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QUANTITATIVE DATA CONCERNING THE DISTRIBUTION AND ECOLOGY OF THE *Mesopodopsis slabberi* (VAN BENEDEN) AT THE DANUBE RIVER MOUTHS AREA

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ABSTRACT:

On the basis of more than 350 samples collected with an original net both in May and September 1975, the distribution and some ecological aspects of the misidacean Mesopodopsis slabberi living in front of the Danube Delta are presented in the paper. In 1975 Mesopodopsis had very poor populations (maximum 95 individuals/m^3) as compared with those recorded more than 20 years age.

Mysidaceans, crustaceans resembling little shrimps in aspect and movements, represent a group of organisms that have been thoroughly studied in the Black Sea, particularly the Romanian shore, thanks to the researches carried out by BACESCU (1, 2, 3, 4, 5, 6).

As a result of the ecological investigations it has been pointed out that one of the most important species of mysidaceans in the coastal shallow waters (Sulina - Ciotic area - in front of the Danube Delta and the lagoon complex Razelm - Sinoe) is Mesopodopsis slabberi (VAN BENEDEN).

In accordance with BACESCU's data (1, 2) this species formed densities of tens of thousands of individuals per cubic me-

tre of water in the area of the Danube river mouth; it was actively consumed by numerous fishes; the native also caught it and used it to feed pigs and ducks.

In the past years, among the numerous ecological changes occurred in the Romanian littoral we have also recorded a considerable decrease in the mysidacean populations. That is why, in 1975 we focus our attention on the Mesopodopsis slabberi populations at the mouths of the Danube river.

METHODS AND MATERIALS

The following areas with the Mesopodopsis populations were investigated: Sulina - North Bay, Sulina - South Bay, Imputita ($45^{o}05'N$), Mila 9 ($44^{o}59'N$), Sfîntu Gheorghe ($44^{o}53'N$), Sahalin şi Ciotic ($29^{o}30'E$).

The materials were collected at depths of 0.5 m, 1.0 m, 2.0 m, 3.0 m and on horizons 0.5 m thick, so that the whole water column above the bottom has been investigated in each station. Samples have been collected by means of a mysidacean net (with 1 mm meshes), of personal design (Fig.1). The net has a rectangular opening (1.000 x 500 mm). In order to operate horizontally it is regulated by floates at the upper side and by weights at the lower side. In every horizon the net has been towing over a distance of 50 m, so that 25 m^3 of water have been filtred. The collected samples have been preserved with formol and by sorting them all the organisms were registred.

RESULTS OBTAINED

From the very beginning we have to mention that immediately after collecting the samples, each of them has been carefully examined in a glass jar, in order to establish the presence of Mesopodopsis. This mysid is a distinctive one: it has a slender transparent body and its eyes are of an uncommon length (twice longer than the diameter of the carapace in the gastric region). In the sample it appears to be under the shape of small hyaline wands, ended in stalked eyes - black dots - actively moving in the water. It is worth noting that in tens of collected samples the mysid has not been found. Thus, in 1975 Mesopodopsis slabberi has never been recorded at Sulina - North Bay (where

