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# SOME NOTES ON THE VEGETATION OF ACHHRO THAR (WHITE DESERT) OF NARA REGION, SINDH, PAKISTAN

**RAHMATULLAH QURESHI[*1] AND MUSHTAQ AHMAD[2]**

*Department of Botany, Pir Mehr Ali Shah Arid Agriculture University, Murree Road, Rawalpindi. Pakistan.*
*[2]Department of Plant Sciences, Quaid-i-Azam University, Islamabad Pakistan.*

**Abstract**

A preliminary survey was carried out in the month of October 2001 from *Achhro Thar* (White desert) of Nara region, Sindh with the aim to record the flora and vegetation of the area in question. Four microhabitats were delineated based on the topography and physiognomic features. Various vegetation parameters like cover, frequency and density were recorded along each transect line using the line intercept method. Within vegetation stands, a total of 76 species belonging to 58 genera and 26 families were identified. In all, 4 plant communities were constructed based on Summed Dominance Ration (SDR). The existing vegetation of the area was identified and categorized into four plant communities viz., 1) *Calligonum-Indigofera-Dipterygium* in Crest*; Calligonum-Aerva-Indigofera* on Slope*; Prosopis-Tamarix* in flat plain and *Desmostachya-Pluchea-Zygophyllum* in Marshland. In all, 8 species viz., *Calligonum polygonoides, Indigofera argentea, Dipterygium glaucum, Prosopis cineraria, Tamarix aphylla, Desmostachya bipinnata, Pluchea lanceolata* and *Zygophyllum simplex* contributed in the formation of plant communities of the area. Amongst the two microhabitats, *Calligonum polygonoides* and *Indigofera argentea* were constantly found in crest and slope habitats and rest of the habitats had different vegetation makeup. The highest species richness was recorded from flat habitat having 61 species followed by slope (37 species), marshland (27 species) and crest (15 species).

## Introduction

Achhro Thar is located in Khipro Taluka (Tehsil), district Sanghar, Sindh Pakistan. It is a part of the Nara Desert and located along the eastern border of India. Because of loose white sand, this part of the desert is named as *Achhro Thar*. The rapid shifting of dunes is the distinct feature of this part of desert. The desert is spread over 4,508 $km^2$ (11, 13, 860 acres) out of the total area of the Taulka Khipro (Anon., 2008). The climate of this area is tropical to subtropical in nature with the mean maximum and minimum temperature ranges of 40°C and 0°C respectively. The hottest months are May and June when average maximum daily temperature reaches up to 50°C. The coolest months are December to February, when the maximum daily temperatures ranges from 25 to 30C. The rainfall is sparse and erratic mostly received in between July and August.

Various studies have been reported on the vegetation across the world (Kandari, 1990; Hajra & Rao, 1990; Asmus, 1990; Shimizu, 1991; Sing & Gupta; Hussain *et al*., 2000). Few studies have been carried out from the adjoining areas (Qureshi, 2008; Qureshi & Bhatti, 2008); however there is no report on the vegetation of the study area. Therefore, the present study was launched to assess the vegetation of the study area.

[*]E-mail: rahmatullahq@yahoo.com, phytotaxonomist@gmail.com;
Tel. +9251-9290093, +092300-6730496

## Materials and Methods

The vegetation study was undertaken in the month of October, 2001. The area was marked into four microhabitats on the basis of topography and physiognomic features. Various vegetation parameters like cover, frequency and density were recorded along each transect line using the line intercept method by following the work of Canfield (1940). Ten transects were randomly selected each measuring 50 meter for the determination of vegetation stands. Summed Dominance Ration (SDR) was computed for each species that was calculated by adding relative density, frequency and cover percentages and dividing by three (Kent & Coker, 1992). When two or more species closely approached each other in order of SDR, the community shared the names of these dominants. The name of the species with highest SDR appears first followed by other dominant species. Species other than the dominants were classified into co-dominants, associates and rare. Plants were identified with the help of floristic literature Jafri, 1966; Nasir & Ali 1970-1989; Ali & Nasir 1989-1991; Ali & Qaiser, 1993-2009; Matthew, 1981-83; Batanouny, 1981; Boulos, 1991; Shetty & Singh, 1987 & 1991; Bhandari, 1978). Life forms were determined by following the work of Raunkiaér (1934)

