SUMMARY AND CONCLUSION
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The entire work on “The Role of Endocrine Mechanism in Reproduction of Ophiocephallus (Channa gachua)” has been devoted to study the scope of the endocrine mechanism of pituitary gland and gonads, involved in the reproduction process. Histology of pituitary gland and gonad has been studied during course of the said study. It brings out a programmatic approach and understanding in the vulnerable field of aquaculture.

The snake headed fish, Channa gachua, carnivorous, air breather, one of the valuable food fish in the inland regions of Marathwada (Maharashtra) in India and hence has a good culture potential. The snakehead fish culture is not practiced in a well defined way all over India as Indian Major Carps.

In the present study, the effect of ovaprim hormone studied histologically, recorted the histological changes due to hormone in the reproductive cycle. During the present study in Channa gachua has been chosen as test fish much economically important having less production of eggs as compare to major carps.

A common problem has been taken into consideration in Channa gachua is the endocrine intervention to induce maturation, ovulation, spawning and accurately assessing the stages of maturity of the fish. Ideally spawning induction should take place when the germinal vesicle has commenced or preferably complete it’s migration from the centre of the gametes to a peripheral
position in the gonads. At this time the gamete develops maturational competence incorporating the development of receptors permitting the induction of final spawning and the necessary physiological pathways supporting to reproduction.

During reproductive cycle, the remarkable change takes place in the proximal pars distalis of the pituitary gland. The cyanophils present in PPD are dominant cell type. The pituitary gland is responsible for syntheses of GnRH. Basophils are considered as gonadotrophs or GtH cells. MTS is empirical dye used particularly to demonstrate different cells of pituitary gland. Eosin and haematoxyline are successfully employed for the histological study of gonads.

Gonads mature through different stages. Ovary gets matured through different stages of oocyte in cytoplasmic growth and having the yolk nucleus is a different evident with nuclear extrusions. Three layers of wall have been found increased and appearance of yolk deposition, vitellogenesis at the end of the maturity. Presence of atresia is distinct but organised in final un-spawn oocytes.

The testicular maturity in fish, *Channa gachua*, the lobule with thick septa contain spermatogonia, Sertoli cells and leydig cells components are observed very thick cytoplasmic organization and elongated. Finally abundant spermatids and spermatozoa are observed.

The basophil cells have been observed in *Channa gachua* during the maturation of gonads and different phases of reproductive cycle. In general pattern of basophil, new are formed during the preparatory phase and found in
hypertrophied. The maximum gonadotrophic potency found during the spawning phase. The basophils found maximum degranulation during the post-spawning phase. Spawning is brought about by the degranulation of a small number of basophils secreting LH and the majority of the basophils elaborate FSH necessary for the growth of the ova.

Ovaprim contain an analogue of Salmon GnRH and a brain neurotransmitter (dopamine) inhibitor. The GnRH in Ovaprim releases the stored gonadotropin from pituitary. Ovaprim utilizes the fish’s own hormonal control mechanism to safely induce maturation and spawning. In normal spawning cycle, Ovaprim can synchronize maturation in treated fish by significantly advance maturation. Ovaprim being used for induced spawning to Channa gachua, it is not only cheaper but also extremely decapendable failure rarely occurs. Being a decapeptide, GnRH is comparatively more stable than GtH or pituitary extract can be stored for a long time in an ordinary refrigerator, From the above description of the hormonal events which produces various stimulates GtH released causing ovulation and spermiation, it is clear that GnRH stimulated GtH acts on the gonads for their development, growth, maturation and spawning, ovaprim used for induced spawning.

Seasonal reproductive cycle in fish is precisely regulated by different hormones, which lead them to breed at a specific time of the year. Environmental signals are presumably received by the brain, which release a decapeptide hormone, gonadotropin releasing hormonal cascades; it stimulates
pituitary (PPD) to release gonadotropic hormone (GTH), the primary mediator of cell growth and maturation. GTH induces the synthesis and release of estradiol-17β from ovarian follicular cells or 11-ketotestosterone from testicular Leydig cell at the initial stage. At a later stage i.e. during the maturation of germ cell, GTH induces 17α, 20β-dihydroxy-4-pregnene-3-one or maturation inducing hormone (MIH) from ovarian follicular cells and testicular somatic and germ cells. The hormonal cascade of events is so perfectly coordinated that male and female fish release their germ cells exactly at the same time to the external aquatic environmental to ensure fertilization.

It is conferred that the proximal pars distalis is the site of GtH cells responsible to reproduction in fish, Channa gachua.

The observations reported here clearly show that the increased demand for fish seed in future, with the progressive utilization of swamp for air breathing fish culture, could be met by induced breeding. The observations indicate that the demand for fish seed, with the progressive utilization of swamps for culture of air breathing fishes, could be met by ovaprim.

This is an important in the farming of snakehead fish because their wild seed collection is very much limited due to monsoon failure.

There is no doubt that investigation, development and refinement is required to improve production of fish, the existing procedures and protocols provide an immediate potential to mass production of fish for recovery programme.
It is concluded that ovaprim interfere with gonadal multiplication, growth and development. The effects of said drug become more pronounced with dose and different reproductive phases. The present study also confirms that ovaprim is helpful in gonadal proliferation growth and development of early oocytes as well as spermatozoa.

Ovaprim can expedite the maturation process in a predictable and repeatable fashion. Ovaprim supplies an exogenous source of salmon GnRH analogue which is more potent than either native salmon GnRH or LHRH. When it used during the spawning season, the salmon GnRH analogue in Ovaprim immediately promotes the release of stored gonadotropin from the pituitary. This action of using the fishes own endocrine system works without adversely affecting viability or fecundity.

An attempt has been made to find out the biochemical constituents viz protein, glycogen and lipid in the gonads of *Channa gachua* having different ecological niches and feeding habits and their seasonal changes during gonadal development. Student ‘t’ test was considered as a mean of various data to find out the level of significance. After the ovaprim treatment, the biochemical constituents have been found increased.

**THE WAY FORWARD**

Realizing the importance of fish in human nutrition, in addition to its role in reducing poverty and hunger, the World Fish Centre will be strengthening its aquaculture and fisheries programmes by mainstreaming
nutrition. This will ensure a greater impact by improving the nutritional status of households, particularly those with young children. Research will be undertaken to gain a better understanding of the role of Channa gachua in decreasing malnutrition and improving the health of the sick. This will also ensure that World Fish Centre Programmes contribute to Millennium Development Goal 4 (reducing child mortality two thirds, by 2015) since high malnutrition levels are associated with increased child mortality rates.

In the view, the present study taken into consideration, it can be said that, to sustain and flourish the population of valuable fish species through culture is needed at present. Keeping in view these all above mentioned aspects, emphasis on the study of Channa gachua has been given on the equal significance with the major carps. Hence, further study on the reproductive behaviour and practical use of Ovaprim for the induced breeding in this fish is still to be studied detail in future with equal importance given to Indian major carps.