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## PHYTOSOCIOLOGICAL STUDY OF FABACEAE PLANT SPECIES IN BALARAM AND ITS ENVIRONS, BANASKANTHA DISTRICT

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### ABSTRACT

Balaram is situated in Banaskantha district of Gujarat. The district takes the name from the river Banas that flows through the district. The Banaskantha district as its name indicates consists of the territories situated on around the river Banas. Quantitative analysis was carried out of selected dominant fabaceae species in Balaram and its environs. For the enumeration of the fabaceae species systematic random sampling method was followed. For the enumeration of plants species sample plots of either 20 × 20 mts size for tree, 5 × 5 mts size for shrubs, climber and 1 × 1 mt size for herbs were demarcated in different areas of Balaram. Ecological parameters like frequency, density and abundance were studied for the fabaceae species recorded in the sample plots. In herb species dominant due to their frequency are followed as *Tephrosia purpuria* (L.) Pers., *Crotalaria burhia* Buch. Ham., *Indigofera spicata* Forssk., *Indigofera linnaei* Ali. and *Alysicarpus longifolius* (Spreng.) Wight & Arn. Dominant species of the climber are *Canavalia ensiformis* (L.) DC., *Lablab purpurea* (L.) Sweet. and *Vigna unguiculata* (L.) Walp. Dominant species of the tree species are *Butea monosperma* (Lam.) Taub. and dominant species of the shrub is *Cajanus cajan* (L.) Huth.

**Key words:** Phytosociological, Balaram and Banaskantha

### INTRODUCTION

The Balaram Ambaji Wildlife Sanctuary covered by village of Danta, Amirgadh, Palanpur, and Vadgam Talukas of Banaskantha district. It lies between 24° 10' to 24° 30' latitude and 72° 20' to 73° 00' longitudes. Total area of BAWs is 542.08 sq.km. out of 542.08 sq.km. We covered 145 sq. km. area during the research work. The Fabaceae is commonly known as the legume, pea or bean family having large number of economically important plants. The Fabaceae, is the third largest family in the world after Asteraceae and Orchidaceae with about 730 genera

and nearly 20,000 species (Wojciechowski *et al.*, 2004) and the second after Poaceae in terms of agricultural and economic importance (Lewis *et al.*, 2005).

## METHODOLOGY

Collected plant species were identified by state flora (Shah, 1978). Phytosociological values were calculated by method of Sharma (2004). For calculation of frequency, abundance and density of trees, herbs, shrubs and climbers of Balaram and its environs a systematic random sampling method was applied. Density gives an idea of the number of individuals per unit area irrespective of its occurrence or not in a specific plot. For the enumeration of plants species sample plots of either 20×20 mts size for tree, 5×5 mts size for shrubs, climber and 1×1 mt size for herbs were demarcated in different areas of Balaram. The density and frequency taken together are of prime importance in determining community structure and have a variety of uses for beyond those of the other quantitative value. After determine the percentage frequency of each species various species are distributed among Raunkiares (1934) five frequency classes depending upon their frequency values.

## RESULTS AND DISCUSSION

Phytosociological study total 59 species were recorded from 32 genera in sample plots and 3 species are found outside the sample plots, which are *Desmodium gangeticum* L. var. *maculatum*, *Desmodium triangulare* Retz. var. *congestum* and *Uraria picta* Desv.