## Results and Discussion

**Vegetation:** During the vegetation survey, 4 microhabitats were delineated based on the topography and physiognomic features from the study area. Within vegetation stands, a total of 76 species belonging to 58 genera and 26 families were identified. The plant communities were constructed based on Summed Dominance Ration (SDR). The existing vegetation of the area was identified and categorized into 4 plant communities viz., 1) *Calligonum-Indigofera-Dipterygium* in Crest*; Calligonum-Aerva-Indigofera* on Slope*; Prosopis-Tamarix* in flat and *Desmostachya-Pluchea-Zygophyllum* in Marshland. In all, 9 species viz. *Calligonum polygonoides, Indigofera argentea, Dipterygium glaucum, Prosopis cineraria, Tamarix aphylla, Desmostachya bipinnata, Pluchea lanceolata* and *Zygophyllum simplex* contributed in the formation of plant communities of the area. Amongst the 2 microhabitats, *Calligonum polygonoides* and *Indigofera argentea* were constantly found in crest and slope habitats and rest of the habitats had different vegetation makeup. The highest species richness was recorded from flat habitat having 61 species followed by slope (37 species), marshland (27 species) and crest (15 species). Poaceae contributed the highest number of species in the vegetation of the study area (21.05%) followed by Fabaceae (9.21%), Aizoaceae (7.89%), Zygophyllaceae (6.58%) and Capparidaceae, Mimosaceae (5.26% each), whereas, rest of the families had fewer species (Table 2).

There was a good diversity of life forms of the vegetation of the study area. The most common life form of the present flora was Therophytes with 50% (Fig. 1) followed by Phanerophytes (32.89%) and Hemicryptophyte (9.21%), while the other vegetation life forms were almost in negligible proportions.

Based on Frequency %, the status of taxa was determined. Two species *Calligonum polygonoides* and *Tribulus longipetalous* were found as very common species having 80-85%, whereas six species were marked as frequent and occasional with the frequency% of 60-75% and 40-45% respectively. The highest number of species (26 spp.) was found as very rare with the frequency percentage of 10 (Table 1; Fig. 2).

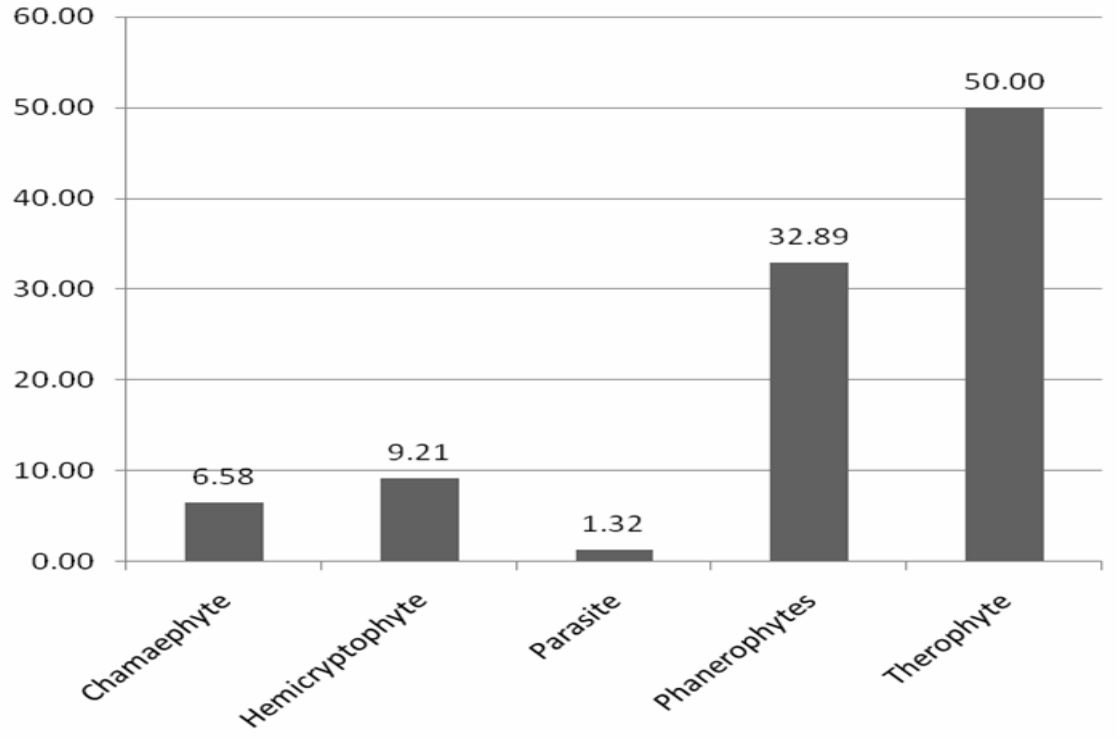


Fig. 1. Life form classes of the flora of Achhro Thar.

