

REDESCRIPTION OF *SARDINELLA SINDENSIS* (DAY) (PISCES :  
CLUPEIDAE) WITH NOTES TO DISTINGUISH THE SPECIES FROM  
*S. GIBBOSA* (BLEEKER)

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ABSTRACT

*Sardinella sindensis* (Day) is redescribed to distinguish it from *S. gibbosa* (Bleeker) based on the material collected for the first time from Vizhinjam (Lat. 08° 23' N Long. 76° 59' E). As the original description is found to be inadequate to differentiate it from *S. gibbosa* and additional characters such as body depth, perforations on the abdominal scales, shoulder spot and gill rakers are described in the paper. The present record extends the distribution of the species to the southwest coast of India where it form a fishery.

INTRODUCTION

*Sardinella sindensis* (Day) (= *Clupea sindensis* Day) was described by Day (1878) from Karachi. Since then it has been reported by Regan (1917) from Bombay and by Chan (1965) from the Philippines. But Whitehead (1965) considered *Sardinella sindensis* and *S. gibbosa* to be synonymous. However, Talwar and Whitehead (1971) have redescribed *S. sindensis*, and Whitehead (1973) has pointed out the need to examine more Indian specimens in order to establish the distinction between *Sardinella sindensis* (Day) and *S. gibbosa* (Bleeker). The present account provides a detailed description of *S. sindensis* with notes to distinguish it from *S. gibbosa* (= *S. jussieu* (Lacépède)) based on the material collected for the first time from Vizhinjam southwest coast of India.

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MATERIAL AND METHODS

The present description is based on 27 specimens of *Sardinella sindensis* ranging between 122 and 150 mm standard length (S.L.) (total length 147-185 mm). For comparison 21 specimens of *S. gibbosa* ranging in size from 120 to 150 mm S.L. (150 to 187 mm T.L.) were used. They mostly occurred in *Achil* (hooks and lines) and *Chala vala* (gill net) catches at Vizhinjam (Lat. 8° 23' N, long. 76° 59' E). Juveniles of *S. sindensis* were not available for comparison. The methods of taking morphometric measurements and meristic counts are the same as those described by Chan (1965) and Dharmaba (1967). The

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specimens were preserved in 5% formalin. In the description given below, the range is given first, followed by mean in parentheses, and this is followed by the meristic count having the highest frequency.

#### DESCRIPTION

##### *Sardinella siddensis* (Day) (Fig. 1 a)

*Clupea siddensis* Day, 1879. *The Fishes of India*, p. 638, pl. 163(2); Seychelles, Sind, Bombay; figure (Life-size) or Karachi specimen, shown 95.5 mm S.L.; 1889, *Fauna of British India*, Fishes, 1:374.

*Sardinella siddensis* Regan, 1917. *Ann. Mag. Nat. Hist.*, Ser; 8:383. (Bombay-India). Chan, 1965, *Jap. J. Ichthyol.*, 13:1-3:II, Fig. 21 (key, 44) specimens; Philippines; Talwar and Whitehead, 1971, *Bull. Br. Mus. nat. Hist. (Zool)*, 22(2):57-85 pl. 1a; (2 specimens 95.5 mm and 90.0 mm S.L., Karachi); Whitehead, 1973, *J. mar. biol. Ass. India*, 14(1):186, fig. 16 with key and synopsis.

*Meristic counts*: D 16-18 (17.5), 18; A 16-19 (17.7), 19; P14; V 8 (7-8), 8; C 24-26 (25.2), 26; lateral scales 42-45 (42.7), 42; longitudinal scale rows 12; pre-dorsal scales



FIG. 1 a. *Sardinella siddensis* (Day)—178 mm T.L.

14-17 (14.4), 14; pre-ventral scutes 17-18 (17.7), 18; post-ventral scutes 15-16 (15.1), 15; gill rakers, upper arm of first gill arch 28.32 (30), 30, lower arm 58-64 (60.5), 61.

