

ABSTRACT

Present studies were conducted in order to study the pattern of oocyte development and seasonal and annual variations in the serum level of reproductive hormones in female *Labeo rohita* (A Pakistani Major Carp). The results obtained helped in defining the sexual cycle in female *Labeo rohita*. The experiments were conducted at Government College University, Lahore, from November 2006 to October 2007. For this purpose a group of 500 fishes of 18 months were stocked as polyculture along with other fishes including Thaila, Mori, Silver and Grass Carps in a commercial fish farm at Muridke near Lahore for growth and Reproduction. Routine operations were done in a typical commercial situation. Sampling was done in the mid of every month. Fishes were taken and placed in a rectangular tanks for one day before actual operation were done at next morning. Gross ovarian stages were defined through physical examination. Ovaries were preserved in 10% buffered formaline solutions and blood drawn for estimation of serum steroid hormone.

Results showed that *Labeo rohita* is a heterosexual fish. Ovaries are probably group synchronous. Ovaries are paired structure, joined by short oviduct. Ovaries develop in hot months (April to June). Ovaries are fully developed in June when GSI was calculated highest (22.73 ± 0.94). Environmental factors especially temperature, photoperiod and rainfall act as the cues for spawning.

Eight developmental stages of oogenesis, Primary Growth Phase Chromatin Nucleolar Stage, Perinucleolar Stage, Yolk Vesicle / Cortical Alveoli Stage, Early Vitellogenic Stage, Late Vitellogenic Stage, Final Oocyte Maturation, Ovulation / Spawning Stage and Postovulatory Stage, were observed in female *Labeo rohita*. No postovulatory follicle was seen. In August, September and October atretic follicles were more in number.

The level of 17β - Estradiol, 17α - OH Progesterone, Testosterone, 11-ketotestosterone and Cortisol were measured in serum from the age of 18-29 months using ELISA method. The value of 17β -Estradiol was minimum in September (0.042 ± 0.003 ng/ml) and maximum in June (0.186 ± 0.012 ng/ml). 17α -OH Progesterone was minimum in June (0.73 ± 0.08 ng/ml) and maximum in November (5.50 ± 0.74 ng/ml). The value of Testosterone was measured minimum in January (0.103 ± 0.03 ng/ml) and maximum in May (0.914 ± 0.32 ng/ml). 11-ketotestosterone displayed minimum values in August (0.020 ± 0 ng/ml) and maximum in June (1.060 ± 0.027 ng/ml). Cortisol showed minimum values in June (326.07 ± 12.81 ng/ml) and maximum in November (932.75 ± 41.01 ng/ml) respectively.

Environmental parameters including temperature, photoperiod, rainfall and steroid hormones appear to affect the growth of oocyte. Growth of oocyte was supposed to be triggered by increasing temperature, photoperiod and increasing values of 17β Estradiol, Testosterone and 11-ketotestosterone. On the other hand growth of oocyte was minimum, when the concentrations of 17α OH- Progesterone and Cortisol was high.

This is actually the first king of study in female *Labeo rohita* in Pakistan and the results have been discussed in the light of available literature and very little systematic information found on reproductive biology particularly the stages of oocyte development and changes in steroid hormone profile in this fish and the relationship found between these. The results are compared with the published data on this species form Indian region.