The Scientific Temper
Vol. 3; No.1&2 : Jan.-July, 2012 : pp73-76
Email: letmepublish@rediffmail.com

ISSN 0976 8653
e-ISSN 2231 6396

SEXUAL DIMORPHISM IN *MYSTUS VITTATUS* (BLOCH.)

P.N. TRIPATHI AND N. P. SINGH
Department of Zoology
K.S.Saket P.G.College, Ayodhya. 224123 (U.P.)

ABSTRACT

Mystus vittatus exhibits sexual dimorphism with distinct external characters. The mature male above 3 mm. to 9 mm. had a muscular conical reddish pink papilla just above the genital opening, the female lacks the same. It persists in mature male but becomes prominent during the breeding season.

KEY WORDS: Sexual dimorphism; Catfish; *Mystus vittatus*; Genital papilla.

INTRODUCTION

Sathyaneshan (1962) for the first time reported presence of minute papilla in male of *A. seenghala,* but segregated the sexes based on probe method. This method was earlier used by Tom Moen (1959) in successfully sexing the channel catfish *Ictalurus punctatus*. In this fish the urinary and genital ducts have separate external openings in female while in male these ducts have only one opening. Ranganathan and Radha (1966) adopted the similar method to segregate the sexes in *A. seenghala*. Pantulu (1961) segregated the male *Mystus gulio* by the presence of well defined proturanee with a free tapering end and females by separate urinogenital opening. David (1963) also observed similar genital papilla (protuberance) in the male of *Mystus gulio* (Ham.), which interestingly disappeared after the spawning season. The presence of such a papilla was reported in *M. keletius* (Cauvier and Valenciennes) and in *M. malabaricus* (Jerdon). It is worth mentioning that the presence of such genital papilla is not confined to the genus *Mystus* of the family Bagridae, but are also found in Sisoridae family e.g. *Gagata* and *Batasio* spp. similar papilla was observed in *Glyptosterum recticulatum* .

The identification of male and female fishes in a given fish population is crucial for their management in any aquasystem. Among small sized siluroids fishes of Indian rivers *Mystus vittatus* (Bloch.) has very high consumer preference. The decline in its catch from natural habitat and recent upsurge in market price pinpointed the need to develop suitable technique for its aquaculture, which is constrained by nonavailability of stocking material .In this sequel its fishery and riverine seed resources in a stretch of Ghaghara river system were studied. During the process observations were made on external sexual dimorphic character of the fish.

The present study describes the sexual dimorphic morphological character and reviews the occurrence of secondary sexual character in *M. vittatus* with the aim that it would help in. identification of sexes in the field. In this study the commercial catches of *M. vittatus* and specimen caught in the vicinity of breeding grounds were examined for external sexual characters. Data on length at first maturity and change in colour of skin were also recorded (Bhatt,1970).

MATERIAL AND METHODS

The fresh water catfish *Mystus vittatus* were collected from the Ghaghra river at Jamtharaghat, Faizabad using Drag nets, Cast nets and Gill nets in the early morning and late evening, after which they were transported to laboratory.

During the study period about 245 specimens were sexed by Probe method (Sathyaneshan, 1962). The total number of males and females was found to be 82 and 163 respectively. Thus the ratio of males to females was about 1: 2.

RESULT AND DISCUSSION

Sexes in mature *M. vittatus* can easily identified by the difference in their external morphological characters. The male *M. vittatus* above 3 mm. to 9 mm. in length and have a muscular, conical reddish pink papilla just above the genital opening. It becomes prominent by acquiring a stout musculature of reddish tinge during the onset of breeding season i.e. March- July. The scrutiny of juvenile catch showed that immature *M. vittatus* below 3 mm. in length lacks such papilla. The papilla was also not observed in the mature female *M. vittatus* specimen.

