

THE VEGETATION AND HABITAT TYPES OF BAHA PLATEAU (SAUDI ARABIA)

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SUMMARY: The present study deals with the vegetation of Baha plateau (19°50'-20°18' N, 41°38'-42°10' E), with elevation ranging between 1700 and 2400 m. Ten plant communities are recorded: communities dominated by trees (*Acacia negrii* and *Juniperus excelsa*); communities dominated by shrubs and under shrubs (*Acacia tortilis*, *Olea europaea*, *Dodonaea viscosa*, *Pulicaria crispa*, *Rumex limoniastrium* and *Astragalus atropilosus*); communities dominated by grasses (*Hyparrhenia hirta*) and a community dominated by ephemerals (*Achillea biebersteinii*-*Cardaria draba*). 167 species of vascular plants are recorded. Relations between communities and their habitat types as well as the human impact in the area are briefly discussed.

Key Words: Vegetation, habitat, acacia, junipers, ephemerals.

INTRODUCTION

Baha plateau embrace one of the richest and most variable floristic regions of Asir mountains, Southwest Saudi Arabia (15). This plateau is a part of the Arabian Shield, essentially of Precambrian crystalline rocks (Braun, 1960). It extends for a distance of 70 km (Figure1) in the north-south direction (19°50'-20°18' N, 41°38'-42°10' E) with rugged topography and elevation above sea level ranging between 1700 m eastwards, and 2400 m westwards. The soils in the area vary considerably, being shallow and coarse-textured in elevated and sloping sites; it is deep of alluvial texture in protected locations.

The present investigation is meant to be a documentary study for the vegetation of Baha area subjected to intensive human interference.

CLIMATE

The area surveyed is characterized by its mild cli-

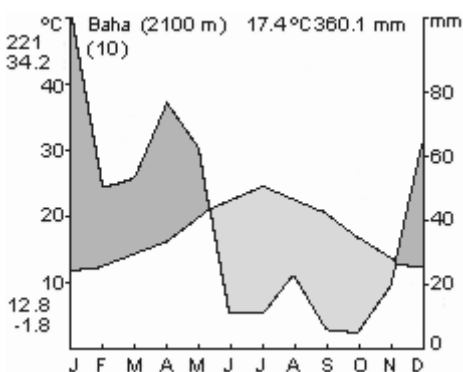
matic conditions. The rainfall is irregular and variable with heavy sporadic rains of frequent occurrence. At Baha town, the annual rainfall is 360.1 mm/year with a monthly mean which ranges between 54 mm in October and 97.9

Figure 1: A map showing the location of the study area.



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Figure 2: Climate diagram of Baha area according to the method of WALTER (1973).



mm in January. The mean monthly temperature ranges from 6.9°C in January to 34.9°C in July. Relative humidity values range between 24% in July and 54% in December. The Clima-diagram for Baha (Figure 2) shows that a humid period extends from November to May.

MATERIALS AND METHODS

The vegetation of Baha area was studied sociologically according to Braun-Blanquet (3) methodology. After a reconnaissance survey, 130 stands were chosen. In each of these stands the species were rated using two scales; one combing the abundance and cover of the species (abundance-dominance) and the second giving a measure of grouping (sociability).

Plant specimens were identified according to Migahid (12,13), Collenette (6), Boulos (2) and Mandaville (11). Two sets of specimens collected are deposited in the herbaria of Cairo (CAI) and Assiut University. A duplicate series is also deposited in the herbarium of the Notional Research Center, Cairo (CAIRC).

In this paper: P= presence value in %, AB = abundance-dominance (combined scale of six grades + to 5). Under 'Associates' are listed the species of negligible abundance-dominance values.

PLANT COMMUNITIES AND HABITAT TYPES

I. COMMUNITIES DOMINATED BY TREES

1. *Acacia negrii* community

Acacia negrii was previously believed to be endemic to Ethiopia, however recently recorded in the highlands of SW Saudi Arabia by Chaudhary (5).

