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SALMOSTOMA KARDAHIENSIS SP. NOV. (PISCES : CYPRINIDAE) FROM MADHYA PRADESH, INDIA

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ABSTRACT

The oriental genus *Chela* has been under continuous revision. The larger *Chela* with a specified number of gill rakers are assigned to an older available name *Salmostoma* though this genus requires further modification in its diagnosis. In the course of such an attempt, a new species named *S. kardahiensis* sp. nov. from the collection made in a small river at Jabalpur is described. The sexes and stages of this species hitherto unknown in this genus are also described.

INTRODUCTION

The taxonomic status of the genus *Chela* (Family Cyprinidae) has been disputed by several workers and has been revised several times. The latest revision is that of Banarescu (1968) who regarded that, taxonomically, all the larger *Chela* with a specified range of gill rakers can be included in one genus comprising 12 species. To this group, nomenclaturally, he applied an older available generic name *Salmostoma* Swainson 1839 with *Cyprinus bacaila* Hamilton as its type. Since several authors have confused upon their own diagnosis, it is not improper to assign an older available name in preference to a common name.

Banarescu's work too, along with others, is not without disadvantages. He had measured the lengths of several specimens from various localities but did not sort them out into sexes or immature specimens. It is dresumed however, that the lengths he had provided belonged to sexually mature specimens or adults though no statement has been made of the lengths at which adult size can be considered or, of sexes, if any difference has been shown by them since Silas (1958) stated atleast in one case that younger specimens of one species are shown as adults of another.

To avoid these anamolies, the genus *Salmostoma* needs further revision which will be undertaken in due course. For the present, there can be no doubt on the generic validity of *Salmostoma* though its generic diagnosis will be modified further. But, before doing so, each species has to be understood in its true perspective and composition. During the course of this attempt, a new species has been found which is described below. In order to augment its specific (or generic) limits, the structure of airbladder and gonad which are hitherto unknown in this genus are

also studied, in both the sexes and in immature specimens.

In this paper, the total length is taken to measure from the tip of the snout to the end of the caudal fin. An adult is intended to mean a sexually mature specimen. Where an adult is not specified but only indicated as a male or a female, it is to be treated as a sexually mature specimen or an adult unless otherwise qualified.

The material for the new species is obtained from the collections made from Kardahi river and at several places along its course, located about 30 km from Jabalpur, M.P. This work was carried out at the Central Regional Station, Zoological Survey of India, Jabalpur. The new species is named after its locality.

Salmostoma Kardahiensis sp. nov.
(Fig. 1)

Material : 7 specimens collected from the Kurdahi river joining at Budagarh lake (*D. K. Harshey* coll. 2-9-78) ; 32 specimens collected from the river near dam site (*K. Reddiah* coll. 13-10-78) ; 48 specimens collected from the river before joining the Budagarh lake (*D. K. Harshey* coll. 24-8-78) ; 148 specimens collected at about 1 km ahead of dam site (*K. Reddiah* coll. 17-11-78).

Types : One ♀ (Holotype) and one ♂ (Allotype) and Paratypes (3 ♀ ♀ and 10 ♂ ♂) have been deposited in the National collections of the Zoological Survey of India, Calcutta.

Immature specimens : 50 examples of immature specimens of various lengths have also been deposited along with the types.

Type Locality : Kardahi river, a nullah type flowing across the jungle and fields, about 30 km from Jabalpur on Katni Road and at several places along its course.

Data on holotype

1. *Size* : Total length—112 mm and height—18 mm.

2. *Locality, date and other data* : Kardahi river, about 30 km from Jabalpur, M.P. on Katni Road, 2 km away from Budagarh ; date of Collection 17-10-78 ; Longitude 79° 56′ E, Latitude 23° 10′ N.

3. *Sex* : Female.

4. *Developmental stage* : Mature, eggs usually polygonal, egg size—0.1 mm.

5. *Name of host* : Free living.

6. *Name of Collector* : Dr. K. Reddiah.

