0.32$	25.5	2.23	10.64
	f	31	17	$20.95 \pm 0.34$	24	1.90	9.06

Due to intensive hunting, the individuals have become cautious, most of the time they procure food while swimming underwater, and they emerge only at places covered with reed or cress.

After the importation and settling of the Chinese phytophagous fish species, the muskrat populations of these fishponds (Iernut, Cipău, Glodeni, Păingeni and Poarta) have become thin and in the majority of the cases they remained only in the channels linking the lakes. So, the phytophagous fish despoiling the vegetation which serves as food for the muskrat, are successful concurrents with the latter ones.

In the Spring of 1988 on the shores of the fishing lakes of Iernut, our dachshund brought out a muskrat from a fox hole, the head of which had been chewed off. In our opinion, this is a sure sign of the fact that foxes consume muskrat.

Along the Mureș River as well as on the Fărăgău and Goldeni lakes, rats of passage (*Rattus norvegicus*) use musk galleries. Where rats appear in large numbers, the number of musks decreases considerably or they may disappear completely. Presumably rats consume young musks.

## Conclusions

1. Muskrats prove to be a species with high ecological potential. In the habitats examined by us, they seem to have adapted successfully to these biocenoses, and in our

opinion with little oscillations the population size will remain on the present level in the Mureş valley.

2. There was no conclusive evidence gathered to support the supposition that muskrats will spread excessively in Romania and cause great damage (Marcheş, 1960). The causes of the regression following the earlier population explosion are: intensive hunting, the spread of internal parasites, and the limiting action of the ancient priding fauna.

In the case of fishponds, the most important competitors for muskrats are phytophagous fish species (in other waters this concurrence need not to be taken into account since these fish can be bred only artificially).

3. The populations we examined do not present statistical deviation compared to other populations living in other areas of Romania.

4. In comparison with the North American populations, the specimens measured by us were smaller with 200-300 g, the rate of the measure of length is similar.

### References

- Filipaşcu, A. (1968): Bizamul în Cîmpia Transilvaniei (Muskrat populations in the Cîmpia Transilvaniei). V.P.S. 3, 16-18.
- Hoffmann, M. (1958): Die Bisamratte. Leipzig, pp. 276.
- Marches, G. (1960): Problema bizamului (*Ondatra zibethica* L.) în ţara noastră (Problem of muskrat in our country). Ocr. Nat. 5, 71-103.
- Nadra, E. (1947): Bizamul (*Fiber zibethicus* L.) în România (Muskrat in Romania). Carpaţi 1, 3-6.
- Sárkány, E. (1977): Präliminäre Studien über die Najadenpopulationen (Unionidae) aus dem Mureş-fluss. Aluta Muz. Sf. Gheorghe 273-286.
- Teleguţ, M. (1963): Va dispărea bizamul din Banat ? ( Will the muskrat disappear from the Babat?). V.P.S. 6, 16.
- Teodoreanu, M. (1973): Studiul morfologic, ecologic şi al răspîndirii bizamului (*Ondatra zibethicus zibethicus* L.) în România (Study of the morphology, ecology and distribution of muskrats in Romania). Rez. Tez. de doc. Univ. Babeş-Bolyai Cluj, pp. 64.

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