Our community is dominated by *Acacia negrii* which is widespread in the study area. Regarding local topogra-

phy, this plant assemblage abounds on deep alluvial fine-textured soil, which commonly occur in relatively low and protected sites. The habitat receives run-off water-borne and wind-borne sediments. Plant cover is mainly contributed by the dominant species, which represented the climax vegetation.

Floristic Composition: Total cover = 30%; number of records = 6.

Species	P (%)	AB
a. Tree layer		
<i>Acacia negrii</i> Pichi-Sermolli	100	3.1
b. Shrub layer		
<i>Rhamnus staddo</i> A. Rich var. <i>deflershii</i> (Schweint.) Chiov.	17	+1
c. Dwarf shrubs and perennial herbs		
<i>Rumex limoniastrum</i> Jaub. and Sp. <i>Conyza stricta</i> Wild.	100	2.1
var. <i>pinnatifida</i> (D. Don) Kitamura	83	1.1
<i>Echinops</i> sp	83	1.1
<i>Withania somnifera</i> (L.) Dun.	50	+1
<i>Cichorium bottae</i> Defl.	33	1.2
<i>Felicia abyssinica</i> A. Rich.	33	+2
<i>Datura stramonium</i> L.	33	+1
<i>Cynodon dactylon</i>	33	+2
<i>Solanum incanum</i> L.	17	+1
d. Annuals and ephemerals		
<i>Urospermum picroides</i> (L.) F.W. Schmidt	100	1.2
<i>Sisymbrium irio</i> L.	83	1.1
<i>Astragalus atopilosus</i> (Hochst.) Bunge	83	1.1
<i>Picris longirostris</i> Sch. Bip.	83	1.2
<i>Paronychia chlorothyrsa</i> Murb.	83	1.2
<i>Avena fatua</i> L.	67	1.1
<i>Euphorbia schimperii</i> Presl	50	1.1
<i>Hordium murinum</i> L.		
subsp. <i>glaucum</i> (Steud.) Tzvelev	33	1.1
<i>Caylusea hexagyna</i> (Forssk.) M.L. Green	33	1.1
<i>Osteospermum vailantii</i> 'Decne.) Norl.	17	+1
<i>Salvia aegyptiaca</i> L.	17	+1
e. Associates		
<i>Cardaria draba</i> (L.) Desv.		
<i>Senecio flavus</i> (Decne.) Sch. Bip.		
<i>Calendula arvensis</i> L.		
<i>Filago desertorum</i> (Pomel) Wag.		
<i>Achilla biebersteinii</i> Afan.		
<i>Anthemis tigreensis</i> J. Gay ex A. Rich		
<i>Sonchus oleraceus</i> L.		
<i>Launaea massauensis</i> (Fresen.) sch. Bip. ex Kuntze		

2. Juniperus excelsa community

This is a widespread community in the highlands of SW Saudi Arabia at levels above 1650 m (1,15). The boulder strewn slopes constitute the favored sites supporting the growth of *Juniperus excelsa* community. The ground surface is rich with fine sediments accumulated in crevices and pockets. *Juniperus excelsa* takes the form of pure stands in some of the studied stands e.g. Raghadan area, however in other sites the woods are more or less open due to human impact.

Floristic Composition: Total cover = 40-60%; number of records = 10.