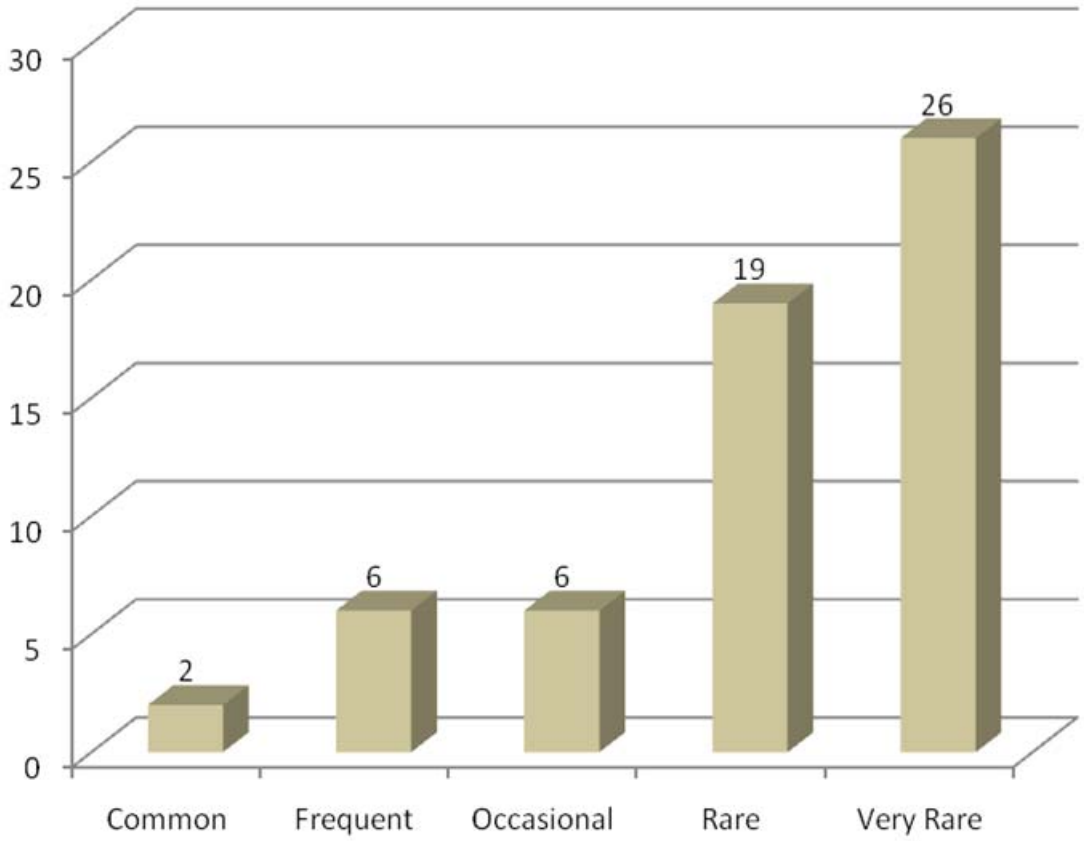


Fig. 2. Status of different taxa based on frequency (%).

