*Sindh Univ. Res. Jour. (Sci. Ser.) 45 (4): 657-660 (2013)*

**SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)**

# Comparison of Condition factor of the Ribbonfish *Trichiurus lepturus* (Linnaeus, 1758) and *Lepturacanthus savala* (Cuvier, 1829) from Karachi Coast, Pakistan

S. TABASSUM[++], N. ELAHI, W. A. BALOCH*

Department of Zoology, University of Karachi

**Abstract:** Study on Condition factor of Ribbonfish *Trichiurus lepturus* (Linnaeus, 1758) and *Lepturacanthus savala* (Cuvier, 1829) from Karachi coast was conducted monthly from January 2011 to December 2011. Four hundred and thirty (430) fish samples were collected by artisanal fishermen using various fishing gears. Variations in coefficient of condition are evident in male and female *T. lepturus* and *L. savala*. The k value of the former species was found more affected by gonadal maturation than feeding activity whereas in latter species it was highly related with feeding intensity than sexual maturity. Male specimens had higher condition factors than Females in both the species. Knowledge of the two species is important for adequate management and maintenance of the biological equilibrium of the ecosystem.

**Keywords:** Condition factor, Length weight relationship, *T. lepturus* and *L. savala*

## 1. INTRODUCTION

Knowledge of quantitative aspects such as length-weight relationship, condition factor, growth, recruitment, and mortality of fishes is an important tool for the study of fishing biology, mainly when the species lies at the base of the higher food web.

In fisheries science, the condition factor is used in order to compare the "condition" or wellbeing of fish. The hypothesis behind is that heavier fish of a particular length are in a better physiological condition (Bagenal, 1978). Condition factor is also a useful index for the monitoring of feeding intensity, age, and growth in fish (Oni *et al*., 1983). It has strong influence of biotic and abiotic environmental conditions and can be used as an index to assess the status of the aquatic ecosystem in which fish live (Anene, 2005). Condition factor has been used as an index of growth and feeding intensity (Fagade, 1979).

The condition factor (k) also provides a comparison on two populations living in the same feeding ground, density, climate and other conditions (Weatherley, 1972; Ricker, 1975). Hile (1936) has stated that condition factor is useful to compare the weights of individual fish relative to length. The condition factor in fish serves as an indicator of physiological state of the fish in relation to its welfare (Le Cren, 1951). It also provides information when comparing two populations living in certain feeding density, climate and other conditions (Weatherly and Gills, 1987). Thus, condition factor is important in understanding the life cycle of fish species and it contributes to adequate management of these species, hence, maintaining the equilibrium in the ecosystem.

## 2 MATERIALS AND METHODS

The fishes used for the present study were collected during the period of January 2011 to December 2011 from the Karachi Coast. The sampled fish were identified in the laboratory of Zoology Department, University of Karachi. The total length (TL) was measured from the tip of the snout (mouth closed) to the extended tip of the caudal fin. Body weight of individual fish was measured to the nearest gram with an electronic balance after removing the adhered water and other particles from the Surface of body.

A total of 235 specimens of *T. lepturus* ranging from 35-70 cm in total length and 40-290 g in weight were measured. A total of 195 specimens of *L. savala* ranging from 30-70 cm in total length and 40-260g in weight were measured. The total number, range of length and weight of male and female of both species are given in (Table 1).

The Condition factor (K) was determined using the expression by (Ricker, 1975).

$$K=100\ W/L^3$$

Where,

K= Condition factor

W= Weight of fish (g)

L= Length of fish (cm)

[++]Corresponding author: S. TABASSUM sadafali26@yahoo.com

*Department of Fresh Water Biology and Fisheries, University of Sindh,

## 3. RESULT AND DISCUSSION

A total of two hundred and thirty five (235) species of *Trichiurus lepturus* and one hundred and ninety five (195) species of *Lepturacanthus savala* were collected for the study. The length weight distribution of *T. lepturus* were males 35-65cm and 40- 275g, females 40-70 cm and 50-290g, combined sex 35-70cm and 40-290g **(Table 1),** and the length weight distribution of *L. savala* were males 32-63cm and 40- 175g, females 35-67cm and 50-260g, combined sex 32-67cm and 40-260g (Table 1). In *T. lepturus* the male length- weight relationship is expressed by the regression equation: $W= -1.560L^{2.550}$ (r=0.933), Female length- weight relationship is expressed by the regression equation: $W= -0.626L^{2.621}$ (r= 0.964) and the combined sex´s length- weight relationship is expressed by the regression equation: $W=-1.677L^{2.650}$ (r=0.953) (Table 2). In *L. savala* the male length- weight relationship is expressed by the regression equation: $W= -0.631L^{2.714}$ (r= 0.922), Female length- weight relationship is expressed by the regression equation: $W= -0.911L^{2.943}$ (r=0.906) and the combined sex´s length- weight relationship is expressed by the regression equation: $W= -0.87L^{2.821}$ (r=0.885) **(Table 2).** In *T. lepturus* the highest mean and Standard Deviation were recorded in males 0.194 ± 0.031 **(Table 3).** In *L. savala* the highest mean and Standard Deviation were recorded in males 0.115 ± 0.024 **(Table 4).**

