urnal of the Indian Fisheries Association
27, 2000, 1-6

SOME ASPECTS OF THE BIOLOGY OF *OTOLITHES CUVIERI* (TREWAVAS) AND *JOHNIUS GLAUCUS* (DAY) FROM VERAVAL

SADASHIV GOPAL RAJE

Mumbai Research Centre of Central Marine Fisheries Research Institute, Army Navy Bldg., 148, M.G. Road, Mumbai - 400 001.

ABSTRACT

The length-weight relationship in *O.cuvieri* and *J.glaucus* can be described by the equations log W = -5.27997 + 3.13225 log L and log W = -4.93431 + 3.02556 logL respectively. The length at first maturity in *O.cuvieri* is estimated as 256 mm and in *J.glaucus* as 180 mm. Empty stomachs occurred in high percentage in both the species. A study on composition of food items revealed that *O.cuvieri* feeds on a variety of organisms while *J. glaucus* a selective feeder.

Key words : Length-weight relationship, food & feeding, maturation, spawning.

INTRODUCTION

Among the small sciaenids landed by commercial trawlers at Veraval, *Otolithes cuvieri* and *Johnius glaucus* are the most dominant species constituting 41.30% and 14.52% of the total sciaenid catch respectively. Maturation and fecundity of *Sciaena glauca* (= *Johnius glaucus*) and food and feeding habits, maturation, spawning and fecundity of *O.cuvieri* from Veraval were studied by Rao (1985). The present communication deals with the length-weight relationship, length at first maturity and food and feeding habit in *O.cuvieri* and *J.glaucus* from Veraval.

MATERIAL AND METHODS

The material for the study was collected from the trawl catches at Veraval fish landing centre from October 1982 to December 1983. The biological data on total length, weight, sex, maturity stages of females were studied during same period. Food and feeding habits of individuals specimens were analysed by volumetric and occurrence method. The index of preponderence was calculated by the method of Natarajan and Jhingran (1961).

The study is based on 260 males (size range 118-326 mm T.L.) and 244 females (size range 122-327 mm) of *O.cuvieri* and 154 males (size range 116-210 mm) and 173 females (size range 115-260 mm) of *J.glaucus*. The relationship were calculated separately for both the sexes by the method of least square.

RESULTS AND DISCUSSIONS

The relationship obtained for *O.cuvieri* were:

Male : log W = -5.27765 + 3.13326 log L (r^2 = 0.87)

Female : log W = -5.28513 + 3.13236 log L (r^2 = 0.94)

for *J.glaucus* were:

Male : log W = -4.69292 + 2.91629 log L; (r^2 = 0.82)

Female : log W = -5.06963 + 3.08550 log L; (r^2 = 0.91)

The analysis of covariance (Snedecor and Cochran, 1967) revealed no significant difference in the regression coefficient between the sexes of these two species (Table I). Thus the data of both the sexes were pooled and the equation obtained were:

log W = -5.27997 + 3.13225 log L for *O.cuvieri* and

log W = -4.93431 + 3.02556 log L for *J.glaucus*.

Similar results on the length - weight relationship among sciaenids were observed in case of *Pennahia macrophthalamus* (Rao, 1983 Murty and Ramalingam, 1986; *Johnius carutta* (Murty, 1979; Rao, 1983; Vivekanandan, 1985), *J.dussumieri* (Murty, 1979); *J.vogleri* (Murty, 1986) and *Otolithes ruber* (Jayasankar, 1990).

For the study of size at first maturity females in stage III and above were considered as mature. In each 10 mm length group the number of mature females was noted and was scaled to percentage.

In *O.cuvieri* females above 193 mm showed mature ovaries (Fig.1 A) while 50% of fishes were found mature at 256 mm, hence this length was taken as the length at first maturity.

In *J.glaucus* females of 126 mm and above showed mature gonads. The percentage of mature fish occurring in various size groups (Fig.1 B) indicate that 50% of the fishes were mature at 180 mm, which was considered to be the length at first maturity.

Stomach contents of 504 specimens of *O.cuvieri* of size range 118-327 mm and 327 specimens of *J.glaucus* of 115-260 mm in total length were examined. The feeding intensity was determined, based on distension of the stomachs and amount of the food contained in it, which were categorised as full, 3/4 full, 1/2 full, 1/4 full and empty. Specimens with extroverted and disgorged condition were observed very frequently and reported as empty. There is not much difference in feeding intensity between males and females of both the species (Table II). Empty stomachs were recorded in higher percentage in both the species.