**Table 1. Showing summed dominance ratio (SDR) of plant species from *Achhro Thar*.**

| S. No. | Plant species | Family | Life form | Crest | Slope | Flat | Marshland | Freq. % |
|---|---|---|---|---|---|---|---|---|
| | | | | CID | CAI | PT | DPZ | |
| 1. | *Acacia jacquemontii* Benth. | Mimosaceae | Phanerophytes | 1.80 | 1.65 | 0.00 | 0.00 | 10 |
| 2. | *Acacia senegal* (L.) Willd. | Mimosaceae | Phanerophytes | 0.00 | 1.12 | 0.00 | 0.00 | 10 |
| 3. | *Achyranthus aspera* L. | Amaranthaceae | Phanerophytes | 0.00 | 0.00 | 1.15 | 0.00 | 10 |
| 4. | *Aerva javanica* (Burm.f.)Juss. | Amaranthaceae | Phanerophytes | 11.20 | 9.45** | 1.56 | 0.00 | 65 |
| 5. | *Alhagi maurorum* Medic. | Fabaceae | Phanerophytes | 0.00 | 0.00 | 0.98 | 2.12 | 10 |
| 6. | *Amaranthus graecizans* L. | Amaranthaceae | Therophyte | 0.00 | 0.00 | 0.85 | 0.00 | 10 |
| 7. | *Aristida adscensionis* L. | Poaceae | Therophyte | 1.28 | 2.31 | 0.00 | 0.00 | 10 |
| 8. | *Aristida funiculata* Trin. & Rupr. | Poaceae | Therophyte | 0.00 | 0.98 | 0.73 | 0.00 | 10 |
| 9. | *Aristida mutabilis* Trin. & Rupr. | Poaceae | Therophyte | 0.00 | 0.00 | 1.12 | 0.00 | 20 |
| 10. | *Blepharis sindica* Stocks ex. T. Anders. | Acanthaceae | Therophyte | 0.00 | 0.00 | 1.15 | 0.00 | 10 |
| 11. | *Boerhavia procumbens* Banks ex Roxb. | Nyctaginaceae | Therophyte | 2.15 | 1.29 | 0.78 | 1.00 | 20 |
| 12. | *Brachiaria ramosa* (L.) Stapf | Poaceae | Therophyte | 0.00 | 0.00 | 0.93 | 0.00 | 20 |
| 13. | *Calligonum polygonoides* L. | Polygonaceae | Phanerophytes | 22.12* | 16.67* | 0.00 | 0.00 | 85 |
| 14. | *Calotropis procera* (Ait.) Ait.f. | Asclepiadaceae | Phanerophytes | 0.00 | 0.00 | 1.50 | 2.24 | 30 |
| 15. | *Capparis decidua* (Forssk.) Edgew. | Capparidaceae | Phanerophytes | 0.00 | 0.00 | 0.76 | 4.45 | 10 |
| 16. | *Cenchrus biflorus* Roxb. | Poaceae | Therophyte | 0.00 | 0.78 | 0.67 | 0.63 | 10 |
| 17. | *Cenchrus ciliaris* L. | Poaceae | Therophyte | 1.48 | 0.82 | 1.12 | 0.45 | 10 |
| 18. | *Cenchrus pennisetiformis* Hochst. & Steud. ex Steud | Poaceae | Hemicryptophyte | 0.00 | 1.23 | 0.71 | 0.00 | 10 |
| 19. | *Citrullus colocynthis* (L.) Schrad. | Cucubitaceae | Chamaephyte | 0.00 | 3.45 | 4.56 | 0.00 | 30 |
| 20. | *Cleome scaposa* DC. | Capparidaceae | Therophyte | 0.00 | 1.92 | 1.16 | 0.00 | 45 |
| 21. | *Convolvulus glomeratus* Choisy. | Convolvulaceae | Therophyte | 0.00 | 0.00 | 0.73 | 0.00 | 10 |
| 22. | *Convolvulus prostratus* Forssk. | Convolvulaceae | Therophyte | 0.00 | 0.00 | 0.46 | 0.00 | 30 |
| 23. | *Corchorus depressus* (L.) Stocks | Tiliaceae | Therophyte | 0.00 | 0.00 | 2.12 | 0.00 | 25 |
| 24. | *Corchorus tridens* L. | Tiliaceae | Therophyte | 0.00 | 1.64 | 1.84 | 0.00 | 10 |
| 25. | *Cordia gharaf* (Forsk.) Ehren. ex Asch. | Boraginaceae | Phanerophytes | 0.00 | 0.00 | 0.37 | 0.00 | 10 |

Table 1. (Cont'd.).