Species	P (%)	AB
a. Tree layer		
<i>Juniperus excelsa</i> M. Bieb.	100	4.2
<i>Acacia negrii</i> Pichi-Sermolli	20	+1
b. Shrub layer		
<i>Rhamnus staddo</i> A. Rich var. <i>deflershii</i> (Schweint.) Chiov.	10	+1
<i>Jasminum grandiflorum</i> L. var. <i>floribundum</i> (R. Br. ex Fresen.) P.S. Green)	10	+1
c. Dwarf shrubs and perennial herbs		
<i>Rumex limoniastrum</i> Jaub. and Sp.	100	1.2
<i>Felicia abyssinica</i> A. Rich	70	1.2
<i>Cluytia myricoides</i> Jaub. and Sp.	40	1.1
<i>Gymnocarpus decandrum</i> Forssk.	40	+1
<i>Ruta chalepensis</i> L.	40	+1
<i>Solanum incanum</i> L.	30	+1
<i>Marrubium vulgare</i> L.	30	+1
<i>Conyza stricta</i> Wild. var. <i>pinnatifida</i> (D. Don) Kitamura	20	+1
d. Annuals and ephemerals		
<i>Anagalis arvensis</i> L.	90	1.1
<i>Achillea biebersteinii</i> Afan.	80	1.1
<i>Hordium murinum</i> L. subsp. <i>glaucum</i> (Steud.) Tzvelev	80	1.1
<i>Calendula arvensis</i> L.	80	1.1
<i>Urospermum picroides</i> (L.) F.W. Schmidt	70	+1
<i>Erodium cicutarium</i> (L.) L'Her.	70	+1
<i>E. glaucophyllum</i> (L.) Ait.	70	+1
<i>Euphorbia peplus</i> L.	60	1.1
<i>Picris longrostris</i>	60	+1
<i>Achyranthes aspera</i> L.	50	+1
<i>Sonchus olerceus</i> L.	50	+1
<i>Pulicaria schimperi</i> DC.	50	+1
<i>Melilotus indica</i> (L.) All.	50	+1
<i>Barleria bispinosa</i> (Forssk.) Vahl	50	+1
<i>Geranium arabicum</i> Forssk.	40	+1
<i>Lolium rigidum</i> Gaud.	40	+1
<i>Sisymbrium irio</i> L.	40	+1

<i>Lamarckia aurea</i> (L.) Moench	30	+1
<i>Teucrium yemense</i> Deflers	30	+1
<i>Filago desertorum</i> (Pomel) Wag.	30	+1
<i>Oxalis corniculata</i> L.	20	1.1
<i>Solanum schimperianum</i> Hochs. ex A Rich.	20	1.1

II. COMMUNITIES DOMINATED BY SHRUBS AND UNDER SHRUBS

1. Acacia tortilis community

This community is confined to the gravelly wadi-beds and slopes of the study area. It is reported from the arid deserts of Arabia (1) and the Eastern Desert of Egypt (9).

The ground surface is covered with pebbles and gravels while the soil is shallow and coarse-textured. The habitat is subjected to wind and water erosion. The growth of *Acacia tortilis* is stunted due to nibble of goats. Consequently the vegetation is thin and the plant cover does not exceed 10%.

Floristic Composition: Total cover less than 10%; number of records = 2.

Species	P (%)	AB
a. Tree layer		
Not represented		
b. Shrub layer		
<i>Acacia tortilis</i> (Forssk.) Hayne	100	2.1
<i>Lycium shawii</i> Roem. and Schult	100	+1
<i>Rhammus staddo</i> A. Rich var. <i>deflershii</i> (Schweint.) Chiov.	50	+1
<i>Ephedra</i> sp.	50	+1
c. Dwarf shrubs and perennial herbs		
<i>Pulicaria crispa</i> (Forssk.) Benth and Hook. fil.	100	1.1
<i>Tribulus terrestris</i> L.	100	1.1
<i>Caralluma sinaica</i> (Decne.) Benth.	100	+1
<i>Blepharis ciliaris</i> (L.) B.L. Burt	100	+1
<i>Argyrobolium arabicum</i> (Decne.) Jaub and Sp.	50	+1
<i>Argemone mexicana</i> L.	50	+1
<i>Morettia canescens</i> Boiss.	50	+1
<i>Convolvulus arvensis</i>	50	+1
d. Annuals and ephemerals		
<i>Asphodelus fistulosus</i> L.	100	1.1
<i>Citrus colocynthis</i> (L.) Schrad	50	+2
<i>Euphorbia granulata</i> Forssk.	50	1.1
<i>Capsella bursa-pastoris</i> (L.) Medic.	50	1.1
<i>Flaveria trinerva</i> (Spreng.) Mohr.	50	1.1
<i>Eruca sativa</i> Mill.	50	1.1
<i>Erodium moschatum</i> (L.) L'Her.	50	+1
<i>Lasiopogon muscoides</i> (Desfb) DC.	50	+1
<i>Verbesina encelioides</i> Gaertn.	50	+1

2. Olea europaea community

This plant assemblage is recorded at levels above 1800 m, occurring on exposed rocky slopes and runnels crossing them. The ground surface is covered with boulders and various sharp angled rocks while the soil is shallow.

