

Morphometric Studies of the Tropical Leatherleaf Slug *Laevicaulis alte* (Férussac, 1822) (Gastropoda: Styllostomatophora)

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ABSTRACT

The present study reports the morphometric studies on a tropical leatherleaf Slug or lined leatherback slug *Laevicaulis alte* (Férussac, 1822) (Gastropoda: Styllostomatophora) from Bangalore. The specimens (N=15) were collected from Hebbal forest department nursery, Bangalore north taluk and subjected to traditional morphometry to analyse the intra specific population variation. Significant positive correlation was obtained between the parameters such as length-circumference (0.81); length-live weight (0.92) and circumference-live weight (0.73). Fitted regression equation was obtained for the species considering two sets of morphometric variables viz., length and circumference; live weight and length, ($Y = 0.42x + 1.08$, $R^2 = 0.66$) and ($Y = 0.96x - 2.50$, $R^2 = 0.85$) respectively.

KEYWORDS : Morphometry, *Laevicaulis alte*, Bangalore

INTRODUCTION

The Tropical leatherleaf Slug or lined leatherback slug *Laevicaulis alte* is thought to be of African origin, but has been introduced to southern Asia, Australia and many Pacific Islands (CAPS, 2011).

Morphology

The colour of the species is dark-colored (grayish) with raised pustules/tubercles and a characteristically narrow foot. A pale brown line spans the length of its dorsum. The keel is tan colored. The tentacles are 2-3 mm long, and rarely extend beyond the tip of the mantle (Website: Terrestrial Molluscan Slug). Most of the species are dark grey; uniformly coloured with a pale brown longitudinal line down the dorsal side (Figures 1-3). They can grow up to 12 cm in length. *L. natalensis* (Krauss) is another species of the same family which is very similar to *L. alte* (Herbert and Kilburn, 2004).

Biology

L. alte lays eggs in batches up to 100; eggs are oval and translucent and it is 6-8 mm in length. After mating eggs are deposited in a whole or depression in the soil. Eggs attach to each other with the help of interconnecting thread forming a string that the parent shapes into a ball-like mass. To maintain high humidity levels the *L. alte* deposits the special fecal pellets on the top of the slugs that contain high concentrations of soil. Hatching occurs around 1-3 weeks with new born slugs measuring around 7-8 mm in length. The young one reached maturity in five months (CAPS, 2011). *L. alte* has shown two distinct feeding peaks, both in the early and late hours of the night (CAPS, 2011). *L. alte* is protandric hermaphrodite. A detailed anatomical investigation has already been reported by different authors (Bishop, 1977 and Thome, 1989).

Pest and vector status

L. alte is reported to be pestiferous in different parts of India (Kalidas *et al.*, 2006, Jayashankar *et al.*, 2013). *L. alte* is considered as a serious agricultural pest in India. Hosts include tobacco (Godan, 1983); coriander, spinach and lettuce. It also acts as an intermediate host to the larval stages of some nematode parasites of vertebrates (dog, cat, and rat lung worms). Raut and Panigrahi (1990) has listed an array of experimental hosts of *L. alte* viz., *Amaranthus gangeticus* (Joseph's-coat), *Basella rubra* (Indian-spinach), *Brassica nigra* (black mustard), *Coriandrum sativum* (coriander), *Lablab purpureus* (lablabbean), *Lactuca sativa* (lettuce), *Lagenaria vulgaris* (bottle gourd) and *Spinacia oleracea* (spinach) (CAPS, 2011)



Figure 1. Key morphological features of (dorsal view *L. alte*) (a=Dark-coloured tuberculated skin; b=the central keel; c= Eye bearing tentacles)



Figure 2. Dorsal and Ventral view of the Slug



Figure 3. Fully stretched slug

MATERIALS AND METHODS

Study area

The samples (N=15) were collected from Hebbal forest department nursery, Bangalore North taluk, Bangalore Urban district. The field work was carried out in the study site with the onset of south-west monsoon, as the showers stimulate the summer aestivating slugs to emerge in large numbers.

