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Population Status of Blister Beetle during Monsoon in Victoria Park Reserved Forest, Bhavnagar, Gujarat

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ABSTRACT

The Blister Beetles are widely distributed in the world. They have serious impacts, whether agronomic, veterinary or medical. The present investigation was carried out to know about population scenario of Blister Beetle in a reserve forest. Blister Beetle has special affinity to some plant species in particular season due to availability of food. In present study density of Blister Beetle was checked in form of density and its affinity towards plant *Abutilon theophrastic* was measured by RPE index which indicates the effect of plant presence on population of Blister Beetle.

Keywords: Blister Beetle, Population Density, RPE Index, Reserve Forest.

1. Introduction

Biological diversity or biodiversity is the sum of all life forms on Earth i.e. animals, plants, & microorganisms, and the ecological system of which they are a part, Tragically, the Earth‘s biodiversity is being lost at an alarming rate.

In the Victoria reserve forest of Bhavnagar District, there seems the large population of Blister Beetles during the monsoon period. They are mainly abundantly found on the plant *Abutilon theophrastic*. These Beetlesare petal eater and get their food & nutrient by eating flowers of Abutilon plants and also worked as a pollinator thus possesses the dual nature. They secretes the blistering agent called “Cantharidin”, an odorless turpene causes veterinary disease, which also used as active ingredient in proprietary wart remover & in hair treatment. These Beetles are also responsible for the crop damage. The numbers of Blister Beetles are dependent on humidity & temperature. Other than this there can be many peculiarities which must be helpful for finding the new medical purpose.Beetles also perform several important functionsfor the grassland ecosystem such as aiding indecomposition and distribution of organic matter [1]. It has been found that 3-33 % of the decomposed wood of fallen trunksat the natural forest is due to the activity of Passalidaeinterstitialis [2, 3]. Coleoptera is the largest order in the animal kingdomand includes about 350,000 named speciesof beetles in the worldand many more unnamed species [4]. India has 4.37% of the world’s beetle fauna [5]. Theyexhibit a great degree of diversity and adaptabilityand are found in extremely varied habitats. Inaddition to being associated with all kinds of plants,they are found in logs, fungi, decaying plant andanimal matter, mud, water, stored food, as well asin termite, bird and mammal nests.Several ecological phenomena of the blister beetles, such as population dynamics, seasonal abundance and activity, behavioral ecology, and the effect of various biotic and abiotic environmental factors, had been studied [6, 7, 8].

2. Study Area

Area selected for the estimating population of Blister beetle was Victoria Park (21°44'48"N 72°7'54"E) Reserved Forest, situated in Bhavnagar city district near Jewells circle. The main site for quadrates is the Krishna kunj Lake in the park area (Fig.1).The park holds significance because it is the oldest manmade forest in India. Tourists get to have a rare glimpse of a wide range of Indian birds such as the waders and raptors. Victoria Park covers a 500 acres of land where rare species of flora and fauna exist. Its lakeside views are hugely popular among the tourists. This is a reserved forest that is considered to be a semi-arid zone with severely hot summers and cold winters. The average rainfall is nearly 500 mm. The hot and humid climate enhances the growth of scrubby, thorny and xerophytic vegetation. However, the forest is currently under the verge of extinction because of deforestation.

3. Materials &Method

In present study carried out in the monsoon season year of 2012. The population status of Blister Beetle was measured in form of Density and RPE index. Density of selected species was countedby quadrate method in which 5 m^2 quadrate was used. Quadrates were laid randomly in selected study area which was Krishnakunj Lake in the Victoria Park. Special affinity of this Blister Beetle towards plant species *Abutilon theophrastic* was also calculated. The effects of plant on populations of beetles were assessed through the relative plant effect (RPE). RPE was calculated according to the method of Markham and Chanway [9]. (RPE = (Xa -Xp)/x. Where X was the population of target species in the absence (a) and presence (p) of the plant *Abutilon theophrastic* and x was the higher of Xa or Xp. Negative values of RPE indicated the beneficial and positive values reflected the negative effects of plant presence on the beetle population in selected area.

4. Result and Discussion

4.1 Population Density of Blister Beetle:- Population of Blister Beetles was calculated monthly during the monsoon *Abutilon theophrastic* (Velvetleaf or Indian Mallow) is a plant of the family Malvaceae, native to Southern Asia and abundantly found in the Krishnakunj Lake in the area of Victoria park. During the monsoon season population of Blister Beetle was very high due to availability of food and shelter. It mainly feeds on flowers of Abutilon plant which was also dense in selected area and worked as a pollinator. During the month of August density of blister beetle was high (3.2 no/5m^2) compare to other months as population of plant *Abutilon theophrastic* was also higher in August. During September month density was 1.6 no./5m^2, in October it was 1.4 no./5 m^2 and in November it was 0.66 no./5m^2. Thus from August to November density of beetle was decreases as monsoon season passes simultaneously with plant presence. Temperature of selected area was also major factor for presence and density of Beetle.

