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### DIVERSITY AND SPECIES COMPOSITION OF EARTHWORMS IN KALUTARA DISTRICT OF SRI LANKA.

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#### ABSTRACT

Earthworms occur in virtually all soils of the world in which moisture and organic content are sufficient to sustain them. The present study titled Diversity and Species Composition of Earthworms in Kalutara District of Sri Lanka has been undertaken to identify the different species of earthworms under edaphically different conditions and to determine species composition: dominant species. The findings of the study add knowledge to the field of study on earthworms which is considered a viable resource to mankind. With regard to species distribution of earthworms in selected study areas it was evident that four earthworm species namely, *Megascolex spectabilis*, *Pheretima houletti*, *Megascolex mauritti* and *Notoscolex species* could be identified in different soil conditions. However, the earthworm species *Pheretima houletti* was found to be thriving in a variety of soil conditions as a dominant species, when compared to other species. The findings of the study therefore provide valuable direction to us in order to use them as pioneer species which could be used in order to increase soil fertility in barren lands in Sri Lanka.

#### INTRODUCTION

In recent years, the disposal of organic waste from domestic, agricultural and industrial sources has caused increasing environmental and economic problems the world over. Since 1978 there has been an increasing interest in possible methods of processing many of these waste using earthworms (Edward and Boheln, 1996). Finding possible new methods of processing organic wastes using earthworms has become a recent interest.

#### METHODOLOGY

Standard grids (Edward and Lofty, 1977) were made and sites were randomly selected to study the earthworms and the physical parameters of the soils in which they lived. (Figure 01). Sampling, preservation identification, and analysis were carried out using standard methodology (Edward and Lofty, 1977). Main chemical and physical parameters of the soil and the data were obtained, analyzed using statistical analysis and interpreted in the form of tables and charts.



Figure.1 Grid Map of Kalutara District showing the Survey Sites within the Kallutara district. Scale 1: 480 000

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## RESULTS AND DISCUSSION

Four earthworm species namely *Megascolex spectabilis* (A), *Pheretima houlleti*, (B), *Megascolex mauritti* (C) and *Notoscolex sp.*,(D) were identified from the different sites which were used for different purposes. Earthworm species *Pheretima houlleti* was found to be thriving in all but one study site. Their distribution according to different conditions and characteristic features of each species is given here.

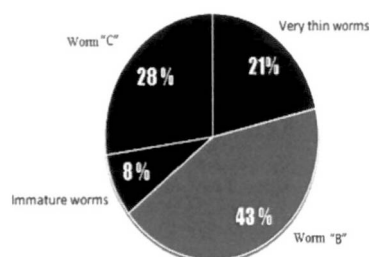


Figure 2. Distribution of earthworms in coconut-banana plantations (S-7).

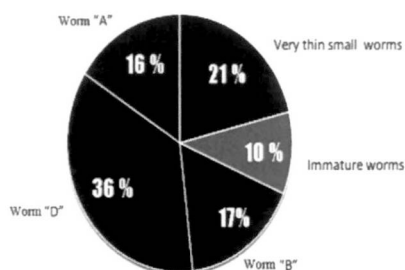


Figure 3. Distribution of earthworms in road side lands (S-8).

Table 1: The characteristic features of adult earthworms from different species, found in the soil samples.

Characteristic Feature	<i>Megascolex spectabilis</i> (A)	<i>Pheretima houlleti</i> (B)	<i>Megascolex mauritti</i> (C)	<i>Notoscolex species.</i> (D)
External body length.	Is 200 + mm.	Is 90-100 mm.	Is 110- 130 mm.	Is 130 mm (thus 110-330 mm).
Diameter of the body	About 4 mm.	Is 3 mm.	Is 2 mm.	Is 5 mm.
Number of body segments	Close to 240 (237).	107, (Thus 90-118).	128, (Thus 120 +).	160.
Distance between the 'nose' and the start of the clitellum.	Is less than two cm	Is less than two cm	Is less than 1 cm	Distance tends to differ up on the individual considerably.
Colour of the body.	Dorsum appears to be dark red-brown - black in coloration	The dorsum appears to be muddy red to brown.	The body is light brick-red, brown.	Light brick-red, brown to purple body. Body wall seems to be unpigmented and reddish.

