TOPIC

A Study On spermatogenesis of tremiorchis vanarum verma, 1930 A Species Of (Family Plagiorchiidae : Digenia)

PAPER 1

BY : DR. APARNA SINGH

This investigation the author has no thought od furnishing a complete solution of the problem of the gametogenesis of digenetic trematodes. Rather it is the author belief, than an extensive and intensive study of gametogenesis, that might be contribution towards the further addition of the useful cytological data to rewa region.

Further work on gametogenesis of Indian species have been done by Tripathi (1972), Saxena (1972), Ghos (1974), Sharma L.P. (1974), Pandey (1975), Mishra (1978), Pande (1979), Sharma S.D. (1981), Awasthi (1982), Gupta (1982), Tiwari (1985), Singh (1986), Mathur (1991) And Dubey (1993).

Introduction

Helninthology in only one of the branch of parasitology. As common nation stands, it means “worm” in its widest sens. The study of the trematodes is as old as man himself since the classification and comparison of diversity of living forms have been intimately connected. With the survival of man. India being a tropical country has a rich fauna. Helmith parasites.

The present investigation of the author is concerned with the studies of cytology of spermatogenesis; of certain species. Of digenetic tremades of plagiorchiidae family. Many new species are being added every day from different corners of the world and it is seen that there is an overlap of different species showing only marginal Differences between them. There are difficulties to understand the limits of intraspacific

variation. During the present century the cytology of spermatogenesis. Oogenesis and fertilization in the digenetic trematodes have enterivdy studied.

MATERIALS AND METHODS

The Indian species of digenetic trematodes of family plagiorchiidae which were collcted during present investigation for spermatogenesis and chromosome numbers from different locatities of rewa region are shown in the table.

Trematode Parasite	Host	Location	Locatity Sindh Rever Bhind
Trimiorchis Vanarum Verma, 1930	Rana Tigrina	Intestine	Dal Sagar Paod And Bihar River Rewa

The parasite were removed from the organ of the host very gently and carefully in normal saline solution. For cyptological studies. The smears were prepared from living material. Testes were taken out with fine needles under stereobinocular mionscope on the clean slide they were punctured with the help of fine needles and semifluid contents were allowed to flow over the slide. The slide is then inverted in a semidried condition over the fixative without loosing much time. Fixative like aqueous bouin's fluid, carnoy's first fluid and zenker's fluid. Stain like iron haemotoxylin and feulgen gave bettes results.

DISCUSSION

Spermatogenesis

The testicular wall consisted of a him sheath of fibrous connective tissue in which some nuclei were occasionally observed. Below this located one to two cell deep germinal epithelium. At some places there patches of crowed primordial germ cells. There was no definite orientation of various stages of spermatogenesis in this species. However, the spermatogonia were generally found

near the peripheral region of testis. The spermatocytes, the spermatids and the mature sperms were seen in any region.

Primordial germ cells

The primordial germ cells developed from the cellular layer below the testis wall. They underwent many nuclear division. Gradually these cells became detached from the common mass and came to lie near the testis-well. The cellular outlines of these cells were indstinct and they measured 2-microns in diameter. The diving stage of germinal cells were infrequently seen during this process.

Spermatogonia

After repeated division the primordial germ cells gave rise to the primary spermatogonia which occurred near the testis wall as well as infrequently seen in smear also. The secondary and tertiary spermatogonia were also seen near them. These cells were oval or spherical in their shape and measure 6-8 microns in diameter. Morphologically there was no clear differentiation between the primordial germ cells and primary spermatogonial cells after the spermatogonial division did not separated from each other division. The secondary spermatogonia remained connected having two cells. The full grown secondary spermatogonium measuresed about 6-12 microns in diameter and oval or spherical in shape.

The secondary spermatogonia on division formed a cluster of four cells, the tertiary spermatogonis, which remained connected with each other at a point. This division was a mitotic one. The individual cells of the tertiary spermatogonia were a like the cells of secondary spermatogonia except their unclei were slightly bigger in size. The full grown spermatogonium measured 16 microns in length and 12 microns in breadth (their individuals cell measured 8 microns in length and 12 microns in breadth). The nucleus measured 6-8 microns in diameters. The stage Of secondary and tertiary spermatogonia were rarely seen during this division.

Spermatocytes

The tertiary spermatogonia on division gave rise to a cluster of eight cells. This stage was very much common and the individuals cells were the largest in whole process of spermatogenesis. This indicate that period of interphase in the primary spermatocyctes was of the longest duration as compared to that in the other cell types, and they grew in

size before maturation division. The cell of primary spermatocytes, remained attached together by their board ends. There was no disc like differented central region of the cytoplasm.

Each cluster of primary spermatocytes immediately after its formation measures 24-34 microns in diameter. The individuals cell measured 12-18 microns in lengthand 12-16 microns in breadth. Their nuclei also measured 4-8 microns in diameter. The cells of the primary spermatocytes cluster entered the first maturation division simultaneously sixteen nuclei were formed in comman cytoplasm. The cytoplasm boundries of the nuclei were not clearly formed however, the nuclei were arranged in a periphery of the cytoplasm. The cluster of the secondary spermatocytes measured 34-42 microns in diameter. The individual cell measured 16-20 microns in lenth and 8-10 microns in breadth. Their nucleus measured 8-10 microns in diameter. There were only few stages of secondary spermatocytes cluster in interphased. This indicates that ther interphase in sixteen celled stage was of a very short duration.

