IMPACT OF HABITAT DETERIORATION DUE TO ALIEN INVASIVE PLANTS AND AGRO-CHEMICAL USE ON BUTTERFLY COMPOSITION: A CASE STUDY IN BUNDALA NATIONAL PARK, SRI LANKA

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Introduction

Butterfly diversity of any selected habitat correlates with the host plants and adult food plants (nectar plants) available within and adjacent to the habitat. The exception to this is the butterfly migratory season. During the migration, butterflies move in mass from one part of the island to another depending on the climatic conditions. According to past studies in Sri Lanka, dry zone butterflies move towards the central highlands of the wet zone at the end of November-December and again in February to May (Woodhouse, 1949).

Loss of nectar and host plants due to invasion of Alien Invasive Plant Species (AIPS) and the effect of pesticides are two globally identified threats to butterflies, especially in tropical agricultural countries like Sri Lanka. Bundala National Park (BNP) located in the Hambantota District (6°08' – 6°14'N, 81°08' – 81°18'E), southeastern arid zone of Sri Lanka was identified as an ideal study area for understanding the effect of later two factors to butterfly faunal diversity since the park is under high threat of AIPS and it surrounds large agricultural schemes (Matsuno *et al.*, 1998; Bambaradeniya, 2001).

Materials and Methods

Field sampling started in July 2006 and continued up to December 2006. Seven different habitat types (Bambaradeniya., 2001), grassland (GL) sand dunes (SD), scrubland (SC), evergreen forest (EF) and *Prosopis* stand (PS) within the park and agricultural land (AL) and home garden (HG) outside the park were selected for study. Total of 35 sampling plots, five for the each habit were sampled once a month for four consecutive days for an hour within 8.00 h to 17.00 h. Butterflies and tree species were sampled along 100 m × 50 m plots. Shrubs and non-woody plants were sampled in four 5 m × 5 m plots within the major plots. Butterflies flying across the habitats were not included in the analysis as no interaction with the habitat was observed. Butterflies and their host plants were identified according to (Woodhouse, 1949) and (D'Abrera, 1998). A total of 163 families from the surrounding villages participated in a questionnaire survey. Information on size of agricultural lands used for cultivation, pesticides used within the past year and distance to the park border from cultivation lands were collected with demographic data.

Results

Sixty seven (67) butterfly species were recorded from all habitats; the highest number (56) of species from Scrublands and the lowest (9) from *Prosopis* stands (Figure 1). Eighty six (86) host plant species were identified within the BNP. Thirty one and 27 common host plant species from HG and AL were identified respectively. Seven species of AIPS were recorded within the above habitats.

Hundred and four families of the 163 villagers interviewed were involved in farming practices. Only 30 farmers had a proper idea or record of the amount of pesticides and their brand names used per year. More than 89 % of ALs and 96.5 % of pesticides used occur within 500 m from the park border.

Discussion

Since sampling was done excluding the migratory period the effect of migration is negligible. Highest number of butterfly species recorded in SC is due to the availability of various host and nectar plants. Underneath *Prosopis juliflora* in PS is a dense growth of Prickly Pear cactus (*Opuntia dillenii*). These two species continue to replace *Ziziphus oenoplea, Acacia indica* and some other host and nectar plants in the SC. This adversely affects on the abundance of many butterfly species such as African Babul Blue (*Azanus jesous*), Banded Blue Pierrot (*Discolampa ethion*), Butler's Spotted Pierrot (*Tarucus callinara*) and Zebra Blue (*Syntarucus plinius*) exclusive to, but common in dry zone coastal area from Hambanthota to northwards (D'Abrera., 1998). GL show higher number of butterfly species due to the attraction of butterflies for herbaceous nectar plants. Although the available host plant number in AL is almost equal to that of HG, that number comprises few families such as Cucurbitaceae, Fabaceae and Poaceae that host to few common species of butterflies.

Conclusion

AIPS reduce the host plant species and nectar plant species thereby reduces the abundance of butterfly species of a particular habitat which they interact with. To determine the effect of pesticide to butterfly diversity more studies should be done in similar agricultural lands where the frequency and amount of pesticide applied is varied. Studies can be further improved by sampling butterfly abundance as well. Farmers' awareness on the use of pesticides should be readily developed.

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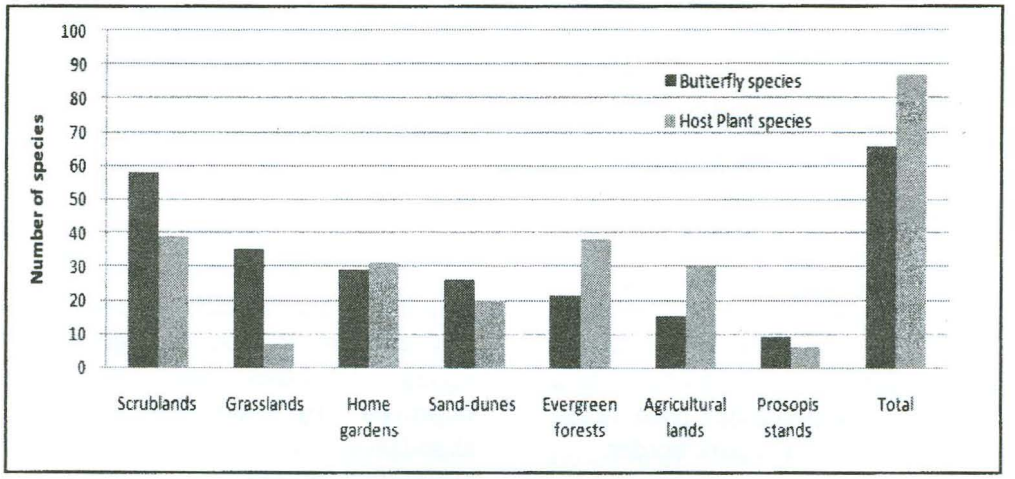

Figure 1. Distribution of butterfly species and host plant species within habitats