7. *Registration*, etc : Registered in the National Collection of the Zoological Survey of India, Calcutta. (FF 1279 to FF 1283)

8. *Elevation* : Below 300 m above sea level.

9. *Depth in which taken* : half a metre, in a shallow area.

10. *Geological age* : not applicable, living.

Description of the adult female : The body of the fish (Fig. 1A) is elongate and laterally compressed ; its mouth and lower jaw directed upwards. A well devoloped knob on symphysis is present. Sub-orbital ring of bones usually wide. Thorax has a smooth

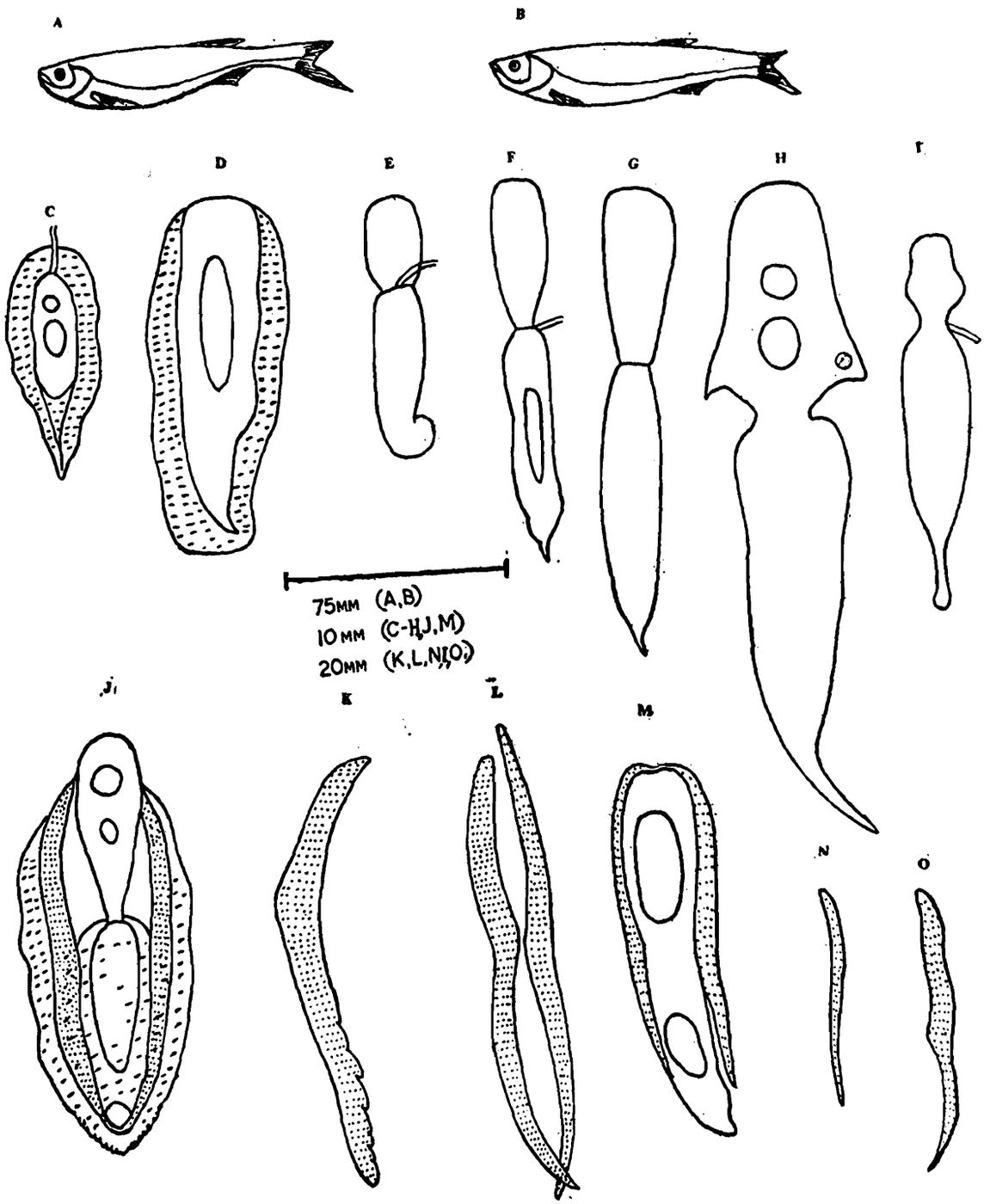

Fig. 1. *Salmostoma kardahiensis* sp. nov. ; A. adult ♀ B. adult ♂ ; C, D. air bladder in unsexed immature specimens ; E-F. air bladder in immature ♂ G. air bladder in mature ♂ ; H. air bladder in adult ♀ ; I. air bladder in adult ♂ J. Gonad in immature ♂ ; K, L. gonad in mature ♀ M. gonad and air bladder in immature ♂ ; N. gonad *in mature*.

edge without support by the bones of the forearm. Pharyngeal teeth hooked, in 2 or 3 rows. Fins generally larger, caudal forked, scales of moderate size, those near the anterior part of the body generally larger.

Fins : Dorsal arises from about half the length of the anal, Pectoral slightly longer than the head, with a wide gap before reaching ventral. Anal arises from about half the length of the dorsal, caudal lobed, the lower the longer.

Scales : Arranged in sinuous rows, those near the head generally larger, the one covering the last ray of the pectoral very large. 2 or 3 rows of scales between the ventral and lateral line and 3 or 4 rows of scales between it and the mid-dorsal line are present.

Body proportions : Length of head 5, of caudal 5.5, height of body 5.5, eye diameter 3.5 in length of head, about 1 diameter from the end of snout. In about 20 specimens of various length groups examined, there is a variation of 1 or 2 in fin rays, pectorals varying from 11 to 13 and of caudal 25 to 36, Ll scales 52-58, Sp. br. (gill rakers) from 36 to 50. Generally, the younger specimens have lower number especially with reference to gill rakers.

