SUMMARY AND CONCLUSION
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1. *Glossogobius giuris* is a prolific breeder in the catchment areas of larger lakes, tanks around Bangalore.

2. *G. giuris* spawns intensively during September when compared to October and December.

3. The present study deals with the histophysiology of prolactin secreting cells in correlation with the testicular cycle of *G. giuris* with reference to: a) Annual testicular cycle, b) Exposure of fishes to different percentages of salinity, c) Exposure of fishes to different percentages of thiourea, d) Exposure of fishes to different percentages of methallilibure and e) Biochemical studies on testicular cholesterol content.

4. The testes are paired and equally elongated structures situated posterior-dorsally in the body cavity.

5. A prominent testicular gland i.e. interstitial gland, extends along the length of each testis and consists of cuboidal cells without intercellular spaces.

6. The testis exhibits seven different stages of germ cells during reproductive cycle, viz., a) Resting germ cells, b) Primary spermatogonia, c) Secondary spermatogonia, d) Primary spermatocyte, e) Secondary spermatocyte, f) Spermatids and g) Spermatozoa.
7. The annual reproductive cycle of the male gobiid fish, *G. giuris* is divided into resting phase (late April-early May), slow spermatogenic phase (May-June), rapid spermatogenic phase (July-August), spawning phase (September-December), post-spawning phase (January-February) and depletion phase (March - early April).

8. In the resting phase, the testicular size was considerably reduced when compared to other reproductive phases. On the other hand, the interstitial gland had increased in size. During slow spermatogenic phase the testis slightly enlarged in size. During rapid spermatogenic phase, the interstitial gland showed further increase in size. The testis was large during spawning phase and reached maximum size, with masses of mature spermatozoa. The interstitial gland further increased in size. The size of the testis was reduced during post spawning phase. The interstitial gland also slowly starts reducing in size and undergoes rapid changes like degranulation and vacuolisation. During depletion phase, the testis further reduced in size correspondingly interstitial gland also decreases in its volume.

9. The hypophysis is broadly composed of nervous part, the neurohypophysis and glandular part, the adenohypophysis. The adenohypophysis is divided into rostral pars
distalis (RPD), proximal pars distalis (PPD) and pars intermedia (PI). A slight mixing up of various cell types of adjoining regions is prevalent during sexual maturity and spawning periods.

10. The hypophysis exhibits different types of secretory cells. Since in the present investigation were carried out to understand the histophysiology of prolactin secreting cells and gonadotropins, the adenohypophysis was chosen.

11. In *G. giuris* the hypophysis-testicular complex plays a major role in reproductive cycle of the fish. There are three important parameters such as physical, chemical and biochemical, with a view to understand a specific role of testicular function, gonadotropins and prolactin secretions of hypophysis. Hence in the present investigation, the fishes were exposed to different percentages of salinity, thiourea and methallibure to study the role of PRL cells, GTH cells in relation to testis during non breeding and breeding phases.

12. From the available literature, it appears that the salinity is an important factor with regard to maturity and spawning. The PRL cells exhibited characteristic signs of involution with reduction in nuclear size, staining intensity and extensive degranulation. This
phenomenon was observed in *G. giuris*, when the fish was transferred from the fresh water to diluted sea water (10, 20 and 30%).

13. Like PRL cells, the GTH cells are also essential for the normal gonadal development in fishes. Particularly when *G. giuris* was exposed to saline condition, the GTH cells showed hypertrophy and vacuolisation. Most of them became degranulated and showed slight increase in their number and size with the increase in the percentage of salinity in the PPD. This indicates that GTH cells in saline media were more activated and released the hormone for the process of spermatogenesis.

14. In *G. giuris* it was observed that the rate of spermatogenesis considerably increased with the increase in the percentage of salinity. The spermatogenic activity reached the peak when fishes were exposed to higher percentage of salinity (30%), which was evidenced by the significant rise in the GSI.

15. When *G. giuris* were subjected to different percentages of thiourea for 14 days, the PRL cells in the RPD region reveals that there was a significant nuclear hypertrophy and degranulation when compared with controls which is indicative of activation of PRL cells and stimulation of prolactin synthetic activity.
16. Exposure of *G. giuris* to various percentages of thiourea markedly inhibited the development of GTH cells. After treatment with higher percentages of thiourea (0.03 and 0.05%) the GTH cells showed hypotrophy and depletion of secretory material resulting in degranulation and vacuolisation.

17. Likewise when the fish *G. giuris* was exposed to various percentages of thiourea (0.01, 0.03 and 0.05%) for a period of 14 days, there was reduction in the size of testis and also interstitial gland. The lobules showed clumping of spermatocytes and spermatids. The interstitial gland cells were degenerated and also showed signs of degranulation and vacuolisation. These observations indicate that there was gonadal regression.

18. In the methalliburated fish *G. giuris*, the PRL cells in the RPD showed cytological alterations. The PRL cells exhibited nuclear hypertrophy, degranulation and vacuolisation when the fishes were treated in higher percentages of methallibure (0.03 and 0.05%). This suggests that there was an increased secretory activity of PRL cells.

19. Investigations were made on the GTH cells after treating the fish with methallibure. The study revealed that
there was nuclear hypotrophy in the higher percentages of methallibure (0.03 and 0.05%). The degranulated cells were predominant with vacuolisation. This phenomenon suggests that the drug blocks the synthesis of gonadotropins which in turn retards the development of testis.

20. When *G. giuris* was exposed to methallibure for 14 days, the testis revealed reduction in its size and the lobules contained degenerated spermatogonial cells and spermatocytes. Further in 0.05% methallibure treatment, the lobules showed clumping of sperms and appeared empty which was evidenced by the highly significant reduction in GSI and gonadal diameter. The interstitial gland also showed reduction in its size and it contained large number of degranulated cells and vacuoles. These findings may be correlated with the inhibition of gonadotrophs which consequently brings about regression of the gonadal activity in the treated fish.

21. Biochemical studies on testicular cholesterol contents were studied after exposure of fishes to salinity, thiourea and methallibure during non breeding and breeding phase.

22. An increase in the testicular cholesterol content was observed during non breeding phase. On the other hand
after exposure of fishes to increasing salinity (10, 20 and 30%), the cholesterol level decreases. During breeding phase, the testicular cholesterol content declined. On the other hand, when fishes were exposed to the above percentages of salinity, there was further decline in the cholesterol contents. This finding clearly indicates that the cholesterol has already been utilised for the further spermatogenic process.

23. When fishes were exposed to various percentages of thiourea (0.01, 0.03 and 0.05%) during non-breeding phase, the testicular cholesterol level rapidly increased with an increase in percentages of thiourea. Similar results were obtained during breeding phase. This phenomenon indicates that the metabolite remained unutilised in the processes of steroidogenesis.

24. During non-breeding phase, the methallibure treated fish testis showed an increase in the cholesterol content along with increased percentages of methallibure (0.01, 0.03 and 0.05%), whereas during breeding phase in the methalliburated fish testis, the cholesterol content was increased in 0.05% when compared to 0.01 and 0.03%. The increase in the cholesterol content of the testis coupled with regressed germinal and interstitial tissues thus indicate the simultaneous failure of both, spermatogenesis and steroidogenesis.