*Measurements*: In percentage of standard length; head length 20.59-25.53 (24.17); maxillary length 9.15-10.20 (9.76); lower jaw length 10.17-10.66 (10.42); snout length 6.34-7.91 (7.18); orbit diameter 5.67-7.35 (6.94); post-orbital length 8.45-10.0 + (9.17); inter orbital width 4.96-6.62 (5.87); width of head between upper ends of gill openings 8.82-10.14 (9.57); depth at dorsal origin 26.43-30.88 (28.13); depth at anal origin 17.86-20.59 (19.21); least depth of caudal peduncle 7.80-8.82 (8.38); pre-dorsal distance 42.55-55.00 (45.23); post-dorsal distance 56.74-64.41 (58.99); pre-pectoral distance 24.29-26.09 (24.89); pre-ventral distance 49.64-52.90 (50.99); pre-anal distance 77.86-81.29 (79.55); length of dorsal base 12.95-15.22 (13.71); length of anal base 15.57-16.10 (15.84); length of last dorsal ray 13.83-17.02 (15.38); length of third anal ray 4.23-5.80 (4.91); length of last branch of last anal ray 4.24-5.88 (5.09); pectoral fin length 15.44-17.02 (16.58); ventral fin length 8.45-10.87 (9.40); caudal fin (lower lobe) length 22.79-27.54 (24.83). Table 1 gives a comparison of a few morphometric and meristic characters of Day's material (as given by Talwar and Whitehead, 1971) with that of the present one.

Head shorter than depth at dorsal origin. Snout equal to or a little greater than eye diameter. Minute teeth on median ridge of tongue, palatine and lower jaw. Black stellar chromatophores distributed on the tongue. Eye covered by adipose tissue, leaving a vertical slit on the middle. Two supra-maxillae. No hypomaxilla. The lower jaw profile steep. Opercular bones, post orbitals and sub-orbitals covered by an adipose sheath. The cephalic sensory canal system arranged in a radiating pattern. Frontoparietal region with cuneiform area bearing about 9 striae and the supra-orbital with about 4 striae.

Body oblong and fairly compressed. The ventro-median part of the body strongly keeled

TABLE 1. Comparison of Day's material of *Sardinella sindensis* (as given by Talwar and Whitehead, 1971) with the present one in respect of a few morphometric and meristic characters

Character	Day's material		Present material	
	Lectotype	Paralectotype	Mean	Range
<i>Morphometric</i> (% in S.L.)				
Depth at dorsal origin	25.7	23.9	28.13	26.43—30.88
Head length	26.7	22.5	24.17	20.59—25.53
Snout length	6.5	6.9	7.18	6.34—7.91
Eye diameter	6.3	6.9	6.86	5.67—7.35
Upper jaw length	9.9	10.6	9.76	9.15—10.29
Lower jaw length	12.0	10.6	10.42	10.17—10.66
Pectoral fin length	16.2	15.0	16.58	15.44—17.02
Pelvic fin length	9.9	8.1	9.40	8.45—10.87
Length of anal fin base	15.7	14.5	15.84	15.57—16.10
Pre-dorsal distance	46.1	43.3	40.06	40.68—43.44
Pre-pelvic distance	48.2	48.9	50.99	49.64—52.90
Pre-anal distance	76.4	77.8	77.49	77.12—77.87
<i>Meristic</i> :				
Lateral scales	42	43	42.7	42.45
Longitudinal scale rows	11	..	12	..
Pre-dorsal scales	15	..	14.4	14.17
Pre-ventral scutes	18	..	17.7	17.18
Post-ventral scutes	14	..	15.1	15-16
Gill rakers : Upper arms	36	37	30.0	28-32
Lower arms	65	63	60.5	58-64
Pectoral rays	15	..	14	..
Pelvic rays	8	..	8	7-8
Anal rays	18	..	17.7	16-19
Dorsal rays	16	17	17.5	16-18

and the scutes partly concealed by scales on either side. The ventral profile slightly more convex than in *S. gibbosa*.