**Table: 1 Frequency, abundance and density of Fabaceae plant species.**

| Sr. No. | Botanical Name                                        | No. of individuals | Occurrence quadrates | Frequency (%) | Frequency class | Abundance   | Density    |
|---------|-------------------------------------------------------|--------------------|----------------------|---------------|-----------------|-------------|------------|
| 1       | <i>Abrus precatorius</i> L.                           | 16                 | 14                   | 3.5           | A               | 1.14        | 0.04       |
| 2       | <i>Alysicarpus bupleurifolius</i> (L.) DC.            | 29                 | 22                   | 5.5           | A               | 1.32        | 0.07       |
| 3       | <i>Alysicarpus longifolius</i> (Spreng.) Wight & Arn. | 56                 | 40                   | 10            | A               | 1.4         | 0.14       |
| 4       | <i>Alysicarpus procumbens</i> Schindl.                | 38                 | 31                   | 7.75          | A               | 1.23        | 0.1        |
| 5       | <i>Alysicarpus scariosus</i> Graham.                  | 11                 | 9                    | 2.25          | A               | 1.22        | 0.027      |
| 6       | <i>Alysicarpus tetragonolobus</i> Edgew.              | 21                 | 16                   | 4             | A               | 1.31        | 0.053      |
| 7       | <i>Alysicarpus vaginalis</i> (L.) DC.                 | 23                 | 18                   | 4.5           | A               | 1.3         | 0.058      |
| 8       | <i>Arachis hypogaea</i> L.                            | 25                 | 8                    | 2             | A               | 3.13        | 0.062      |
| 9       | <b><i>Butea monosperma</i> (Lam.) Taub.</b>           | <b>370</b>         | <b>92</b>            | <b>92</b>     | <b>E</b>        | <b>4.02</b> | <b>3.7</b> |
| 10      | <i>Cajanus cajan</i> (L.) Huth.                       | 90                 | 34                   | 8.5           | A               | 2.67        | 0.23       |
| 11      | <i>Canavalia ensiformis</i> (L.) DC.                  | 94                 | 81                   | 20.25         | B               | 1.16        | 0.24       |
| 12      | <i>Cicer arietinum</i> L.                             | 28                 | 13                   | 3.25          | A               | 2.15        | 0.07       |
| 13      | <i>Clitoria ternatea</i> L.                           | 10                 | 7                    | 1.75          | A               | 1.43        | 0.025      |
| 14      | <i>Crotalaria burhia</i> Buch. Ham.                   | 197                | 136                  | 34            | B               | 1.45        | 0.5        |
| 15      | <i>Crotalaria juncea</i> L.                           | 5                  | 4                    | 1             | A               | 1.25        | 0.013      |
| 16      | <i>Crotalaria medicaginea</i> Lam.                    | 19                 | 18                   | 4.5           | A               | 1.14        | 0.047      |
| 17      | <i>Crotalaria retusa</i> L.                           | 5                  | 4                    | 1             | A               | 1.25        | 0.013      |
| 18      | <i>Cyamopsis tetragoloba</i> (L.) Taub.               | 15                 | 8                    | 2             | A               | 1.88        | 0.038      |
| 19      | <i>Dalbergia sissoo</i> Roxb.                         | 79                 | 60                   | 60            | C               | 1.32        | 0.79       |
| 20      | <i>Derris indica</i> (Lam.) Bennet.                   | 38                 | 36                   | 36            | B               | 1.06        | 0.38       |
| 21      | <i>Desmodium triflorum</i> (L.) DC.                   | 6                  | 5                    | 1.25          | A               | 1.2         | 0.015      |
| 22      | <i>Dolichos falcatus</i> L.                           | 44                 | 32                   | 8.5           | A               | 1.26        | 0.11       |
| 23      | <i>Dolichos trilobus</i> J.K.kelein                   | 43                 | 34                   | 8             | A               | 1.38        | 0.11       |
| 24      | <i>Erythrina variegata</i> L.                         | 2                  | 2                    | 2             | A               | 1           | 0.02       |
| 25      | <i>Gliricidia sepium</i> (Jacq.) Walp.                | 2                  | 1                    | 1             | A               | 2           | 0.01       |

