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Research Article

STUDY OF FOOD PREFERENCES IN FRESHWATER GASTROPOD *LYMNAEA ACUMINATA* (LAMARCK-1882)

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ABSTRACT

Snail *Lymnaea acuminata* was collected from Botanical garden University premises. Total 30 snails was selected for experimental study, and divided into four groups A, B, C & D. In each groups 10 snails was kept and provided for four different types of food items i.e Spinach leaves, Bougainvillea leaves, Mulberry leaves & Hibiscus leaves etc. Observation done for 3 days. In group A fed by Spinach leaves total food consumption was (3.5gm), in group B fed by Bougainvillea leaves total food consumption was (2.61gm), in group C fed by Mulberry leaves total food consumption was (0.61gm) & group D fed by Hibiscus leaves was (0.00gm). That means group A is highly preferred to Spinach leaves as compared to Bougainvillea leaves, Mulberry leaves and Hibiscus leaves. Because the Spinach leaves are soft and smooth texture and they are easily ingested.

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INTRODUCTION

Gastropods are unsegmented unsymmetrical mollusca provided with univalve spirally coiled shells. Among the freshwater pulmonates the snails belonging family Lymneidae are most widely used in various types of research works. Gastropods of the genus *Lymnaea* are crucial member of freshwater ecosystem and inhabit. The freshwater bodies from sea level to the height up to 10,000 feet: from icy water to hot springs in shallow waters to depth of 250 meters (Hyman, 1967). *Lymnaea acuminata* is abundantly found in river, pond, lake, ditches, & streams in the vicinity of historic Aurangabad city (MS) India (Quazi, 1974). They are herbivorous feeding on algae and other aquatic vegetation. The feeding system of gastropod mollusc has provided many insides into the neural basis of behavior, including the sensory control behavior, the mechanism of patterns generation and neuromodulation. Food in the environment sensed by the tentacle (Bicker *et al.*, 1982). Food initiates appetitive behaviors which generally include orientation and locomotion toward the food. Movement towards the food may be similar to these in response to those attractive stimuli; such as potential mates (Leonard & Lukowiak, 1984; 1986; Ziv *et al.*, 1989). The gastropods the ultimate's of appetitive and consummatory phases of feeding by chemical stimuli in the environment are reviewed by (Croll,

1983; Benjamin, 1983). Despite preferring herbaceous vegetation on *Achatina fulica* found saprophytic habitat i.e. this land snail feeding on horse and bull feces (Albuquerque *et al.*, 2008).

In *Lymnaea* feeding sequence of in which the three phases of movement (protraction, rasp and swallow). The muscles of the buccal mass principally the anterior and posterior jugalis (aj, pj) and radular tensor (rt) – contract, squeezing and rotating the odontophore (OD). This is covered by the many-toothed radula (R), which is rasped across the substratum. Food particles are then collected and passed into the oesophagus (OE) mouth. After (Benjamin and Elliott (1989).

In *Lymnaea* and other pulmonates, such as *Helisoma*, *Planorbis* and *Helix*, the consummatory phase of feeding consists of a series of repetitions of three sequential movements: (i) protraction, in which the radula extends to contact the food; (ii) retraction, in which the radula rasps the food and brings it into the mouth; and (iii) swallowing or hyper-retraction, in which the food is conveyed to the gut (Kater, 1974; Peters and Altrup, 1984; Rose and Benjamin, 1979, 1981a & 1981b). In addition, the radula can rotated over the underlying support tissue, allowing flexibility in the amplitude of a rasp (Smith, 1988). In *Lymnaea*, the feeding pattern can be modified to produce egestion. Furthermore, a motor sequence very similar

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to that in feeding is used in egg-laying, to clean off the substratum on which animals will lay eggs.

MATERIALS AND METHODS

Sample Collection

Snails were collected from botanical garden university campus by using handpicking method with wearing hand gloves after collection snails were brought to the departmental laboratory, snails were clean and removing the algae from their body and acclimatized into 24 hrs in 5 liter water capacity in the plastic trough with aerators.



A



B



C

Fig 1 (A) Sampling collection site, (B) Snails maintaining in trough, (C) Snails feeding time

Experimental study

10 healthy snails were taken for the experimental study the species *Lymnaea acuminata* total body weight ranging from (0.40gm to 0.61gm) species were kept in separate plastic trough into 5 liter water capacity. 4 types' food items were

provided i.e. *Spinach leaves*, *Bougainvillea leaves*, *Hibiscus leaves* and *Mulberry leaves*. 10 gm of each food items was given separately to snails and allowed to feed for 3 days. The quantum of food was measured before and after the experiment and calculates the rate to consumption and also measured species weight before and after feeding.