Table 1: Population status of Blister Beetle in form of Density and RPE index in Victoria Park.

Month	Density (p) no./5 m^2	Density (a) no./5 m^2	RPE	Temperature (^{0}C)
August	3.2	0.6	-0.8	31.5 ^{0}C
September	1.6	0.4	-0.75	30 ^{0}C
October	1.4	0.2	-0.85	31 ^{0}C
November	0.6	0.2	-0.66	28.5 ^{0}C

4.2 RPE index of Blister Beetle

The results of the RPE index indicates that the beetle specieshasspecial preference for a particular habitat. Negative values of RPE indicated the beneficialeffects of plant presence on the beetle population in selected area. In present study RPE index was found negative in all the month. During the month of August it was -0.8 which indicating beneficial effect of dense plant population on density of Beetles as flower of this plant is main food of this Beetle during monsoon season. Density of Beetle in August was also high due to high density of *Abutilon theophrastic.* RPE index was found -0.66 in November month when the density of beetle was also lowest. One more thing was also noted that flowers of *Abutilon theophrastic* were fully opened when temperature goes high and at this time density of beetles was also recorded higher.

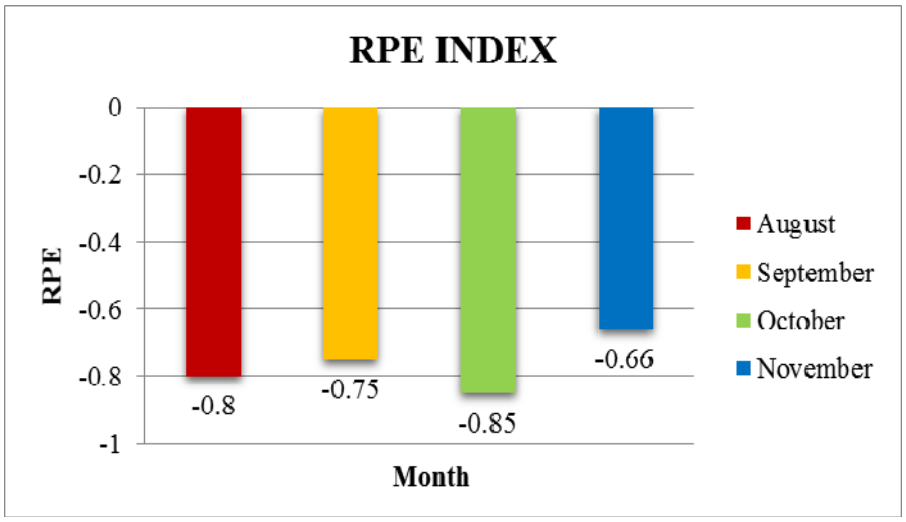

Fig 2: Month wise RPE index of Blister Beetle in Victoria Park.

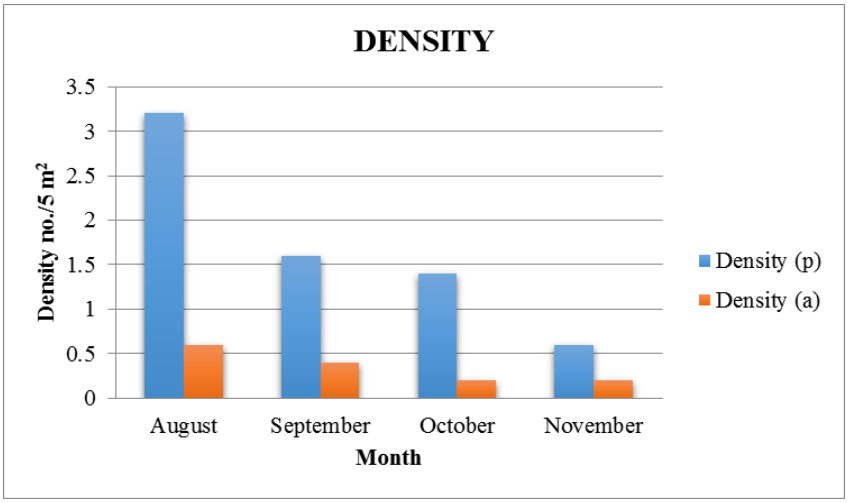

Fig 3: Month wise Density of Blister Beetle in presence of Abutilon plant and in absence of Abutilon plant in Victoria Park.

Fig 1: Study area map

Fig 2: Population of Blister Beetles on *Abutilon theophrastic* plant

Fig 3: Dense vegetation of *Abutilon theophrastic* plant in study area

Fig 4: Mating behavior of Blister Beetle.

Fig 5: Blister Beetle feeding on flower of *Abutilon theophrastic* plant.

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