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THE SEASONAL GONADAL ACTIVITY OF THE ENGLISH SPARROW (Passer Domesticus)

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In order to study the gonadal activity of the sparrow, the gonads were collected, fixed, sectioned. mounted, and stained. Any change such as increase or decrease of germ cells, intertubular tissue, number and size of the tubules is easily noted.

The testes of the sparrow are kidney shaped, pale cream colored, and lie just ventral to the kidneys, the left being generally larger than and a

little posterior to the right. They are composed of convoluted tubules, in which develop the germ cells, held together by connective tissue and surrounded by a thick outer coat.

The primordial germ cells line the interior of the tubules. There are many nuclei next to the tubule wall which appear to be nuclei without cytoplasm and cell walls. A few cells of which the cell walls are definite are interspersed between these nuclei and extend out into the protoplasm in the center of the tubule. There is no lumen on the tubules at this stage of development, but the center is filled with cytoplasm in which appear lines, thought to be cell walls belonging to nuclei around the basement membrane.

The tubules are very small in November and December. No cells but primordial germ cells are present. A few have definite cell walls, but a great number of nuclei are present which line the tubule walls and appear to be without cytoplasm. The intertubular tissue is abundant and the tubule walls are made up of several layers of connective tissue cells. Large cells are present in the intertubular tissue in December which are interpreted as interstitial cells.

When the germ cells begin to multiply, they move from the basement membrane toward the center of the tubule and the cell walls become definitely outlined. Even by the last of December many cells occupy more of the center of the tubule than formerly. From then on, the number increases, and the testes enlarge. Other internal changes are the decrease in amount of the intertubular tissue, which may be attributed to the growth in the size of the tubules, and the disappearance of the interstitial cells, and maturation of germ cells.

By March 10th, sexual activity has reached its climax of greatest development. The testes are as much as 300 times the volume of those in the resting condition. The tubules are many times as large in cross section, and there is no intertubular tissue at all. The tubules are lined with primordial germ cells and inside those are the primary spermatocytes which are larger than and stain more darkly than the spermatogonia. Inside the primary spermatocytes are secondary ones and spermatids. The spermatids are not in a layer as were the others, but are around the head and between the bundles of sperm.

Apparently the body temperature of the bird plays an important part in the time of day that cell division takes place in the gonads. It has been found that the body temperature of birds, varies as much as 5 degrees F. in the twenty-four hours of a day. Activity seems to be the most important factor in temperature change. Cell divisions were found in the testes of birds taken at night or directly after daylight in the mornings. No divisions were present in those taken during the day.

In spermatogenesis, the spermatogonia grow and divide, and after the last spermatogonial division, the chromatin forms the fine sporeme of the spermatocyte; shortens to the coarse spireme and finally tetrads. The tetrads divide and the secondary spermatocytes divide immediately to form spermatids which transform into sperm with acrosomes many times longer than the oval shaped nuclei to which is also attached the very long tail.

Changes of the weather conditions are apparently without effect on the gonads as shown by graphs on which the testis growth was plotted with the factors of the weather. However there is a parallel between the testis growth and the increase in average spring temperature. The latter is not held to be a correlation, because of Rowan's work on the junco, and Bissonnette's work on the European Starlings.