J. Mar. biol. Ass. India, 1967, 9 (1): 173-178

ON THE NOMENCLATURE OF TWO INDIAN BACKWATER OYSTERS

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THE two oviparous backwater oysters, *Crassostrea gryphoides* (Schlotheim) and *C. madrasensis* Preston, found in India have lately been indiscriminately synonymised and rarely described separately as belonging to two separate species. In view of this, it is felt desirable to bring out clearly the affinities and differences between these two edible backwater oysters of India and in doing so, also review the earlier systematic work on these oysters.

As early as 1904, Vredenburg described the fossilized oysters found during the excavation work on Clive Street, Calcutta, and identified as *O. gryphoides* (Schlotheim) by Colonel Alcock. This oyster, as Alcock opined, was identical with a large species of oyster which lives in large numbers in the mud banks near the mouth of the channels of Sunderbans. Later, Newton and Smith (1912) once again examined the fresh collections of the oyster shells found under Clive Street, Calcutta, and stated ' We have come to the conclusion that the specific name *gryphoides* should be applied to the Miocene oyster so long known in modern years as *crassissima* as also to the recent forms from the Bay of Bengal which we consider in every way as possessing identical characters.' For fuller details of synonyms, readers may refer Newton and Smith (*op. cit.*). These authors thus described the oyster found under Clive Street as *Ostrea gryphoides* (Schlotheim) and the recent oyster identical with the type *O. gryphoides* as var. *cuttackensis*, var. nov., based mainly on the lesser prolongation of the ligamental area and a rather deeper nature of the lower (left) or the attached valve. The mascular impression of the living form was also usually narrower than the type *O. gryphoides*. The authors further state that the differences in the type *O. gryphoides* and the variety *cuttackensis* could be due to the different environmental conditions. Coggin Brown (1923) supported the observations of Newton and Smith (*op. cit.*). The latter, further compared the living species of oyster (*O. gryphoides* var. *cuttackensis* var. nov.) with the north American *O. virginica* of Gmelin and state that ' ....besides differences of form, the colour of the adductor scar readily distinguishes the two species. Although both in the adult stage become very elongate, yet *O. gryphoides* is a much bulkier shell, and not so narrow. The umbonal end in *O. virginica* is more acuminate also. With regard to the muscular impression, that in the latter species is invariably purplish black, whereas in *O. gryphoides* it is practically white '. The differences and similarities between *O. virginica* and *O. gryphoides* have been well brought out and discussed by Annandale and Kemp (1916).

With such a clear description of oyster species and also the differences between the Indian and American oyster, there should not have been the present confusion about the systematics of the Indian backwater oyster, especially with the later description of the second species of oyster by Preston (1916) who found an oyster from Cochin and Ennur backwaters that could be favourably compared with *O. virginica*

Gmel. (=*O. canadensis*, L.K.). However, he clearly brings out the differences between these two oysters. The Indian oyster found in Cochin and Ennur backwaters is of a straighter form and thinner texture and is also much foliaceous externally. The left valve in the Indian oyster is more concave and the inner margins of both the valves, as well as the muscular scars, are of deep purplish-black colour. This species he named as *madrasensis* sp. n.

There were thus two known species of oysters in India, namely *O. gryphoides* (Schlotheim) and *O. madrasensis* Preston described by Newton and Smith, and Preston respectively. However, the systematics of these two well-known oysters was confused by later workers. Hornell (1916) found the edible oyster occurring on the muddy bottoms of Aramra creek (Kattiawar) as identical with or extremely closely related to *O. virginiana* Gmelin, and *O. madrasensis* Preston. However, noticing the differences in the colour of the muscle scar which is white in the Kattiawar oyster while purplish-black in both *virginiana* and *madrasensis*, he thought that the Kattiawar oyster would probably turn out to be *O. gryphoides* Schlotheim, or a variety thereof. He thus made the systematic position of the Indian backwater oysters doubtful. Further, in his later publications (1918, 1921, 1949 and 1951), he opined that the well-known *O. madrasensis* of Preston is in no way separable from *O. virginiana* Gmelin and hence on the basis of the law of priority he preferred to call *O. madrasensis* Preston as *O. virginiana*. Hornell in his more recent publication (Hornell, 1951) states ' Among the more recent of the scientific names under which it has been described are *O. gryphoides*, var. *cuttackensis* and *O. madrasensis* by Preston. It has, however, no outstanding differences from the common American species (*O. virginiana*) '. Hornell thus put two distinctly separable species of oysters into one species *virginiana*.

