International Journal of Environmental Sciences

Full Length Research Paper

Determination of Size-weight percentage of Invasive Bivalve Mollusk *Anadara inaadival (Bruguière, 1789)*in the Black Sea

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ARTICLE INFORMATION

ABSTRACT

The article provides the results of size-weight percentage of invasive bivalve mollusk - Anadara inaadival (Bruguière, 1789) in the Black Sea. The relationship of mollusk's length to body weight was determined-with raw (whole weight) meat (useful) mass, Modern and mathematical methods of determination and calculation are described. 2 categories are studied according to size.

Introduction

Bivalve mollusks are bilaterally-symmetrical animals. Their body is unsegmented. The shape of the shellis triangular-oval. The shell, which consists of two parts, is known as thevalve (Novikov P., Naumov S., 1989). Mollusks, as a rule, tend to havea less movable habit, and some of them are characterized with animmovable character. The soft, skeleton deprivedbody of most of them is placed in the shell. Bivalve mollusk - Anadara inaequivalvis is a new, opportunistic self-conditioning filter for the Black Sea (Gogmachadze T. M. & Mikashavidze E. V. 2005). It is widespread in the Black Sea coast of Georgia.

Today, humanity is studying different organisms every day to use it as an alternative source of food **(Zaitsev Y. 1998).** The size-weight ratio ofthis hydrobiont inhabitant of Bental on the Georgian coastline, is still unexplored, which has aroused our interest. Based on the above, we aimed to conduct a study on the body of the invasive bivalve mollusk - Anadara (Anadara inaeqiuvalvis) of the Black Sea Georgia shelf,To determine its weighted value. We think in this regard, it will give us useful information and in increasing the diversity of the human food base, Anadara will establish its place in the food rationas a delicacy in Georgia.

Materials and methods

For the purpose of the study, we used modern methods of known hydrobiological research[2]**.** In the Black Sea shelf zone of Georgia, research material was obtained at pre-planned stationary stations.In particular, in the areas of Anaklia, Poti, Kobuleti, Chakvi, Mtsvane Kontskhi, Batumi and Gonio. The survey was conducted in 2016-2018. A massive amount of material was collected on the Batumi beach in November 2018 during a 4-5 degree sea rough. At this time, about 10 kilograms of material of various sizes were isolated and collected, which enabled us to conduct significant research. The material was processed in the Fisheries and Black Sea Monitoring Laboratory.

The size-weight of the animal was determined by the appropriate (Todorova V. & Konsulova T. 2005) using an electronic scale (total mass) with an analytical accuracy of 0.001 g. For all further calculations we used the mean length and weight. We grouped mollusks according to size classes. The following components were identified: a) total weight; B) the weight of the shell.

Results

The tables and diagrams below show the ratio of crude weight (mollusk weight with shell) to length.In order to determine the percentage ratio, we took 10 specimenes of approximate size, whose average length was 52-75 mm, Which averaged 48.4mm per specimen.The length of each specimen was measured using a pair of trammelsand weighed on an electronic scale. We also compiled the relationship of meat weight (mollusk without the shell) to the length of the shell. The meat of each specimen was removed from the shell and weighed separately; On the basis of which the dependency index table and graphs were compiled,On which the size-weight relationship of Anadara (Anadara inaeqiuvalvis) is given(Table 1; Legend: 1,2).

Table1. Relation of body length to total raw weight and meat weight of inaquelvalvis

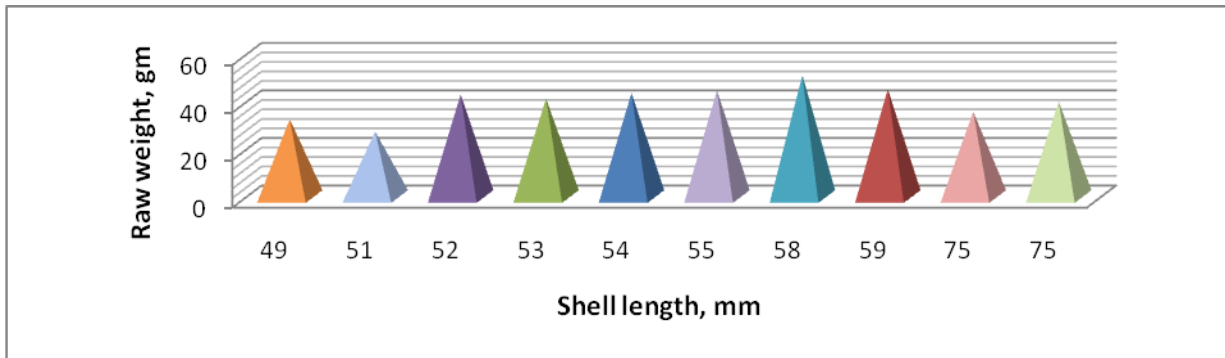| Length, mm	Raw weight, gm	Meat weight, gm
54	43.6	18.2
59	45.2	15.6
53	41.2	17
52	43	16
58	51.1	22.9
49	32.6	13
51	27.4	8.5
75	35.7	13.5
75	40	16.4
55	44.6	15.3

