



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 7, Issue, 10, pp. 13782-13786, October, 2016

**International Journal of
Recent Scientific
Research**

Research Article

AN ASSESSMENT OF ANTLION PREY, BY ANALYZING ITS PREY REMNANTS INSIDE PITS IN SELECTED DISTRICTS OF KERALA

Anila K* and Francy K. Kakkassery

Department of Zoology, St. Thomas' College (Autonomous), Thrissur, Kerala

ARTICLE INFO

Article History:

Received 17th July, 2016

Received in revised form 12th August, 2016

Accepted 04th September, 2016

Published online 28th October, 2016

Key Words:

Antlion, Prey, Prey remnants, Hymenoptera,
Coleoptera

ABSTRACT

Surveys are direct knowledge from the natural conditions and it is the most reliable results rather than gathering from imitated artificial conditions. Hence a survey was done for understanding the diversity of antlion prey by analysing its prey remnants. It was very difficult and time consuming at the time of identification because the remnants after sucking the body juice only present inside the pit. The collection of antlion prey was made from January 2016-July 2016. Six varieties of antlion prey were found, which include four insect orders, one spider and millipede. A total of 74 prey remnants were collected from various locations of the different geographical regions, it is found that Hymenopterans are the most preferred prey of antlion, which include mostly ants. Antlion larvae also seen inside the pits, they were considered as the larvae which are not survived at that area. Coleopterans, in spite of its hard exoskeleton, are also preferred by antlion larvae.

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INTRODUCTION

Insects make up the species diversity on the earth. Instead of creating species diversity, they play some major roles like pollinators, bio indicators, food for other animals etc. Irrespective of their colour, function, smell etc nobody can live without coming contact with a single insect. There are 30 insect orders are coming under Class Insecta and Neuroptera is one of the Order which include antlions. Antlions include a family called Myrmeleontidae and are soil dwelling creatures in the larval stage.

They are considered as a good predator of ants, hence the name antlion. Out of it, the other organisms seen in antlion pits are considered as an unravel thing. Antlion makes a conical shaped pit for preying other insects and anticipated a long wait for it and hiding in the pit expecting their prey. They suck the body fluids of prey by the help of hollow mandibles and throw the remnants of prey outside the pit, a mechanism called pit cleaning and wait for the next prey. They have an excellent mechanism for sensing the arrival of prey by the help of soil vibrations (Fertin *et al.*, 2007). The characters like hard exoskeleton, size etc are the reasons for the variation in the prey. Mostly ants are soil dwelling insects, the chance to fall inside the pit is high compared to others.

Not only the physical character of prey, but also the season played a major role in the prey diversity in the pit (Maoge *et al.*). A study point out that the main potential prey of antlion in sudano guinean zone of Cameroon is Myrmecaria

opaciventris (Ngamo *et al.*, 2016) during dry season. So the potential prey changes according to the seasonal variation in that area. Studies regarding the modulation in the feeding prey capture, feeding kinematics of Myrmeleon crudelis etc (Iambert *et al.*, 2011) are the recent studies based on the prey capture. Associative learning enabled antlion to dig better pits and got prey efficiently, moult before the actual time (Guillette *et al.*, 2009).

Every encounter with a prey is not successful, there are escaping of prey from pit also happening. Some defensive attacks by ants are seen and it will cause severe injury to antlion which leads to the death of antlion (Lucas, 1981). Mostly prey with large body size are very time consuming and it is not preferred by antlion. The body mass and successful predation is negatively correlated (Scharf *et al.*, 2010). There are intraspecific competition and cannibalism are also present in between antlions.