The habitats are severely affected by erosion, consequently the plant cover is thin. Associated species are relatively few and recorded mainly in protected spots.

Floristic Composition: Total cover = 15-25%; number of records = 8.

Species	P (%)	AB
a. Tree layer Not represented		
b. Shrub layer <i>Olea europaea</i> L. <i>Dodonaea viscosa</i> L. <i>Rhamnus staddo</i> A. Rich <i>var. deflershii</i> (Schweint.) Chiov.	100 75 25	2.1 +.1 +.1
c. Dwarf shrubs and perennial herbs <i>Hyparrhenia hirta</i> (L.) Stapf <i>Pulicaria crispa</i> (Forssk.) Benth and Hook. fil. <i>Blepharis ciliaris</i> (L.) B.L. Burtt <i>Solanum sepicula</i> Dun <i>Argemone mexicana</i> L. <i>Melhanian ovata</i> (Cav.) Spreng. <i>Crotalaria emarginella</i> Vatke	100 100 87 50 37 37 25	1.1 1.1 1.1 +.1 1.1 +.1 +.1
d. Annuals and ephemerals <i>Astragalus atropilosus</i> (Hochst.) Bunge <i>Senecio flavus</i> (Decne.) Sch. Bip. <i>Asphodellus fistulosus</i> L. <i>Arnebia hispidissima</i> (Lehm.) DC.	50 37 37 25	+.1 1.1 +.1 +.1
e. Associates <i>Euphorbia blsamifera</i> Ait. subsp. <i>adenensis</i> (Defl.) Bally <i>Indigofera spinosa</i> Forssk. <i>Campanula edulis</i> Forssk. <i>Commiphora</i> sp.		

3. Dodonaea viscosa community

The community dominated by *Dodonaea viscosa* is common in foggy habitats particularly among the rocky slopes and their runnels. The soil supporting this community is shallow, coarse-textured and the ground surface is rich with boulders and rock fragments. Water resources in these habitats are fairly limited while erosion effect is obvi-

ous. Generally the plant cover is thin, ranging between 10 and 20%; mainly of the dominant plant.

Floristic Composition: Total cover = 10-20%; number of records = 3.

Species	P (%)	AB
a. Tree layer Not represented		
b. Shrub layer <i>Dodonaea viscosa</i> L. <i>Olea europaea</i> L.	100 67	2.1 +.1
c. Dwarf shrubs and perennial herbs <i>Hyparrhenia hirta</i> (L.) Stapf <i>Euryops arabicus</i> Steud. <i>Otostegia fruticosa</i> (Frosk.) Schweint. ex Penzing <i>Jasminum grandiflorum</i> L. <i>var. floribundum</i> (R. Br. ex Fresen.) P.S. Green <i>Aerva javanica</i> (Burm. fil.) juss. ex J. A. Schultes <i>Conyza strica</i> Willd. <i>var. pinnatifida</i> (D. Don) Kitamura	100 67 67 33 33 33	1.1 +.1 +.1 +.1 1.1 +.1
d. Annuals and ephemerals <i>Mava parviflora</i> L. <i>Urospermum picroides</i> (L.) F.W. Schmidt <i>Rumex vesicarius</i> L. <i>Plantago albicans</i> L. <i>Heliotropium arbainense</i> Fresen. <i>Silene apetala</i> Wild. <i>Chenopodium murale</i> L.	67 67 67 33 33 33	1.2 1.1 1.1 +.1 +.1 +.1
e. Associates <i>Heliotropium longiflorum</i> Hochst. and Steud. <i>Cometes abyssinica</i> R. Br. <i>Ficus salicifolia</i> Vahl <i>Helichrysum glumaceum</i> DC. <i>Phagnalon</i> sp. <i>Lavandula atriplicifolia</i> Benth. <i>Capparis cartilaginea</i> Decne.		