Morphometric measurements

The specimens were hand collected with hand gloves on; into zip lock polythene cover provisioned with holes for aeration. The specimens were safely transported to the laboratory at the Department of Zoology, Bangalore University. Recording of morphometric parameters (Total length and circumference at the widest region of the body) using thread and centimetre scale in mm and live weight (g) was recorded using electronic weigh balance.

Statistical analysis

Statistical analysis (correlation and regression) was performed using SPSS software 17.0 version for morphometric parameters. Regression of two morphometric variables viz., length and circumference; live weight and length were performed.

RESULTS AND DISCUSSION

Morphometric observations of *L.alte* coupled with co-occurrence of other malacofauna are reported in the present paper. This is followed by distribution studies undertaken by Jayashankar *et al.*, (2013) in Bengaluru region. The values of descriptive statistics are reported in Table. 1

Table 1: Descriptive Statistics of the sample (N=15)

| Morphometric Parameter | Minimum | Maximum | Mean ± SD |
|------------------------|---------|---------|-------------|
| Length (cm) | 4 | 6.4 | 5.37 ± 0.72 |
| Circumference (cm) | 2.6 | 3.8 | 3.33 ± 0.37 |
| LiveWeight (g) | 1.52 | 3.99 | 2.66 ± 0.76 |

A significant (at 1 % level) positive correlation was obtained between the parameters, length-circumference (0.81**); length-live weight (0.92**) and circumference-live weight (0.73**). Fitted regression equation was obtained for the species considering two sets of morphometric variables viz., length and circumference; live weight and length, ($Y = 0.42x + 1.08$, $R^2 = 0.66$) (Figure 4) and ($Y = 0.96x - 2.50$, $R^2 = 0.85$) (Figure 5) respectively.

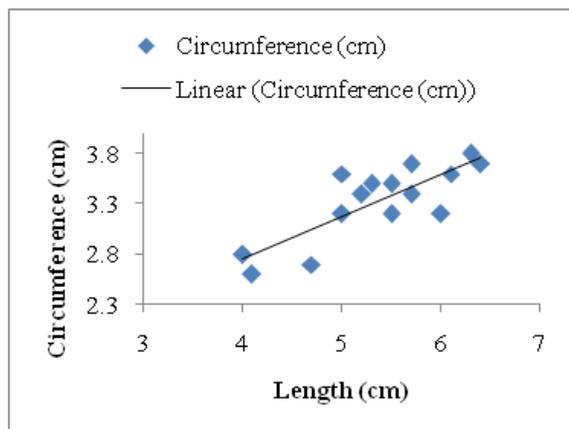


Figure 4: Regression analysis plots for (Length-Circumference)

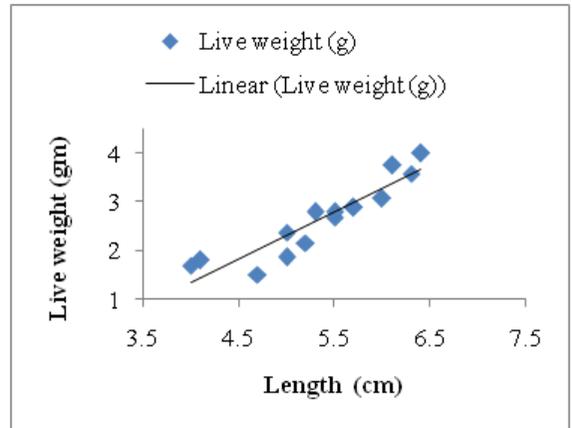


Figure 5: Regression analysis plots for (Live weight- Length)

In addition to the slug other co-occurring terrestrial malacofauna includes *Achatina fulica* (Bowdich), *Cryptozona bistralis* (Beck), *Macrochlams indica* (Benson), *Mariella dussumeri* (Gray) and *Glossula brevis* (Pfeiffer). The present observations are preliminary and first of its kind from the region intended to contribute to the understanding of eco-biology of pestiferous malacofauna. This considering the spread of invasive species and emergence of molluscs as emerging pests in agri-horticultural ecosystems.

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