Prashad (1921) most aptly stated ' . . . as the identity of the Indian and American species has not yet been definitely established, I prefer to designate the Indian and Sumatran forms as *O. gryphoides*. The differences in the shell of the American *O. virginiana* and the Indian species were fully noted by Newton and Smith, and are summarised in the paper by Annandale and Kemp '.

The confusion regarding the nomenclature of the two species of Indian backwater oyster *viz.*, *O. madrasensis* and *O. gryphoides* continued in spite of the clear description of both the species by Awati and Rai (1931) and of the former species by Satyamurti (1956). The recent workers namely Subrahmanyan *et al.* (1949), Patil (1954) and Kundu (1965) have described probably *gryphoides* under names like *bicolor* and *madrasensis*. Though none of these has given a clear description and figure of his specimen, from my experience of oysters from Bombay, Okha (also refer Hornell, 1916) and Karwar, I feel, that the oysters they have described is probably *gryphoides* having white muscle scar. However, this cannot be said with any certainty as I could not have had the access to materials collected by these workers.

I had the opportunity to examine the type collections of Zoological Survey of India, Calcutta and compare these with my own collections done at Bombay and Mandapam.

Descriptions of the types examined :

Ostrea gryphoides var. *cuttackensis* Newton and Smith. Loc. Hukitola near False point, Bay of Bengal (Cuttack coast). Collected on 27-3-1910. Reg. No. M $\frac{4909}{1}$.

Dimensions :—

Maximum height	15.60 cm.
Maximum width	15.70 cm.
Maximum height of the hinge area in the left valve	3.50 cm.
Maximum width of the hinge area in the left valve	4.00 cm.
Maximum length of the muscle scar in the left valve	5.20 cm.
Maximum width of the muscle scar in the left valve	2.50 cm.

The shells are massive and foliaceous externally especially in the left (lower) valves. Right (upper) valve more or less flat with whitish and dirty brown colouration externally. The left valve not much deep cup-shaped, externally whitish in colouration ; internally both the valves are nacreous white ; hinge line straight ; hinge area of the left valve produced with a groove in the centre and elevations on either side, the cavity beneath the hinge area in the left valve well-marked, transverse striations on the hinge area clear ; muscle scar somewhat oblong, more or less central, pure white with faint longitudinal lines. On the right valve no such lines were observed on the muscle scar which was thus more or less smooth.

The paratypes numbered M $\frac{4922}{1}$ and $\frac{4939}{1}$ were also examined. The former had two prominent lines on its somewhat excentrically placed muscle scar in the left valve.

A paratype younger specimen bearing the number M $\frac{4909}{1}$ and measuring about 4.5 cm. in height had denticulations along the edge of the right valve. The scar was dirty yellow and somewhat excentrically placed. The left valve was not available for study. Identity of this specimen is doubtful as the denticulations along the edge are not so far known in *O. gryphoides.*

Ostrea madrasensis Preston

Loc. Ennur backwater, Madras. Donated by Dr. N. Annandale

Reg. No. M $\frac{9658}{2}$

Syn. *O. arakanensis* Sowerby

Dimension :—

Maximum height	13.60 cm.
Maximum width	6.00 cm.
Maximum height of the hinge area in the left valve	3.50 cm.
Maximum length of the muscle scar in the left valve	1.30 cm.
Maximum width of the muscle scar in the left valve	1.60 cm.

The oyster not massive but moderately foliaceous externally and suffused with purple colouration. It is of a straighter type, narrows at the hinge end; the right valve flat opercular, white internally; the muscle scar somewhat central, deep purple in colour with faint recognizable striations; the inner margin suffused purplish; the areas around muscle scar especially on its lower and left lateral sides also suffused purple; the hinge line straight with hinge area slightly produced with somewhat obscure elevations and depressions which would fit into the corresponding elevations and depressions on the hinge area of the left valve; faint transverse striations on the hinge area visible.