4. Pulicaria crispa community

This community has a relatively narrow range of distribution in the study area. It occurs in the ample rooms of the low laying sites. These habitats receive run-off water and water-borne sediments. Associated species are moderate, with a total cover ranging between 5 and 10% (8).

Floristic Composition: Total cover = 5-10%; number of records =1.

Species	P (%)	AB
a. Tree layer		
<i>Acacia tortilis</i> (Forssk.) Hayne	100	+1
<i>Nuxia oppositifolia</i> Hochst.	100	+1
b. Shrub layer		
<i>Lycium shawii</i> Roem. and Schult	100	+1
<i>Jasminum grandiflorum</i> L.		
<i>var. floribundum</i> (R.Br. ex Fresen.) P.S. Green	100	+1
c. Dwarf shrubs and perennial herbs		
<i>Pulicaria crispa</i>	100	2.1
<i>Lavandula pubescens</i> Decne.	100	1.1
<i>Blepharis ciliaris</i> (L.) B.L. Burt	100	1.1
<i>Solanum sepicula</i> Dun.	100	+1
<i>Themeda triandra</i> Forssk.	100	+1
<i>Cenchrus ciliaris</i> L.	100	+1
<i>Cynodon dactylon</i> (L.) Pers.		
<i>Onopordon heteracanthum</i> C.A. Mey	100	+1
<i>Cayusea hexagyna</i> (Forssk.) M.L. Green	100	+1
<i>Astragalus sparsus</i> Decne.	100	1.1
d. Annuals and ephemerals		
<i>Astragalus vogelii</i> (Webb) Bornm.	100	+1
<i>Lobularia libyca</i> (Viv.) Meisner	100	1.1

5. Rumex limoniastrum community

The community dominated by this species is wide-spread in Asir mountains especially near cultivation. It is frequently met with in localities with deep deposits and ample water revenue, namely at the foothills and elevated borders between man-made terraces. The vigor growth of the dominant species may be related to the sour taste of the leaves which are not grazed by livestock.

Floristic Composition: Total cover = 10-25%; number of records = 4.

Species	P (%)	AB
a. Tree layer		
<i>Juniperus excelsa</i> M. Bieb.	25	+1
b. Shrub layer		
<i>Anagyris foetida</i> L.	25	+1
c. Dwarf shrubs and perennial herbs		
<i>Rumex limoniastrum</i> Jaub. and Sp.	100	2.3
<i>Xanthium spinosum</i> L.	75	1.1
<i>Euryops arabicus</i>	50	+1
<i>Allium</i> sp.	20	+1
<i>Dipcadi viride</i> (L.) Moench	20	+1

d. Annuals and ephemerals		
<i>Achillea biebersteinii</i> Afan.	75	1.1
<i>Andrachne aspera</i> Spreng.	50	1.1
<i>Urtica urens</i> L.	50	+1
<i>Citrullus colocynthis</i> (L.) Shrad.	25	+1
<i>Cenchrus ciliaris</i> L.	25	+1
<i>Erodium cicutarim</i> (L.) L'Her		
e. Associates		
<i>Otostegia fruticosa</i> (Forssk.) Schweinf. ex Penzig		
<i>Centaurea pseudosinaica</i> Czerep.		
<i>Ammi majus</i> L.		
<i>Commicarpus sinuatus</i> Meikle		
<i>Gagea reticulata</i> (Pallas) Schultes and Schultes fil.		
<i>Adiantum capillus-veneris</i> L.		
<i>Chenopodium album</i> L.		
<i>Astragalus sieberi</i> DC.		
<i>Aloe</i> sp.		
d. Annuals and ephemerals		
<i>Echium longifolium</i> Del.	80	1.1
<i>E. horridum</i> Batt.	60	1.1
<i>Sisymbrium irio</i> L.	60	1.1
<i>Asphodelus fistulosus</i> L.	40	+1
<i>Picris longirostris</i> Sch. Bip.	40	+1
<i>Reichardia tingitana</i> (L.) Roth	40	+1
<i>Hordium murinum</i> L.		
<i>subsp. glaucum</i> (Steud.) Tzvelev	20	+1
<i>Calendula arvensis</i> L.	20	+1
<i>Lotononis platycarpa</i> (Viv.) Pichi-Serm.	20	+1
<i>Silene</i> sp. aff. <i>burchellii</i> Otth.	20	+1
e. Associates		
<i>Lotus</i> sp. aff. <i>quinatus</i> (Forssk.) Gillett		
<i>Solanum carense</i> Dunal		
<i>Rosa abyssinica</i> R. Br.		
<i>Aizoon caraiense</i> L.		
<i>Orobanche ramosa</i> L.		
<i>Verbascum yemense</i> Defl.		
<i>Striga hermontica</i> (Del.) Benth.		

