STUDIES ON THE BUTTERFLIES DIVERSITY AND COMPOSITION ALONG THE TUNGABHADRA IRRIGATION CHANNEL AT BALLARI, KARNATAKA

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ABSTRACT

The assessment of diversity and species composition of butterflies has been studied along the Tungabhadra Channel at Vijayanagara Sri Krishnadevaraya University in Ballari District. The study was conducted from October 2017 to March 2018. All the efforts were made to collect the maximum specimens from each locality by using different methods, such as the use of aerial nets and searching and visual encounter method. The maximum number of specimens was collected because for the calculation of diversity abundance and richness both are needed. The collected specimens were brought to the laboratory and identified. The collections were made in the morning and evening hours. A total of 45 species belonging to five families and 28 genera were collected. The Shannon-Wiener's diversity index (H') was found to be 1.37 and species composition indicated Nymphalidae was higher (20%) followed by Pieridae (11%), Papilionidae (7%) Lycaenidae (5%) and the least Hesperiidae (2%). Variation in the composition of butterflies related to variation in habitat structure and plant composition. Our results suggest that plantations can help conserve a limited number of forest species, and serve to highlight the research that is necessary to understand better the relationship between fruit feeding butterflies and environmental variables that are amenable to management.

Key: Butterflies, Diversity, irrigation channel, bioindicators

Introduction

Insects have been shown to be sensitive to changes in vegetation composition and the physical attributes of the environment resulting mostly in a decrease in insect diversity. Butterflies are not only fun to watch but they serve as pollinators of many flowering plants. Tropical butterfly assemblages are highly diverse, with many endemic species (Sutton and Collins 1991). Compared with other invertebrate groups, the high visibility of butterflies, together with their relatively well-known taxonomy, has resulted in this group receiving a reasonable amount of attention throughout the tropics. Butterflies are one of the most conspicuous species of Earth’s biodiversity. Being extremely responsive to any changes in their environment, namely, temperature, humidity, light, and rainfall patterns these insects are identified as useful bioindicators (Brereton, et al., 2010). Among insects, butterflies perform prominent roles in pollination and are considered as good indicators of the health of any specified terrestrial ecosystem (Bonebrake et al., 2010). Butterflies are treated as an important model group in ecology and conservation (Watt and Boggs 2003; Ehrlich and Hanski 2004). Around 20,000 - 25,000 species of butterflies occur in the world (Larsen, 1986). In India due to variation in topography and habitat, 1500 species were recorded (Venkataramani, 1986). Gunathilagaraj et al., (1998), Eliot, (1992) and Goakar (1996) were reported that about 299 species in Nilgiries, 115 from Malay Peninsula, 245 from Western Ghats and 150 from Eastern Ghats. Butterflies are an often used target taxon for conservation studies. The limited number of species and the availability of large quantitative data sets make them an ideal candidate for comparative studies and biodiversity forecasting efforts (Ulrich and Buszko 2004).The richness of butterflies has been correlated with the richness of vertebrates and vegetation types (Lawton et al. 1998) and is appropriate subject for the study of logging impacts on biotic communities (DeVries and Walla 2001). Butterfly diversity is important scientifically, socially, economically, educationally, culturally, aesthetically and recreationally and it is the one of the major features of the animal communities (Maguran, 1988). It is therefore the present study aims to examine the diversity and distribution of butterflies across the Tungabhadra irrigation channel at Vijayanagara Sri Krishnadevaraya University, Ballari.
Materials and methods

Study Area

The study was carried out in and around Vijayanagara Sri Krishnadevaraya University in Ballari District (15.15°N 76.93°E), from July 2017 to March 2018. It has an average elevation of 495 meters (1,624 ft). The average annual temperature in Ballari is 27.4 °C and rainfall is averages 515 mm. The climate is very dry and classified as a semi-arid tract. The main vegetation comprising of Albizia amara and Acacia arabica. The plains are over run by weeds, of which Oassia auriculata, Jatropha glandulifera and Opuntia dillenii are the major once. The vegetation on either side of the Tungabadra irrigation channel which runs all along the University campus attracts most beautiful insects and other fauna.