Air bladder : Anterior bladder (Fig. 1H) is 12 mm long, vase shaped with a narrow neck in a specimen of 97 mm in total length. Its postero lateral corners are winged and often contains 2 air bubbles. The posterior bladder is 20 mm long, carrot shaped with a short, thin, usually curved tapering tail.

D. 1/8 ; p. 12 ; v. 9 ; A13 ; C. 3/8-3/11 ; L 1 52 ; sp. br. 46.

Gonad : The gonad (Fig. 1L) is about 40 mm long, flat, its posterior 1/3rd measures its greatest width of 3 mm and bent inwards. Its inner margins are sometimes toothed. Mature egg size 0.1 mm., eggs of various shapes, usually polygonal or angular.

Size : Total length of 11 females range 71—112 mm, average 83 mm.
Height or width of 11 females range 12— 18 mm, average 16 mm.

Colour : Silvery white.

Description of the adult male : The numbers of males in relation to females are small in a sample. The males (Fig. 1B) of same sizes are compared with those of females but no significant differences are found in the skeletal features or in the proportions of the body parts. The differences appear to be chiefly internal. In a specimen of 115 mm, the anterior bladder (Fig. 1I) is 10 mm long, the posterior 27 mm long. The tail is thinner and longer sometimes with a knob at its tip (Fig. 1I).

The gonad measures 17 mm in length and 2 mm in width and hang like thin threads on either side of the air bladder.

Size : Length of 5 females range 74—113 mm—average 88 mm
Width of 5 females range 13— 18 mm—average 15 mm

Colour : Silvery white.

Immature Stages

The immature stages are recognised in this species up to 60 mm in length. Gonads begin to appear in the length groups 50 to

60 mm initially with a lustrous white band of peritonial membrane around air bladder. They differentiate between males and females in length groups 60 to 70 mm. Sexually mature individuals or adults are noted from 70 mm and above. The stages of development of air bladder and gonad in males and females are described below.

