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Length–weight relationships of *Channa punctata* (Bloch, 1793) from Western Ghats rivers of Tamil Nadu

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Summary

The study deals with the length–weight relationships of 1940 spotted murrel, *Channa punctata* (Bloch, 1793), collected in the Tamirabarani, Siruvani, Vellar and Cauvery rivers of Western Ghats, Tamil Nadu, India in the years 2001 through 2003. Lengths varied from 5 to 27 cm. Linear regression was used for the study and a trend line graph applied to compare conditions in the various rivers as per relationships. Results of the present study show that there is no significant difference ($P > 0.005$) in the length–weight relationship as a function of sex in the Siruvani, Vellar and Cauvery populations, whereas there is a significant difference between males and females in the Tamirabarani population, indicating non-homogeneity of these relationships.

Introduction

The mathematical relationship between length and weight of fishes is a practical index suitable for understanding their survival, growth, maturity, reproduction, and general well-being (Le Cren, 1951). A number of reports are available on the length–weight relationships of marine and inland fishes, but limited information is available on these relationships in air-breathing fishes, especially of the genus *Channa*. The spotted murrel, *Channa punctata* (Bloch, 1793), is generally a warm-water teleost widely available in lakes, ponds and rivers as well as in confined waterbodies of Southeast Asia (Jayaram, 1999). *C. punctata* contributes to considerable landings among inland fishes available in local markets and fetches a good price due to taste and fewer intramuscular spines (Haniffa et al., 2003), but has been identified as a threatened species by IUCN as a result of habitation loss and pollution (CAMP Report, 1998). For successful development, management, production and ultimate conservation, it is essential to understand the relationship between length and weight of this species in a natural environment. An attempt is made here to study this relationship in *C. punctata* from different rivers of Western Ghats, Tamil Nadu, India.

Materials and methods

Random samples of *C. punctata* were collected from the Tamirabarani (Thirunelveli: 8.44°N, 77.44°E), Siruvani (Coimbatore: 11.00°N, 77.00°E), Vellar (Chidambaram: 11.24°N, 79.44°E) and Cauvery (Thiruchi: 10.50°N, 78.46°E) rivers of the Western Ghats during the years 2001 through 2003. Ranging in length from 5 to 27 cm, a total of 1940 *C. punctata* was sampled over the 3-year period. Length and body weight

of each fish was recorded after identification of sex. The length–weight relationship in the form $w = aL^b$ was fitted by linear regression.

Results and discussion

The regression equation for length and weight of *C. punctata* in each studied river system is shown in Table 1. There was homogeneity in the length–weight relationship of males and females in Siruvani, Vellar and Cauvery populations, whereas there was a significant difference in males and females in the Tamirabarani River, indicating non-homogeneity. The length–weight relationships of the Siruvani, Vellar and Cauvery river populations were comparable with the earlier work of Sarkar (1996). Isometric growth ($b = 3.20$) was observed only in females of the Tamirabarani population; this type of relationship is found in fishes that maintain a constant body shape (Sunil Kumar et al., 1999). A negative allometric growth condition was observed for Siruvani, Vellar and Cauvery populations; such changes in the b value may be attributed to certain environmental factors such as overfishing, food competition and the trophic potential of the rivers/ponds (Kle-anthids et al., 1999).

Figure 1 gives the variations in a and b values for Tamirabarani males and females, and the combined values for both sexes in the remaining river populations, indicating a clear picture of the average growth condition of *C. punctata*. According to Le Cren (1951), ecological conditions of the habitats or variation in the physiology of the animals, or both, are responsible for growth rate variations in the same species

Table 1
Linear regression equation parameters for length–weight relationships of male and female *Channa punctata* from rivers of Western Ghats, Tamil Nadu, India. M, male; F, female; Min, minimum; Max, maximum

River	No. specimens	Length range (cm)		a	b	r	
		Min	Max				
Tamirabarani	M	222	17.43	26.81	–1.98	2.99	0.912
	F	288	15.75	27.44	–2.23	3.20	0.915
Siruvani	M	205	15.60	25.00	–1.52	2.77	0.902
	F	265	15.97	24.44	–1.77	2.72	0.936
Cauvery	M	256	15.21	25.35	–1.34	2.83	0.879
	F	281	17.34	25.95	–1.74	2.80	0.873
Vellar	M	205	16.74	24.87	–1.58	2.81	0.851
	F	218	15.86	24.50	–1.55	2.77	0.866

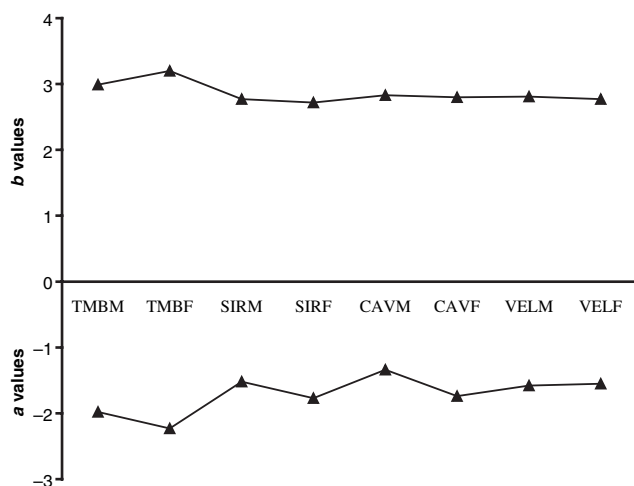


Fig. 1. Growth equation changes in a and b values for male and female *C. punctata* populations from the river system as indicated by trend lines. TMBM, Tamirabarani males; TMBF-Tamirabarani females; SIRM, Siruvani males; SIRF, Siruvani females; CAVM, Cauvery males; CAVF, Cauvery females; VELM, Vellar males; VELF, Vellar females

from different localities. On the contrary, it can be seen that the growth condition is towards a declining trend from river to river. Again, this provides evidence that the ecosystem might be the causative factor for the poor growth of *C. punctata* in these rivers.

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