Statistical Analysis

Calculation done by statistical method i.e. Mean and standard deviation and total percentage by using MS-Excel-2007.

RESULTS AND DISCUSSION

The snails *Lymnaea acuminata* was very active in the early morning and late evening which external up to mid night. The snail *Lymnaea* herbivorous were truthfully eating to food mostly in group. Food will be detected by the opening of mouth movement of jaws and lowering of either for separating and engulfing of the food materials. The result indicates daily consumption of four food items. The experiment was carried out on freshwater snail *Lymnaea acuminata* which were feeded by four different types of food items i.e. *Spinach leaves*, *Bougainvillea leaves*, *Mulberry leaves*, and *Hibiscus leaves*. Four different groups was done A, B, C, & D. In each group 10 snails were kept, the experiment was carried out for 3 days and during experiment observation was done. Group A was feeded by *spinach leaves* and total consumption of spinach leaves food for 3 days was 3.5gm. In group B feeded by *Bougainvillea leaves* and total consumption of food was 2.61gm & group C feeded by *Mulberry leaves* and total consumption was 0.61gm. Simultaneously observed in group D was feeded by *Hibiscuses leaves* and they consume 0.00gm. (Table. No.1)

Group A is highly preferred to spinach leaves as compared to the *Bougainvillea leaves*, *Mulberry leaves* & *hibiscus leaves*, because spinach leaves are soft and smooth texture and easily ingestible.

The data presented in table 1 indicates that group A showed weight average of food consumption (1.66±0.152), group B showed total average food consumption (0.87±0.060), & group C showed total average of food consumption was (0.2±0.1).

Table 1: Indicate the daily average of food consumption of four different food materials (i.e. *Spinach leaves*, *Bougainvillea leaves*, *Mulberry leaves* & *Hibiscus leaves*) Mean and Standard Deviation.

Species Name	Food items & species	3 days food consumption/10gm Food of 10/ individual			Total food weight	Mean ± SD
<i>Lymnaea acuminata</i>	<i>Spinach leaves</i>	1.30	1.00	1.20	3.5	1.16±0.52
	<i>Bougainvillea leaves</i>	0.90	0.91	0.80	2.61	0.87±0.060
	<i>Mulberry leaves</i>	0.30	0.20	0.10	0.6	0.2±0.1
	<i>Hibiscus leaves</i>	0.0	0.0	0.0	0.0	0.0

Spinach leaves > *Bougainvillea leaves* > *Mulberry leaves* > *Hibiscus leaves*

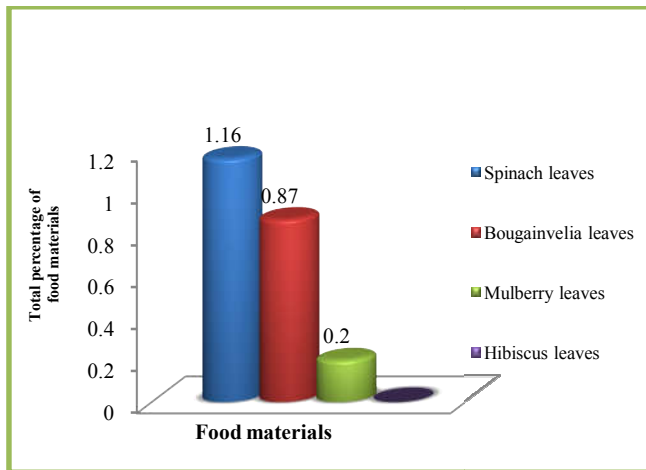


Fig 2 Showed three different types of food materials Mean and Standard Deviation

The rate with which the particular food is consumed also differs in different groups of snails and it, in some cases, also depends on morphology of feeding apparatus the radula. For example, the snail's studies of (Barnese & Lowe, 1990) showed that prosobranch *Emilia livesces* had significantly less effective razing effective as compared to pulmonates species: *Physella gyrina*, *P. parkerii*, *Lymnaea stagnalis*, *L. emarginata* & *Helisoma anceps*. The reason for this seems to be the comparatively weak and less developed radula of *E. livesces*. Our experimental study similarly that study. According to (Wagh & Patil, 2016) they showed land snail *Achatina fulica* high preferred to *spinach leaves* as compared to *Mulberry leaves*, *Hibiscus leaves*, *Jujube leaves* and *Cabbage leaves*. In (Al-Akraa *et al.*, 2010) showed average of daily consumption of two ornamental plants (*Peganums* & *Hibiscus*), *sanseveria*, *Date palm* and *Egyptian clover* for *M. obstracta*, *T. pisana* and *E. vermiculata* under laboratory condition and They also observed that Egyptian clover leaves most consumed by their snails followed by Peganums, Hibiscus, Date palm, Sanseveria leaves.

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