



# International Journal of Fisheries and Aquatic Studies

ISSN: 2347-5129

IJFAS 2015; 2(5): 305-307

© 2015 IJFAS

www.fisheriesjournal.com

Received: 06-03-2015

Accepted: 11-04-2015

**Sushil Kumar Sarmah**

Department of Zoology,  
Guwahati College Guwahati-  
781021

**Sharmistha Paul**

Department of Zoology,  
Arya Vidyapeeth College,  
Guwahati- 781016

**Subhas Chandra Dey**

Department of Zoology,  
Gauhati University Guwahati-  
781014

## Mass Propagation of *Danio aequipinnatus*, an ornamental fish of North Eastern India

**Sushil Kumar Sarmah, Sharmistha Paul, Subhas Chandra Dey**

### Abstract

North eastern region (NER) of India harbours 266 species of fishes out of which 196 have potential ornamental value. The present paper incorporates the technique of mass propagation of indigenous ornamental fish species with *Danio aequipinnatus* as the test species. For successful mass propagation of *D. aequipinnatus*, selection of brood stock, food and feeding schedule and breeding set-up are important criteria. Maintenance of physico-chemical parameters of the breeding tank is important in the survival of the breeders. Best fertilization rate were obtained with 3:2 male to female ratio.

**Keywords:** Mass propagation, *Danio aequipinnatus*, Ornamental fish, north eastern India

### 1. Introduction

The hobby of keeping ornamental fish has expanded into a booming international trade. 85% of ornamental fish from north eastern region are exported to the global market and all are traded on wild catch. The commercial organized export of freshwater ornamental fish depends primarily on assured and adequate supply as and when demand arises. Although some studies have been done by the earlier workers on food, nutrition and rearing of some ornamental freshwater fishes viz., Tekriwal *et al.* (1990) [19]; Mukhopdhyay (2001) [11]; Sinha (2001) [14]; Anna Mercy, (2001) [2] and Swain *et al.* [18]. It was indeed Dey *et al.* (2000) [7]; Sarmah and Dey (2000) [16]; Sarmah and Dey. (2004) [17] and Paul *et al.* (2009) [13] who made empirical studies on the breeding of some native ornamental fish species of N.E. India hitherto remain. Looking at the present scenario of ornamental fish trade of NER, the present paper accentuates the technique of mass propagation of indigenous OFS *Danio aequipinnatus* a classified ornamental fish of NER in particular for the benefit of entrepreneurs in ornamental fish trade. *Danio aequipinnatus* (McClelland) commonly known as 'Giant Danio' has brilliant colouration of basic blue with mixture of silvery tinge. Three alternate bluish and thinner golden yellowish bands run along the caudal peduncle to post opercular region. Due to its brilliant colouration the test species has a high demand among domestic and international ornamental fish traders. The species is semi-torrential and inhabits rocky stream with medium water current. Mainly solitary species but may be found in school of 15-25 individuals. Since semi-torrential the species can withstand wide range of temperature fluctuations.

### 2. Materials and Methods

The target fish species were collected from streams of Assam and Meghalaya. The collection stations were Basistha and Bahini hillstream, Kopili stream, Kalpani stream, Sukurboria stream at Rani Garbhanga Reserve forest of Kamrup District. For rearing of breeders dechlorinated tap water treated with 5% methylene blue for 2-3 days were used. Methylene blue acts as a disinfectant. Glass tank of the size 60x45x45cm and 60x30x30cm were used to rear male and female brooders separately. Both corner and under gravel filters are used with artificial oxygenation for 24 hours. The fecal matter and uneaten food particles of the tank were siphoned out every day and the water was partially changed every two days. The corner filter was also cleaned every alternate day. The important criteria for laboratory propagation of fresh water native ornamental fish are selection of breeders, maintenance of breeders, stocking density of breeders, breeding set up and breeding technique. Reports on the reproductive biology of OFS of North-eastern India are meager and mainly restricted to Chaudhuri (1962a) [4]; Chaudhuri (1962b) [5] and Kelly (1987) [9]

