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INTER-SPECIFIC AND INTRASPECIFIC EYE LENS PROTEIN DIFFERENCES IN SOME SCIAENID FISHES FROM GOA COAST

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Soluble eye lens nuclei proteins of sciaenid fishes were studied by cellogel electrophoresis. Four distinct patterns characterized by the number of bands, mobility and staining intensity were observed. Morphological studies of these fishes showed that they belonged to species *Otolithus ruber* (Schneider), *Johinius sina* (Cuvier) and *J. argenteus* (Houttuyn). The eye lens proteins of *J. argenteus* showed 2 types of electrophoretic patterns suggesting the occurrence of 2 breeding populations of *J. argenteus.*

Key-words : Eye lens proteins, electrophoresis, Sciaenids.

INTRODUCTION

Sciaenids popularly known as croakers are one of the commonest fishes along the Indian coast. However, their taxonomy, mainly based on external morphology, is a bit ambiguous (Mohan, 1969a). Hence, an attempt was made to identify sciaenid fishes on the basis of electrophoresis of eye lens proteins.

Samples were collected by bottom trawling off Aguada, Goa (73°40′ E; 15°30′ N) in January 1984.

Eye lens nuclei of 66 sciaenids were screened individually. The methodology was the same as given earlier (Menezes, 1984). Four distinct electrophoretic patterns were observed (Table I). Morphological examination of the fishes showed that they belonged to the species *Otolithus ruber* (Schneider), *Johinius sina* (Cuvier), and *Johinius argenteus* (Houttuyn); The morphological characters of the fishes were as follows :

O. ruber — Total length (TL) 14.3 — 15.0; Dorsal (D) X, I, 27–28; Anal (A) II, 7; Gill rakers (G.R) 6 + 13. On either side of the symphysis of the upper jaw a pair of large canines and in the lower jaw two central curved canines. The gill rakers were found to be larger than *J. sina* and *J. argenteus* gill rakers.

J. sina — TL. 13.3 — 14.5 D.X-XII, I, 25–27; A. II, 7; G.R. 4 + 12. Villiform teeth in both jaws, spinous dorsal dotted with black, gill rakers smaller than *J. argenteus* gill rakers.

J. argenteus (type I) — TL. 11.7–13.8; D. X-XI, I, 24–28; A. II, 7; G.R. 7 + 14–15. Villiform teeth in both jaws; spinous dorsal blackish with light centre band.

Table I. Electrophoretic analysis of eye lens proteins. (Relative mobility (%) & the percentage of protein in each fraction (in parenthesis).

Species	Fractions (in order from the slowest to the fastest)								No. of samples
	1	2	3	4	5	6	7	8	
O. ruber	—40.00 (29.00)	—15.0 (20.42)	+5.0 (10.4)	50 (11.95)	100 (28.32)				12
J. sina	—36.84 (6.04)	—21.05 (15.79)	0 (21.95)	21.05 (5.86)	31.58 (5.86)	47.47 (9.32)	63.16 (9.32)	100 (25.86)	18
J. argenteus (type I)	—44.44 (9.73)	—27.78 (23.82)	—11.11 (18.31)	11.11 (8.75)	55.56 (14.75)	100 (24.64)			24
J. argenteus (type II)	—40.00 (15.09)	—25.00 (12.83)	—10.00 (26.33)	+10.00 (7.84)	20.00 (5.77)	55.00 (11.69)	100 (20.45)		12

J. argenteus (type II) — TL. 12.8 — 13.5; D. X, I, 25–26; A. II, 7; G.R. 8 + 14–15. Other characters similar to type I.

Due to the apparent convergence of external morphological characters between the species of different genera, their value is limited (Mohan, 1969b). Clear differences however were seen in the electrophoretic patterns (Table I, Fig. 1). The eye lens proteins of *O. ruber* showed 5 bands. The 1st, 2nd and 5th bands were major protein bands. In *J. sina* the eye lens proteins showed 8 bands. The 2nd, 3rd and the 5th were the major protein bands. The eye lens proteins of *J. argenteus* showed two main types. Type I has 6 bands with 2nd, 3rd and the 6th being the major protein bands. Type II with 7 bands,