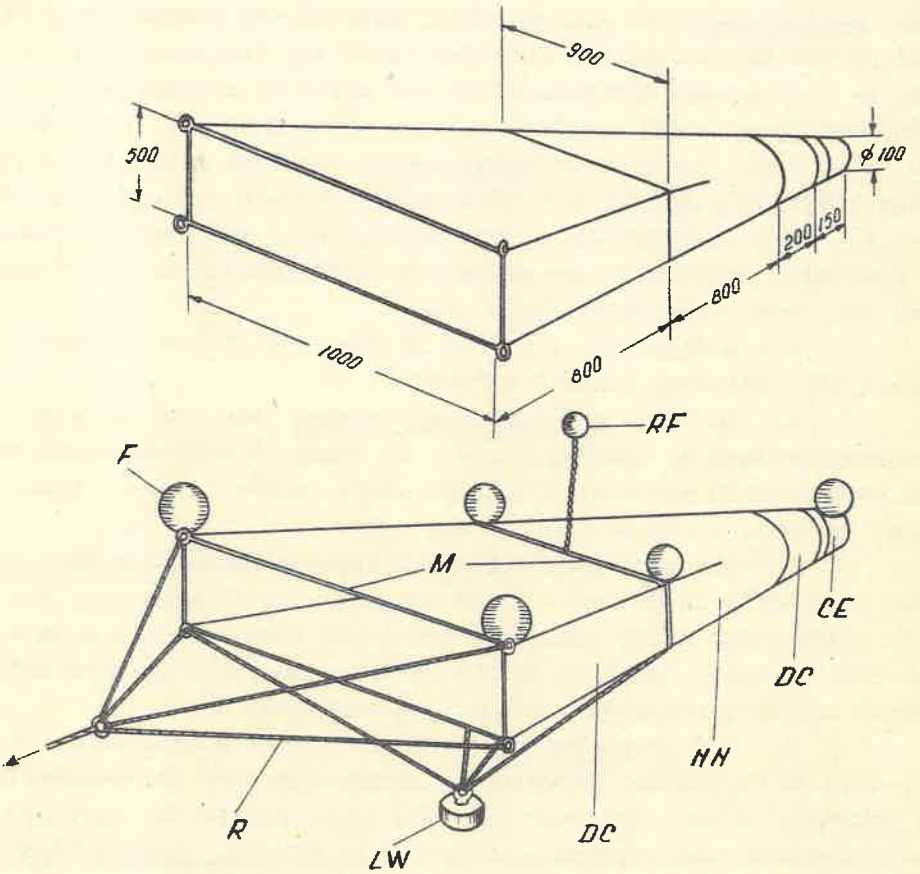

Fig. 1 - Mysidacean net:

CE - cod end (metal conteiner); DC - duck cloth; F - floats; LW - lead weight; M - metal frame; NN - nylon net ϕ 1 mm; R - ropes; RF - rope with float for net closing.

more than 6o samples were collected). Also, in the other investigated localities the mysid has not been found at depths greater than 1.5 m (in 225 samples).

At the Danube river mouths area, both in spring and autumn, Mesopodopsis has been recorded only in the narrow strip of shallow waters, having the offshore limit the 1.5 m isobath. But, even in this narrow littoral strip the mysid is ununiformly distributed and forms small crowds - shoals, which actively shift in the water mass. The area of Mesopodopsis has been delimited only after collecting samples 4-5 times consecutively and analysing the results. In the discussion of the results only the maximum values of densities (expressed) as numbers of individuals per 25 m^3 water) have been considered (Table 1).

The preliminary analysis of the data (Table 1) makes evident the following general aspects.

1. In 1975 Mesopodopsis slabberi had very poor populations (maximum 95 individuals/m^3) as compared with those recorded more than 2o years ago (BACESCU, 1954, p.85: "tens of thousands of individuals at 1 m^3 of sea water").

2. The most abundant populations of Mesopodopsis have been registered at Saline - South Bay zone. As we move away from this place going south along the coast the mysidaceans are less and less numerous, so that in the Ciotic zone their maximum densities hardly reach values of 25 individuals/25 m^3.

3. The Mesopodopsis populations were more numerous in May than in September. However, we cannot consider this situation as general, because the year 1975 was characterized by specific ecological conditions, produced by the Exuviaella cordata blooming whose critical consequences occurred during the summer (8).

4. In the structure of Mesopodopsis populations there are ovigerous females, having 7-5o embryos each (in average 22), both in spring (May) and autumn (September).

5. In the zone where the mysidacean populations form shoals, there also appear some other organisms in the water mass, but their densities (except benthic copepods) are usually very small (Table 1).

The analysis of the vertical and horizontal distribution of the populations is done mainly on the basis of a very sig-

Table 1

Maximum quantities of organisms (number of individuals/25 m^3 water) found in 1975 in different zones (down to 1.5 m depths) infront of the Danube Delta

