

Seasonal Variations (Sexual Cycle) in the
Testis of *Rana tigrina*.

BOTH lower and higher vertebrates offer a fruitful field for research regarding (1) seasonal variations in their organs of reproduction, and (2) an interesting line of investigation with a view to finding out whether the periodic activity of their gonads could, in any way, be correlated with the hormonal activities of their ductless glands. Oslund¹ has published a useful summary of the work done so far as the year 1925. Since then Bissonnette² has published a series of papers on the sexual cycle in the starling and Blount³ has investigated the seasonal cycle of the interstitial cells in the testis of the horned toad. The difficulty of obtaining specimens of the animal under investigation throughout all the months of the year in other parts of the world may partly explain the paucity of papers on this subject. In this country Asana⁴ has been working on the sexual cycle of some Indian lizards.

Frogs have been captured from one and the same locality in the vicinity of Gujarat College, Ahmedabad, at an interval of 8 to 10 days throughout the year. Observations were made and the gonads fixed from five to ten animals every time they were dissected. Adults of almost uniform size were selected.

From the latter half of October and throughout November, December, January and February externally the testes maintain their minimum size, their average volume being round about 4 c.mm. The average length and diameter of the testis during those months were .4 cm. and .115 cm.

¹ Oslund, R. M., "Seasonal modifications in testis of vertebrates. 1928," *Quart. Rev. of Biol.*, **111**, 254-270.

² Bissonnette, T. H., "Studies in the sexual cycle in birds. I. Sexual maturity, its modification and possible control in the European starling, 1930," *Am. Jour. Anat.*, **45**, 289-306.

Bissonnette and Chapnic, M. H., "Studies on the sexual cycle in birds. II. The normal progressive changes in the testes from November to May in the European starling, 1930," *Ibid.*, **45**, 307-343.

Bissonnette, T. H., "Studies on the sexual cycle in birds. III. The normal regressive changes in the testis of the European starling from May to November, 1930," *Ibid.*, **46**, 477-497.

³ Blount, R. F., "Seasonal cycles of the interstitial cells in the testis of the horned toad, 1929," *Jour. Morph. and Physiol.*, **48**, 317-343.

⁴ Asana, J. J., "Studies on the sexual cycle of some Indian lizards," *Proc. Nineteenth Indian Sci. Congress*, 1932.

respectively. Their microscopic examination reveals no spermatozoa internally, and in the testes the tubules are almost uniform in shape but small in size. Interstitial cells are very small and few in number. Thus the male gonads seem to be dormant as far as sexual activity is concerned during this part of the year.

From about the first week of March testes begin to increase in length and diameter, the changes being very gradual and the rate of increase very slow for about 20 days. Thereafter the male gonads increase in size at a very rapid rate throughout April and the first three weeks of May attaining their maximum growth during the last week of July, the average maximum volume being 147 c.mm. which is about 37 times greater than the average minimum volume. These external macroscopic changes seem to be correlated with the internal activity of the gonads leading to the production of mature spermatozoa. The tubules grow in size but lose their uniform shape. The interstitial cells correspondingly grow enormously both in size and number.

The regressive changes, the decline in the activity of the gonads, seem to be rather abruptly heralded; and before the end of August testes have decreased in size to a remarkable extent, the average volume being 15 c.mm. Through the whole of September and the first half of October there is a slow gradual decline leading to the attainment of the minimum size with which the cycle started.

Detailed observations including the study of the chromosomes will be published shortly.

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