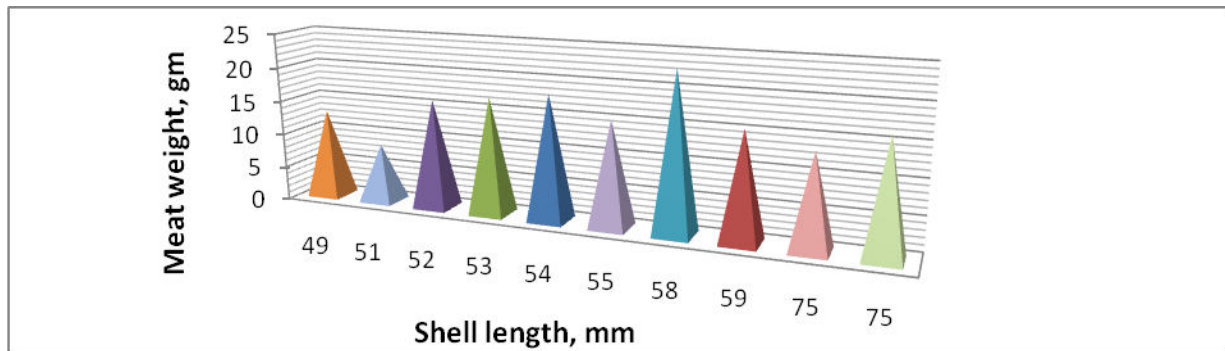**Fig. 1.** Raw Weight length relationship of Anadara inaeqiuvalvis

Fig. 2. Meat weight length relationship of Anadara inaeqiuvalvis

Certain peculiarity was evident, namely that the weight of the meat will be about three times less than the size. Another important thing was studied on the specimens at our disposal - the relationship between raw weight and meat weight (Table 2).

As the analysis of the obtained results shows, on average 40.14 gm of raw weight per mollusk 15.6 gm comes from the weight of meat, the rest is the shell.This percentage can be calculated as follows: **15.6X100/40.1=38.9%** (determination of percent). Analysis of the samples shows that the weight of fresh meat averaged 39% of total body weight.Which is a very important value for this adult size category. In order to confirmthe results of our research, we studied the same parameters in another category.In this particular case, the average size of mollusks was 35.3 mm, the body weight of the shell was 11.64 gm, and the weight of meat - 4.62 gm. Analysis of this size-weight relationship revealed that the specimens studied were characterized by a smaller size and a relatively thinner shell.The

result also turned out to be different.If the size / weight ratio for the large size example was 5/4, in this case it was 3/1.That is, in the first case it was 83%, in the second - 32.3%.

Table2: Dependence on the raw (total) weight and meat weight of inaquelvalvis

Raw weight gm	Meat weight gm
43.6	18.2
45.2	15.6
41.2	17
43	16
51.1	22.9
32.6	13
27.4	8.5
35.7	13.5
40	16.4
44.6	15.3

Table3: A.Relation of inaquelvalvis body length to raw (total) weight and meat weight

Length, mm	Raw weight, gm	Meat weight, gm
32	11.3	5,1
34	10.6	4.4
35	12.8	6
35	8.7	2.5
36	11.7	5.4
36	12.3	4.6
36	9.1	2.7
36	14	4.9
36.5	11.4	5,1
36.5	14.5	4.4
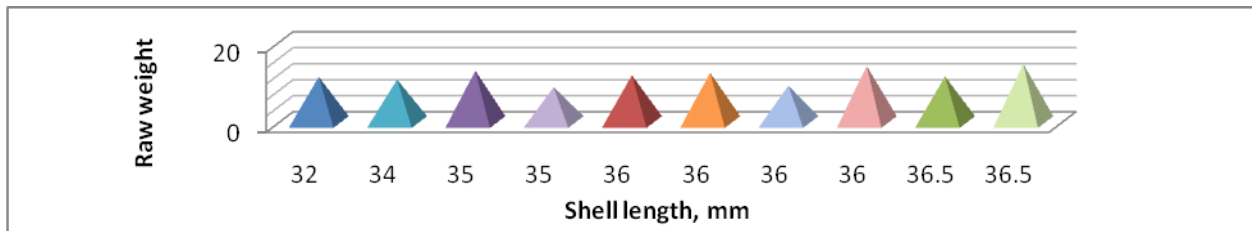
Fig. 3. Dependence on the raw (total) weight and meat weight of inaquelvalvis
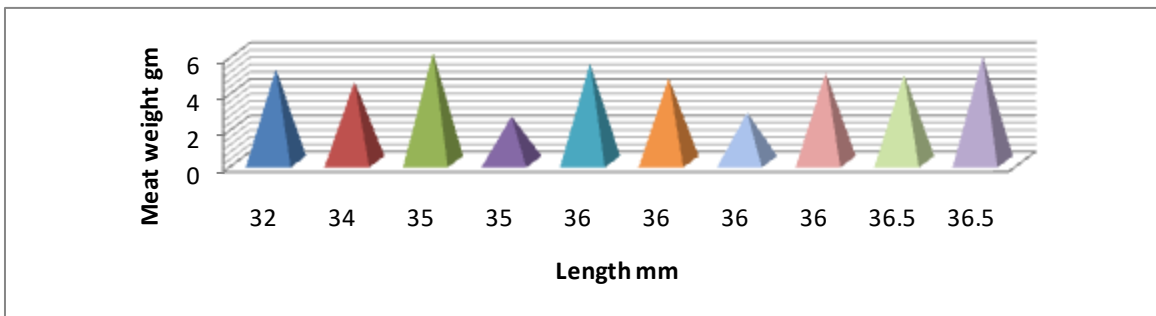
Fig 4. A.Relation of inaquelvalvis body length to raw (total) weight and meat weight