Organisms / Locality/ Month/	South Bay-Sulina		Imputita		Mila 9		Sf.Gheorghe		Ciotic	
	V	IX	V	IX	V	IX	V	IX	V	IX
Mesopodopsis slabberi V.BEN.	2,32o	863	1,7o9	737	467	3	85	47	2o	-
Mesopodopsis ♀	37	-	196	-	5	2	2o	13	2	-
Cumacea	1	-	-	-	-	-	-	-	-	-
Amphipoda	47	-	22	-	12	-	16	4	-	-
Benthic copepods	1,225	-	728	-	1,328	-	886	-	1,23o	1,545
Planktonic copepods	4o4	-	36	-	-	-	-	-	-	48
Ostracoda	2	-	-	-	-	-	-	-	-	-
Idothea baltica (PALLAS)	2	-	-	-	-	-	-	-	-	-
Crangon crangon (L.)	2	1	1	-	-	-	-	-	-	-
Small medusae	38	-	5	-	2		6	-	-	-
Halacarida	1	-	-	-	-	-	-	-	-	-
Aphia minuta (RISSO)	2	-	-	-	-	-	-	6	-	-

nificant example, that is the results registered at Sulina zone - South Bay.

Sheltered by the Sulina Canal the South Bay represents an ideal place for the mysidacean populations. It seems that the majority of the observations concerning the great abundance of Mesopodopsis on the Romanian littoral refer to this zone. During the skin-diving surveys we made at Sulina-South Bay area in the years 1959-1960, dense crowds of mysidaceans like hyaline "clouds" in the low transparent mass of water have been observed.

In May 1975 at the depth of 0.5 m Mesopodopsis shoals with densities of about 80 individuals/m^3 appeared. Isolated individuals (1-2 specimens/m^3) were also found. Together with the mysid, in the water layer above the bottom there are other organisms, both planktonic and benthal, but less numerous (Table 1). Depending on the quantity of mysidaceans, the qualitative and quantitative structure of the association changes. It is worth giving as example the composition of two samples, one rich and the other poor in mysidaceans (the values represent the number of individuals per 25 m^3 water):

	Sample A	Sample B
Mesopodopsis slabberi V.BEN.	1,961	2
Amphipode (Gammarus aequicauda MART.)	34	47
Benthic copepoda	-	1,225
Crangon crangon L. (shrimp)	2	-
Small medusae	2	-
Aphya minuta (RISSO) (fish)	2	-

It comes out from the above mentioned data that between the populations of Mesopodopsis and the benthic copepod ones rising and swimming above the bottom there is a relationship of competitive exclusion type.

In september no mysidacean has been recorded in this bathimetrical zone.

In the zone of 1 m isobath, in the superficial layer of water (0.5 - 0 m horizon), Mesopodopsis can also be found in great quantities (50 indivs./m^3 in May, but there are isolated individuals too (as much as 3 specimens/m^3). The other organisms recorded in the samples, form a mixture of planktonic and benthic elements

and their populations are scarce (maximum 4 Amphipoda - Ampelisca, 1 Crangon crangon, 1 Idothea, 5 small medusae, 1 Aphya minuta per 25 m^3 water).

In May, the bottom layer water (1-o.5 horizon) the greatest crowds of Mesopodopsis (94 indivs./m^3) from the Romanian littoral of Black Sea have been met.

In comparison with the great number of mysidacean the other organisms appearing in the samples are rare (4-7 Amphipoda, 2 Idothea) 2 small medusae, 1 Aphya minuta per 25 m^3 water).

It is interesting to note that the results of vertical sampling (for a test - the net without floats dropped on the bottom and then drawn to the surface) show the absence of mysids and the fauna composition was totally different from that collected horizontally; the average density of organisms per 1 m^3 is as follows: 1 Cumacean, 22 benthic Copepods, 4o4 planktonic Copepods, 2 Ostracods, 1 Halacaridae. Once again this test of vertical sampling comes to prove the ununiform distribution of Mesopodopsis. In September the mysid was no more recorded in the zone of 1 m isobath.

In May at depths of 1.5 m Mesopodopsis could be found in an extremely small number (5 indivs./25 m^2 water) and only in the water layer above the bottom (1.5 - 1.o m horizon). In September the mysid formed shoals in the same bottom layer, but its populations were more abundant (up to 863 indivs./25 m^3 water).

In seems that in autumn the mysids gather in deeper zones; their absence at depths of o.5 m and 1.o m emphasizes that. However the autumn populations were less numerous, although it is a matter of individuals concentrating in 1.5 m isobath zone. Other organisms recorded in the samples together with the mysidaceans were the small medusae in May (19 indivs./25 m^3) and Crangon crangon in September (1 indivs./25 m^3).

The situation in the South Bay - Sulina can be considered typical for the distribution of mysidaceans in the predeltaic waters of the Romanian Black Sea littoral.

