PREFACE:

The phylum Mollusca includes many familiar examples like snails, slugs, clams, oysters, chitons, squids, octopus and nautil. These molluscs occupy all available ecological niches ranging from abyssal depths of ocean to highly arid terrestrial regions or habitats. The tropics and subtropics are the most favourable regions for distribution of molluscs. Of these molluscs some snails and slugs are terrestrial forms included in the class Gastropoda.

The class Gastropoda comprises of three subclasses- Prosobranchia, Opisthobranchia and Pulmonata. The members of pulmonates are mainly freshwater basommatophoran snails and terrestrial stylommatophoran snails and slugs. The terrestrials pulmonates inhabit open woodlands, parks, gardens, cemeteries, hedgerows, borders of marshes, ditches and canals, vineyards wood similar habitats where humid niches may be found. They usually do not occur in evergreen woods. They are nocturnal hiding by day in a contracted quiescent state under rocks, fallen logs, plants mats, or burried in soil and emerging at twilight to feed.

From economical importance point of view, snails and slugs are important to human being in several ways. Some of these forms are the serious pests of agriculture, particularly paddy, horticulture and social forestry. Most of the snails are the intermediate hosts of trematode parasites,
hence are called as vector snails of various pathogenic parasites causing
diseases to human, Schistosomiasis and other diseases such as fascioliasis,
bilharziasis, paragoniasis and metagoniasis to domestic animals and birds.
Because of this noted fact, studies on these snails and slugs undertaken by
various authors in different parts of the world to elucidate various diverse
aspects viz habitat, biology, physiology and their control by both, biological
and chemical control means.

Pulmonates are gastropods adapted for terrestrial and amphibious
habitats. They are derived from prosobranch ancestors and have one atrium
and one nephridium. The gill has been lost, however, and the mantle cavity
is a heavily vascularized lung adapted for respiration in air. There is
typically a coiled shell but some slugs have reduced and internalized the
shell, and are not coiled and are secondarily symmetrical. Pulmonates are
hermaphroditic and do not have an operculum. They are found in terrestrial
habitats as well as near shore, intertidal marine and freshwater environment.

The order Stylommatophora is a largest pulmonate taxon, which
includes the slugs and most terrestrial snails (Aquatic pulmonates belongs to
Basommatophora). Two pairs of tentacles are present and the eyes are at the
tip of the posterior pair. Terrestrial snails are coiled, asymmetrical, and have
a shell, but slugs are uncoiled, symmetrical, and have lost or reduced shell.
The functional anatomy and histology of reproductive system of gastropods have been studied by number of workers. A considerable diversity exists in the internal anatomy of reproductive tract of gastropods. Considerable literature is available on the various aspects of freshwater pulmonate reproduction. However very little attention has been paid on anatomy, histology and other aspects of stylommatophoran pulmonates.

The present investigation has been carried out on the land snail *Macrochlamys petrosa* (Hutton), is a representative of the order Stylommatophora of the family Ariophantidae. This snail is found distributed in the vicinity of Aurangabad. It seems to be the voracious feeder, because after emergence from the aestivating conditions found attacking on various varieties of plants growing at its habitat. Lot of research has been done on gastropod neuroendocrinology and reproduction particularly on the freshwater species and very less attention has been paid on garden snails and slugs. Recently a few attempts have been made to study some aspects of *Macrochlamys* species.

Practically nothing is known about the breeding biology and reproductive cycle of the snail *Macrochlamys petrosa*. The present thesis includes following chapters.
The first chapter deals with reproductive physiology of the snail *M. Petrosa*. Under this chapter various aspects like breeding behaviour and reproductive pattern, morphology and histology of reproductive system. Being a hermaphrodite snail, its different male and female components includes, hermaphrodite gland (ovotestis), hermaphrodite ducts and seminal vesicles as common parts. The male reproductive component includes prostate gland, vasdeferens, penial complex and male genital opening. The female reproductive parts include, albumen gland, spermoviduct, vagina and associated spermatheca. This chapter also deals with gametogenesis, changes in male and female phase gametogenic cycles. In addition, effect of optic tentacle removal on gametogenesis of the snail is included in this chapter.

The second chapter includes biochemical studies of different body components of the snail viz, hepatopancreatic gonadal complex, albumen gland, mantle and foot. Three different organic metabolites such as total proteins, glycogen and total lipids were estimated during different breeding activity periods of the snail *Macrochlamys* (pre-reproductive; reproductively active, post-reproductively quiescent period.)

The third chapter deals with the neuroendocrine system of the snail *M. petrosa*. This includes the morphology of neuroendocrine system and histology of different central ganglia and associated endocrine glands.
Different types of neurosecretory cells are described in various ganglia viz. paired cerebral, pedal, pleural, parietal and single visceral ganglion. Neurosecretory activity of cerebral ganglion cells and dorsal body cells (endocrine organ) and their possible role in regulation of reproductive cycle is worked out. In addition, optic tentacular neurosecretion and its probable role in regulation of reproduction is included in this chapter.

The distribution pattern substratum preference, food preference and feeding behavior studied in laboratory and natural habitat of the snail. Different chemical agents and common molluscides have been used to test the mortality and survival rate of snails under laboratory conditions as chemical control of the snail, *Macrochlamys*, is included in fourth and last chapter.

At the end of the thesis general summary and conclusion will be followed by bibliography.