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Studies on the diversity of *Solenopsis* species from Mathahi block of Madhepura District, Bihar

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Abstract- The study has been carried out in the Mathahi block, of Madhepura District as no adequate information on *Solenopsis* species diversity of this region has been available yet. The present study was carried out during November 2017 - May 2018. During the study diverse subfamily of ants were observed. Out of which Myrmicinae was the dominating. The ants were sampled by employing intensive all out search method (AOS method). The sampled specimens were collected carefully. Through this study availability and abundance of ants in this Mathahi block region were revealed. This study also shows that ants can also survive in odds and adverse condition.

Keywords-*Solenopsis,* Mathahi block, diversity, AOS

INTRODUCTION

Solenopsis species are widely distributed in almost every possible terrestrial area of India. These are you eusocial organisms working continuously together to sustain their lives as well as maintaining the survival of their species. They are usually beneficial for the ecosystem showing active participation in measure ecosystem stabilizing activities. These activities vary from minor roles in decomposition to major roles in pollination. They show mutualistic behaviour with most plants and animals.[1]

They show high level of interaction among themselves. This coordination in maintaining their family of billions forms the milestone. Their communication method generally consists of scents pheromones, touch body language and sound antennae forms of key component in communicating.[2] *Solenopsis germinata* generally called red ant owing to its light brown reddish colour it is also called fire and due to the burning sensation it causes, when it stings.[3]

Other than *Solenopsis germinata* ants such as *Solenopsis indica*, pharaoh ants, black garden ants, weaver ants, harvester ants, grassland ants, carpenter ants and flying ants are found in India.[4]

S. germinata undergoes metamorphosis the first stage is egg which is followed by larva, pupa and finally adult stage. *S. germinata* flourishes in a hot and arid climate. It now seems to flourishes in climate controlled environment like buildings, human dwellings etc. This method restricts their spread/ dispersal to far areas but forms a continuous establishment. Their abundance is seen to decrease in areas where they remain under shade for more time.[5]

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They derived nutrition from various sources such as grains seeds decaying vegetables. *Solenopsis germinata* infestations are major in agricultural areas. They are usually feared for their stinging habits. The sting is venomous enough for an invertebrate to be preyed upon. They respond rapidly and are very aggressive under even a slight disturbance to their habitat or food.[6] It gives multiple stings even after its venom depleted. The sting is followed by inflammation and reddening of nearby tissue.

MATERIALS AND METHODS

This field work was conducted in various regions of Matahi block of Madhepura district. Both well ventilated and shaddy areas were examined thoroughly.

Ant sampling method

Ant field sampling was done from November 2017 to May 2018. Intensive All Out Search (AOS) method was employed for raw data collection. The ants were manually collected preferably during the daytime with the help of forceps and brush. The data comprising of date time, habitat and locality of collection was also recorded and kept for future references.

The samples were transferred in a bottle containing ethyl alcohol. They were then taken into the department's lab for identification labeling and preservation.

Cleaning

- Any kind of foreign material such as mud or pollen which adhered to the ant's body was removed. To do this process a small brush dipped in water was employed.
- The ants were sorted very carefully according to their location.
- Samples were separated from dirt and they were washed before preserving them.
- Species were identified and grouped accordingly.
- Different levels were put on the jars for easy identification.

Identification

The genus was identified using basic taxonomic keys prepared by Balton in 1994.[7]

Experts were also referred to avoid any confusion regarding the species.

Labeling

The ants were permanently preserved using the preservation techniques and provided with identification and data labels. The data labels contained the date and time of collection along with the habitat and locality they were found. Identification labels consist of species name, common name, and scientific name with author, genus, family and order.

The ants were preserved both by wety preservation and dry preservation.

Wet preservation

The ants were directly put in 70% ethyl alcohol separate vials were used for different species.

Dry preservation

The ants are glued down to the apex of a small triangular strip of thick paper, between the fore and middle coxae. Then a pin is pushed through it. This then stored in an insect box.

CONCLUSION

The diversity of *Solenopsis* species was analyzed in this comprehensive survey. Approximately 1,000 specimens were captured. *Solenopsis germinata* & *Solenopsis invicta* dominated the area under study. The distribution of these two species depended on several factors such as food resources, nesting habitats etc. Mathahi is rich in *Solenopsis* species owing to the ant favouring climate throughout the year and availability of food resources. Their ecological niches had overlapping. Ants have generally shown resistance to pollution and harsh climatic condition. Their body covering consisting of chitin helps them to do so. The diversity of ants was seen through extensive data collection for 8 months. This data clearly shows increase in ant activity from winters to summers showing its peak during the hottest month of the year April- May. Though tiny, the number of ants balances the hectic lifestyle they maintain for survival. They play a vital role in maintaining the dynamic equilibrium of stability. This study provides a model for future surveys and establishes a foundation for continuing research.

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