A THESIS

entitled

HISTOPHYSIOLOGICAL STUDIES OF THE REPRODUCTIVE SYSTEM OF ACHATINA FULICA

presented by

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SYNOPSIS

The reproductive physiology of the Giant African Snail, Achatina fulica has been studied using histochemical and chromatographic techniques. These procedures have helped to clarify the organisation and role of the different parts, especially the glandular elements, of the reproductive tract.

This snail is a hermaphrodite with a gonad producing both sperms and ova. However there is cross copulation and mutual insemination.

The male tract consists of a seminal vesicle, prostate gland, sperm channel, transition region, vas deferens and penis. The seminal vesicle stores autosperms and lipid could be detected in it's walls. It also absorbs excess spermatozoa. The prostate gland produces a complex secretion of carbohydrate and protein and could possibly function in the formation of the seminal fluid as well as in egg formation. The significance of the transition region and of the material in the rounded cells of the vas deferens is not clear. The preputial region of the penis is glandular

with three distinct gland cells, each with it's characteristic secretion. These secretions could assist in copulation and in the formation of the semen. Associated with the female tract are the albumen gland, uterus, oviduct, vagina, seminal receptacle and spermatheca. Ova are probably fertilised in the region of the seminal-receptacle and then provided with a thick coat of 'albumen' secreted by the albumen gland. This secretion is a complex protein-polysaccharide with galactogen being the main polysaccharide component. The egg then enters the uterus where the formation of the egg shell is completed. Glands in the uterine wall produce an acid mucosubstance as well as some calcium. The egg shell is calcified and the source of the calcium is the uterus as well as the ovum itself. The acid mucosubstances produced by the uterine gland cells enter into the formation of the egg shell.

The eggs are stored in the uterus until oviposition. The oviduct does not appear to contribute any material towards the formation of the egg, rather it functions in conducting allosperms towards the seminal receptacle and in passing the eggs to the exterior. The vagina is very muscular and functions in holding the intromittant organ firmly during copulation as well as in oviposition by regular dilation of it's muscular wall. The role of the

spermatheca is not clear.

The egg consists of the fertilised ovum invested by a thick coat of 'albumen' or perivitelline fluid, which in turn is enclosed by the egg shell. The embryo develops at the expense of the perivitelline fluid.