Air bladder : The development of air bladder is traced from the 50 mm length group in which it fiirst appears as a simple sac without division (Fig. 1C). The pneumatic duct originates from its anterior tip and may contain one or two air bubbles. The undivided bladder measures 6 mm in length and 2 mm in width. It is attached and surrounded by a thin layer of lustrous peritonial cover but without gonad even at this stage.

Immature male : In the male of 65 mm length group (Fig. 1E) a division appears with the anterior bladder somewhat squarish. The posterior bladder gradually tapers into a coil which differentiates later in a straightened tail. The pneumatic duct occupies a position anterior to the posterior bladder. The gonad appears as a thin filamentous structure suspended but attached anteriorly on either side. The male germ cells are in a developmental stage. The anterior bladder measures 4 mm and the posterior 7 mm. The gonad measures 6 mm long and 1 mm wide. In a male of 65 mm (Fig. 1F), a thin short tail is formed with the anterior bladder measuring 6 mm and the posterisr 10 mm with a width of 2 mm. A brownish gonad also appears.

In the 70 mm length group (Fig. 1G), the anterior bladder measures 8 mm and the posterior 12 mm with a short and blunt tail, sometimes knobbed at the end. A thin gonad of 1 to 2 mm wide (Fig. 1N) extends throughout the lenght of the air bladder. Fat globules gradually accumulate and a thin sheet of peritonium is present on either side of the gonad.

Immature females : In the females also up to the 70 mm length group, the air bladder follows the same pattern of development but in adults beyond this length the tail is much longer and broader. In the 100 mm group, the anterior bladder is produced into wings on either side.

The gonad : The development of gonad has been studied in 60-65 mm length groups in both sexes. The gonad appears only after the air bladder is fully developed. It appears first as a white streak in this length group suspended on either side of the air bladder and flanged by a thin sheet of peritonial membrane. The follicles develop and the germ cells are in the process of development.

Immature female : In the immature female of 61 mm (Fig. 1J), the gonad measures 20 mm long and 4 mm wide. Its upper surface is whitish and the under surface brownish. The gonad is speckled throughout indicating that follicular formation has begun. Its anterior ends are narrower but posteriorly it becomes confluent with the bladder and covered by fat bodies. The independent limbs of this gonad are not discernible until its next stage. The lustrous fold of the peritonium extends throughout its length.

Adult female : In the 100 mm length group, the gonad is 40 mm long and 5 mm wide. Its inner margins are sharply wavy or lobed. Its widest part is about its middle or slightly anterior to it. The pair of gonads develop

as separate structures. The gonad presents no groove at any stage. Full description is provided earlier.

Immature male: The gonad of males (Fig. 1M) is shorter than air bladder in 65 mm length group. Its length is 10 mm and width 1 mm. The gonad is speckled indicative of the appearance of the follicles.

The pair of gonads hang like two filaments on either side of the bladder and joined by an epithelium underneath in the form of a boat-shaped structure in the preserved specimens, inside which the air bladder fits in. The chief differences in the gonad of females are in the total length of the gonad and its width. The size of gonad in males is almost half of that of the females.

Distinguishing Characters

Twelve species are included in the genus *Salmostoma* considered by Banarescu (1968) who distinguished these species chiefly on the basis of the length and the number of gill rakers. The new species differs from all the other species in having a gill raker range of 42-52. This character is fairly constant in a large number of specimens examined. In some immature specimens, the number is reduced to as much as 36 but this is not taken into account for the purpose of comparison of their immaturity. The only species of which the gill raker count is not known is *S. horai* from which the new species differs in the number of lateral line scales, anal rays and even in total length. In the total length, the new species is closer to *S. clupeoides* and *S. untrahi* from which the new species differs in the number of gill rakers.

In order to further subtantiate its specific identity, the measurements and shape of the air bladder and gonad are also taken into account to which published descriptions do not provide any clue for comparison.

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