III. COMMUNITIES DOMINATED BY GRASSES

1. Hyparrhenia hirta community

The community dominated by *Hyparrhenia hirta* abounds on the steeply sloping beds of the numerous ravines and tributaries connected with the drainage system of the wadis. These effluents lead run-off water to the main wadi channels and consequently they are obviously water eroded. Trapped fine sediments constitute the soil support-

ing the growth of *Hyparrhenia hirta* community. Plant cover is variable, being ranging between 20 and 35% with numerous associates (7).

Floristic Composition: Total cover = 20-35%; number of records = 5.

Species	P (%)	AB
a. Tree layer		
<i>Juniperus excelsa</i> M. Bieb	40	+1
b. Shrub layer		
<i>Dodonaea viscosa</i> L.	60	1.1
<i>Rhamnus staddo</i> A. Rich var. <i>deflersii</i> (Schweinf.) Chiov.	20	+1
<i>Pergularia daemia</i> (Forssk.) Chiov.	20	+1
c. Dwarf shrubs and perennial herbs		
<i>Hyparrhenia hirta</i> (L.) Stapf	100	2.2
<i>Aerva javanica</i> (Burm. fil.)	80	1.1
<i>Euryops arabicus</i> Steud.	80	1.1
<i>Fagonia acerosa</i> Boiss.	60	1.1
<i>Pulicaria crispa</i> (Forssk.) Benth. and Hook. fil.	60	+1
<i>Lavandula pubescens</i> Decne.	60	+1
<i>L. dentata</i> L.	60	+1
<i>Solanum incanum</i> L.	60	+1
<i>Felicia abyssinica</i> A. Rich.	40	+2
<i>Teucrium polinum</i> L.	40	+1
<i>T. yemense</i> Defl.	20	+1
<i>Anarrhinum orientale</i> Benth.	20	+1
<i>Polygala abyssinica</i> R. Br.	20	+1
<i>Farsetia longisiliqua</i> Decne.	20	+1
<i>Onopordon heteracanthum</i> C.A. Mey	20	+1
<i>Ruta chalepensis</i> L.	20	+1
d. Annuals and ephemerals		
<i>Malva parviflora</i> L.	80	1.2
<i>Rumex vesicarius</i> L.	80	1.2
<i>Osteospermum vaillantii</i> (Decne.) Norl.		
<i>Dianthus strictus</i> Banks and Sol.	40	+1
<i>Sisymbrium irio</i> L.	20	+1
<i>Asphodelus fistulosus</i> L.	20	+1
e. Associates		
<i>Cetarach officinarum</i> DC.		
<i>Chellanthes vella</i> (Ait.) F. Mueller		
<i>Rosa abyssinica</i> R. Br.		
<i>Cardus pycnocephalus</i> L.		
<i>Urospermum picroides</i> (L.) F.W. Schmidt		
<i>Psiadia punctulata</i> (DC.) Vatke		
<i>Telephium sphaerospermum</i> Boiss.		
<i>Monsonia heliotropioides</i> (Cav.) Boiss.		

IV. COMMUNITIES DOMINATED BY EPHEMERALS

1. *Achillea biebersteinii*-*Cardaria draba* community

This plant assemblage has outstanding characters with the two dominant species having dense flower heads. The flowers are tiny, deep yellow and very aromatic in *Achillea* and white sweet-scented in *Cardaria*. The community is widespread near cultivation, especially of wheat fields growing in the natural or man-made terraces of the study area. The soil is deep, of alluvial nature. Plant cover varies greatly and is related to the intensity of rainfall.