| S. No. | Plant species | Family | Life form | Crest | Slope | Flat | Marshland | Freq. % |
|---|---|---|---|---|---|---|---|---|
| | | | | CID | CAI | PT | DPZ | |
| 26. | *Crotalaria burhia* Ham. Ex Bth. | Fabaceae | Phanerophytes | 8.98 | 4.45 | 1.25 | 0.00 | 60 |
| 27. | *Cuscuta chinensis* Lam. | Cuscutaceae | Parasite | 0.00 | 0.00 | 0.53 | 0.00 | 10 |
| 28. | *Cyperus arenarius* Retz. | Cyperaceae | Hemicryptophyte | 1.50 | 1.12 | 0.00 | 0.00 | 10 |
| 29. | *Cyperus rotundus* L. | Cyperaceae | Hemicryptophyte | 0.00 | 0.00 | 1.80 | 0.00 | 30 |
| 30. | *Dactyloctenium aegyptium* (L.) Willd. | Poaceae | Therophyte | 0.00 | 1.50 | 2.84 | 6.00 | 35 |
| 31. | *Dactyloctenium scindicum* Boiss. | Poaceae | Therophyte | 0.00 | 1.78 | 4.56 | 0.56 | 45 |
| 32. | *Datura fastuosa* L. | Solanaceae | Phanerophytes | 0.00 | 0.00 | 0.50 | 0.00 | 10 |
| 33. | *Desmostachya bipinnata* (L.) Stapf | Poaceae | Hemicryptophyte | 0.00 | 0.00 | 0.84 | 19.3* | 20 |
| 34. | *Dipterygium glaucum* Decne. | Capparidaceae | Chamaephyte | 11.8*** | 8.96 | 0.00 | 0.00 | 75 |
| 35. | *Eragrostis cilianensis* (All.) Lut. ex F.T. Hubbard | Poaceae | Therophyte | 0.00 | 0.00 | 1.45 | 0.52 | 20 |
| 36. | *Eragrostis ciliaris* (L.) R. Br. | Poaceae | Therophyte | 0.00 | 0.00 | 0.48 | 0.00 | 15 |
| 37. | *Euphorbia caducifolia* Haines | Euphorbiaceae | Phanerophytes | 0.00 | 4.45 | 0.00 | 0.00 | 30 |
| 38. | *Euphorbia clarkeana* Hk.f. | Euphorbiaceae | Therophyte | 0.00 | 0.98 | 0.78 | 0.00 | 35 |
| 39. | *Fagonia indica* Burm.f. | Zygophyllaceae | Chamaephyte | 0.00 | 0.00 | 3.45 | 0.00 | 40 |
| 40. | *Farsetia hamiltonii* Royle | Brassicaceae | Therophyte | 0.00 | 0.90 | 0.55 | 0.00 | 10 |
| 41. | *Gisekia pharnaceoides* L. | Aizoaceae | Therophyte | 0.00 | 1.45 | 0.78 | 0.00 | 20 |
| 42. | *Gynandropsis gynandra* (L.) Briq. | Capparidaceae | Therophyte | 0.00 | 1.17 | 0.89 | 0.00 | 30 |
| 43. | *Haloxylon stocksii* (Boiss.) Benth. & Hook. | Chenopodiaceae | Phanerophytes | 0.00 | 0.00 | 0.00 | 5.20 | 10 |
| 44. | *Heliotropium crispum* Desf. | Boraginaceae | Phanerophytes | 0.00 | 0.00 | 0.00 | 2.60 | 30 |
| 45. | *Heliotropium strigosum* Willd. | Boraginaceae | Therophyte | 0.00 | 0.00 | 1.45 | 1.20 | 30 |
| 46. | *Indigofera argentea* Burm.f. | Fabaceae | Chamaephyte | 15.69** | 8.98*** | 0.00 | 0.00 | 75 |
| 47. | *Indigofera cordifolia* Heyne ex Roth | Fabaceae | Therophyte | 1.41 | 0.82 | 0.82 | 1.36 | 25 |
| 48. | *Indigofera hochstetteri* Baker | Fabaceae | Therophyte | 0.00 | 0.55 | 0.78 | 0.00 | 30 |
| 49. | *Indigofera sessiliflora* DC. | Fabaceae | Therophyte | 0.00 | 0.82 | 0.69 | 0.00 | 20 |
| 50. | *Leptadenia pyrotechnica* (Forssk.) Dcne. | Asclepiadaceae | Phanerophytes | 0.00 | 1.78 | 1.23 | 0.00 | 35 |

