

STUDIES ON PHYTODIVERSITY OF ARID MACHIA SAFARI PARK–KAILANA IN JODHPUR (RAJASTHAN)

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A B S T R A C T

The present paper envisages an account of vegetation, floral composition with a checklist of vascular plants comprising of 304 species belonging to 196 genera spread over 66 families. Besides, a list of 64 important plants of bioperspective nature has also been prepared. The present study has also drawn attention towards occurrence of 33 rare and threatened plants in the area which need effective conservation measures for maintenance of germplasm. Floristic analysis of the area is also discussed in the paper. The present article also envisages account of 12 cultivated/crop plants with their 14 wild relatives occurring in Machia Safari Park.

The faunal diversity aspects covering vertebrates, which includes mammals, birds, reptiles, amphibians and fishes have also been dealt along with their suggestive conservation status.

INTRODUCTION

India with its vivid culture and heritage, once known for its vast tracts of thick, lush green forests with diverse wildlife used to be central theme of naturalists, artists and writers. However, with the change of time and undesired explosion in human population coupled with increase in cattle and livestock numbers and advancement in core economic section have put tremendous pressure on natural resources. It is predicted that, about half of the estimated 13.6 million species on earth may become extinct by the year 2050, unless we take appropriate measures to save them (Wilson, 1992). The manifestation of current biodiversity crisis also include the disappearance of many populations of surviving species, depletion of genetic diversity of crop plants, domesticated animals and their innumerable wild relatives, degradation of several unique habitats and ecosystem. The foremost challenges faced by conservation biologist in general and systematic biologist in particular is completing the inventorisations of biodiversity (Pushpangaden & Nair, 2001). With this motivation an attempt has been made to study the floristics of Arid Machia Safari Park, Kailana, Jodhpur.