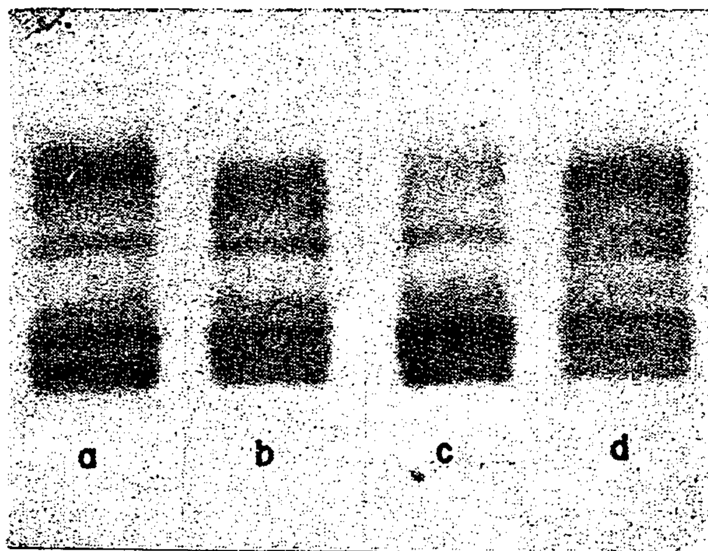

Fig. 1. Electrophoretic patterns of eye lens proteins of *O. ruber* (a); *J. argenteus* (type I) (b); *J. argenteus* (type II) (c) and *J. sina* (d).

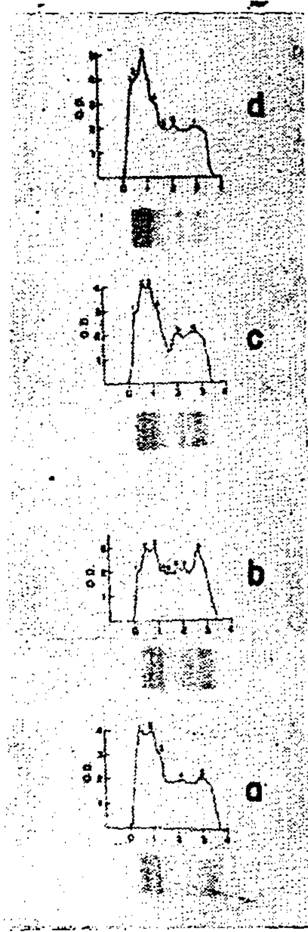

Fig. 2. Densitometric tracings of the eye lens protein patterns of *O. ruber* (a); *J. sina* (b); *J. argenteus* (type I) (c) and *J. argenteus* (type II) (d).

has 1st, 3rd and the 6th as the major protein bands. The patterns along with the densitometric tracings showing the intensity of proteins in each band are given in Fig. 2. The fractions have been assigned numbers in the order of increasing mobility.

Electrophoretic patterns of eye lens proteins were constant with respect to number, mobility and intensity of the bands within each species/group. They did not show any variation either due to sex or size.

The eye lens core or nucleus is comprised of fibres that have sclerosed and died during formation because they lacked intrinsic circulation and had been removed from sources of dietary protein and oxygen (Walls, 1942). Thus the nucleus contains only genetically determined structural proteins — some readily soluble and ideal for studying genetic variation. Methods for detecting such variations are of considerable importance to fishery biologists who find it necessary to identify separate breeding populations (Smith, 1965).

Electrophoresis of soluble lens proteins in the present study produced a distinct pattern for each species. The eye lens proteins of *J.argenteus* however showed 2 types. It is the presence of the 5th minor band in *J. argenteus* (type

II) eye lens having relative mobility of 20 (Table I) that produced the pattern variation. *J argenteus* (type I) showed 6 bands and *J. argenteus* (type II) 7 bands. They further differed slightly in the amounts of protein in the various bands. The lower gill rakers also showed a difference between these 2 groups. In *J. argenteus* (type I) there were 7 and in *J. argenteus* (type II) 8 lower gill rakers. Thus it may be concluded that these two groups of *J. argenteus* belong to 2 different breeding populations.

It may also be concluded that electrophoretic analysis of nuclear eye lens proteins provides a very useful information for a precise differentiation of the species and for distinguishing the breeding populations, separately.

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REFERENCES

Menezes, M.R. 1984. Soluble lens protein polymorphism in flyingfishes from the Central Arabian Sea, *Indian Journal of Marine Sciences,* **13:** 102–103.

Mohan, R.S.L. 1969a. On three new genera of sciaenid fishes (pisces: sciaenidae) from India, *Current Science,* **38:** 295–296.

Mohan, R.S.L., 1969b. A synopsis of the Indian genera of the fishes of the family sciaenidae, *Indian Journal of Fisheries,* **16**: 82–98.

Smith, A.C., 1965. Intraspecific eye lens protein differences in yellow fin tuna, *Thunnus albacares*, *California Fish and Game,* **51:** 163–167.

Walls, G.L., 1942. The vertebrate eye and its adaptive radiation, *Bulletin. Cranbrook Institnte of Science*, **19**:795.