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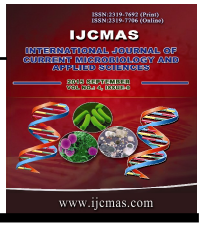

Original Research Article

Studies on Some Molluscs in the Kolhapur District (Maharashtra, India) with Reference to their General Behaviour

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A B S T R A C T

The present investigation was aimed to study the behavior with respect to movement, mucus secretion, response to touch, change in pigmentation and escape has been carried out in *Stylommatophoran molluscans Semperula maculata* and *Laevicaulis alte* in their natural habitat and in the laboratory conditions. The observations showed *S. maculata* were very slow in movement as compared to *L.alte.* Both secreted heavy and thick linings of mucus in the natural habitat but in the laboratory conditions after 2nd week it was limited. They always tried to escape from the troughs. Both the slugs were very sensitive to touch. The observations highlighted general behavior in the two terrestrial slugs and can be disused with available literature. There is no work on the behavior of these slugs therefore the present work was undertaken to know the general behavior of *S. maculata* and *L. alte*.

Introduction

The behavior of an organism represents the final integrated results of a diversity of biochemical and physiological process. Thus a single behavioral parameter is more comprehensive than a physiological or biochemical parameter. The behavior of an animal represents the ultimate expression for all the underlying metabolic activities essential for survival and species perpetuation.

Like other animals, as long as they are not considered by man to be either useful or destructive, gastropods play a role in the balance of nature, in the production of humus, in the disposal of plant and animal waste products, in control of fungi, algae and lichens and also as predators and parasites, while in turn the molluscs are hunted and eaten by predators.

Slugs and snails are of importance to man because of the damage they do in agriculture and forestry. Furthermore they are of importance in medicine and veterinary practice, since they serve as intermediate hosts for certain parasitic worms of man and his domestic animals. Gastropods not only attract attention as pests, but like oysters, mussels and octopuses, they may be of commercial value (Cadart, 1955; Brandt, 1968). Gastropods used as a food in the Mediterranean region and in earlier times in Europe were popular fare during lent. Today

they are regarded as a delicacy mainly in France and Italy and to an increasing extent in the Federal Republic of Germany. The apple snail, *Pila globosa* is regularly eaten by the poor peoples in the Tanjavur and Tirunelveli districts of South India.

Molluscs are also used in scientific research, as in the study of drug action, using molluscan hearts, hormones, enzymes and antitoxins especially in relation to immunological haematology. Their shells have served as a model for the study of the process of calcification of bones. Molluscs are used for determining the degree of chemical pollution of coastal waters, lakes, rivers and land areas and also as biological indicators of radioactive pollution.

Taking into consideration economic importance of molluscs, it is necessary to study the behavior of Stylommatophoran land slugs *S. maculata* and *L. alte* found in the Kolhapur district of Maharashtra. There is no work on behavior of these slugs on above aspects. Therefore present investigation was undertaken to study the general behavior of slugs.

Material and Methods

The Stylommatophoran land slugs, *S. maculata* and *L. alte* were selected to study their general behavior in their natural habitat and in the laboratory conditions. Healthy slugs were brought to the laboratory and acclimated for a week and then after kept in two separate troughs containing sufficient moist soil and were fed with plant material once in a day. The general behavior of animals with respect to movement, mucus secretion, response to touch, change in pigmentation and their escaping behavior were observed for five weeks. The experiments were repeated for three times (From June to October, 2013) and confirmed results in 2014. These observations were made daily at 6.00 am, 12.00 noon and 6.00 pm. Though the slugs are nocturnal, their behaviors were noted in the night at 11.00 pm and 5.00 am.

In the natural habitat, both the slugs lived in the moist places so as to afford under boards, beneath the leaves, under the garbage, stones, shady places and in holes in the ground. They congregated in mass lying one upon other, in groups of 2 to 8. Some were isolated. Slugs avoided exposure to direct sunlight. They prefer to live in soft and ideally loose and loamy soil, which has sufficient ground coverage with plants and damp moss.

Results and Discussion

Table 1 indicates average distance travelled by slugs per hour for five weeks in the field.

S. maculata showed very slow movements. It traveled an average 21.7 cm. distance per hour whereas *L. alte* showed faster movements (24.8cm.per hour).Both secreted heavy and thick linings of mucus. After touch *S. maculata* started to crawl for an average 0.8 mins in clock-wise direction and then after remained silent. On the other hand *L. alte* crawled for 0.4 mins in the same manner as *S. maculata* and then after remained silent. *S. maculata* was generally blackish colored and *L. alte* was drab grayish colored. Matured slugs were highly pigmented. *S. maculata* excreted greenish brown colored faeces and the color of the excreta of *L. alte* was greenish but splashed with yellow.

In the laboratory conditions, both the slugs kept in two separate troughs and their behavior was noted for 5 weeks. Results are indicated in table 2 and represented by ++++ as maximum activity.

Movements in both the slugs were slower down and it was 1.4 cm/hr in *S. maculata* and 1.5 cm/hr in *L. alte*. Mucus was heavily secreted by both the slugs but mucus linings of *S. maculata* are thicker than *L. alte*. Skin color remained same throughout the experimental period in both slugs but after 3rd week pigmentation become faint. The color of the excreta become comparatively lighter after 2nd week in both the slugs *S. maculata*, in particular, crawled continuously and remained in crawled state for maximum period than *L. alte*. When touched both the slugs started to crawl again and tried to escape. Few of these slugs were buried by exposing their anterior end and remaining few were buried deep into the soil. Some had stretched their bodies and has entangled into netlon cloth below the margins of troughs where there was dark.

The Stylommatophoran land slugs *S. maculata* and *L. alte* showed remarkable general behavior in their natural habitat and in the laboratory conditions. There is little information is available on behavior in slugs. It included the work of Wolda *et al.* (1971) and Raut and Ghose (1984). For aging behavior of terrestrial gastropods were studied by number of workers in recent years. Bailey (1989) studied the foraging range of adults of slug, *Deroceros reticulatum*. Rollo (1991) recorded hourly observations of activity of terrestrial slug, *Deroceros reticulatum*. Coto and Saunders (1987) worked out the biology and behavior of slugs, *Arion sp.*, *Limax sp*. in the laboratory conditions.

Our observations highlighted the general behavior of two slugs.

Table.1 Average distance in cm travelled by slugs per hour for five weeks in the field

Slug	Weeks					Average
	I	II	III	IV	V	
S.maculata	23.0	23.0	21.5	21.0	20.0	21.7
L.lectularis	25.0	26.0	25.5	25.5	22.0	24.8

Table.2 Behavior of two slugs in laboratory condition for five weeks

Slug		Weeks				
		I	II	III	IV	V
S.maculata	Movement	++++	+++	++	+	+
	Mucus secretion	++++	+++	+++	+++	+++
	Skin color	++++	++++	+++	+++	+++
	Color of excreta	++++	++++	+++	++	++
	Touch	++++	+++	++	++	++
L.lectularis	Movement	++++	+++	++	+	+
	Mucus secretion	++++	+++	+++	+++	+++
	Skin color	++++	++++	+++	+++	+++
	Color of excreta	++++	+++	+++	++	++
	Touch	++++	+++	++	++	++

++++ maximum

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