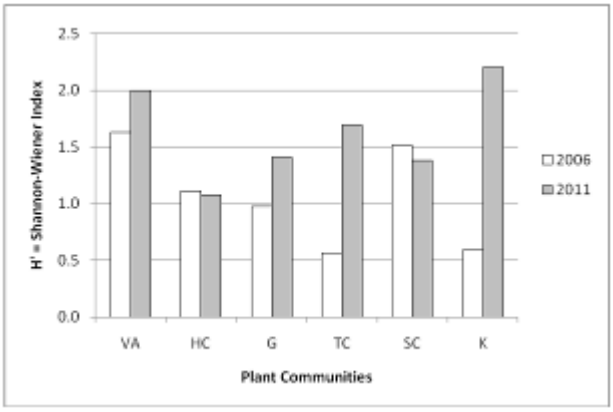

Figure 11: Species richness profiles in 2006 and 2011.

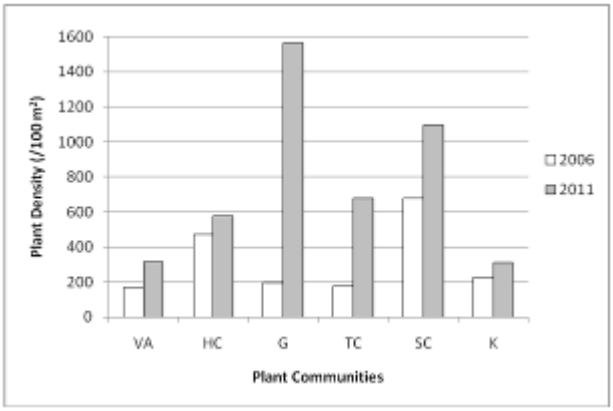

Figure 12: Plant density profiles in 2006 and 2011.

Plant Density

Plant density profiles of six different plant communities studied in YBP were increasing during the year 2006 to 2011 (Figure 12). The highest increase values of plant density during this five year periods were found in Grassland community (G), while the lowest one found in Kuno Forest (K). The difference was due to the maturity of the sites. More mature sites or forests would have less increase in plant density, because of the crowd of the area. Conversely, immature sites may have more empty space for new plants or seedlings to grow. Therefore, they may have great increase in plant density, especially sapling density. But this still depends on how good soil conditions preserve and how many nutrients available in that site. Moreover, competition in gaining nutrients, water and sunlight between plants, either deep-rooted or shallow-rooted, large canopy or small canopy, also became an important factor.

5. Conclusion

The purpose of the work was to study various profiles of plant communities in a forest-designed park. The field work was conducted in late winter to early summer 2011 in the study area of Yamuna Biodiversity Park, Delhi, India. The study was started by vegetation sampling to measure density, diversity, species richness, abundace and maturity of tree species by measuring their girth at breast height (GBH). The vegetation sampling was carried out in stratified sampling design [4] by selecting fifteen sampling plots at different plant communities across the site. For each plant community one plot was made at quadrat size 10×10 m^2 as the basis area for vegetation analysis. All plants occurred within the plots including trees, saplings and grasses were counted, and GBH of tree species sized above 20 cm were measured [6].

The important findings of this study were that high species richness did not always indicate high diversity index. In other word, forests with more number of species were found to be less diverse as compared to forests with low species richness in similar area size. The heterogeneity factor was the reason for this. Some forest was dominated by only two or three plant species which most of them are herbs and grasses, while some other have no highly specific dominant species and tend to be heterogeneous. The sites with less tree density were also found to have more sapling and grass density. Study found that according to its species abundance, the park is still categorized as heterogenous.

Another finding was that parameter of GBH was found to be inversely proportional to the number of total plant density. Forests with high mean GBH mostly have lesser density than forests with low mean GBH. This indicated the maturity of the forests in which the mature forests would have lesser density than immature forests, because their basal area was covered more by large trees than small trees. Immature forests might have more empty basal area that allowed new seedlings to grow, and hence created more number of saplings and more forest density. In this case, density of forests was not actually governed by large number of tree species. Number of saplings, including small trees, shrubs, herbs, seedlings and climbers influenced most of the density and the basal cover of the sites. But, most of the saplings, particularly herbs, were categorized as annually-growing species that abundant only in a particular season. Therefore, they cannot identify the maturity or density of the forests as they may have disappeared in the next non-growing season.

Habitat improvement was clearly shown in the comparative vegetation data of 2006 and 2011. Most of the sampling plots have shown an improvement in plant density as well as diversity. But in few communities, there was a declining feature in plant diversity and species richness due to different sampling location and different number of plots constructed. Moreover, as timing (or season) of sampling was also different, majority of plant species recorded in 2006 were annual plants with few tree species. However, the 2011 data has shown more trees and fewer annuals (herbs).

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