In sciaenids along the Indian coast, empty or everted stomachs were reported by Rao (1963), Suseelan and Nair (1969) Jayaprakash (1974) and Muthiah (1982).

The composition of various food items and their relative importance are presented in Table III. Crustaceans, fishes and molluscs formed the main food items in O.cuvieri whereas in J.glaucus these were crustaceans and fishes only.

The crustacean food of *O.cuvieri* was composed of *Acetes* spp, *Solenocera* spp, *Nematopalaemon tenuipes, Parapenaeopsis stylifera, Exhippolysmata ensirostris, Squilla* spp, Crabs and other penaeid

Table 1 : Analysis of covariance to test the significance of difference between length-weight relationship of males and females of *O.cuvieri* and *J.glaucus*.

Source of variation	*O.cuvieri* Deviation from regression			*J.glaucus* Deviation from regression		
	df	SS	MS	df	SS	MS
Due to regression within sexes	501	4.43940	0.008861	323	1.64195	0.00508
Difference between regreession coefficients	1	0.02408	0.02408	1	0.00870	0.00870
Residuals due to regreession pooled within	502	4.46348	0.008891	324	1.65062	0.00509
Difference between adjusted means	1	0.01040	0.01040	1	0.01040	0.01040
Total	503	4.47388			325	1.66066

Comparison of slopes : F = 2.7175; df = 1,501; F = 1.7066; df = 1,323 Not significant

Comparison of elevations : F = 1.1697; df = 1,502; F = 1.9795; df = 1,324 Not Significant

Table 2 : Percentage occurrence of stomachs in different degree of fullness in males and females of *O.cuvieri* and *J.glaucus*.

Sex	*O.cuvieri*					*J.glaucus*				
	Full	¾ full	½ full	¼ full	Empty	Full	¾ full	½ full	¼ full	Empty
Males	10.4	—	12.3	28.1	49.2	1.3	—	3.3	13.6	81.8
Females	8.2	—	13.1	32.8	45.9	0.6	—	5.2	8.1	86.1
Total	9.3	—	12.7	30.4	47.6	0.9	—	9.2	5.8	84.1

Table 3 : Index of preponderance of food items of O.cuvieri and J.glaucus.

Food items	*O.cuvieri*	*J.glaucus*
Crustaceans :		
Acetes spp	30.89	1.0
Solenocera spp	4.89	0.3
Other penaeid prawns	1.10	1.2
Nematopalaemon tenuipes	0.35	—
Parapenaeopsis stylifera	0.12	—
Exhippolysmata ensirostris	0.03	—
Squilla spp	0.03	—
Crabs	0.01	—
Fishes :		
Coilia dussumieri	27.1	2.1
Sciaenids	1.99	—
Fish larvae	1.35	3.5
Apogon spp	0.68	—
Trichiurus spp	0.42	—
Harpodon nehereus	0.31	—
Bregmaceros macclellandi	0.04	—
Cynoglossus spp.	0.03	—
Stolephorus spp	0.01	—
Ilisha spp	0.01	—
Molluscs :		
Sepia spp	0.15	—
Digested matter	30.49	91.90