In the other investigated zones Mesopodopsis, less abundant but also ununiformly distributed, was found only between depths of 1.o - 1.5 m, in the bottom layer.

After having analysed the state of abundance of Mesopo-

Dopsis in the predeltaic zone in 1975 it is interesting to make a few references to the quantities of this mysid in the littoral lagoons, where in the past it formed great populations.

Owing to the studies achieved in Sinoe Lagoon in the past years it has been ascertained that the Mesopodopsis has considerably decreased here too, becoming a species almost absent in the benthos samples (personal communication of Dr.C.Nagy and Dr.D.Manoleli). The mysid does not always appear even in the plackplankton samples and when it is present its quantities vary very much. In 1973-1974, when monthly samples were collected from the Sinoe Lagoon, Mesopodopsis was present only in some of them.

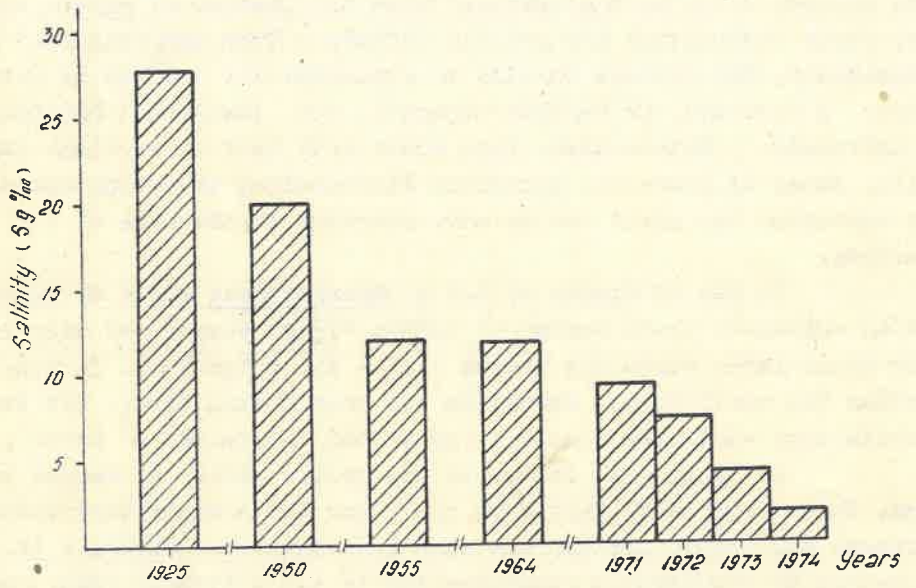

Fig.2 - Evolution of water salinity in Sinoe Lagoon between 1925-1974.

It is appreciated that the decrease in the quantities of Mesopodopsis has been caused by the repeated phenomena of the diminishing salinity in the past years. The evolution of the water salinity (Fig.2) in the Sinoe Lagoon in the past 5o years is conclusive (7). Thus, in 1925 the salinity was 27.81 g S‰. In consequence of dredging the Dunavăţ and Dranov Canals (in the Danube Delta) in 1951-1952 the salinity gradually diminishes:

12.oo gS%o in 1959, 9.3 gS%o in 1971, 7.4 gS%o in 1972, 4.2 gS%o in 1973 and, at last 1.9 gS%o in 1974. It is obvious that the change in the salinity factor caused the reduction of Mesopodopsis populations in the Sinoe Lagoon.

But, for the time being it is difficult to find the causes responsible for the decrease in the mysidacean populations in front of the Danube Delta. We guess that one of these causes is the pollution of the Danube river waters. It is not impossible that the special features in 1975, the consequences of water blooming with Exuviaella cordata (8) might have negatively influenced the Mesopodopsis populations.

CONCLUSIONS

Because of the small densities and biomasses, because of the fact the Mesopodopsis slabberi populations live in a limited area, the stock of the mysid at the Romanian littoral was low (8.68 - 22.71 tones).

Although the high biochemical and trophic value of Mesopodopsis recommends this species for an industrial exploitation, this is not possible because of the extremely rare populations in nature.

Mesopodopsis is still an important species for the ecosystem (being dominant there where it lives), as a source to feed the rich ichthyofauna at the Danube river mouths area, and therefore it is necessary to continue the observations and study the dynamics of its populations.

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