In the left valve, the hinge area (beak) turning either to left or right, with a shallower central groove and raised ridges on either side, the transverse striations on the beak are well marked; the muscle scar narrow and somewhat reniform, excentric in position, deep purple almost black in colour with recognizable faint striations; the inner margin suffused with purple colouration; the cavity beneath the hinge area not well marked.

The paratypes examined had more or less the same description except in one case in which the cavity beneath the hinge area in the left valve was fairly well developed.

From the descriptions of the types of *O. gryphoides* var. *cuttackensis* and *O. madrasensis* given above, the conchological differences in these two oysters could be well brought out as below.

	Ostrea gryphoides	*Ostrea madrasensis*
1.	More bulky	less bulky
2.	Roundish and broad in shape	Straight and narrower in shape
3.	Whitish or greyish externally	Somewhat purplish externally
4.	Inner margins of both the valves pearly white	Inner margins purplish
5.	Inner surfaces of both the valves pearly white	Inner surfaces of both the valves generally suffused with purple colour
6.	Muscle scar pearly white in colour	Muscle scar deep purple, almost black in colour.
7.	Muscle scar broad and more or less oblong	Muscle scar narrow and more or less reniform
8.	Striations on the muscle scar obscure and sometimes not seen	Striations on the muscle scar well seen
9.	Cavity beneath the hinge area well marked	Cavity beneath the hinge area generally not well marked.
10.	Central groove and side elevations on the hinge area of the lower valve well pronounced	Central groove and side elevations on the hinge area of the lower valve not well pronounced.

Field observations made on these two oysters reveal that *O. madrasensis* has a tendency to grow vertically so that the oyster beds appear as rock fragments jutting out from the substratum. The area of adherence naturally is less and restricted

generally to the portion nearer the hinge of the animal. However, in the majority of cases, sides are attached to some dead or living oyster. *O. gryphoides* especially of the Bombay coast, is attached to the substratum with a more portion of its left valve so that it grows more horizontally.

O. gryphoides found around Bombay coast is more like *O. madrasensis* in shape, though it is not so narrow and straighter type as the latter. It is also not bulky and heavy as type *O. gryphoides* var. *cuttackensis*, described earlier or even like the larger specimens of *O. madrasensis* author has seen from Porto Novo obtained through the courtesy of Prof. R. V. Seshayya, and from Athankarai estuary near Mandapam (author's own collection).

The shape of the muscle scar also differs in *O. gryphoides* found around Bombay. It is more like that of *O. madrasensis* than that of *O. gryphoides* var. *cuttackensis* type specimen from the Zoological Survey of India.

However, rest of the conchological characters like the colour of the outer and inner surfaces and mainly of the muscle scar, tends to indicate the affinity of the Bombay backwater oyster to type *O. gryphoides*. The slight variations in the shape and muscle scar may perhaps be racial or environmental as it has been observed that the shape of the scar differs even in the specimens collected from the same locality. Hence, it is advisable to call the oyster from the west coast of India, having the above given characters as *O. gryphoides* and in no case it should be confused with *O. madrasensis*. The author also does not feel it worthwhile to create a variety for *O. gryphoides* found around Bombay to distinguish it from *O. gryphoides* var. *cuttackensis*. Some oysters reportedly collected at Jaitapur, Kolaba district, Maharashtra, by Messrs. P. R. Awati and H. S. Rai and left at the Institute of Science, Bombay, are bulky and large like variety *cuttackensis*. It is, therefore, felt that these oysters be better referred to under a simple name *O. gryphoides* or more correctly *Crassostrea gryphoides* rather than creating varieties for probable environmental differences.

Acknowledgements

The author is grateful to Dr. A. P. Kapur, Director, Zoological Survey of India, for facilities given for the completion of this work. He is also thankful to Shri K. Virabhadra Rao of the Central Marine Fisheries Research Institute, for going through the manuscript and suggesting improvements.

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