**Correspondence**

**Sharmistha Paul**

Department of Zoology,  
Arya Vidyapeeth College,  
Guwahati- 781016

The breeders were selected after Baskar (1993) [3] and Krishnakumar (1997) [10]. Maintenance of the brooders, stocking density, breeding setup and breeding technique were made after Huet (1986) [8]. Food is a major component for the maintenance of brooders. Both natural (live) and artificial (formulated) food was supplied for maintenance of brooders. The stocking density of the brood stock was calculated through surface dimensions and surface area. If the surface area is 60x30cm = 1800 sq.cm, the recommended level was obtained by dividing the surface area by 13 and in 60x45cm = 2700 sq.cm. the dividing factor was 20. Dawes (1984) [6]

### 3. Results and Discussion

#### 3.1. Selection of brood stock

For breeding, female brooders of size 72 mm in length and male of 74.6 mm were selected and kept separately in the brood rearing tanks and monitored constantly. The water temperature was maintained as between 18.0-21.0 °C and 24.0-25.00 °C, pH between 7.7-8.0 and 7.1-7.5, Dissolve oxygen (DO) (mg/l) between 5.2-5.5 and 5.0-5.1, Total alkalinity (TA) (mg/l) between 83.0-92.0 and 72.0-74.0, Total hardness (TH) (mg/l) between 14.0-16.7 and 18.5-20.0 during winter and summer respectively. The water analysis was done as APHA [1]. The water volume was maintained at 60- 80 cm and depth at 15- 20 cm. The bottom of the aquarium was scattered with small stone chips. The food comprised of both live as well as formulated food. Live food consisted of mosquito larva, blood worm and tubifex which were supplied at the rate of 6% and 5% per body weight respectively at every 8 hours and formulated feed were supplied at the rate of 8% per body weight at every 12 hours. The suitable stocking density level was found to be 1fish/135 sq.cm.

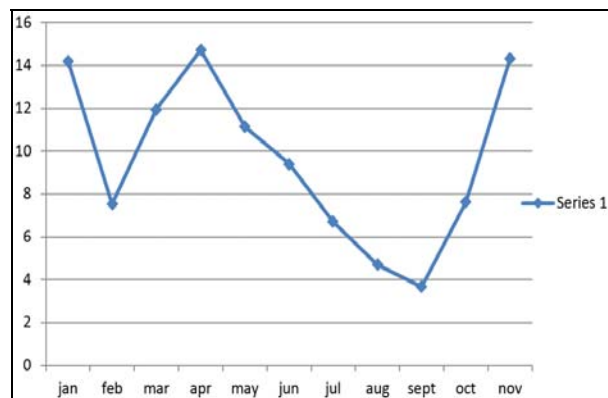


Fig 1: Average GSI of *Danio aequipinnatus*

The gonado somatic index (GSI) of the species indicates two breeding seasons, the first season being November to January and the second breeding season being April. The spawning habitat was created by placing small mosaic chips of size 10-12mm or small glass beads of size 15 mm diameter on the bottom of the breeding tank. Corner filter with feeble aeration was also supplied. The suitable breeding ratio for captive breeding of the test species was found to be 3:1 (male: female) but 3:2 ratio also yields good results. The gravid female was introduced first into the breeding tank. The males were introduced 18- 20 h after the female was introduced. Courtship display continues for 4- 6 h after which the female spawns and the eggs are scattered into the bottom of the tank. Both male and female were removed from the breeding tank after spawning is completed. The maximum number of hatchlings

calculated in 3:2 (male: female) ratio were 210 whereas 170 numbers of hatchling were recorded in 3:1 (male: female) ratio.

Nutrition is an important factor and there was a preference for blood worm and tubifex over mosquito larva. As for formulated feed, the application level was scaled down to @ 5-8% per body weight from the recommended level of 10% per body weight Baskar (1993) [3] showing no adverse effect in either growth or survival of brooders.