MATERIALS AND METHODS

Study area: The study area selected for this work was three districts of Kerala, Such as Palakkad, Thrissur and Wayanad. Palakkad is the gateway to Kerala from the nearest state Tamil Nadu due to the presence of Palakkad gap, in the Western Ghats. Thrissur has a tropical humid climate with plentiful and seasonal rainfall. Wayanad district stands on the southern tip of Deccan Plateau and includes parts of the Western Ghats. It has a large amount of dry and moist deciduous forest. Palakkad and Thrissur are the nearest districts, but Wayanad seen after two

*Corresponding author: Anila K

Department of Zoology, St. Thomas' College (Autonomous), Thrissur, Kerala

districts of northern part of Kerala. These three diverse districts gave an outlook about the prey species in antlion pits in the Kerala state.

collected 74 prey remnants. Among the data made from the study area it is clear that the most preferred prey is considered as hymenopterans (ants), because of its soft body and soil dwelling character.



Study area- Source: Google map

METHODOLOGY

Analysis inside antlion pits shows the presence of antlion and some partially digested prey remnants. The collection of prey was made from three districts and nine areas of Kerala. The unusual insects inside antlion pits were carefully collected with a brush and transferred in to plastic boxes. The collection of antlion prey was made from January 2016-July 2016. The collected prey remnants were identified in the Order level by the help of the available literature etc. After taking photographs of prey remnants, the tabulation of data was done. The collected prey remnants were kept in the research laboratory of Research and Post Graduate Department of Zoology, St. Thomas College, Thrissur for further studies.

RESULT AND DISCUSSION

The prey remnants inside the pit found like a dried exoskeleton after consuming the body fluid by antlion. So the exoskeleton dried without any destruction. The lack of body fluid helps to dry the body parts. A total of 51 pits were analysed and

Though the ants are walking without any laziness, the incidence inside the pit was more frequent. Antlion larvae also collected from the pits but it is not dead as a result of intraspecific competition or cannibalism. It is clear that some temperature variation affected and the larvae in that area found dead, the body dried and colour changed to blackish. Hence the analysis was done excluding the dead antlion.

Coleopterans also present in the category of antlion prey, though it is flying insects, it may accidentally falling in to the pit. The hard exoskeleton remained exact and the body fluid sucks by antlion.

The collected data were undergone descriptive analysis, and got district wise prey preference status of antlion prey. The below table indicates the order of animals which is present in the pits of three districts of Kerala.

Table 1 Table showing the collection data of antlion prey remnants from antlion pits.

Order	Month	Place of collection	District	Number of individuals
	May	Parali	Palakkad	3
	April	Parali	Palakkad	4
	April	Parali	Palakkad	1
	April	Ottappalam	Palakkad	2
	April	Parali	Palakkad	2
	April	Ottappalam	Palakkad	3
	May	Ottappalam	Palakkad	1
	May	Parali	Palakkad	1
	May	Parali	Palakkad	2
	April	Pathirippala	Palakkad	2
	April	Pathirippala	Palakkad	1
	April	Pathirippala	Palakkad	1
	April	Asarikkad	Thrissur	2
	March	Asarikkad	Thrissur	2
	March	Asarikkad	Thrissur	1
	June	Parali	Palakkad	1
	July	Muthuvara	Thrissur	1
	July	Asarikkad	Thrissur	1
Hymenoptera	May	Vadakkanchery	Thrissur	1
	June	Parali	Palakkad	2
	May	Parali	Palakkad	2
	June	Parali	Palakkad	3
	May	Sulthan Bathery	Wayanad	4
	May	Sulthan Bathery	Wayanad	1
	March	Asarikkad	Thrissur	2
	March	Parali	Palakkad	2
	March	Parali	Palakkad	1
	March	Parali	Palakkad	1
	March	Parali	Palakkad	1
	March	Parali	Palakkad	1
	March	Parali	Palakkad	2
	March	Parali	Palakkad	3
	January	Panamuk	Thrissur	1
	February	Parali	Palakkad	1
	January	Ottappalam	Palakkad	1
	January	Parali	Palakkad	1
	February	Parali	Palakkad	1
	April	Asarikkad	Thrissur	1
	May	Sulthan Bathery	Wayanad	1
	June	Parali	Palakkad	1
	May	Parali	Palakkad	1
Coleoptera	March	Asarikkad	Thrissur	1
	January	Asarikkad	Thrissur	1
	January	Parali	Palakkad	1
	March	Edathara	Palakkad	1
Lepidoptera	June	Asarikkad	Thrissur	1
	March	Parali	Palakkad	1
Millipede	May	Sulthan Bathery	Wayanad	1
Araneae	June	Parali	Palakkad	1
Total				74