Origin of dorsal fin nearer to snout than to caudal base; lower part of fin invested in scaly sheath. The pectoral fin tips do not reach the pelvic base. Pre-pectoral distance about half the pre-ventral distance. No axillary scale. Ventral inserted almost below the middle of dorsal base; nearer to pectoral base

than to anal origin. Axillary scale present. Anal fin nearer to caudal base than to pelvic base. Last two anal rays somewhat larger and more extensively branched than the preceding rays. Caudal deeply forked with pointed upper and lower lobes; the lower lobe slightly longer than the dorsal lobe.

Pseudobranch present, exposed, as long as eye diameter. Gill rakers fine and slender, close-set, the longest about  $\frac{1}{2}$  of eye diameter.

**Scales:** Body covered by somewhat thick cycloid scales. Predorsal medial ridge covered by overlapping scale rows on either side. Abdominal scales firmly adherent with less perforations (Fig. 2 a). Each scale has only one continuous transverse groove distally and 5 to 7 pairs of interrupted ones with wide, distinct interspace between the disconnected

pairs of interrupted striae whereas those in the posterior region (above the middle of anal) have 7 pairs and those in the middle region (below the middle of dorsal) have 6 pairs.

**Egg:** Ripe intraovarian egg of *S. sindensis* is spherical and has a diametre range of 0.784 - 0.882 mm. It has a cluster of oil globules placed almost in the centre. The yolk is chambered and, as in other sardines, it is honeycomb-like.

**Colour:** In fresh condition the shoulder spot at the supracleithral region is greyish black with grey background and closely-set black pigments. Yellow lateral band is feebly seen or absent. Dorsal 1/3 region greyish while the sides are silvery white. Edge of dorsal dark dusky. Caudal greenish grey with black margin; there is a greenish white line parallel to the edge found on the upper lobe and some times on the lower lobe also. Tips of jaws blakish. Dark spot at base of anterior dorsal rays present. If preserved in formalin upper 1/3 of body brownish grey, yellowish brown on the sides. On the back, each scale pocket is marked by a brown margin. Shoulder spot greyish black. Edges of dorsal and caudal brownish.

**Local names:** In Tamil it is known as *Choodai* and in Malayalam it is called *Chala mathi*.

**Distribution:** Karachi, Bombay, Philippines. Sydney and at present Vizhinjam.

**Distinguishing characters:** The most important external distinguishing feature between *S. sindensis* and *S. gibbosa* is the distinct difference in the body depth. In *S. sindensis* the body depth range is 26.43-30.88 (28.13) while in *S. gibbosa* (Fig. 1 b) it is 23.86-26.96 (25.86). Similarly the abdominal scales of these two species show a specific difference. The highly perforated abdominal scales of *S. gibbosa* (Fig. 2 b) seem to be tender when compared to the sparingly perforated hard

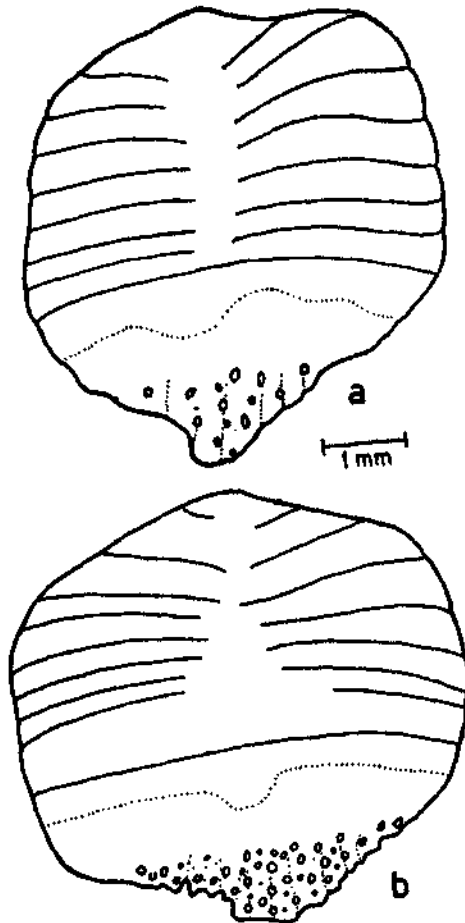


FIG. 2. Abdominal scales: a. *Sardinella sindensis* and b. *S. gibbosa*.