Collection of Butterfly

Butterflies were observed, captured by using insect net and photographed at the spot. The dead specimens were kept in butterfly collection boxes. Collecting live specimens was avoided during the study. The photographs taken in different angles were used for identification and classification. The Shannon species diversity index and species composition were calculated.

Results and discussion

The present study compares the community dynamics of butterflies along the Tungabadra irrigation Channel at Vijayanagara Sri Krishnadevaraya University in Ballari District. The results revealed that the overall species richness observed in the present study was 45 species, comprises five families of and 28 genera showed in the table 1.

Among Papilionidae comprises seven species; *Papilio polytes, Papilio demoleus, Papilio demoleus* (Lime butterfly), *Pachliopta hector, Pachliopta aristolochia, Graphium doson,* and *Graphium agamemon.* Pieridae comprises eleven species; *Belenois aurot, Catopsilia Pomona, Catopsilia pyranthe, Cerpornaris saphryne, Colotis aurora eucharis, Delias eucharis, Eurema hecabe, Eurema hecabe, Pararioneria hippie and Pieriscanidia indica.* Family Nymphalidae comprises twenty species; *Acraea terspicore, Ariadne merione, Byblia llithiya, Callirhea nirmala Danaus chry sippus, Euploea core, Euploea klugii kollari Hypolimnas bolina, Hypolimnas missipus, Hypolimnas bolina, Junonia almanac, Junonia hierta, Junonia iphita, Junoniale monias, Junonia orithyaoxyle, Junoniaorithy sxinhtoei, Melanitis ledy, Melanitis phedimavaraha, Melanitis zitenius and Ypthima asterope.* The family Lycaenidae comprises five species viz.; *Chiladesparrhasius Euchryspenes Freyeria putti Jamides celeno and Leptotes plinius.* Hesperiidae comprises only two species *Lambrix salsala* and *Pelopidas mathias.*

<table>
<thead>
<tr>
<th>S.N</th>
<th>Family</th>
<th>Species (Genera)</th>
<th>% Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Papilionidae</td>
<td>7 (3)</td>
<td>0.15</td>
</tr>
<tr>
<td>2</td>
<td>Pieridae</td>
<td>11 (8)</td>
<td>0.24</td>
</tr>
<tr>
<td>3</td>
<td>Nymphalidae</td>
<td>20 (10)</td>
<td>0.44</td>
</tr>
<tr>
<td>4</td>
<td>Lycaenidae</td>
<td>5 (5)</td>
<td>0.11</td>
</tr>
<tr>
<td>5</td>
<td>Hesperiidae</td>
<td>2 (2)</td>
<td>0.044</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: diversity and species composition of butterflies

![Fig 1. Species composition of butterflies](image.png)
Among the 45 individual butterflies belonging to five subfamilies revealed that Nymphalidae was found to be higher (20%) followed by Pieridae (11%), Papilionidae (7%) Lycaenidae (5%) and the least Hesperidae (2%) (Fig. 1.). This indicates that quick, small-sample surveys of a single understory habitat in one month would only capture a small fraction of the total species richness in the community. Present study also revealed that there is a substantial difference in plant species composition and overall structural diversity of the vegetation (Pearman et al., 1995). Pinheiro et al. (1992) indicated that the vegetation gradient of the local area influence on the diversity of butterflies. The disparity in the representative number of species is a significant indicator of the prospective habitat selection for the conservation of the butterfly species in the concerned geographical area (Koh and Sodhi 2004). In the present study the higher number of species in Nymphalidae indicates the forage favorability conditions in the study area. Further the Pieridae, Papilionidae, Lycaenidae and Hesperidae showed moderate and low density indicates their competition and predation, landscape features and difference in geographical areas (Öckinger et al., 2006). It is well known that low or intermediate habitat disturbance generally has a positive effect on species richness (Denslow, 1987).
Reference