SUMMARY

1. The annual spermatogenetic cycle of the Indian tropical Marbled balloon frog *Uperodon systoma* has been studied. The findings show that the activity of germinal epithelium can be divided into the following stages:

i) The spermatogenetic period can be divided into two stages, which are distinct from each other.
   a) The initial low active stage during November and December.
   b) The stage of high activity during March, April and May.

ii) The resting period from July until October.

Thus from the findings of the present investigation it can be inferred that this frog species is a unique one which is having a 'continuo-discontinuous' type of spermatogenetic cycle.

2. Sub-cutaneous injections of testosterone into normal frogs resulted in the suppression of secondary spermatogonia and consequent inhibition of later spermatogenetic stages.

3. In the present experiments, 15 days after withdrawal of testosterone, there was a gradual recovery of spermatogenetic stages. After 30 days of withdrawal, all spermatogenetic stages were revived to normal condition. This may be compared with the "rebound recovery" of mammals.
4. Administration of exogenous stilbestrol suppresses spermatogenesis in frog but the inhibitory effect is more pronounced and suppression of all stages noticed when split dose treatment is allowed.

5. Administration of corticosteroids such as DOCA and cortisol inhibits all spermatogenetic stages. In the present species, it is possible that these corticosteroids show mainly gonad inhibiting action because they are potent inhibitors of pituitary gonadotrophic hormones.

6. Subcutaneous injection of 17β-estradiol results in pyknosis of all spermatogenetic cysts.

7. In the present investigation, it has been noted that progesterone inhibits the primary spermatogonial and secondary spermatogonial stages considerably and retards the mitotic divisions of secondary spermatogonia as well as meiotic divisions of secondary spermatocytes.

8. In *Uperodon systoma*, LH administration resulted in the acceleration of all spermatogenetic stages.

9. But injection of FSH to normal frogs results in the decrease of spermatogenetic activity.

10. Pituitary extracts from animals of summer and winter months were administered to summer and winter frogs and *vice versa*. Spermatogenesis was accelerated by pituitary extract administered any time of the year although the effect was more pronounced in frogs treated with summer pituitary extracts during summer time than winter. This experiment proves that the gonadotropin secretion of the hypophysis depends upon the external
environmental condition. The latter in turn sensitizes the germinal epithelium alone in conjunction with the internal physiological rhythm.

11. The extirpation of pituitary pars-distalis of *Uperodon systoma* has resulted in the inhibition of spermatogenetic stages.

12. Testosterone injection in hypophysectomised frogs results in inhibition of primary spermatogonia.

13. Injection of LH to testosterone treated hypophysectomised frogs also results in inhibition of all spermatogenetic stages.

14. Injection of FSH to testosterone treated hypophysectomised frogs resulted in inhibition of spermatogenetic stages to a greater degree.

15. Injection of LH and FSH in a combined dose to testosterone treated hypophysectomised frogs does not overcome the androgen induce suppression of spermatogenesis.

16. A short term melatonin treatment produced a marked inhibition of spermatogenesis. If the treatment of melatonin is continued for a prolonged period, the testicular inhibition is withdrawn and the testes recrudesce to normal.

17. A short term injection of melatonin either in the morning or evening was equally effective in producing anti-gonadal effects. But when melatonin was given both in the morning and evening the antagonadal effect was not seen. This action of melatonin is refered to as a counter-anti-gonadotropic action.

18. Administration of FSH or LH simultaneously melatonin, prevents the antagonadal effects of this indoleamine. It is suggested that these gonad suppressing effects of melatonin was
only temporary. It may be due to that the testis becomes refractory when it is continuously administered for a prolonged period.

19. Melatonin failed to inhibit spermatogenesis in pinealectomised frogs suggesting that the suppressive effects of melatonin on FSH secretion and spermatogenesis is somehow mediated through the pineal gland.

20. Cytomorphology of pituitary has revealed that all the steroids administration apparently interferes with the elaboration and secretion of gonadotropins from the pars distalis.

Thus, concluding the present observation on Uperodon systoma tends to believe that both environmental and hormonal factors are operative in the sequential determination and characteristics. Amongst environmental factors, temperature and photoperiod seem significant. As regards hormones, exogenous administration of FSH and LH gonadotropins and pituitary extract both appear to be stimulatory to spermatogenesis, whereas, all the sex steroids inhibit it. Further, these steroids apparently bring about alterations in the pituitary secretory activity and this also exercises an indirect mediatory role on spermatogenesis.