The k value of *T. lepturus* of males was the highest during March but declined in June but rise again in August and December. For females of *T. lepturus* the estimated k values obtained in different months followed with maximum in February and May, **(Figure 1).** For males of *L. savala*, the higher values of k were during May but declined in August and September to rise again October and December. In the case of females of *L. savala*, relatively higher k values were observed in May but declined in August to December to rise again in January **(Figure 2).**

The condition factor is an index reflecting interactions between biotic and abiotic factors in the physiological condition of fishes. It shows the population's welfare during the various stages of the life cycle (Angelescu *et al.*, 1958). Vazzoler & Vazzoler (1965) stated that the condition factor does not merely reflect the feeding condition of the adult stage, but includes the state of gonadal development, based on the consumption of fat reserves during the spawning period.

Vazzoler (1996) confirmed that lowest k values during the more developed gonadal. Fluctuations in the condition factor of ribbonfishes during different months have been attributed to many reasons by Gupta (1967) and Narasimham (1972). In male and female of *L. savala* the higher values of k, during April- May and in December- January may be due to higher feeding intensities as shown by gastro-somatic index (Rizvi, 2001). The peak breeding of the species was found during December and May (Rizvi and Nautiyal, 2002). The size at maturity of *L. savala* is 517 mm (Rizvi *et al*., 2003) and therefore, most of the fishes after this size showed remarkable change in the condition factor. The sharp rise in k, of females larger than 541-580 mm appears to be due to gonadal maturation, as the ovaries attain larger size and weight. Gupta (1967) also stated that in the young ones of *L. savala*, the condition factor is determined by feeding intensity, but in larger individuals, it is largely because of maturation of gonads. Condition factor decrease with increase in length (Bakare, 1970; Fagade, 1979); and also influences the reproductive cycle in fish (Welcome, 1979). Narasimham (1972, 1976) has reported the condition factor of *T. lepturus* and *E. muticus* from Kakinada, east coast of India**(Table 1-4)**.

**Table 1. Length and Weight measurements of *T. lepturus* and *L. savala.***

| Male | | | |
|---|---|---|---|
| Total Number | Length range(cm) | Weight range (g) | Total Number Length range(cm) Weight range (g) |
| ***Trichiurus lepturus*** | | | |
| 98 | 35-65 | 40-275 | |
| ***Lepturacanthus savala*** | | | |
| 90 | 30-65 | 40-175 | |

**Table 2. Estimated length weight relationship of *T. lepturus* and *L. savala.***

| **Species** | **Sexes** |
|---|---|
| | **Male** |
| **Female** | **Combined sex** |
| ***T. lepturus*** | $W= -1.560L^{2.550}$ |
| ***L. savala*** | $W= -0.631L^{2.714}$ |

**Table 3. Condition Factor of *T. lepturus* at Karachi Coast.**

| **Sex** | **Minimum** | **Maximum** | **Mean ± SD** |
|---|---|---|---|
| **Male** | 0.0944 | 0.209 | 0.194 ± 0.031 |
| **Female** | 0.077 | 0.148 | 0.097 ± 0.021 |
| **Combined sex** | 0.077 | 0.209 | 0.104 ± 0.( |
| | | | |

**Table 4. Condition Factor of *L.savala* at Karachi Coast.**

| Sex | Minimum | Maximum | Mean ± SD |
|---|---|---|---|
| **Male** | 0.0571 | 0.244 | 0.115 ± 0.024 |
| **Female** | 0.063 | 0.128 | 0.092 ± 0.037 |
| **Combined sex** | 0.571 | 0.244 | 0.092 ± 0.040 |
| | | | |