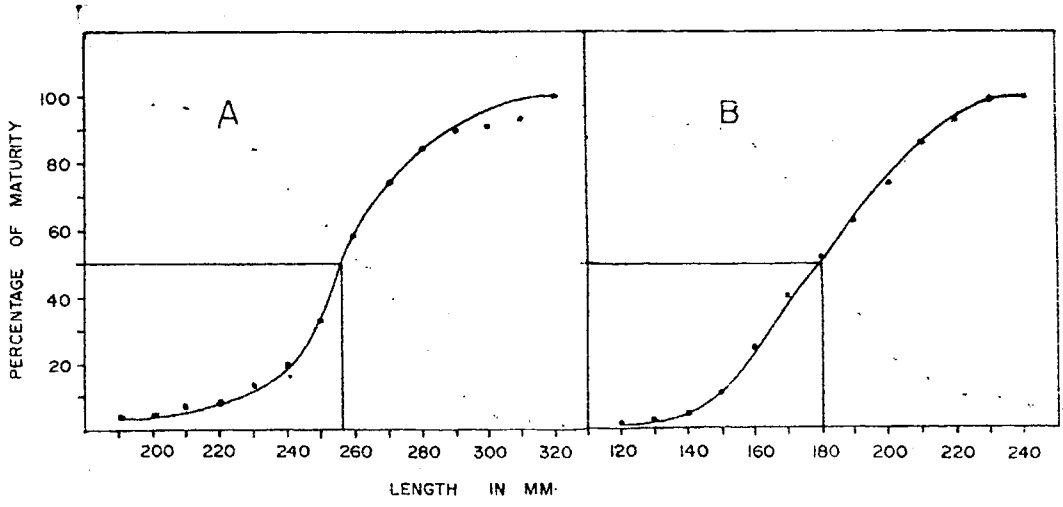

Fig. 1 The size of first maturity curve for O.cuvieri and J.glaucus

prawns. Fishes were represented by *Coilia dussumieri,* Sciaenids, *Apogon* spp, *Trichiurus* spp, *Harpodon nehereus*, *Bregmaceros macclellandi, Cynoglossus* spp, *Ilisha* spp, and fish larvae.

Acetes spp, *Solenocera* spp, and other penaeid prawns constituted the crustacean diet and fish by *Coilia dussumieri* and fish larvae in *J.glaucus.*

Present studies indicate that *O.cuvieri* feeds on wide variety of organisms compared to *J.glaucus.* This may be due to large superior mouth and a strong canire teeth which may be helping them to catch prey.

ACKNOWLEDGEMENT

I am thankful to Dr. P.S.B.R. James, Director and Dr. P. Bensam, Head of Demarsal Fisheries Division of C.M.F.R. Institute, Cochin, for encouragement; Dr. S.K. Chakraborty, Sr. Scientist for critically going through the manuscript and Shri H.K. Dhokia, B.P. Thumber, J.D. Sarang and M.S. Zala, for collection of data.

REFERENCES

Jayprakash, A.A. 1974. Food and feeding habits of juveniles of 'Koth' *Otolithoides brunneus* (Day) in Bombay water. *Indian J.Fish,* **21(1):** 127-140.

Jayasankar, P. 1990. Length-weight relationship and relative condition factor in *Otolithes ruber* (Schneider) from the Gulf of Mannar and Palk Bay. *Indian J. Fish.,* **37(3) :** 261-263.

Murty, V. Sriramachandra, 1979. Observation on some aspects of biology of the croakers *Johnius* (Johineops) *dussumieri* (Cuvier) and *Johnius* (Johnius) *carutta* Bloch from Kakinada *J.mar.biol.Ass.India* **21 (1&2) :** 77-85.

Murty, V. Sriramachandra and Ramalingam, P. 1986. Observations on some aspects of biology of *Johnius*

(Johnieops) *vogleri* (Bleeker) and *Pennahia macrophthalamus* (Bleeker) in the Kakinada region. *J. mar. biol. Ass. India* **28 (1&2) :** 57-62.

Muthiah, C. 1982. Study on the biology of *Johnieops vogleri* (Bleeker) of Bombay water. *Indian J.Fish.*, **29 (1&2)** : 118-133.

Natarajan, A.V. and Jhingran, A.G. 1961. Index of Preponderance - a method of grading the food elements in the stomach of fish. *Indian J.Fish.*, **8 (1):** 54-59.

Rao, T. Appa. 1983. Length - Weight relationship in *Pennahia macrophthalamus* (Bleeker) and *Johnius carutta* (Bloch). *Indian J.Fish.*, **29 (1):** 263-266.

Rao, T.Appa. 1987. Maturation and fecundity in *Sciaena glauca* (Day). *J.mar.biol.Ass.India* **27** (1&2) : 183-185.

Rao, T. Appa. 1987. Observations on some aspects of biology of *Otolithes cuvieri* (Trewavas) from Veraval. *J. mar. biol. Ass. India* **27** (1&2): 186-188.

Rao, K. Venkata Subba. 1963. Some aspects on the biology of 'Ghol' *Pseudosciaena diacanthus* (Lacepede). *Indian J.Fish.*, **10**: 313-459.

Snedecor, G.W. and Cochran. W.G. 1967. *Statistical methods.* Oxford and IBH publishing Co., New Delhi. Sixth Edition 593 pp.

Suseelan, C. and Somasekharan Nair K.V. 1969. Food and feeding habits of the demersal fishes off Bombay. *Indian J.Fish.*, **16** (1&2) : 56-74.

Vivekanandan, E. 1985. The sciaenid fishery and some biological aspects of *Johnius carutta* (Bloch) from Madras. *J.mar.biol.Ass.India.*, **27** (1&2) : 9-14.