Table 2 Table showing district wise data of prey remnants

	Palakkad	Thrissur	Wayanad	Total
Hymenoptera	46	11	5	62
Coleoptera	4	3	1	8
Lepidoptera	1	1	0	2
Millipede	0	0	1	1
Araneae	1	0	0	1
Total	52	15	7	74

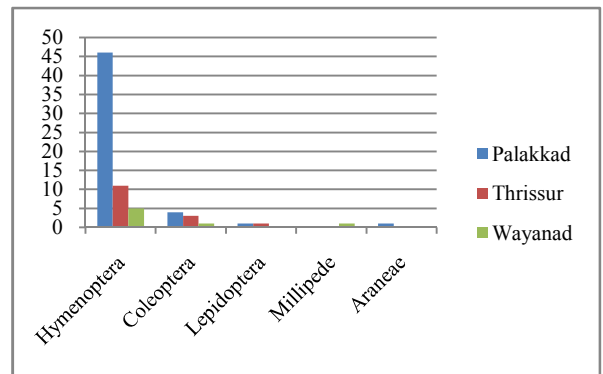


Fig 1 Graph showing district wise data of prey remnants

The data from the three districts taken separately and made pie diagram. In all the three districts, the antlion prefer hymenopterans and coleopterans. These two groups are the soil dwelling insects but in the case of spider and millipede they are rare, considered as accidently fallen groups.

The different orders obtained from different districts are as follows:

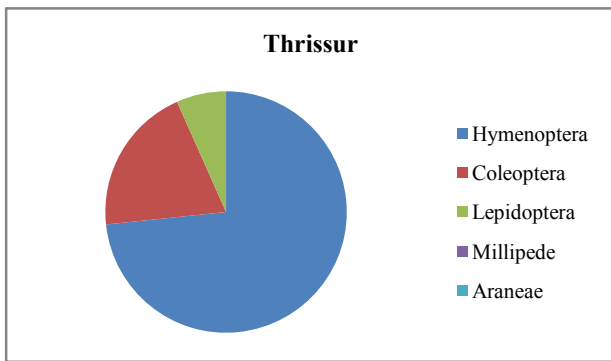


Fig 2 Pie diagram showing the diversity of different orders of prey in Thrissur district.

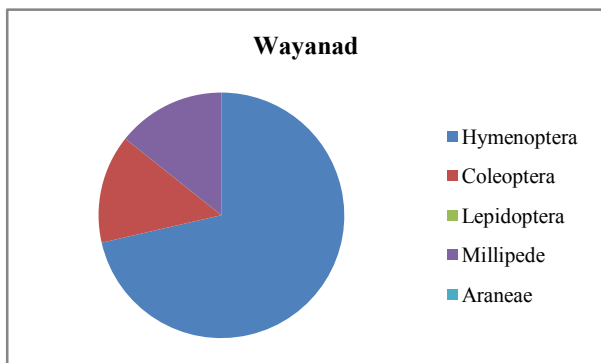


Fig 3 Pie diagram showing the diversity of different orders of prey in Wayanad district.

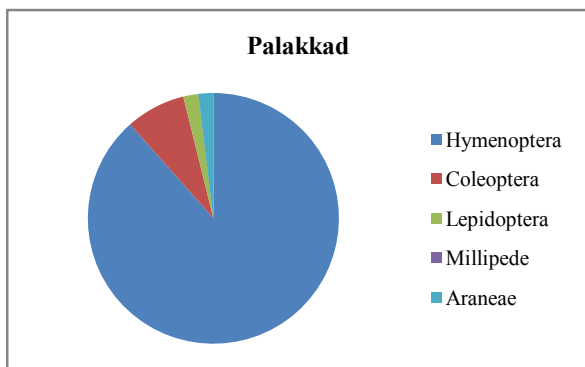


Fig 4 Pie diagram showing the diversity of different orders of prey in Palakkad district.