An identification key was developed by using these characteristic features of different adult earthworm species, found in the soil samples. It should be noted that this key refers to major groups of earthworms found and identified within the areas of study. Several keys should be attempted to confirm identities practically. The identification key for the earth worms identified through the study

1. Size of the individual (small), 90 -100 mm in length..... 4
2. Size of the individual (medium), 110- 130 mm in length..... 5 / 7
3. Size of the individual (large), the body is 200 + mm in length..... 6
4. Diameter of body is about 3 mm..... 8

5. Diameter of body is about 2 mm.....	9
6. Diameter of body is about 4 mm.....	11
7. Diameter of body is 5 mm.....	10
8. The number of segments in the body- 90-118.....	12
9. The number of segments in the body- 120 +.....	13
10 .The number of segments in the body- 160.....	16
11. The number of segments close to 240.....	17
12. Distance between the ‘nose’ and the start of the clitellum is less than two cm.....	17/14
13. Distance between the ‘nose’ and the start of the clitellum is less than 1 cm.....	15
14. The dorsum appears to be muddy red to brown.....	<i>Pheretima houletti</i>
15. The body is light brick-red, brown but globules of whitish-yellow colour are present on the near surfaces forming the outer layer of the alimentary tract.....	<i>Megascolex mauritti</i>
16. The body is light brick-red, brown to purple.....	<i>Notoscolex sp.</i>
17. The dorsum appears to be dark red-brown -black in coloration.....	<i>Megascolex spectabilis</i>

The percentages of the organic contents, of moisture contents and the variations in the soil temperatures of different soils in which the earthworm that thrive in most number of sites *Pheretima houletti* , (B) are represented in the graphs here and below.

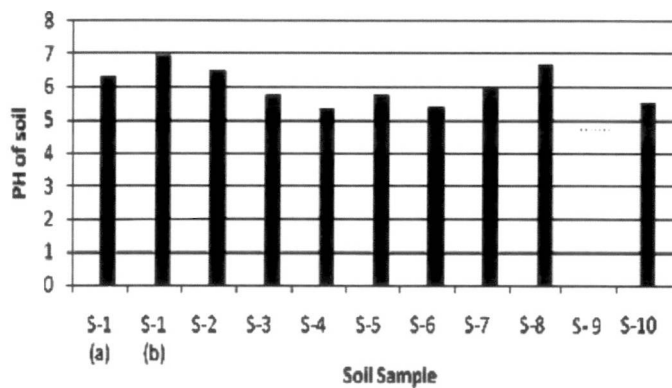


Figure. 4. pH of soil types found in each sample, in Which worm B (*Pheretima houletti*) was found.

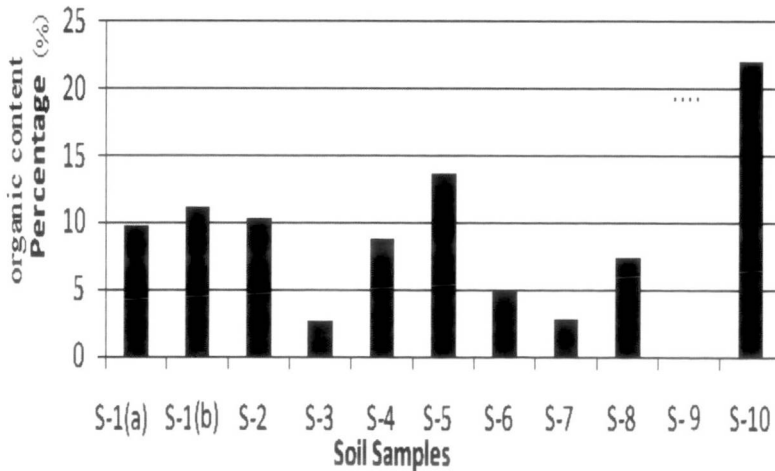


Figure.5. The percentages of the organic content of the soil samples in which worm B (*Pheretima houletti*) was found.

