Thesis Title STRUCTURE AND DEVELOPMENT OF REPRODUCTIVE SYSTEM IN *ACHATINA FULICA*

Name Udomsri Ngowsiri

Degree Master of Science (Anatomy)

Thesis Supervisory Committee

Prapee Sretarugsa,Ph.D. Major Advisor

Prasert Sobhon,Ph.D. Committee

Jittipan Chavadej,Ph.D. Committee

Maleeya Kruatrachue,Ph.D. Committee

Date of Graduation March 1 , 1989

ABSTRACT

The morphology of ovotestis, prostate gland, uterus and albumen gland of *Achatina fulica* were studied by light microscopy (LM). They were fixed in Bouin's fluid and processed for (LM). It was found that ovotestis consisted of spermatogenic cells, oocytes, Sertoli cells and follicle cells. Prostate gland contains two distinct types of cells characterized by their affinity to staining. The first type is the gland cell with eosinophilic granules while the second type consists of clear granules. Uterus is characterized by a long tube.

lts wall is divided into three layers; the inner layer is ciliated epithelium; the middle layer is adipose tissue and the outer is of muscular layer. Albumen gland composes of a large number of follicles which open into the main duct.

The ultrastructure of ovotestis and ovotestis duct were investigated by scanning and transmission electron microscopy (SEM,TEM). They were fixed with 2.5% glutaraldehyde in 0.1 M sodium cacodylate buffer pH 7.4 and processed for SEM and TEM. Ovotestis consists of the round and different sizes of spermatogenic cells. The clump of spermatozoa with long tail and cytoplasmic knobs are observed. Spermatogonia and spermatocytes are located towards the base of the acini in close association with Sertoli cells. Spermatocytes are large cells that have nuclei which show numerous clumps of highly condensed heterochromatin along the nuclear evelope. Spermatids could be classified into four stages based on the shape, the chromatin appearance, the organization and distribution of cell organells. Stagel spermatid is characterized by the small and uniformly-dense nucleus, the cell size is larger than spermatocyte. StageII spermatid has a small nucleus with similar chromatin appearance as in stagel.

Mitochondria are concentrated towards one side of the cell. StageIII spermatid contains the cap-shaped nucleus whose chromatin is still evenly distributed. Nucleus, mitochondria and Golgi complex are clearly localized in different zones of the cytoplasm. In later stage the cap-shape nucleus is elongated further and embraced around the centriolar area. The cell is also elongated and axoneme core is formed. The cluster of mitochondria begin to re-orient longitudinally and wrap around the axoneme core. StageIV spermatid is characterized by the cone-shaped nucleus that contains dense chromatin rods closely packed together with narrow intervening spaces. Spermatozoon is characterized by the elongated head and tail and mitochondrial sheath. the nucleus shows completely condensed chromatin. No cytoplasm is found in all part of both mid-piece and the tail. The structure of mature spermatozoon in ovotestis duct can be divided into head, mid-piece and tail regions. The head is cone-shaped. The mid-piece is composed of two spiral columns; namely in the flagellum and the mitochondrial keels. The tail is divided into three parts based on its diameter and the internal ultrastructures.

The development of ovotestis in from hatching to 1 year old stages was studies by light microscopy. It was found that ovotestis was firstly appeared in three-months old. It is composed of many acini seperated by surrounding connective tissue. Each acinus contains various stages of developing germ cells; namely, spermatogonia, primary spermatocytes, spermatids and spermatozoa. In some acini, the group of sperm heads adhered to Sertoli cells are observed. These morphological characteristics were also observed in three months snails and in the later stages of maturity. It is therefore suggested that spermatogenesis in *Achatina fulica* begins at three-months old, and that spermatogenesis in each acinus is produced in cycle. On the other hand, the large oocytes are firstly observed at five months old. They are often located at the periphery of acini and progessively increased in number as snails reach seven to eight months old. After this age, the number of oocytes are decreased. It is also interesting to note that the male phase of snail develops early in life while the female phase of the same organism arised later.

The effect of seasonal change on the number of oocytes per acinus was studies by LM. Ovotestis obtained

from greenhouse and field were fixed in Bouin fluid and processed for LM. It was found that the number of oocytes per acinus collected from both the field and greenhouse are highest in May and September and lowest in March. However, the number of oocytes per acinus obtained from the greenhouse is higher than the snail collected from the field. In contrast, spermatozoa are produced concurently all the year.