The gradual change in the natural (Shinning silver gray) colour of skin also helped in identification of male fish during breeding season. Appearance of white creamy secretion “nutriexuate” locally known as ‘Chara’ on the ventral surface of the male fish distinguishes it as

colour

Fig. Sexual Dimorphism in fresh water catfish *Mystus vittatus* .

the nest guarding male and confirms the commencement of breeding.

The presence of papilla in related catfish represented only a secondary sexual character, which disappeared after the breeding season. But in present study, it indicated proximity or actual condition of spawning by acquiring prominence during breeding season and persisted perpetually in the mature male *M. vittatus* even after the breeding season.

Functional anatomy of urogenital papilla has been studied in some species of teleost fishes, where it has been observed to play important role in transfer of sperm. In certain cichlids and gobies which make nest, it has been observed that they repeatedly rub their genital papilla and ventral surface over the nest. During the process it becomes enlarge and erected.

M.vittatus exhibits profound parental care and the male prepares nest for the young ones. Brief sexual play during construction of nest has been observed. Though, it is difficult to record actual mating behavior of the fish in nature, to understand the function of genital papilla, yet the prominence of genital papilla during breeding indicates its definite role in breeding of *M.vittatus.* Since, the fertilization in *M.vittatus* is external, the plausible function of genital papilla seems to be for stimulating the mating female for laying the eggs.

Minimum length at which at least 50% of the individuals are mature during spawning is here considered as the minimum size at first maturity. The present observations were based on 1017 specimens (414 males, 603 females) collected. Females and males with maturing and mature gonads (Stage III and Stage IV) were considered to spawn during the ensuing spawning season. The smallest males with mature gonads appeared in the 6.5 cm group, 50% of all males are mature in the 8.0 cm group. All males above 9.5 cm have mature testes during spawning season. Few females in the 6.5 cm group have mature gonads while 50% of the females are matures in the 8.5 cm. All females above 10.0 cm have mature ovaries during spawning season.

The various size groups falling in the various maturity stages have been given in Table. It would be understood from the table that is male's maturity first appears at 8.0 cm and in females 8.5 cm. All the males below 8.0 cm and females below 8.5 cm were immature.

During the period of investigation the specimens were sexed by an external and internal examination, of which 414 were males and 603 females. The ratio of males and females comes to about 1:1.45 which showed that the number of female is greater in the population (Table).

Some size differences between males and females have also been noticed. The maximum size of male was found to be 11.1 cm while the largest females measured 12.2 cm.

From the above account it may be established that there exists distinct sexual dimorphism in *M.vittatus* once the fish attains maturity. The genital papilla observed in male seems to perform definite function during courtship prior to egg laying by the female partner. The present study provided a direct method of its sex segregation, and can easily be adopted by fishermen. It is much simpler than the methods given by earlier researchers. More or less similar findings were also reported by Bhatt, V.S. (1970), Arockiaraj *et al*. (2003), Sath, R.N. (2001).

ACKNOWLEDGEMENTS

The authors are thankful to U.G.C., New Delhi for the grants received to us.

Table - Sex-ratio in monthly samples of *Mystus vittatus* (Bloch)

Month	Number		Total	Males %	Females %	M : F ratio
	Males	Females				
April 2007	40	23	63	63.49	36.50	1 : 0.57
May	19	47	66	28.78	71.21	1 : 2.47
June	31	38	69	44.92	55.07	1 : 1.22
July	27	39	66	40.90	59.09	1 : 1.44
August	14	36	50	28.0	72.0	1 : 2.57
September	34	34	68	50.0	50.0	1 :
October	56	100	156	35.89	64.10	1 : 1.78
November	35	93	128	27.34	72.65	1 : 2.65
December	50	109	159	31.44	68.55	1 : 2.18
January 2008	34	26	60	56.66	43.33	1 : 0.76
February	37	27	64	57.81	42.18	1 : 0.72
March	37	31	68	54.41	45.58	1 : 0.83
Total	414	603	1017	40.70	59.29	1 : 1.45

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