portions. The number of interrupted striae differs from place to place in a particular fish. Thus, in a fish of 142 mm standard length scales of the anterior region (where the tip of pectoral fin rests when folded against the body) have 5

scales of *S. sindensis* (Fig. 2 a). Gillraker both lectotype and paralectotype of *S. sindensis* number can be of some help. In *S. sindensis* have the lower count of 14. One out of five the gillraker number varies from 58 to 64. other Day specimens (BMNH 1889.2.1919-24) Whereas in *S. gibbosa* it ranges from 50 to 56 has 14 post-pelvic scutes. If scute number is only. In fresh condition the shoulder spot of diagnostic, then *S. sindensis* can be separated from *S. gibbosa* by its slightly higher range for

TABLE 2. Varying characters of *Sardinella sindensis* (Day) and *S. gibbosa* (Bleeker)

Characters	<i>S. sindensis</i>	<i>S. gibbosa</i>
Depth at dorsal origin	26.43—30.88 (28.13)	23.86—26.96 (25.86)
Depth at anal origin	17.86—20.59 (19.21)	16.67—19.49 (18.13)
Pre-dorsal distance	42.55—55.00 (45.23)	41.53—45.28 (44.27)
Orbit diameter	5.67— 7.35 (6.94)	6.86— 7.89 (7.42)
Pre-anal distance	77.86—81.29 (79.55)	76.99—80.18 (78.42)
Pre-pectoral distance	24.29—26.09 (24.89)	23.33—25.44 (24.53)
Pre-ventral distance	49.64—52.90 (51.00)	48.33—52.18 (50.01)
Pre-dorsal scales	14-17 (14.4)	13-14 (13.3)
Gillrakers (lower arm)	58-64 (60.5)	50-56(53.9)
Abdominal scales	Hard with less perforations	Soft with more perforations.
Colour of shoulder spot	Dark with densely concentrated black pigments on a grey background	Less dark with scattered black pigments on a yellow background

(Mean values are given in parantheses).

concentrated black pigments on a grey background, thus giving a blackish appearance, whereas in *S. gibbosa* it is less dark with scattered black pigments on a yellow background. Varying characters of the two species are given in Table 2.

#### DISCUSSION

Talwar and Whitehead (1971) while drawing the distinction between *S. sindensis* (Day) *S. gibbosa* (Bleeker) made the following comments: '*Sardinella sindensis*, together with *S. gibbosa* (Bleeker) can be separated from other species of *Sardinella* by its slightly higher postpelvic scute count (15-16, rarely 14 or 17-18; cf 12-14, rarely 11 or 15—see key in Whitehead (1973). This slight distinction held true in 44 and 159 specimens (respectively) examined by Chan (1965) and also in British Museum material, and it is unfortunate that

gillraker numbers (58-72 at 69-122 S.L.; of 43.63 at 90-150 mm S.L.—figures from Whitehead (1973) '.

It would thus appear that these two species could be distinguished by gillraker count. Chan (1965) reports, however, a considerable overlap in this character between the two species. But Vizhinjam material did not show such an overlap, the ranges in the gillraker number being 58-64 and 50-56 respectively for *S. sindensis* (122-150 mm S.L.) and *S. gibbosa* (120-150 mm S.L.). The greater body depth of *S. sindensis* (26.4 - 30.9 per cent of S.L.) is also fairly distinct from that of *S. gibbosa* (23.9 - 26.9 per cent of S.L.). Regan (1917) also distinguishes these two species by their body depth and gillraker count. The present

study has revealed further that the two species could be distinguished from *S. gibbosa* on the basis of the nature of the abdominal scales, the perforations of the abdominal scales, the colour of the shoulder spot and also on the basis of the number of gillrakers.

Therefore, it is apparent that *S. sindensis*

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