Though the data was taken monthly, based on that graphs are also prepared.

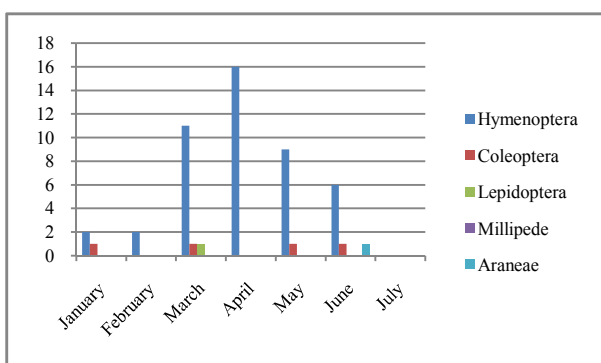


Fig 5 Monthly data of prey remnants collected from Palakkad District

In the three districts, the number of prey was high in March, April, May months. The activity of insects may be in increased level in summer season, or the successful predation is high in these three months.

Monthly data of different orders of prey remnants.

The presence of prey inside the antlion pit is high in the month of April, it may be because of the season in which the number of hymenopterans are high at Palakkad.

In the case of Thrissur district, the numbers of hymenopterans are high in the month of march. From Wayanad, the prey was got only in the month of May. Though it is a forest area, frequent rain was found. The insects inside the antlion pit may lost through rain water, it may be the main reason for the decrease in prey.

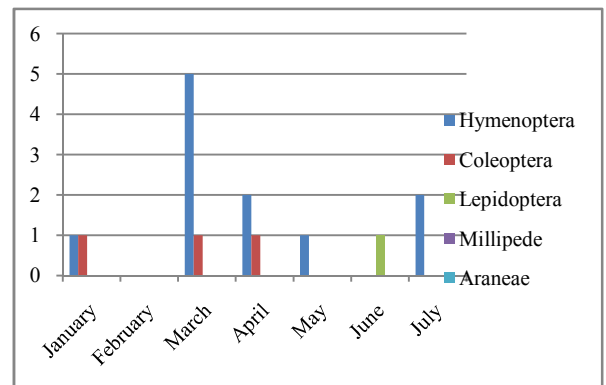


Fig 6 Monthly data of prey remnants collected from Thrissur District.