**Table 1. (Cont'd.).**

| S. No. | Plant species | Family | Life form | Crest | Slope | Flat | Marshland | Freq. |
|---|---|---|---|---|---|---|---|---|
| | | | | CID | CAI | PT | DPZ | % |
| 51. | *Limeum indicum* Stocks ex. T. Anders. | Aizoaceae | Therophyte | 7.89 | 2.45 | 0.50 | 1.33 | 65 |
| 52. | *Lycium edgeworthii* Dunal | Solanaceae | Phanerophytes | 0.00 | 0.00 | 0.55 | 0.00 | 10 |
| 53. | *Lycium ruthenicum* Murray | Solanaceae | Phanerophytes | 0.00 | 0.00 | 0.48 | 0.00 | 20 |
| 54. | *Mollugo cerviana* (L.) Ser. | Molluginaceae | Therophyte | 0.00 | 0.76 | 1.32 | 0.00 | 30 |
| 55. | *Mukia maderaspatana* (L.) M.J. Roem. | Cucubitaceae | Hemicryptophyte | 0.00 | 0.00 | 0.52 | 0.00 | 10 |
| 56. | *Ochthochloa compressa* (Forssk.) Hilu | Poaceae | Hemicryptophyte | 4.52 | 3.45 | 2.12 | 5.72 | 75 |
| 57. | *Panicum turgidum* Forssk. | Poaceae | Phanerophytes | 0.00 | 2.55 | 0.00 | 0.00 | 30 |
| 58. | *Pentatropis nivalis* (J.F. Gmel.) Field & J.R.I. Wood | Asclepiadaceae | Phanerophytes | 0.00 | 0.00 | 0.89 | 0.00 | 20 |
| 59. | *Pluchea lanceolata* (DC.) C.B. Clarke | Asteraceae | Phanerophytes | 0.00 | 0.00 | 1.07 | 14.89** | 20 |
| 60. | *Prosopis cineraria* (L.) Druce. | Mimosaceae | Phanerophytes | 0.00 | 0.00 | 19.98* | 2.58 | 30 |
| 61. | *Prosopis juliflora* Swartz | Mimosaceae | Phanerophytes | 0.00 | 0.00 | 0.72 | 0.00 | 10 |
| 62. | *Saccharum spontaneum* L. | Poaceae | Hemicryptophyte | 0.00 | 0.00 | 0.98 | 1.65 | 35 |
| 63. | *Salsola imbricata* Forssk. | Chenopodiaceae | Phanerophytes | 0.00 | 0.00 | 0.00 | 4.25 | 20 |
| 64. | *Salvadora oleoides* Decne. | Salvadoraceae | Phanerophytes | 0.00 | 2.59 | 1.19 | 0.00 | 40 |
| 65. | *Senna italica* Mill. | Caesalpiniaceae | Therophyte | 0.00 | 1.54 | 1.50 | 1.69 | 30 |
| 66. | *Sesuvium sesuvioides* (Fens) Verdi. | Aizoaceae | Therophyte | 0.00 | 0.00 | 0.52 | 4.05 | 10 |
| 67. | *Stipagrostis plumosa* (L.) Munro ex T. Anders. | Poaceae | Therophyte | 1.65 | 1.06 | 0.00 | 0.00 | 45 |
| 68. | *Tamarix aphylla* (L.) Karst. | Tamaricaceae | Phanerophytes | 0.00 | 0.00 | 9.1** | 0.00 | 45 |
| 69. | *Tephrosia uniflora* Pers. | Fabaceae | Chamaephyte | 0.00 | 0.00 | 1.15 | 0.00 | 20 |
| 70. | *Trianthema portulacastrum* L. | Aizoaceae | Therophyte | 0.00 | 0.00 | 1.12 | 0.00 | 10 |
| 71. | *Trianthema triquetra* Rottl. and Willd. | Aizoaceae | Therophyte | 0.00 | 0.00 | 0.00 | 2.30 | 25 |
| 72. | *Tribulus longipetalus* Viv. | Zygophyllaceae | Therophyte | 6.53 | 2.58 | 2.25 | 2.55 | 80 |
| 73. | *Tribulus ochroleucus* (Maire) Ozenda & Quezel | Zygophyllaceae | Therophyte | 0.00 | 0.00 | 1.45 | 1.41 | 35 |
| 74. | *Tribulus terrestris* L. | Zygophyllaceae | Therophyte | 0.00 | 0.00 | 0.82 | 0.00 | 25 |
| 75. | *Zaleya pentandra* (L.) Jeffrey. | Aizoaceae | Therophyte | 0.00 | 0.00 | 0.85 | 2.50 | 25 |
| 76. | *Zygophyllum simplex* L. | Zygophyllaceae | Therophyte | 0.00 | 0.00 | 0.00 | 7.45*** | 30 |