Floristic Composition: Total cover = 50-65%, number of stands = 6.

Species	P (%)	AB
a. Tree layer		
<i>Juniperus excelsa</i> M. Bieb	17	+1
<i>Acacia negrii</i> Pichi-Sermolli	17	+1
b. Shrub layer		
<i>Jasminum grandiflorum</i> L. var. <i>floribundum</i> (R. Br. ex Fresen.) P.S. Green	33	+1
<i>Rubus sanctus</i> Schreb.	33	+1
c. Dwarf shrubs and perennial herbs		
<i>Rumex limoniastrum</i> Jaub. and Sp.	50	1.2
<i>Pulicaria crispa</i> (Forssk.) Benth. and Hook. fil.	33	+1
<i>Ruta chalepensis</i> L.	17	+1
<i>Marrubium vulgare</i> L.	17	+1
d. Annuals and ephemerals		
<i>Achillea biebersteinii</i> Afan.	100	3.2
<i>Cardaria draba</i> (L.) Desv.	100	2.2
<i>Euphorbia helioscopia</i> L.	83	1.1
<i>E. peplus</i> L.	83	1.1
<i>Cardus getulus</i> Pomel	67	1.1
<i>Hordium murinum</i> L. subsp. <i>glaucum</i> (Steud.) Tzvelev	60	1.1
<i>Triticum aestivum</i> L. (Escape from cultivation) (Syn.: <i>T. sativum</i> Lam.)	60	2.1
<i>Medicago lupulina</i> L.	33	+1
<i>Rosa abyssinica</i> R. Br.	33	+1
<i>Erodium cicutarium</i> (L.) L'Her.	33	+1
<i>Geranium arabicum</i> Forssk.	33	+1
<i>Vicia sativa</i> L.	33	+1
<i>Emex spinosus</i> (L.) Campd.	17	+1
e. Associates		
<i>Dichrocephala crsanthemifolia</i> (Blume) DC.		
<i>Centaurea pseudosinaica</i> Czerep.		
<i>Cheilanthes pteridioides</i> (Richard.) C. Chr.		

Senecio asirensis Boulos and J.R.I. Wood
Cnicus benedictus L.
Conyza pyrhopappa Sch. Bip.
Malcolmia chia (L.) DC.
Foeniculum vulgare Mill.

DISCUSSION

The floristic and sociological data outlined above clearly indicate that Baha plateau is rich, with variable vegetation including ephemerals, perennials and succulents (Figure 3). The climax vegetation of the highly elevated stands (over 2000 m) is characterized by plant communities dominated by *Juniperus excelsa*, *Acacia negrii* and *Olea europaea*. The distribution of other recognized plant communities viz. *Dodonaea viscosa*, *Hypparrhenia hirta*, *Pulicaria crispa* and *Rumex limoniastrum* are correlated with soil attributes rather than altitudinal gradient. Water-eroded, shallow and coarse-textured soils are common among rocky slopes, main wadi and tributary channels while deep and fine-

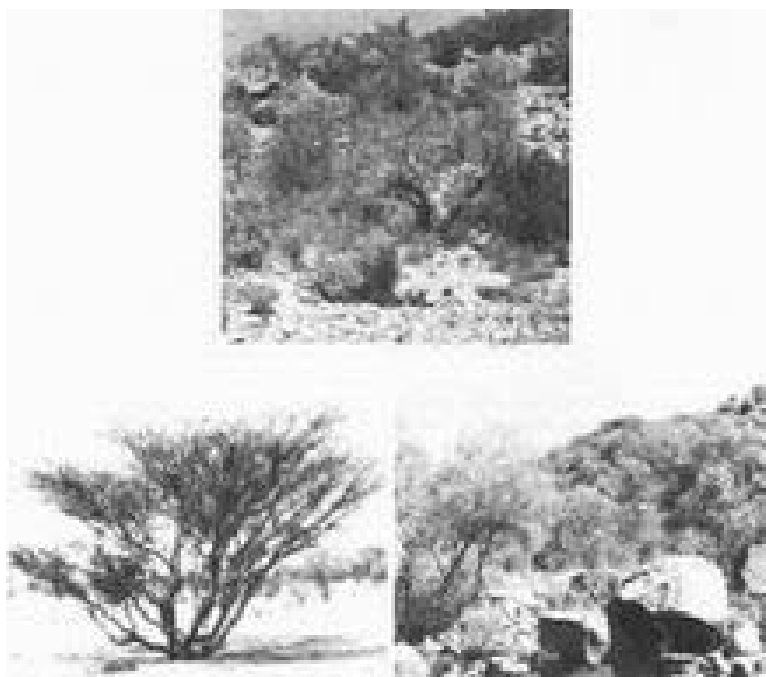
textured soils abounds at the feet of the rocky ridges, road sides and protected habitats.

