

Study of Phenotypic Correlations between Morphologic Characters and Body Parameters at River Male Lobsters (*Astacus Fluviatilis*)

Marian Bura, Silvia Patruica, Szidonia Szucs, Iosif Sorin Tizler

Banat's University of Agricultural Sciences and Veterinary Medicine Timisoara, 300645, Aradului Road, 119, Romania

Abstract

The body measurements was made on 20 males of river lobster (*Astacus fluviatilis* or *Astacus astacus*). The lobsters on witch the study was made had an average total length of body of 12.72 cm \pm 0.19 cm (formed from: 6.07 \pm 0.10cm the length of cefalothorax, 4.73 \pm 0.10 cm the length of abdomen and 1.91 \pm 0.07 cm length of telson), and a body weight of 55.70 \pm 3.07 g. the males present a length of antennas of 8.53 \pm 0.34 cm, a feelers of 2.20 \pm 0.05 cm, and the stems of the eyes of 0.51 \pm 0.02 cm. The body of males present a average width of 3.35 \pm 0.07 cm at level of cefalothorax, and 2.40 \pm 0.05 cm at abdomen level. Average deepness of cefalothorax was 2.85 \pm 0.07cm, and abdomen deepness of 1.34 \pm 0.03cm. The 5 pairs of periopodes had an average length of 10.91 \pm 0.42 cm, 6.06 \pm 0.22 cm, 7.21 \pm 0.21 cm, 6.57 \pm 0.16 cm and 5.85 \pm 0.15cm. The average length of pleopods was at first pears of 2.00 \pm 0.06 cm, at second pair of 2.11 \pm 0.05 cm, at third of 1.85 \pm 0.05 cm, at fourth of 1.73 \pm 0.04 cm and at fifth pair of 1.55 \pm 0.04 cm.

Key words: river lobster (*Astacus fluviatilis*), somatic measurements, body measures

1. Introduction

The productive level of animal species is conditioned by hereditary base and by the environmental conditions in witch the breeding conditions have place. Regarding the fact that the populations of lobsters from the study was gathered from natural habitat and we cant action on environmental conditions, and the modality to intercede the river lobster selection (*Astacus fluviatilis*) has to start from a very good knowledge of morphologic characters and phenotypic correlations between this and body parameters.

In consulted specialty literature [1, 2, 3, 4, 5, 6, 7], we didn't find information regarding phenotypic correlations of river lobsters (*Astacus fluviatilis*)

2. Materials and methods

On base of primary data, presented in prior paper, simple phenotypic correlations was established between morphologic characters involved in study, and a series of body parameters was calculated, with the help offered by this parameters we can characterize morphological the population of male lobsters from the Carp Farm, from Garla Mare, county Mehedinti, Romania.

Body parameters were established after next relations:

Profile parameter, put in evidence body format of lobsters, and was determined after the relation:

$$I_p = \frac{L_{tc}}{A_c}$$

in which:

I_p – profile parameter

L_{tc} – total length of the body, in cm

A_c – depth of cephalothoraxes, in cm.

* Corresponding author: Marian Bura, 0256277139, 0256277110, marian_bura@animal.sci

With how much the profile parameter is lower, the cephalothorax is more stuck out.

The parameter of meat, show the weight of rate, at abdomen (tail), from the total length of the body. For estimate this parameter we use this relation:

$$I_c = \frac{L_a}{L_{tc}} \times 100$$

In witch:

I_c – parameter of meat;

L_{tc} – total length of the body, in cm;

L_a – the length of abdomen, in cm.

With how much the parameter of meat, has lower values, the lobster has more meat.

The parameter of fattening shows the condition of maintaining the lobsters from an aquatic pond.

And it is established by the next relation:

$$I_G = \frac{m_c}{L_{tc}} \times 100$$

I_G – parameter of fattening;

m_c – body weight, in g;

L_{tc} – total weight of body, in cm.

A bigger value of fattening parameter shows that the lobsters have a good development.

3. Results and discussion

In table 1 are presented correlation coefficients between morphologic characters involved in study, at all 20 male river lobsters (*Astacus fluviatilis*).

Total length of body at males, has a strong positive correlations with almost all morphologic characters involved in study ($r > 0.6$), the exception is the length of telson witch one has a low positive correlation ($r = 0.23$).

The length of cephalothoraxes is strongly and positively correlated ($r > 0.5$), with the body weight, the deepness of abdomen and cephalothoraxes, the width of abdomen and cephalothoraxes, and also with the length of eyes stem, feelers and abdomen. The length of cephalothoraxes is low positive correlated with the length of feelers ($r = 0.297$), and low negative ($r = -0.263$) with the length of telson.

The length of abdomen is strongly positive correlated with body weight, the deepness of abdomen and cephalothoraxes, the width of abdomen and cephalothoraxes, the length of feelers and the eyes stems. Between the length of

abdomen and the length of telson, is a low positive correlation ($r = 0.029$).

The length of telson has a low correlation, positive or negative, with all of morphological characters involved in study.

The length of feelers is strongly and positively correlated with the width of abdomen ($r = 0.518$), and the length of feelers ($r = 0.535$), and also correlated low positively with the body weight, width of abdomen and cephalothoraxes, width of cephalothoraxes and the length of eyes stem.

The length of eyes stem is strongly and positively correlated with the body weight, the deepness of abdomen and cephalothoraxes, and also with the length of abdomen and cephalothoraxes.

The width of cephalothoraxes is strongly and positively correlated with body weight, the deepness of abdomen and cephalothoraxes, and also the width of abdomen.

The width of abdomen is strongly and positively correlated with the body weight, the deepness of abdomen and cephalothoraxes.