|    |                                                               |     |     |       |   |      |       |
|----|---------------------------------------------------------------|-----|-----|-------|---|------|-------|
| 26 | <i>Goniogyna hirta</i> (Willd.) Ali.                          | 4   | 4   | 1     | A | 1    | 0.01  |
| 27 | <i>Indigofera astragalina</i> DC.                             | 19  | 15  | 3.75  | A | 1.27 | 0.048 |
| 28 | <i>Indigofera cordifolia</i> Roth.                            | 40  | 36  | 9     | A | 1.1  | 0.1   |
| 29 | <i>Indigofera linifolia</i> Retz. var. <i>campbellii</i>      | 6   | 4   | 1     | A | 1.5  | 0.015 |
| 30 | <i>Indigofera linifolia</i> Retz. var. <i>linifolia</i>       | 7   | 6   | 1.5   | A | 1.17 | 0.017 |
| 31 | <i>Indigofera linnaei</i> Ali.                                | 67  | 55  | 13.75 | A | 1.22 | 0.17  |
| 32 | <i>Indigofera spicata</i> Forssk.                             | 92  | 74  | 18.5  | A | 1.24 | 0.23  |
| 33 | <i>Indigofera tinctoria</i> L.                                | 10  | 9   | 2.25  | A | 1.11 | 0.025 |
| 34 | <i>Lablab purpurea</i> (L.) Sweet.                            | 7   | 6   | 1.5   | A | 1.17 | 0.018 |
| 35 | <i>Medicago sativa</i> L.                                     | 19  | 13  | 3.25  | A | 1.46 | 0.048 |
| 36 | <i>Melilotus alba</i> Lam.                                    | 56  | 30  | 7.5   | A | 1.87 | 0.14  |
| 37 | <i>Melilotus indica</i> Ali.                                  | 25  | 21  | 5.25  | A | 1.19 | 0.063 |
| 38 | <i>Mucuna prurita</i> Hk.                                     | 86  | 75  | 18.75 | A | 1.15 | 0.15  |
| 39 | <i>Phaseolus vulgaris</i> L.                                  | 11  | 10  | 2.5   | A | 1.1  | 0.028 |
| 40 | <i>Pisum sativum</i> L.                                       | 9   | 3   | 0.75  | A | 3    | 0.023 |
| 41 | <i>Psoralea corylifolia</i> L.                                | 2   | 2   | 0.5   | A | 1    | 0.005 |
| 42 | <i>Psoralea plicata</i> Del.                                  | 2   | 2   | 0.5   | A | 1    | 0.005 |
| 43 | <i>Pterocarpus marsupium</i> Roxb.                            | 2   | 2   | 2     | A | 1    | 0.02  |
| 44 | <i>Rhynchosia minima</i> (L.) DC. var. <i>minima</i>          | 21  | 17  | 4.25  | A | 1.24 | 0.053 |
| 45 | <i>Rhynchosia minima</i> (L.) DC var. <i>laxiflora</i>        | 37  | 31  | 7.75  | A | 1.2  | 0.093 |
| 46 | <i>Sesbania bispinosa</i> (Jacq.) W.F.                        | 3   | 3   | 0.75  | A | 1    | 0.008 |
| 47 | <i>Sesbania grandiflora</i> (L.) Pers.                        | 3   | 3   | 3     | A | 1    | 0.03  |
| 48 | <i>Sesbania sesban</i> (L.) Merr. var. <i>sesban</i>          | 4   | 4   | 1     | A | 1    | 0.01  |
| 49 | <i>Tephrosia pumila</i> (Lam.) Pers.                          | 2   | 1   | 0.25  | A | 2    | 0.005 |
| 50 | <i>Tephrosia purpuria</i> (L.) Pers.                          | 400 | 220 | 55    | C | 1.82 | 1     |
| 51 | <i>Tephrosia tinctoria</i> (L.) Pers.                         | 3   | 3   | 0.75  | A | 1    | 0.008 |
| 52 | <i>Tephrosia villosa</i> (L.) Pers.                           | 56  | 46  | 11.5  | A | 1.22 | 0.14  |
| 53 | <i>Trifolium repens</i> L.                                    | 10  | 8   | 2     | A | 1.25 | 0.025 |
| 54 | <i>Trigonella foenum-graecum</i> L.                           | 92  | 30  | 7.5   | A | 3.1  | 0.23  |
| 55 | <i>Vigna aconitifolia</i> (Jacq.) Marchal.                    | 48  | 20  | 5     | A | 2.4  | 0.12  |
| 56 | <i>Vigna radiata</i> (L.) Wilczek var. <i>radiata</i>         | 28  | 16  | 4     | A | 1.75 | 0.07  |
| 57 | <i>Vigna radiata</i> (L.) Wilczek var. <i>sublobata</i> Roxb. | 9   | 5   | 1.25  | A | 1.5  | 0.023 |
| 58 | <i>Vigna unguiculata</i> (L.) Walp.                           | 88  | 52  | 13    | A | 1.7  | 0.22  |
| 59 | <i>Vigna vexillata</i> (L.) A. Rich.                          | 4   | 2   | 0.5   | A | 2    | 0.01  |