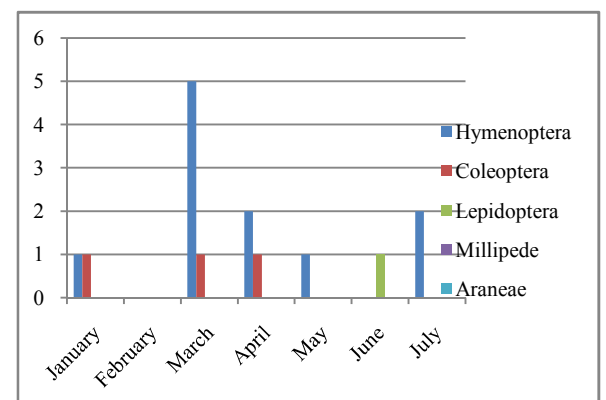
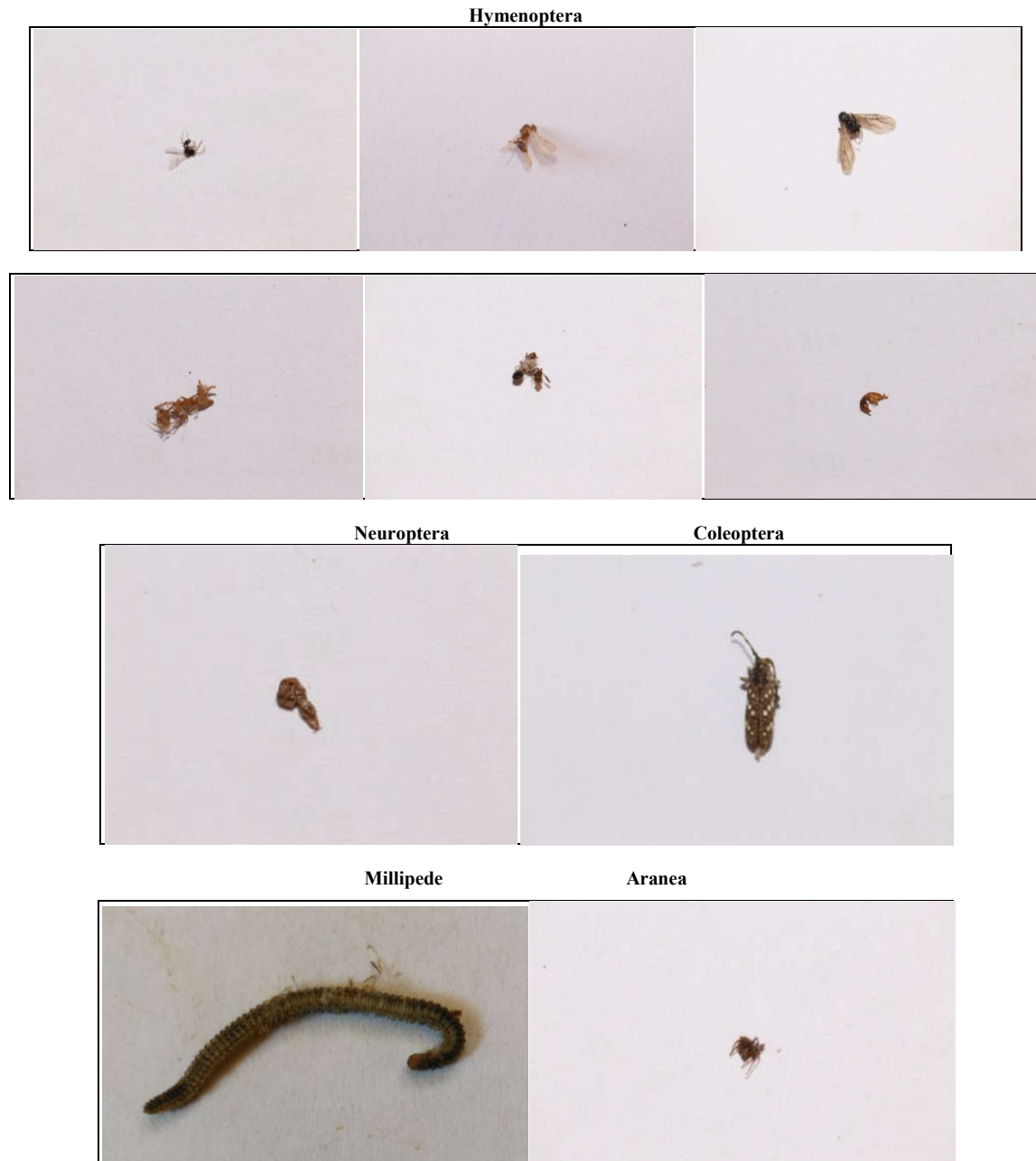


Fig 7 Monthly data of prey remnants collected from Wayanad District.

The number and variety of prey will change in the change in geography, rain, soil moisture, population change of organisms etc. Though ants are soil dwelling creatures, they are frequently fallen inside the pits hence the Hymenopterans seen more as prey. The prey species may change with the change in moisture content of soil because the presence of millipede also noted.

CONCLUSION

Antlion researches are rare when compared to other insects in India. The prey species may change from place to place and time to time. In the climatic and seasonal changes may influence the prey species but the ants are very common in our country, they remain constant. Cannibalism also prominent in the case of antlion, but the change in the exoskeleton gave the exact reason for their death.



Acknowledgment

We thank our Principal Dr. Jenson. P. O, St. Thomas' College (Autonomous), Thrissur for his inspiration. Also convey our thanks to UGC, RGNF for supporting financially for the research and publishing papers in research journals.

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