The deepness of cephalothoraxes is strongly and positively correlated with the mass of abdomen and the deepness of abdomen.

The deepness of abdomen, is strongly and positively correlated with the body weight ($r = 0.767$).

The second table is presenting the body parameters of male river lobsters (*Astacus fluviatilis*).

On the primary data obtained by the way of body measurements and weightings, was calculated the body parameters whereby we can characterize morphologically the population of lobsters from the Carp Farm „Garla Mare” county Mehedinti.

The body parameter, calculated through the rapport between total body length (in cm), and the deepness of cephalothoraxes (in cm), was in average of 4.50, and the limits of profile was between a maximum of 5.23 and a minimum of 3.90. Analyzing the body parameters at all 20 male river lobsters we can affirm that, how lower that value goes that stuck out the cephalothoraxes will be.

The meat parameter, show the percents of abdomen length (tail), from the total length of body. In average, the 20 males presents a meat parameter of 37.14%, and the extreme values was 33.33% and 38.73%. In the case of meat parameter, a lower value shows more meat on individuals.

Table 1. Correlations coefficients between morphological characters involved in study at male lobsters (*Astacus fluviatilis*)

No.	Specification	Body weight	Abdomen deepness	Cefalothorax deepness	Abdomen width	Cefalothorax width	Eyes stem length	Feelers length	Antennas length	Telson length	Abdomen length	Cefalothorax length	Total length of body
1	Total length of body	0.84***	0.73***	0.71***	0.97***	0.91***	0.71***	0.904***	0.60**	0.23	0.93***	0.83***	-
2	Cefalothorax length	0.86***	0.60**	0.88***	0.84***	0.80***	0.87***	0.73***	0.30	-0.26	0.76***	-	-
3	Abdomen length	0.74***	0.60**	0.51*	0.90***	0.79***	0.63**	0.90***	0.77***	0.03	-	-	-
4	Telson length	-0.04	0.33	-0.05	0.16	0.22	-0.22	0.15	0.12	-	-	-	-
5	Antennas length	0.33	0.23	0.07	0.52*	0.37	0.22	0.54*	-	-	-	-	-
6	Feelers length	0.53*	0.64**	0.53*	0.88***	0.81***	0.66**	-	-	-	-	-	-
7	Eyes stem length	0.87***	0.63**	0.86***	0.72***	0.81***	-	-	-	-	-	-	-
8	Cefalothorax width	0.89***	0.73***	0.78***	0.92***	-	-	-	-	-	-	-	-
9	Abdomen width	0.88***	0.68**	0.70***	-	-	-	-	-	-	-	-	-
10	Cefalothorax deepness	0.84***	0.60**	-	-	-	-	-	-	-	-	-	-
11	Abdomen deepness	0.77***	-	-	-	-	-	-	-	-	-	-	-
12	Body weight	-	-	-	-	-	-	-	-	-	-	-	-

Explication of semnification:

- *** - big semnification (p<0.001);
- ** - distinct semnification (p<0.01);
- * - semnificative (p<0.05).

Table 2. Body parameters at lobster males (*Astacus fluviatilis*)

No.	Profile parameters (cm)	Meat parameters (%)	Fatting parameters (%)
1	4.30	38.73	2.58
2	4.67	37.86	2.55
3	4.17	37.19	3.27
4	3.91	36.00	2.96
5	4.22	37.04	3.17
6	4.81	38.46	2.09
7	4.76	37.82	2.37
8	4.62	37.50	2.72
9	5.23	37.50	2.55
10	4.29	33.33	2.43
11	4.67	37.86	2.55
12	3.90	36.00	2.97
13	4.81	38.46	2.09
14	4.61	37.50	2.71
15	4.28	33.33	2.43
16	4.30	37.73	2.58
17	4.17	37.19	3.27
18	4.21	37.04	3.17
19	4.76	37.82	2.37
20	5.22	37.50	2.54
TOTAL	4.50	37.14	2.67

The fatting parameter, reflect the keeping conditions of lobsters from a pond, and it is calculated trough the procentual rapport between body weight and the total body length at cube. The lobster males involved in study has an average

fatting parameter of 2.67%. The limit values of this parameter were between 2.09% and 3.27%. At lobsters, a bigger value of fatting parameter shows a better development of the individ.

4. Conclusions

1. The total length of the body at males of river lobsters (*Astacus fluviatilis*), is strongly and positively correlated with the moist of morphologic characters involved in study ($r > 0.6$), excepting the length of telson, witch one has a low positive correlation ($r = 0.23$).
2. The length of abdomen is strongly and positively correlated with the body weight ($r = 0.744$), the deepness of abdomen ($r = 0.600$), and with cephalothoraxes deepness ($r = 0.513$), the width of abdomen ($r = 0.901$), and of cephalothoraxes ($r = 0.792$), the length of eyes stem ($r = 0.631$), the length of feelers ($r = 0.896$), and the length of antennas ($r = 0.774$). Between the length of abdomen and the length of telson, exist a low positive correlation ($r = 0.029$).
3. The profile parameter was in average 4.50, and the limits values were between a maximum of 5.23 and a minimum of 3.90. With how much the profile parameter is lower, the cephalothoraxes are more stuck out.
4. In average, the 20 male lobsters present a meat parameter of 37.14% and extreme values were 33.33% and 38.73%. With how much the parameter of meat, has lower values, the lobster has more meat.
5. The lobster males involved in study had an average fattening parameter of 2.67% and the limit values were between 2.09% and 3.27%. A bigger value of fattening parameter shows that the lobsters have a good development.

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