

## Breeding behaviour and parental care of the induced bred spotted murrel *Channa punctatus* under captivity

The spotted murrel *Channa punctatus*, an obligatory air-breathing fish, is distributed all over India (According to an IUCN report it is at low risk, near-threatened category). It naturally breeds during south-west and north-east monsoons in flooded rivers and ponds<sup>1</sup>. According to Parameshwaran and Murugesan<sup>2</sup>, induced bred murrels never exhibited parental care. We report our observations on breeding behaviour and parental care of the spotted murrel *Channa punctatus* induced with different ovulating agents.

The present study was conducted in cement tanks (3 × 1 × 1 m) between July and December 1999. Mature healthy males and females (length 12–18 cm and weight 35–80 g) were selected by external morphological characteristics. A day before the experiment, the required fishes were selected and transferred to (3 × 1 × 1 m) cement tanks of 1500 l capacity filled with 30 cm level of de-chlorinated water. Each breeding set consisted of two males and one female<sup>3</sup>. Different types of natural (pituitary gland and human chorionic gonadotropin) and synthetic hormones (ovaprim and ovatide) were used to induce spawning. For each hormone, three doses were used and for each dose, three breeding trials were made to assess the reproductive response of the fish. Injections were administered intramuscularly in the dorso-lateral region of the body. Immediately after administering the hormones, the breeding sets were released into the spawning tanks (3 × 1 × 1 m), provided with *Hydrilla verticillata* for hiding purposes. Spawning behaviour was observed 4 h after hormone injection until spawning. After spawning, eggs were allowed to hatch and grow along with the parents in the breeding tanks.

In the present study, the hormone-administered fishes showed breeding behaviour after 4 h of injection irrespective of the type of ovulating agents used. Each female paired with a single male. At all times the more active and aggressive male paired with the female and the other male was found passive and idle in the corner of the breeding tank. Mating was preceded by elaborate courtship. The active male chased the female (Figure 1) and frequently excited movement of the

paired breeders commenced from 10 to 12 h after the hormone injection. In all the spawning attempts, the male was more actively involved in the courtship and spawning. It was seen hitting the female snout and vent region more frequently (Figure 2). The spawning activity continued till the release of gametes. At the culminating courtship, the male bent its body close to the female, breeders joined together (Figure 3) and the male released its milt and the female its eggs, after external fertilization occurred. The eggs were laid in a clear area harboured by weeds. In the present study, breeding behaviour of *C. punctatus* commenced 4 h after administration of the hormone and continued till spawning. Parameshwaran and Murugesan<sup>2</sup> reported that mating behaviour in *C. punctatus* was preceded by the excited movements of the paired breeders, which commenced about 9–14 h after the second injection of pituitary extract. Similar reports are available on the spawning behaviour of *Anabas testudineus*<sup>4</sup>, *Clarias batrachus*<sup>5</sup> and *Heteropneustes*

*fossils*<sup>6</sup>. In the present investigation, no nest building was observed in *C. punctatus* spawners. The giant murrel *C. marulius* has been reported to construct a cup-like nest in water not more than 1.2 m depth<sup>7</sup>. Table 1 reports the differences between natural breeding and induced breeding behaviour. Whereas natural spawners showed frequent jumping above the water surface on the day prior to spawning, no such movement was noticed in the case of induced spawners. Moreover, no nest-building habit was observed in the latter. In contrast to previous reports of Parameshwaran and Murugesan<sup>2</sup>, parental care was noticed prior to induced mating.

The scattered eggs in the breeding tank were pooled in the vicinity of weeds by the moving activity of the male parent. The male parent was found with eggs and hatchlings while the female parent was seen in the vicinity of the egg mass in the breeding tank (Figure 4). The fertilized eggs usually float and adhere to each other forming an egg mass 5–10 cm in diameter while the unfertilized eggs lost their adherent ability and were scat-



Figure 1. Active male chasing the female.



Figure 2. Male hitting the vent region.



Figure 3. Courtship behaviour.



Figure 4. Egg mass guarded by female parent.

## SCIENTIFIC CORRESPONDENCE

**Table 1.** Spawning and parental behaviour of *C. punctatus* during natural and induced breeding

Natural breeding	Induced breeding
Spawners jump frequently above the water surface up to a height of 30–90 cm before spawning <sup>4</sup>	Spawners never jump
Spawners were sluggish but building nests was observed <sup>4</sup>	Spawners were sluggish but no nest building was observed <sup>8</sup>
Aggressive behaviour was exhibited by female after spawning <sup>4</sup>	Aggressive behaviour was observed in the male <sup>9</sup>
Chasing by male was normal <sup>10</sup>	Chasing by male was more aggressive
Selection of male by female was at random <sup>10</sup>	Aggressive male forces the female to copulate by driving away the passive male <sup>8</sup>
Both parents guarded the juveniles <sup>4</sup>	Female guarded the eggs whereas male guarded the juveniles <sup>8</sup>

tered throughout the tank. While guarding the egg mass, the male parent remained quiet, curving around eggs or intermittently swimming in a slow circle fanning the eggs with its pectoral fins. Intense parental care was observed in the breeders induced by different hormones. Both parents guarded the eggs, but aggressive behaviour was observed in the male parent. Previous reports of *C. punctatus* indicate both parents have been reported to look after the eggs and fry<sup>1</sup> in natural conditions. In the present investigation, parental care was observed up to one month and eggs guarded by the male parent remained clean, developing embryos until hatching and after reaching post-larval stage. If the eggs were remo-

ved and incubated without parental care, they would have suffered fungal infection followed by poor hatching.

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