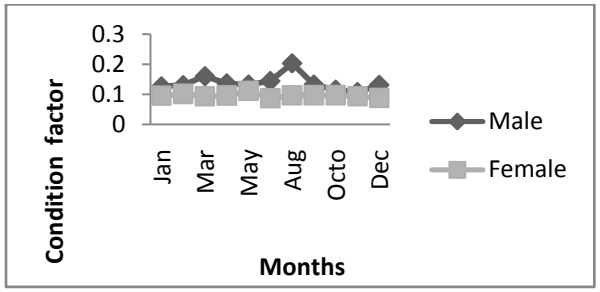



**Figure 1. Month- wise Condition Factor in *Trichiurus lepturus.***

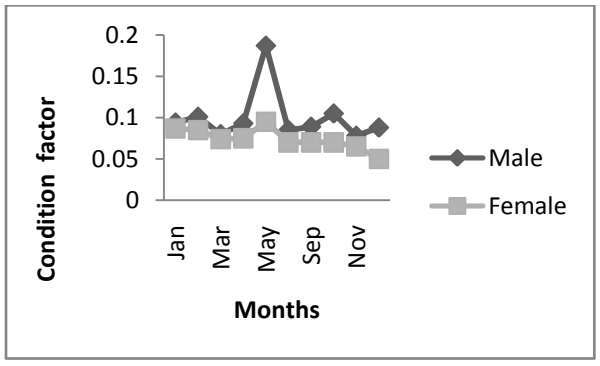



**Figure 2. Month- wise Condition Factor in *Lepturacanthus savala*.**

## REFERENCES:

Anene, A. (2005). Condition factors of four cichlid species of a man-made lake in Imo state, Southeast, Nigeria. *Turk. J. Fish. Aquat. Sci*., 5: 43-47.

Angelescu, V., F. S. Gneri, & A. Nani. (1958). La merluza del mar argentino (biologia e taxonomia*). Secr. Mar. Serv. Hidrog. Nav. Publico, H1004*: 1-224.

Bagenal, T.B. (1978). Aspects of fish fecundity. In: S.D.Gerking (Ed) Ecology of Freshwater fish Production. Blackwell Scientific Publications, Oxford: 75-101.

Bakare, O. (1970). Bottom deposits as food of inland freshwater fish. In Kainji: a Nigerian man-made lake: Kainji Lake studies Vol. 1. Ecology, edited by S.A. Visser. Ibadan, Nigerian Institute of Social and Economic Research, pp.65–85.

Fagade, S.O. (1979). Observation of the biology of two species of Tilapia from the Lagos lagoon Nigeria. Bull. Inst. Fond Afr. Nore (Ser. A), 41: 627-658.

Gupta, M. V. (1967). Studies on the taxonomy, biology and fishery of ribbonfishes (Trichiuridae) of the Hooghly estuarine system. 2. Biology of *Trichiurus savala* Cuvier *Proc. Zool. Soc.*, Calcutta 20:153-170.

Hile, R. (1936). Age and growth of the Ciso, Leucichthys artedi (Le Sueur) in the lakes of the north-eastern highlands. Wisconsin Bull. U.S. Bur. Fish.48: 211-317.

Le-Cren, E.D. (1951): the lengh-weight relationship and seasonal cycle in gonadal weight and condition in the perch, *Perca fluviatilus*. *J. Animal Ecol.* 20:201-219.

Narasimham, K.A.(1972). On the length- weight relationship and relative condition factor in *Trichiurus lepturus* Linnaeus. *Indian J. Fish*., 17: 90-96.

Narasimham, K. A. (1976). Some observation on the biology of the ribbonfish *Eupleurogrammus muticus* (Gray). *Indian J. Fish*., 21 (2): 479-494.

Oni, S.K., J.Y. Olayemi, and J.D. Adegboye. (1983). Comparative physiology of three ecologically distinct fresh water fishes, *Alestes nurse* Ruppell, *Synodontis schall* Bloch and *S. schneider* and *Tilapia zilli* Gervais. *J. Fish Biol*., 22: 105-109.

Ricker, W.W. (1975). Computations and interpretations of biological Statistics of fish populations. *Bull.Fish.Res*.Bd.Can., 191: 201-210.

Rizvi, A. F. (2001). Studies on two ribbonfish from Mumbai waters. Ph. D. Thesis. University of Mumbai: 305Pp.

Rizvi A. F. and P. Nautiyal. (2002). Landing and exploitation pattern of ribbonfish from Mumbai Coast. *Him. J. Env. Zoo*. 16: 95-102.

Rizvi, A. F., S. K. Chakraborty and V. D. Deshmukh. (2003). Stock assessment of small head hair tail Eupleurogrammus muticus (Gray) (Pisces/ Trichuridae) from Mumbai coast. *Indian J. Mar. Sci.*, 32: 85-88.

Vazzoler, A. E. A. de M. and G. Vazzoler. (1965). Relation between condition factor and sexual development in *Sardinella aurita* (Cuv. & Val. 1847). *Anais Acad. Bras. Ciênc.*, 37(supl.): 353-359.

Vazzoler, A.EA., and M. de (1996). Biologia da reprodução de peixes teleósteos: teoria e-prática. EDUEM, SBI, Maringá, 169Pp.

Welcome, R.L. (1979). Fisheries Ecology of Flood Plain Rivers. Longman Press, London, 317Pp.

Weatherley, A. H. (1972). Growth and ecology of fish populations. Acad. Press. London and New York, 443Pp.

Weatherly, A. H. and H. S. Gill. (1987). The biology of fish growth, London, academic Press. 433- 443.