Laying is conspicuous in some of the recorded plant communities viz. *Pulicaria crispa*, *Acacia negrii*, *Juniperus excelsa* and *Rumex limoniastrum*. It is fairly missing in some other communities such as those dominated by *Acacia tortilis*, *Olea europaea* and *Dodonaea viscosa*.

Due to the rugged topography of the study area, several microhabitats were recognized namely wet habitats, terraces, wadi bed and proper slopes and cliffs. Each of these microhabitats supports special type of vegetation with characteristic floristic composition and plant cover.

Regarding the socio-economic changes of the whole area, striking human activities could be observed. Such activities greatly deteriorate the plant cover while its effect is usually irreversible and towards xerism (1). Among the man-made changes are the construction activities, especially that of building alternative modern cities, villages and roads, as well as big

Figure 3: Some stands in the area showing differences in vegetation cover.



tourism projects. Another effective man-made change is the removal of plant cover and soil erosion due to the dense traffic.

On the other hand, the traditional human impact, has been accelerated in the area. This includes over-grazing, uprooting of ligneous species for firewood connected with increasing population and expanding consumption (10).

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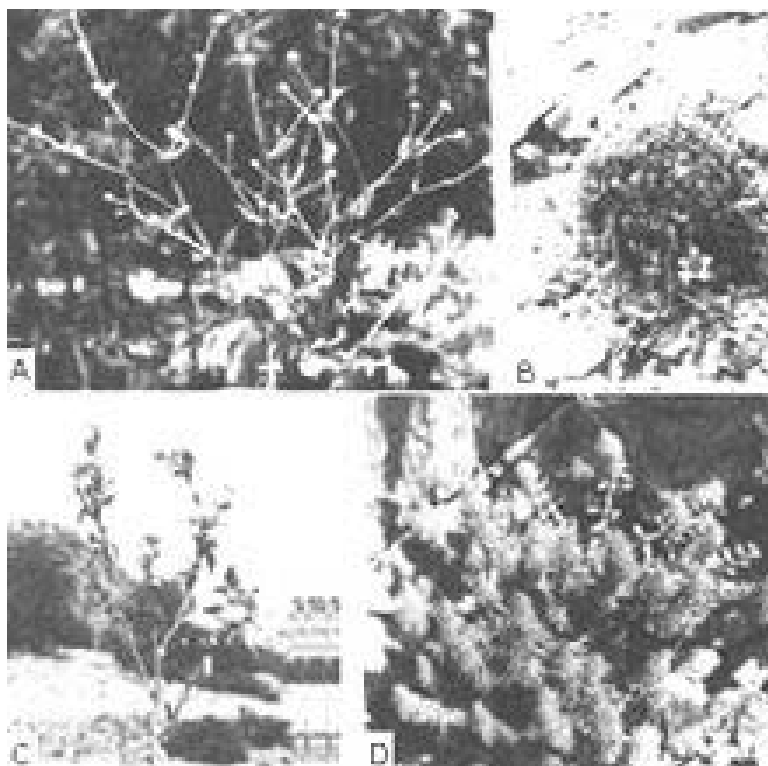
Figure 4: Selected individuals;

a. *Dichrocephala crysanthemifolia*,

b. *Campanula edulis*,

c. *Centaurea pseudosinaica*

d. *Teucrium yemense*.



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