Plant communities: CID = *Calligonum-Indigofera-Dipterygium;* CAI = *Calligonum- Aerva-Indigofera;* PT = *Prosopis-Tamarix*; DPZ=*Desmostachya-Pluchea-Zygophyllum*

**Table 2. Share of plant families in the vegetation of Achhro Thar.**

| S. No. | Family | Sp # | % Age |
|---|---|---|---|
| 1. | Poaceae | 16 | 21.05 |
| 2. | Fabaceae | 7 | 9.21 |
| 3. | Aizoaceae | 6 | 7.89 |
| 4. | Zygophyllaceae | 5 | 6.58 |
| 5. | Capparidaceae | 4 | 5.26 |
| 6. | Mimosaceae | 4 | 5.26 |
| 7. | Amaranthaceae | 3 | 3.95 |
| 8. | Asclepiadaceae | 3 | 3.95 |
| 9. | Boraginaceae | 3 | 3.95 |
| 10. | Solanaceae | 3 | 3.95 |
| 11. | Chenopodiaceae | 2 | 2.63 |
| 12. | Convolvulaceae | 2 | 2.63 |
| 13. | Cucubitaceae | 2 | 2.63 |
| 14. | Cyperaceae | 2 | 2.63 |
| 15. | Euphorbiaceae | 2 | 2.63 |
| 16. | Tiliaceae | 2 | 2.63 |
| 17. | Acanthaceae | 1 | 1.32 |
| 18. | Asteraceae | 1 | 1.32 |
| 19. | Brassicaceae | 1 | 1.32 |
| 20. | Caesalpiniaceae | 1 | 1.32 |
| 21. | Cuscutaceae | 1 | 1.32 |
| 22. | Molluginaceae | 1 | 1.32 |
| 23. | Nyctaginaceae | 1 | 1.32 |
| 24. | Polygonaceae | 1 | 1.32 |
| 25. | Salvadoraceae | 1 | 1.32 |
| 26. | Tamaricaceae | 1 | 1.32 |

**Microhabitats and vegetation**

**1. Crest habitat:** Sand hills and hummocky dunes are typical features of this microhabitat. They vary in their height ranges from few meters to above 110 meters. Since the sand is the dominant fraction, therefore there is sparse vegetation due to sandy soil. This habitat was dominated by *Calligonum-Indigofera-Dipterygium* plant community consisting on *Calligonum polygonoides, Indigofera argenta* and *Dipterygium glaucum* with the SDR value of 11.80-22-12 (Table 1). In addition, *Aerva-Crotalaria-Limeum* was found as associated community in this habitat. The species composition of the later community was *Aerva javanica, Crotalaria burhia* and *Limeum indicum*. The other common species include *Tribulus longipetalus* and *Ochthochloa compressa*. Six species are rarely reported from this habitat. In all 15 species were observed in this habitat.

**2. Slope habitat:** This habitat is formed due to increase of silt particles which results in an acclimatization of some more species in addition to crest habitat. This habitat represented by *Calligonum-Aerva-Indigofera* community consisting of *Calligonum polygonoides, Aerva javanica* and *Indigofera* species with the SDR values of 16.67-8.94 along with a very close association of *Dipterygium glaucum* (Table 1). *Crotalaria burhia*

and *Euphorbia caducifolia* were found as co-dominants in this habitat. There were 37 plant species recorded from this habitat including seven occasional and 22 species rare.

