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Research Note

Body Composition of *Ompok bimaculatus* (Bloch 1794) from Tripura Waters with respect to Body Size, Condition Factor and Sex

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Proximate composition is a good indicator of physiology which is needed for routine analysis of fish (Cui & Wootton, 1988). Body composition illustrates the nutritional quality of food because analysis of biochemical composition including protein, fat and ash is very important in assessing food value (Kamal et al., 2007). So, biochemical evaluation is necessary to ensure the nutritional value as well as eating quality of fish (Azam et al., 2004). However, the value of these body constituents vary significantly from one species to other and one individual fish to another depending on age, sex, feeding season, sampling time, activity and environmental condition (Tang et al., 2009). Many investigators have analysed the body composition of fish (Weatherley & Gill, 1987; Dempson et al., 2004) but few have examined the changes in relation to body size, condition factor and sex (Salam & Davies, 1994; Salam et al., 2001; Yousaf et al., 2011). In the present study, an attempt was made to examine changes in the proximate composition of *Ompok bimaculatus* in relation to body size, condition factor and sex since there is no report available on these aspects particularly from the states of North East India where the fish is considered as a delicacy and is under extreme fishing pressure.

Fifty wild *O. bimaculatus* of different body sizes, ranging from 12.5-23.5 cm total length and 36.4-66.4 g body weight were collected during post monsoon months from Tripura and brought to the laboratory in live condition. The fresh fish were washed with tap water several times to remove adhering substances. They were anaesthetized with Tricaine Methanesulfonate (MS-222), weighed to nearest 0.01 g on an electronic digital balance (Shimadzu) and their length measured to the nearest 0.1 cm on wooden measuring tray. Muscle samples were collected and placed in a pre-weighed aluminum foil tray in an electric oven (NSW 143) at 70°C until a constant weight was obtained. Dry carcasses were powdered in an electric blender (Moulinex) and sub-samples taken for ash and fat determination. Ash content was determined in duplicate for each fish using 1 g sub samples in a muffle furnace (RJM-1.8-10A) for 12 h at 450-500^{0}C. The total lipid content of 1 g dry tissue was determined by extraction in a 1:2 mixture of chloroform and methanol (Bligh & Dyer, 1959). For single fish, the difference between replicate samples was less than one percent. The protein contents were estimated following Kjeldahl method. Condition factor (K) for each fish was calculated using the formula $K = 100 \times WL^{-3}$ by the method of Weatherley & Gill (1987) and Wootton (1998). Statistical analysis including regression analysis, calculation of correlation coefficients, standard error of the estimates and plotting of data were carried out using SAS 9.2.

The variation of body constituents with reference to sex is depicted in Table 1. As variations in the body constituents and condition factors were found to be related to body weight or length, regression analysis was applied to assess the size dependence of moisture, ash, fat and protein content. The regression parameters of these relationships are given in Table 2, 3 and 4. Student's *t* test shows that the slopes (*b*) of the regression lines are statistically different from $b = 0$ in all cases.

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Table 1. Mean values and ranges of various body constituents of male and female *Ompok bimaculatus*

Body constituents (% wet wt.)	Female		Male	
	Mean ± S.D.	Range	Mean ± S.D.	Range
Moisture	79.05±0.92[a]	78.13-82.44	79.03±1.10[a]	78.65-82.44
Ash	3.83±0.92[a]	3.12-5.24	3.81±0.94[a]	3.12-5.24
Fat	4.07±0.78[a]	3.48-5.30	4.11±0.70[a]	3.48-5.20
Protein	12.91±1.08[a]	11.65-14.45	12.81±1.34[a]	11.42-14.25

Table 2. Total length (cm) versus body constituents of *Ompok bimaculatus*

Body constituents	r	a	b	S.E. (b)	t value, when b=0
Moisture	0.097	82.528	0.022	0.080	0.277
Ash	0.761*	0.930	0.158	0.047	3.318
Fat	0.436	2.764	0.072	0.052	1.370
Protein	0.491	10.366	0.136	0.085	1.595

Statistical parameters of various relationships, correlation coefficient (r), intercept (a), regression coefficient (b), standard error of b (S.E.) and n = 50 in each case. Significance level: *p<0.05

Table 3. Wet body weight (g) versus body constituents of *Ompok bimaculatus*

Body constituents	r	a	b	S.E. (b)	t value, when b=0
Moisture	0.117	82.420	0.009	0.028	0.335
Ash	0.747*	0.851	0.055	0.017	3.181
Fat	0.474	2.582	0.028	0.018	1.523
Protein	0.450	10.466	0.044	0.031	1.428

Statistical parameters of various relationships, correlation coefficient (r), intercept (a), regression coefficient (b), standard error of b (S.E.) and n = 50 in each case. Significance level: *p<0.05

Table 4. Condition factor (*K*) versus percent body constituents (g) of wild *Ompok bimaculatus*

Body constituents	r	a	b	S.E. (b)	t value, when b=0
Moisture	-0.146	7.467	-0.077	0.186	-0.417
Ash	-0.676*	2.538	-0.396	0.152	-2.597
Fat	-0.507	2.541	-0.372	0.223	-1.665
Protein	-0.497	3.835	-0.219	0.135	-0.162

Statistical parameters of various relationships, correlation coefficient (r), intercept (a), regression coefficient (b), standard error of b (S.E.) and n = 50 in each case. Significance level: *p<0.05

In the present study, it was observed that total length and wet body weight of fish has positive influence on ash, fat, protein and water contents and this result is in general agreement with the earlier findings for other fish species (Salam & Davies, 1994; Salam et al., 2001; Yousaf et al., 2011). The significant positive correlation ($p<0.05$) between ash content and body weight and total length is in agreement with the findings in *Wallago attu* (Yousaf et al., 2011). The negative correlation between *K* and water content is in agreement with the findings in *Oreochromis mossambicus* (Salam et al., 2001) and *Aristichthys nobilis* (Naeem & Salam, 2010). Negative correlation ($p>0.05$) between *K* and protein is in agreement with the study in *O. mossambicus* (Salam et al., 2001). Negative correlation between K and ash content is in agreement with the finding in *Aristichthys nobilis* (Naeem & Salam, 2010). The relationship between body composition (moisture, fat and protein content in wet body weight) and *K* was found to be not significant ($p>0.05$) in this study, suggesting no effect of *K* on moisture, fat and protein content. This could be due to the fact that the weight of a fish is not always proportional to the cube of its length (Weatherley & Gill, 1987). The non-significant difference ($p>0.05$) between the sexes is in agreement with Mermid et al. (2006). It is therefore concluded that if it is impossible to determine the proximate composition of *O. bimaculatus* directly, body constituents can be estimated from weight or length of the fish using predictive regression models with a reasonable amount of accuracy.

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