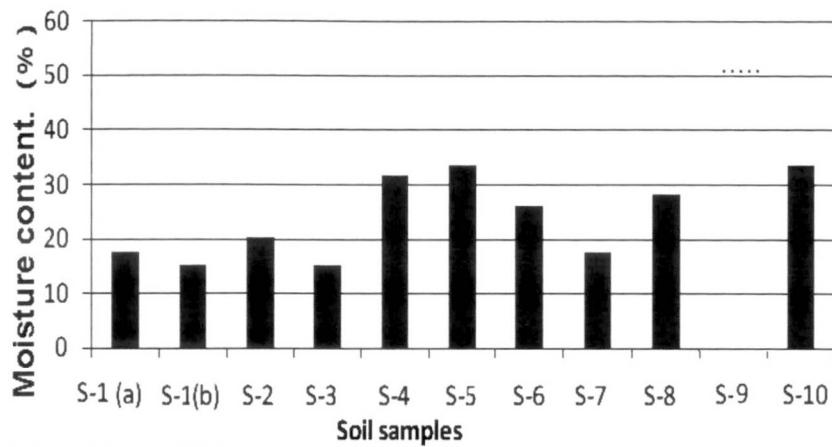


Figure.6. The percentages of the moisture content of the soil samples in which *(Pheretima houlleti)* was found.

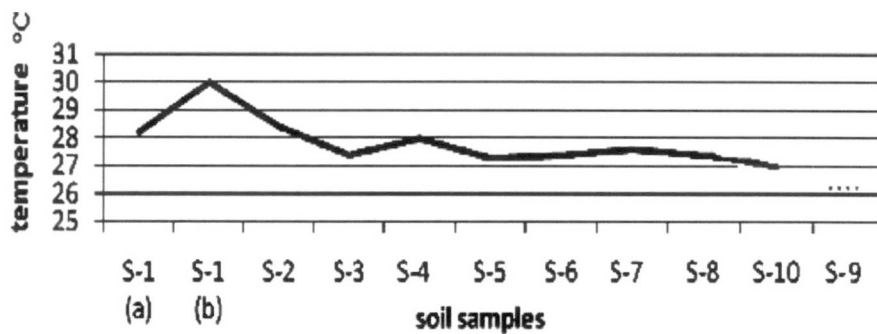


Figure. 7. The temperature variation of the soil samples, in Which worm B (*Pheretima houlleti*) was found.

*Pheretima houlleti* (labeled as ‘worm B’) could be regarded as a more dominant species than the others which seems to be relatively more successful in thriving in a variety of soil conditions. This is because *Pheretima houlleti* or ‘B’ was found in majority of the sites, whereas *Megascolex spectabilis* ‘A’ was found only in a single site (S-8). Both *Megascolex mauritti* ‘C’ and *Notoscolex* species ‘D’ were found in two sites as indicated in Table – 2.

When the soil types and the different edaphic conditions prevailing within them are taken in to consideration as a whole, it is clear that, from among the selected sites, site S-8 possesses the most favorable conditions with regard to the life of earthworms.

Table 2: The different types of adult earthworms found in soil samples.

Site	Site	Site	Site	Site	Site	Site	Site	Site	Site	Site
S-1	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10
(a)	(b)									
B &	B	B	B	B	B	B	B & C	A, B	C	B

## CONCLUSIONS / RECOMMENDATIONS

Out of the four species identified, *Pheretima houlleti* was found to be dominant the species. The species *Megascolex mauritti* and *Notoscolexa* come next in distribution.

It could be recommended that *Pheretima houlleti* could be introduced for increasing soil fertility and it is also worth considering the viability of it being utilized for vermicompost production. Since *Pheretima houlleti* and *Notoscolex* species were found in Tsunami affected areas, they could be utilized to improve the soil fertility in saline soils. *Megascolex mauritti* could be considered to enrich the soil fertility in acidic soils up to a pH of 4.88.

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