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Short Note

A preliminary survey of arthropod diversity through pitfall trap in the selective habitats at Rajshahi University Campus

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Arthropods include an incredibly diverse group of taxa such as insects, crustaceans, spiders, scorpions, and centipedes. The arthropods are essential for our existence, directly or indirectly providing us with food, clothing, medicines, and protection from harmful organisms. The systematic relationships of arthropod groups are not fully understood, which is not surprising given the size and diversity of the phylum.

Arthropods are sensitive bio-indicators of environmental change because of their rapid reproductive rates, short generation times, and the fine grain at which they occupy space in the soil (Moldenke & Lattin, 1990). They have been recognized as efficient indicators of ecosystem function and recommended for use in conservation planning (Rosenberg et al., 1986; Finnamore, 1996) and many researchers have assessed habitat quality and measured habitat differences using arthropods (Kitchin et al., 2000; Gibb & Hochuli, 2002). Insects are almost exclusively terrestrial, although a number of species are aquatic or have an aquatic stage in their life cycle, and their economic and medical importance cannot be overstated. Investigation has been done of soil micro-arthropods in prairie (Pimentel, 1961; Peters, 1997) and forest litter invertebrates in tropical forest by Jansen (1997). Arthropod groups have been used to track restoration success in many contexts (Greenslade & Majer, 1993). Therefore, the present survey aimed to investigate arthropod diversity and density to different habitats at Rajshahi University Campus (RU campus).

Site selection: Three habitats, grass land, crop land and beside pond were selected for pitfall trap setting and sampling arthropods. Grass land was primarily composed of herbaceous spermatophytes of grass and grass like plants of family Gramineae. The mustard field was chosen for trap setting was covered with weeds. Beside the ponds of the RU campus, there are long grassy lands shaded by medium sized bushes and tall trees, and this habitat was also selected for trap setting.

Trap setting and Sampling: Total 36 pitfall traps were set in the three habitats. Four sticks each one meter length was used to measure an area of one meter square and four traps were set in each corner of the area. Thus three replications of collection site were established at each of the three studied habitats. The traps were kept opened for 72 hours and then the mouth wasclosed and brought to the Insect Research Laboratory, Department of Zoology, University of Rajshahi. The collected insects were preserved in 70% alcohol keeping individually in separate vials labeled marked with dates, habitats and replication number. The traps were set every week for three month from December, 2003 to February 2004. The collected specimens were recorded and identified according to Imms (1977) up to order level. The numbers of insects of each order were recorded separately for each of the studied habitat. Distribution of insects at different habitats was presented by number, and that of orders found at RU campus was presented by percentage.

Total 117 specimens of different arthropods were sampled using the pitfall traps set at the three habitats. Among 117 specimens, 60 were found in the crop land, 37 were found in the grass lands and 20 individuals were found beside the pond (Fig.1). Erwin (1982) reported that consistent with succession theory, arthropod diversity increased with vegetation height and complexity. In this survey a similar patterns of arthropod diversity was found at three habitats.

Southwood et al. (1979) described increasing insect diversity with increases in plants and spatial diversity, followed by a decrease in insect diversity with even higher spatial diversity but decreasing plant diversity. They stated that there is an arch in arthropod species diversity with the height of vegetation. In this study sites grass land was more vegetated than the crop land and beside pool habitat respectively. Therefore, this finding is similar to others (Siemann, 1998; Rebek et al., 1995). This survey technique is relevant to rapid biodiversity assessment, because arthropod comprises the largest component of terrestrial biodiversity. Rebek et al., (1995) analyzed the arthropod abundance and diversity in the corn field by pitfall traps. Erwin (1982) found the highest representatives from the order Coleoptera and Hymenoptera which are similar to the present survey results.

Species richness and the biological success of specific communities are positively related to the diversity of niches and soil microenvironments (Parmelee, 1995). As a result, the extent to which cropping diversity, rotational regimes, and soil preparation influence the diversity of microenvironments in the soil tremendously impacts arthropod populations (Pankhurst, 1997). Although plant diversity is thought to be overwhelmingly influential in determining regional and global arthropod diversity (Moldenke & Lattin, 1990; May, 1978), these results suggest it is not the only or perhaps not even the most important factor influencing local arthropod diversity.

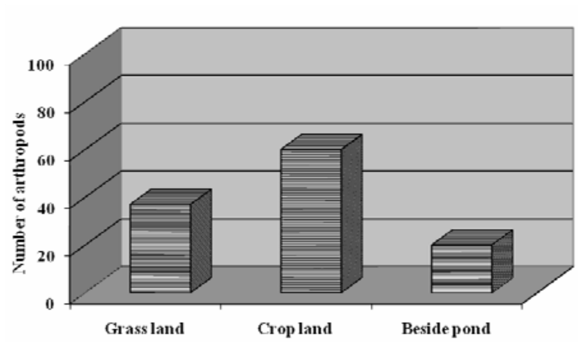

Fig.1. Showing arthropods richness at three different habitats at RU campus.

The maximum number of the total collected specimen was insects (85%) and the rest were arachnids (5%). Among the insects the highest percentage was from the order Coleoptera (41%). The orders Hymenoptera (26%) and Orthoptera (14%) were also important from the point of population density (Fig.2). The present survey results predicting that the diversity among the arthropods was also different in the three habitats. Thus it is concluded that pitfall trap is easy to measure the arthropod diversity in different habitat rapidly.

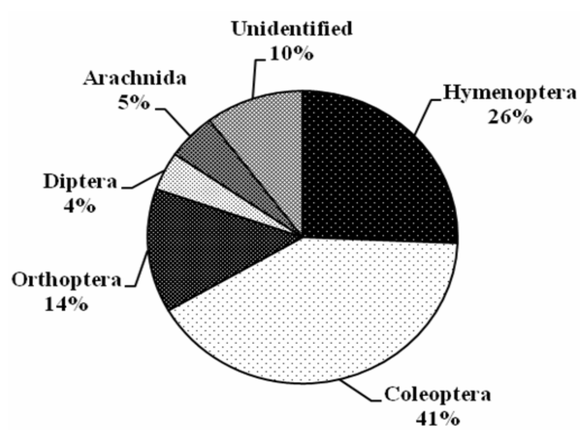

Fig. 2. Showing the abundance and diversity of arthropods at RU campus

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