Also here some peculiarities were revealed. In this case, the weight of the meat depends on the size too.If the 54 mm specimenes contained about 18 grams of meat, the weight of 30-35 mm is only within 5 grams.

The analysis of the obtained results reveals that on average 11.6 gm raw weight mollusk 4.6 gm comes from the meat weight.This percentage can be calculated accordingly:

$$4.6 \times 100/11.6 = 39,65\% \text{ (determination of percent)}$$

As a result, 39% of the total raw weight comes from the meat mass.

Table4: The dependence of the raw weight of inaquelvalvis on the weight of its meat

Raw weight, gm	Meat weight, gm
11.3	5,1
10.6	4.4
12.8	6
8.7	2.5
11.7	5.4
12.3	4.6
9.1	2.7
14	4.9
11.4	4.8
14.5	5.8
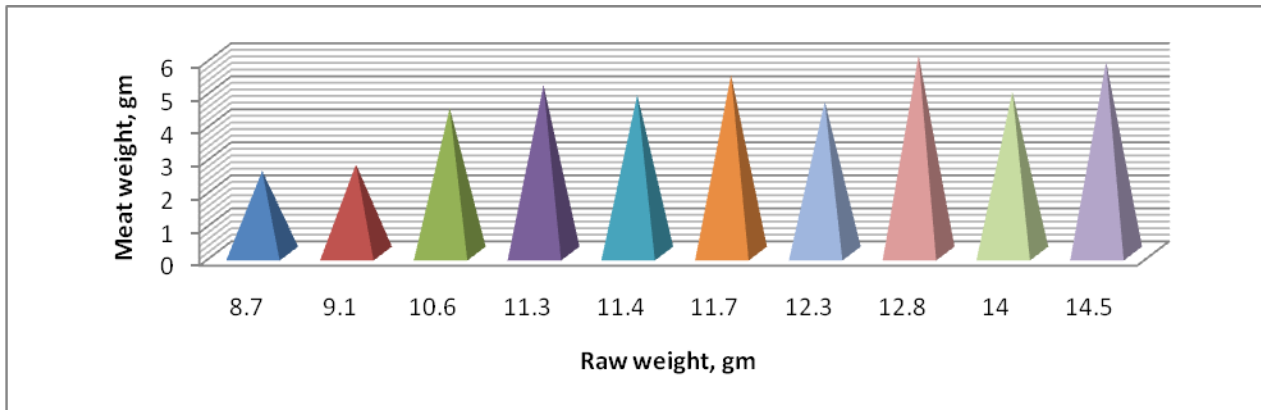
Fig 5. The dependence of the raw weight of inaquelvalvis on the weight of its meat

Conclusion

For the purpose of determining the nutritional value of the common bivalve mollusk - Anadaraat Black Sea shelf on the territory of Georgia,in particular at pre-planned stationary stations, in the areas of Anaklia, Poti, Kobuleti, Chakvi, Mtsvane Kontskhi, Batumi and Gonio, A study was conducted to determine the ratio of Anadara inaequivalvis body length to total (raw) weight, meat weight, as well as raw body weight and meat weight. Based on the information obtained from the study, a useful coefficient was determined from the total mass of the catch. In particular, for 100 kg of mollusks with a shell length of 50-60 mm, about 39 kg is meat, which is quite a high figure.

References

1. Gogmachadze T. M. &Mikashavidze E. V. 2005. Cunearca cornea (Reeve) – new dominant hydrobiont at the coastal shelf of the Black Sea of Georgia. News of Biology, Ivane Javakhishvili Tbilisi State University
2. Todorova V. &Konsulova T. 2005. Manual for quantitative sampling and sample treatment of marine soft-bottom macrozobenthos. Varna, Bulgaria: Institute of Oceanology, Bulgarian Academy of Sciences
3. Zaitsev Y. 1998. The most bluecoloured in the world. Series of the Black Sea Ecology [ChernomorskaiaEkologicheskaiaSerija]
4. Novikov P., Naumov S., 1989. Type of mollusks or mollusks (Lightning). Zoology. Publishing House "Education", Tbilisi.
5. Mikashavidze E.V. 1987. Distribution of moluscs on the shelf of the eastern part of the Black Sea. Molluscs. Result and prospects ih findings. Leningrad.
6. MikashavidzeE.V. 1987. Distribution of lightning rods on the shelf of the eastern part of the Black Sea. Molluscs. Result and prospects ihfindings. Leningrad.