

Synthetic hormones for induced breeding of fishes



INTRODUCTION

- Synthetic spawning hormones - increasingly used due to their efficacy and convenience
- Banerjee et al. (1989) succeeded in the purification of pituitary gonadotropic hormone from *Channa punctatus* and *Catla catla*.
- Of all the mammalian hormones tested on fish, chorionic gonadotropin (CG) - successful -because CG behaves as a luteinising hormones (LH)
- Synahorin (a mixture of CG and mammalian pituitary extract) in combination with pituitary gave positive results in rohu

- Bhowmick et al. (1979) found mammalian hormones antuitrin-s, leutocyclin and RH-LH ineffective when injected singly or in combination with carp pituitary extract
- The CIFRI, Barrackpore - detailed studies on the use of LH-RH alone or in combination with progesterone and obtained breeding success which ranged between 25-49% in carps and 100% in catfish

Synthetic spawning agents :

- LH-RH (natural or synthetic) alone - not very effective in inducing spawning in fish
- A combination of LH-RH-a (GnRH-a) and a dopamine antagonist for induced ovulation and spawning in cultured fish is a highly effective procedure called the Linpe method
- Reports of successful spawning of catla, rohu and mrigal with LH-RH analogue at 10-20 µg/kg b.w. and obtained 100% ovulation with pimozide at 10mg/kg b.w.
- Parameswaran et al. (1988) achieved successful spawning in mrigal with LH-RH-a, buserelin acetate in combination with progesterone
- Investigations of Jose et al. (1989) with LH-RH-a indicated successful breeding of mrigal and *Labeo fimbriatus*.

The Linpe method and ovaprim:

- Commercialized by Syndel Laboratories, Inc., Vancouver, British Columbia, Canada, under the tradename ovaprim
- The ovaprim spawning kit - use with salmonids, cyprinids and other freshwater cultured fish- wide success
- In India- ovaprim for induced spawning of Indian major carps, fringe lipped carp, silver carp, bighead carp and grass carp (Nandeeshha et al. (1990, 1991)) economically, the use of ovaprim is advantageous
- The spawning success, quantity of eggs obtained, the fertilization rate and hatching percentage remained consistently higher with ovaprim as compared to carp pituitary extract (CPE) or human chorionic gonadotropin (HCG)

- 40% more fry can be obtained by using ovaprim in place of commercial CPE
- Ovulation and spawning has been successfully induced in India by the Linpe method in the Asian catfish, *Clarias batrachus* (Manickam and Joy, 1989) and Indian catfish, *Heteropneustes fossilis* (Manickam, 1992)
- Similarly, indigenous preparations, viz. Ovatide (M/s. Hemmopharma Ltd., Mumbai) and WOVA-FH (M/s. WOCKHARDT Ltd., Mumbai) are also being used commonly for the commercial spawning of carps and other fishes in India
- A combination of busereline (LHRH-a) and domperidone has been successfully used for the spawning of IMC (Basavaraja et al., 2007).

Dosage of ready-to-inject spawning agents (ovaprim, ovatide, WOVA-FH, etc.)

- ***Females :***

- Catla : 0.4-0.5 ml/kg b.w.
- Rohu : 0.3-0.4 ml/kg b.w.
- Mrigal : 0.25-0.3 ml/kg b.w.
- Fringe-lipped carp : 0.3-0.4 ml/kg b.w.
- Catfishes : 0.6-0.8 ml/kg b.w.

- ***Males (all species of carps) :*** 0.1-0.3 ml/kg b.w.

- ***Males (catfishes) :*** 0.15-0.4 ml/kg b.w.

- Silver carp : 0.4-0.7 ml/kg b.w.
- Grass carp : 0.4-0.8 ml/kg b.w.
- Bighead carp : 0.4-0.5 ml/kg b.w.
- Mahseers : 0.6-0.7 ml/kg b.w.

Steroids :

- The effects of steroid hormones on ovulation are seen primarily as germinal vesicle breakdown (GVBD)
- GVBD is normally controlled by one or more steroids produced in the ovaries under gonadotropin stimulation, but the timing of ovulation related to that of GVBD varies
- *In vitro* ovulation normally follows steroid induced GVBD in catfish (*H. fossilis*) (Goswami and Sundararaj, 1971a,b)
- The action of pituitary gonadotropins on final oocyte maturation is known to be mediated through steroid hormones

- Deoxy corticosterone acetate (DOCA) and cortisone effectively stimulated *in vitro* ovulation in *H. fossilis* (Ramaswami, 1962; Goswami and Sundararaj, 1971a,b)
- The thyroid stimulating hormone is also reported to bring about ovulation in Indian catfish (Ramaswami and Lakshmanan, 1958)
- There are circumstantial evidences which suggest that pheromones secreted by IMC help in effecting spawning (Ranganathan et al., 1967)
- Similarly, sympathetic spawning of carps in bundhs appears to be due to the release of pheromones (Moitra and Sarkar, 1975).