Soon after the formation of second maturation division took place forming the thirty-two spermatid cluster the nuclei of spermatids arranged themselves in the peripheral regions where the cytoplasmic mass. This mass measured 34-44 microns in diameter.

spermiogenesis

The spermatids were weakly stained and showed no nucleoli in them. The nuclei became ovoid and they came to lie close to the cell wall towards the outer free boundries of the spermatids. A centrosome granule was seen between the peripheral of cytoplasm and nucleus. It gave origin of a single filament and incorporated the formation of a flagellum of a sperm. With extension of the tail the nucles also elongated. It showed basophilic tendancy and stained deeply. Ultimately it became thread like the sperm came out in bundles of thirty-two leaving behind the residual mass of cytoplasm.

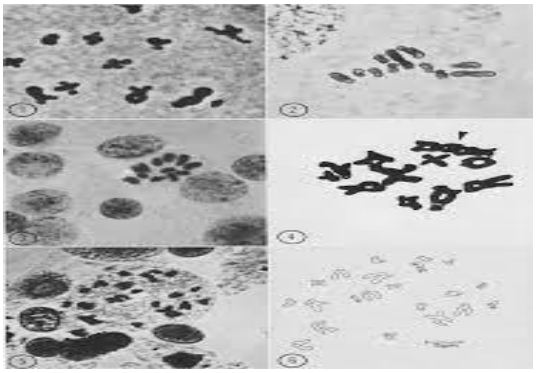
Fully mature sperm measured 26-30 microns in length. The residual mass of cytoplasm was seen in the smear preparation.

RESULT –

The haploid number of chromosomes is 8 and the diploid number is 16 in this species. The first pair of chromosome 3.6-5.5 microns in length. The rest of the

chromosomes are small, rod shaped measuring 1.5-2.8 microns in length. 14 chiasmata formations with 8 terminals. The chiasma frequency is 1.7 per bivalent. the present investigation deals with “studies on the cytology of family plagiorehidae (tremiorchis vanarum) with special refrences to their spermatogenesis” here to discuss the various views regarding the gonadial complex of male. Genital system cytology of spermatogeneis, spermatogenesis AND chromosome number. This shap and size.

FIG. NO 1 STAGES OF SPERMATOGENESIS



ACKNOWLEDGEMENTS

Authors are thankful to prof. n.p. tripathi retired principal. Govt science college rewa (m.p.) for providing guidance and also thankful to govt. science college rewa from providing necessary facilities.

REFRENCES

Pandey, L.P. (1977). Studies on the morphology and taxonomy of certain Indian digenetic trematodes with specials refrences to the intraspecific variation. Ph. D. thesis, A.P.S. university, rewa (m.p.)

pidiha, S.N. (1977). Studies on HElminth parasites (digenetic trematodes) ph. D. thesis, A.P.S. university, rewa.

Reddy, p. venkat and subramanyam, S. (1973). Chromosome studied in the liver fluke, fasciola gigantic Cobboold, 1856, from andra Pradesh. Curr. Sci. April, 20, 42, No. 8: 288-291.

Rees, G. (1939). Studies on the germ cell cycle of the digenetic trematode parorchich acanthus Nicoll part I . autonomy opf the genitakia and gametogenecis in the adult. Parasite. 31: 417-433.

Saksena, J.N. (1963). Studies on the morphology, cytology and early embryology of certain digenetic trematodes. Ph. D. thesis (1963), Jabalpur university india. Pages 1: 217.

Saksena j.n. (1969). Chromosome studies of Indian digenetic trematodes. Proc. Nat. acad. Sci. india 39(B). I&II, :81-110.

Sharma, S.D. (1981). Studies on the cytology of certain digenetic tremtode with special refrence to their spermatogenesis. Ph. D. thesis, A.P.S. university, rewa (M.P.).

short, R.B. (1957). Chromosomes and sex in schistosomatium douthitti trematoda : schistosomatidae. J. hedity, 48: 2-6.

Singh, C.B. (1972). Studies on the gametogenesis, fertilization and chromosome number in certain species of aspidogastrea. Ph. D. thesis (1972), A.P.S. university, rewa (M.P.) india.

Shrivastava, M.L.D. and jha A.c. (1964). Structure and behavior of the chromosomes of fasciola gigantic cobbold, 1856 (Trematoda Digenea : Fasciolidae) Proc. Nat Acid. Sci. India Ann. Number, pp. 125.

Tiwari, R.B. (1985). Studies on the cytology of certain digenetic treamtodes with special refrences to their gametogenesis. Ph. D. thesis, A.P.S. university, rewa (M.P.)

tripathi, N.P. (1974). Studies on the chromosome number of canocephalus ferox (Rud, 1975) Dietz, 19009. Proc. M.P. vig. Acad Bhopal, abst. 5: (Z-10), 1974.

Tripathi, N.P. (1974). Studies on the cytology of certain digentic trematodes with special refrence to their chromosome numbers. Ph. D. thesis, A.P.S. university Rewa (M.P.) india.