It was observed that *D. aequipinnatus* could be successfully bred in medium sized glass tank with a bed prepared from small mosaic chips which gave better spawning performance. Indeed an optimum temperature level for breeding of daniiids at 27.0 °C, Kelly (1987) [9] could be established in the present empirical investigation.

The present investigation also revealed the optimum combination of male and female breeders for successful breeding in the test OFS. This ratio was ascertained as 3:2 as compared to *D. devario* and *P. daniconius* (1:1) hitherto remained unreported. Sarmah, S.K. (2001) [15].

#### 4. References

- American Public Health Association (APHA). Standard methods for the examinations of water and wastewater, 17 ed. APHA (New York), 847.
- Anna Mercy TV. Breeding and optimum rearing condition for successful propagation of ornamental fish species In: Captive Breeding for Aquaculture and Germplasm Conservation (ed), Ponniah, A.G.; Lucknow, 2001.
- Baskar IS. Investigation on a few freshwater aquarium fishes, Ph.D. Thesis, Madras University, 1993, 169.
- Chaudhuri H. Breeding and life history of *Rasbora elanga* (Hamilton), Proc Indian Sci Congs 1962a; 49(3):390.
- Chaudhuri H. Breeding of *Puntius sarana* (Hamilton) and observations on its life history and bionomics; Proc Indian Sci Cong 1962b; 49(3):390.
- Dawes AJ. The fresh water aquarium question and answer, Pp126 Robert Royce Ltd. (London), 1984.
- Dey SC, Sarmah SK. Breeding lineament of *Glossogobius giuris* (Hamilton, 1822), Regl. Sem. On recent trends in Zoology, NEHU, 2000.
- Huet M. Text book of fish culture: breeding and cultivation of fish. 2<sup>nd</sup> edition, Pp 438, fishing news book (England), 1986.
- Kelly J. A complete guide to setting up Aquarium. Pp125, TFH. Publication Inc. New Jersey, 1987.
- Krishnakumar. Studies on few freshwater aquarium fishes, Ph. D. Thesis. Madras University, 1997, 125.
- Mukhopdhyay PK. Development of feed for raising brood stock of cultivable freshwater fin fish. In: Ponniah A.H., K.K. Lal and V.S. Basheer (eds). Captive Breeding for Aquaculture and Germplasm Conservation, NBFGR – NATP, Pub No 3 Lucknow, 2001.
- Nikolsky GV. The ecology of fishes, Academic press, (London), 1963, 352.
- Paul S, Sarmah S, Dey SC. In- house Propagation and Life- history of *Nandus nandus* (Hamilton, 1822). J. Environ & Eco 2009; 27(2A):949-951.
- Sinha A, Das PC, Biswas PS, Mandal RK, Patra PK. Development of artificial feed for rearing the gold fish, *Carassius auratus* In : Ponniah, A.G. ; K.K. Lab. and U.S. Basheer (eds.) Captive Breeding for Aquaculture and Germplasm conservation, NBFGR – NATP, Pub No 3 Luknow, 2001.

15. Sarmah SK. Studies on some Freshwater Ornamental Fishes of North Eastern India. *Ph.D. Thesis* Gauhati Unievrsty, Assam, 2001, viii+180.
16. Sarmah SK, Dey SC. *In vitro* sexual dimorphism of Four Ornamental Daniids of North Eastern India. In: Welfare Biology in the New Millennium (Edited Book) Published by Allied Publishers Pvt. Ltd. Bangalore. 2000, 83.
17. Sarmah SK, Dey SC. Captive breeding of endemic ornamental fishes of Northeast – A case study of silver danio, *Danio devario* (Hamilton) In: Ornamental Fish Culture and Trade In North Eastern India (Edited Workshop proceeding) Published by UFRI (ICAR) Barrackpore, Kolkata, 2004, 68-78.
18. Swain SK, BK Das. Captive mass breeding of dwarf gourami *Colisa lalia* in the cement cisterns, NBFGR – NATP *Pub No 3*, 2001, 10.
19. Tekriwal KL, Rao AA. Ornamental aquaculture fish of India, TFH publ Inc London, 1990.