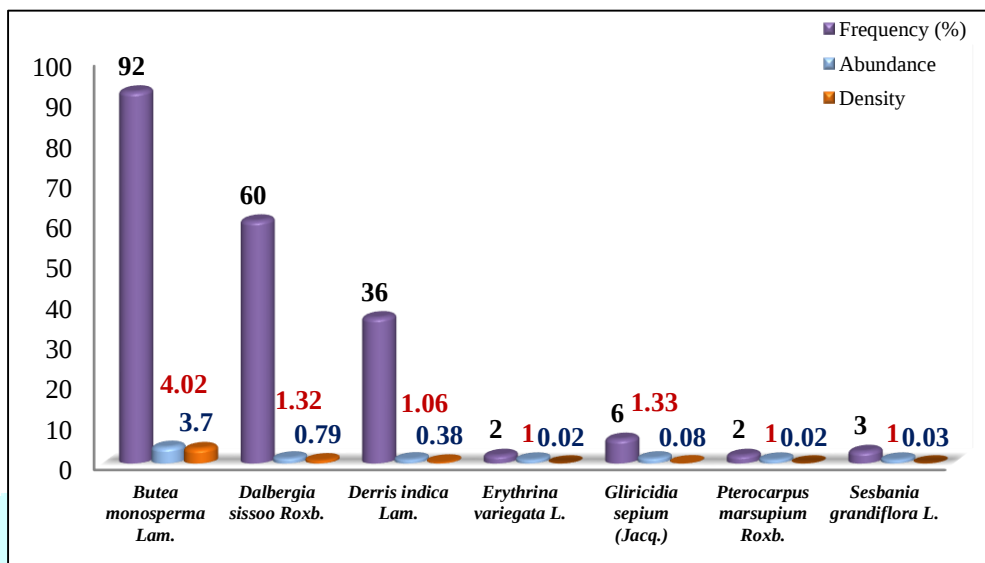
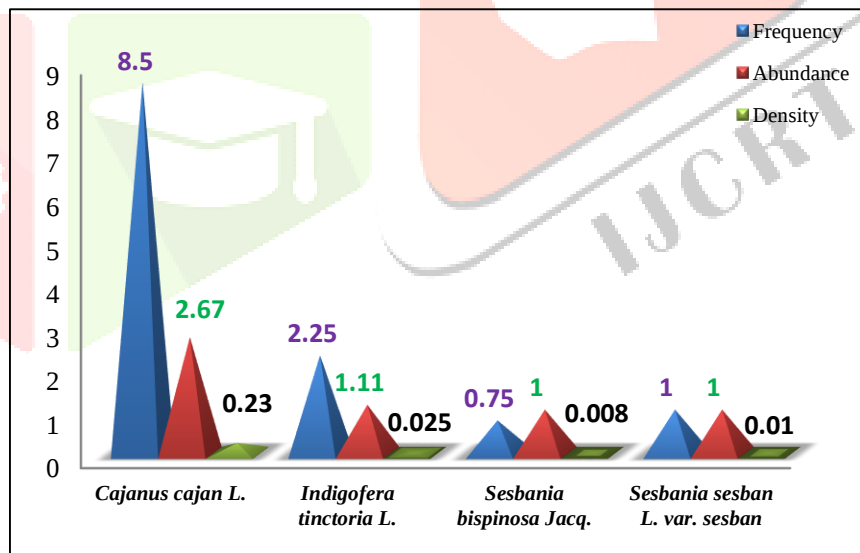
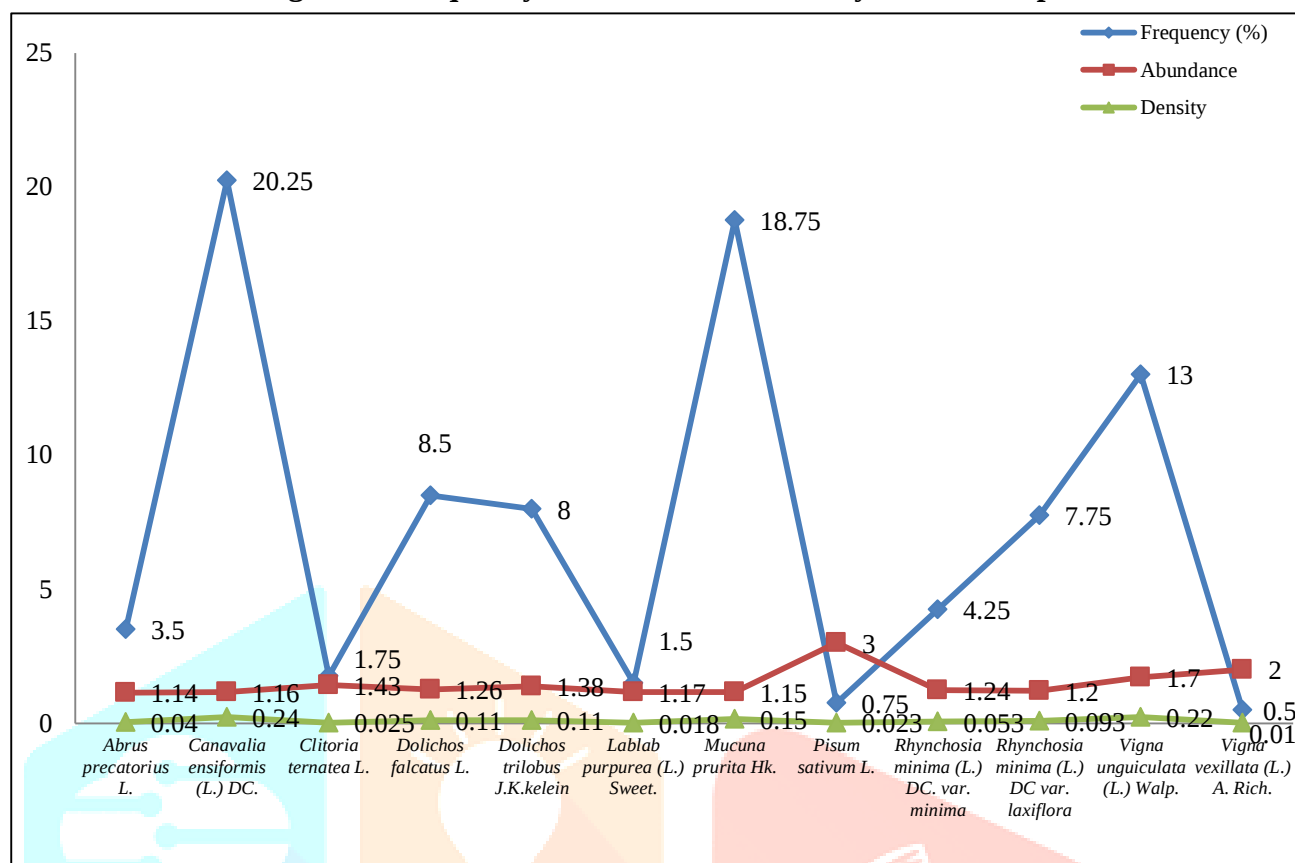
**Figure: 1 Frequency, abundance and density of tree species****Figure: 2 Frequency, abundance and density of shrub species**

Figure: 3 Frequency, abundance and density of climber species



## CONCLUSION

In our study 62 species are collected in this area collected tree is 7 which belong to 7 genera, shrub species is 4 which belong to 3 genera, herb species is 39 belonging 17 genera while climber species is 12 which belonging to 9 genera. Highest diversity of the Fabaceae is the herb species followed by climbers, trees and shrubs. In herb species dominant due to their frequency are followed as *Tephrosia purpuria* (L.) Pers., *Crotalaria burhia* Buch. Ham., *Indigofera spicata* Forssk., *Indigofera linnaei* Ali. and *Alysicarpus longifolius* (Spreng.) Wight & Arn. Dominant species of the climbers are *Canavalia ensiformis* (L.) DC., *Lablab purpurea* (L.) Sweet. and *Vigna unguiculata* (L.) Walp. Dominant species of the tree species are *Butea monosperma* (Lam.) Taub. and dominant species of the shrub species is *Cajanus cajan* (L.) Huth. The dry deciduous forest is suitable for the growth and development of *Butea monosperma* (Lam.) Taub.

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