Vegetation Management as a Tool to Design the Entrance Area of the Kaudulla National Park

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Abstract

Kaudulla National Park(KNP) is a popular elephant destination from August to December. However during off season less visitors were recorded. As KNPis located in the Polonnaruwa Habarana road, there is a potential to increase the visitor number during off season. Hence the present study was conducted with the objectives of designing the entrance area of the park in an aesthetically pleasing and environmental friendly manner by adopting vegetation management techniques to attract more small wildlife in view of converting the entrance area attractive to visitors as well. To achieve the said objectives, a systematic approach to the design is vital, hence prior to the design process a site investigation, investigation of diversity and abundance of butterflies in the entrance area and along the roadside of the KNP during the rainy and the dry season, phenology and aesthetics of potential wild plants exist in the park, propagation of *Grewia damine*as a potential plant were conducted to gather information to support the design process.

Twenty three butterfly species were recorded in the KNP. The number of species recorded along the roadside and in the entrance area were similar, however the roadside recorded higher numbers and diversity in both wet (H'= 2.301) and dry (H'= 1.7323) periods compared to the wet (H'=1.300) and dry (H'=0.673) periods in the entrance area. Nevertheless, no significant difference was observed in the numbers between sites. The census indicates a gradual increase in species diversity and abundance from January to April, followed by a decline in May. A gradual decrease in rainfall and increase in temperature have led to the disappearance of the annual green vegetation in May and this could be attributed for the low abundance of butterflies in May.

Seedsof *G. damine* are dormant. Therefore, 14 different seed dormancy breaking treatments were used to improve germination, of which a significantly high ($p < 0.05$) germination percentage (93%) and other germination parameters were recorded upon the treatment of scarification with a sand paper. The results suggest that seeds of *G. damine* possess a physical dormancy. Hence seeds could be used by the nurserymen after breaking dormancy to produce plant material at large scale.

The maps of the entrance area prepared by Global Positioning System indicateshigh temperatures (45.1^{0}C) and light intensities (69.60 Klux) close to the main road and parking area which create an unfavorable environment for the visitors. Hence, *G.damine*could be introduced to provide partial shade to convert this area to a visitor friendly area. Further, changing phenological events of *G. Damine* help to break the monotony of the area creating aesthetically pleasing view.

Out of 15wild plant species studied, *Cassia auriculata* and *Ixora coccinea* showed continual flowering over a duration of 51.33 (± 0.33) and 51.67 (± 0.33) weeks respectively while the other 13 species showed annual flowering patterns,of which, *Ichnocarpus frutescens*, *Aristolochiaindica*, *Calotropisgigantea*, *Grewia orientalis*, *Cassia roxburghii* and *Mussaenda frondosa* showed a flowering duration of more than 24 weeks in a given year. An increasing number of species with flowers were observed from January to April with a peak in February to April. A reduction in number was observed in September where only five species were in flower. These flowers displayed a mixture of colours ranging from white, violet, yellow, orange, red, red purple and blue. Understanding the flowering phenology of plants enables the introduction of such species to obtain an aesthetic effect throughout the year. Some of these plants act as host plants for butterflies and provide food for birds. Hence once planted, these plants are capable of attracting butterflies and birdsto the entrance area. The growth habit of the species ranged from shrubs to small trees and vines. Hence these species can be effectively combined in a theme resembling a mix plant border in designing the entrance area of the KNP. Further, as wild plants need zero maintenance requirements, incorporating such plants will help in the approach of environmental friendly designs. Vegetation management techniques which include appropriate introduction of selected species into selected locations with predetermined spacing could enhance the aesthetics of the entrance area while attracting more wildlife. Consequently passing visitors may focus their attention to the KNP, which could lead to an enhancement of visitor numbers, particularly during the offseason.

Keywords: Butterfly; Kaudulla national park; Phenology; Vegetation management