**3. Flat habitat:** This is low-lying flat area with smooth surfaced soil with hummocks. These habitats are mostly encircled by sand dunes consisting of sandy loam soils enabling a large number of taxa to grow in it. This area presented a look of forest due to community formation of tree species like *Prosopis cineraria* and *Tamarix aphylla* with SDR values of 19.98 and 9.10 respectively (Table 1). This community was found associated with *Citrllus colcynthis* and *Dactylotenium scindicum*. There was highest species richness in this habitat and recorded 61 species from this habitat. Five species like *Fagonia indica, Dactyloctenium aegyptium, Tribulus longipetalus, Corchorus depressus* and *Ochthochloa compressa* were occasionally found and 52 species were marked as rare based on SDR values.

**4. Marshy habitat:** These habitats are formed due to the seepage of water from Chotiari Wetland Complex which became a waterlogged area. Twenty seven species are identified in this habitat. Plant community comprising of *Desmostachya bipinnata, Pluchea lanceolata* and *Zygophyllum simplex* was found dominating in this habitat with the SDR value of 7.45-19.30 (Table 1). The other species like *Dactyloctenium aegyptium, Ochthochloa compressa* and *Haloxylon stocksii* were found as co-dominants (Table 1). Besides, *Capparis decidua, Salsola imricata* and *Sesuvium sesuvioides* were also frequently found. During the survey, 7 species were marked occasionally and 11 as rare.

**Life form classes:** There was a good diversity of life forms of the vegetation of the study area. The most common life form of the present flora was Therophytes with the percentage of 50 (Fig. 1) following by Phanerophytes (32.89%) and Hemicryptophyte (9.21%), whereas the other vegetated forms were in negligible proportions. The dominancy of Therophytes clearly depicts the desertic nature of habitats with unfavorable climatic conditions for growing of most of the species. The ephemerals which complete their life cycle in couple of weeks are the main component of Therophyte life form. This indicates that there is harsh climate with unpredictable rainfall which results the opportunistic plant species to avail the little moisture for the growth and completion their life cycles in short period. These species can be regarded as pseudoxerophytes which can only be survived by rapid ripening and maturation of their seeds before advent of harsh climate.

**Status of taxa:** Based on Frequency %, the status of taxa was determined. Two species *Calligonum polygonoides* and *Tribulus longipetalous* were found as very common species having 80-85%, whereas six species like *Dipterygium glaucum, Indigofera argentea, Ochthochloa compressa, Aerva javanica, Limeum indicum* and *Crotalaria burhia* were marked as frequent with the frequency ranges of 60-75%; whereas *Cleome scaposa, Dactyloctenium scindicum, Stipagrostis plumosa, Tamarix aphylla, Fagonia indica* and *Salvadora oleoides* were marked as occasional. The highest numbers of species (26) were found as very rare with the frequency percentage of 10 (Table 1; Fig. 2).

Few vegetation studies have been reported from in and outside of the country. Hussain *et al.* (2000) studied the vegetation of Ghalegay hills, District Swat and recorded plant associations of three vegetation zones such as Subtropical semi-evergreen, subtropical chir

pine and blue pine temperate zones. They constructed three communities within three ecological zones of the study area. Celik *et al.,* (2003) studied vegetation of Dilek Peninsula-Great Menderes Delta national park and discovered 3 new plant associations. Likewise, Ahmad *et al.,* (2007) studied vegetation of Soon Valley with reference to leguminous plants. The results obtained on various parameters for species importance studied in the study area agree with the work of aforementioned study. Qureshi (2008) reported the vegetation of Sawan Wari of Nara Desert, Pakistan. He reported 6 plant communities distributed in 5 microhabitats. The present study site is an adjoining area and therefore similar types of plant associations are discovered. The results of present study are in agreement of those studies carried out by Austin & Heyligers (1989) and Kirk-Patrick (1990).

## Conclusion

The vegetation of area studied is under immense biotic pressure for forage, fuel wood, timber wood, etc. The anthropogenic activities observed in the investigated area appeared to be a continuous threat and as a result of which native species are declining at an alarming rate therefore, a large number of species were found as rare. This patch of desert has an inimitable landscape having the areas of without vegetation and forested look bearing insights (Valleys) in inter-dunal areas. This combination presents a wealth of flora and its subsequent association. It is assumed that there are various locations yet to be discovered and this paper gives a valuable glimpse and starting point for detailed floral and vegetation surveys. It is therefore, suggested that detailed study should be undertaken for the understanding of ecology and vegetation of this area.

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