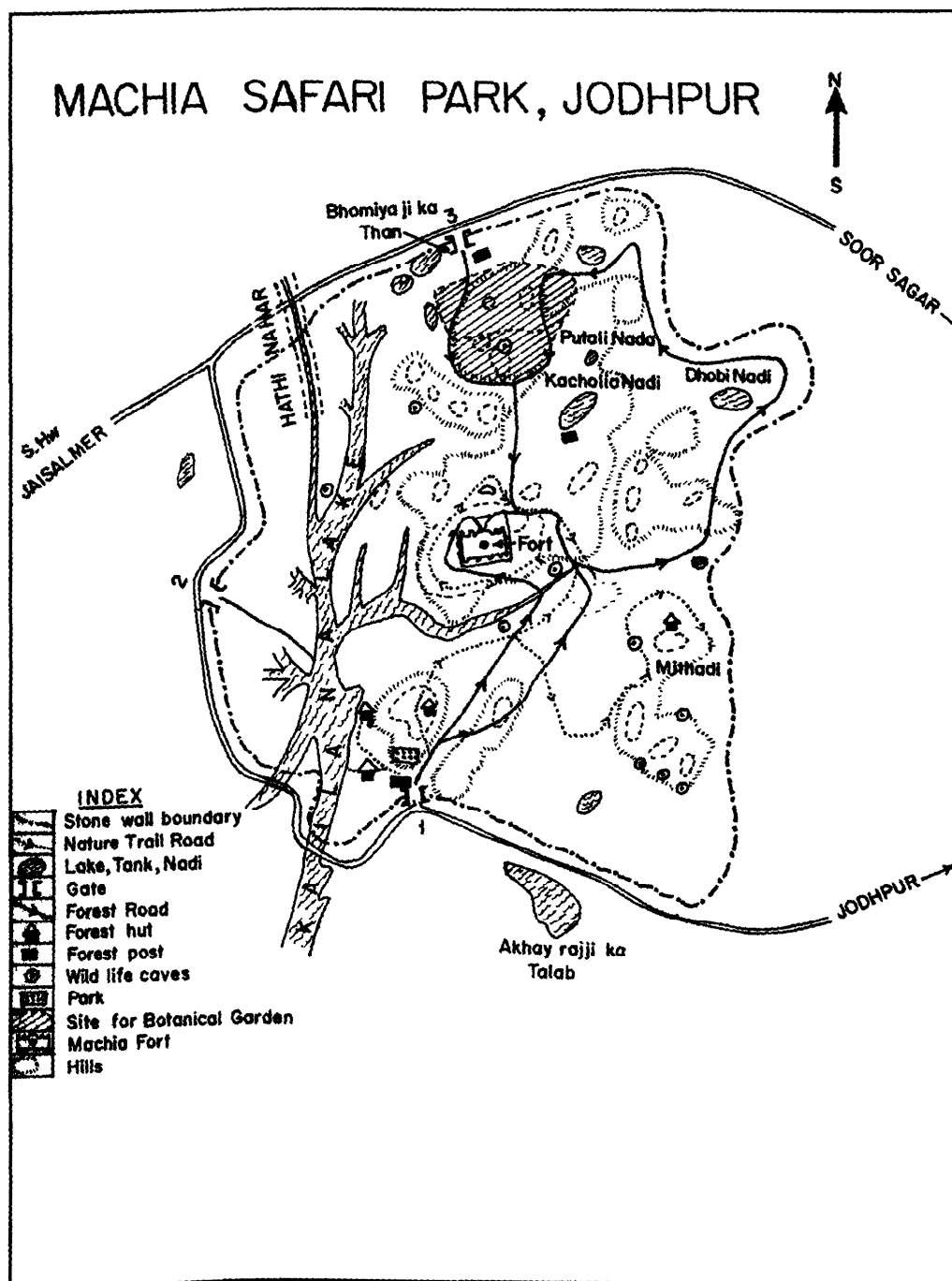
PREVIOUS WORK AND PRESENT STUDY

The perusal of literature reveals that, a number of earlier workers have contributed significantly in the field of floristics and vegetation aspects of Rajasthan or Indian desert in general and Jodhpur-Jaisalmer district in particular. These include King (1879), Macadam (1890), Blatter & Hallberg (1918-21), Sankhala (1951), Sarup (1951, 1952, 1954, 1957a, 1958), Chapline (1953), Sarup & Dutt (1954), Vyas (1955), Ramdeo (1955), Sarup & Vyas (1957b), Sharma (1961), Rolla & Kanodia (1962-63), Satyanarayan & Saxena (1966), Sen (1965), Chakravarty (1968), Jain (1972, 1977), Majumdar (1975), Bhandari (1978, 1990), Shetty & Pandey (1979) and finally the publication of Flora of Rajasthan by Shetty & Singh (1987-93) which gives an insight to our knowledge about the Flora of Rajasthan. However, detailed screening of literature further reveals that very limited workers like Verma (1964), Bhimaya & al. (1964) have dealt with vegetation aspects of Kailana while Gupta & Sharma (1973) had made an attempt to assess the phytosociological changes in the said area way back in 1973. So, the present work was undertaken with an objective to prepare up to date comprehensive account of Biodiversity of Arid Machia Safari Park – Kailana in Jodhpur.

LOCATION, TOPOGRAPHY AND HISTORY

The Arid Machia Safari Park-Kailana is situated north-west outskirts of Jodhpur city, at a distance of 8 km from Jodhpur railway station, on Jaisalmer road and stretches over 650 hectares of Machia protected Forest Block (see Map). It lies at 26°18'N latitude and 73°01'E longitude, and characterized by undulating mass of low hills, rising upto 70-100 m above ground level, rocky to gravelly terrain with ridges, valleys and gullies (mainly formed by weathered acidic pre-Cambrian Malani-type rhyolites, except for the north-eastern portion of the Park which has exposed Vindhyan-type rocky sandstone deposits). About 10 km to the west is a "Barli" village where buried type sandstone with an upper layer of alluvial deposits can be seen. At certain places in the park, land surfaces have been covered with recent or quaternary wind blown sandy and sandy to loamy alluvium, although the banks of the reservoir and water bodies which form part of the park have depositions of heavy, loamy to clayey soil.

Besides this, there are eight watershed areas in the Park. The northern portion of the twin lake of Takhat sagaf-Kailana which is the main source potable water for the present city dwellers, is longitudinally extended into the south-western portion of the park. The Kailana lake with a filling capacity of 190 M.C.F. and run-off area of 84 sq km is wholly situated within the Machia Safari Park. Besides this, there are one perennial (Dhobi-talab) and three seasonal water holes (Balaji-nada, Bhomiya-nada and Kacholia-nada) inside the park. Presently, the entire park is fenced with 11.5 km long dry stone masonry wall during 1982-83 and 1983-84 under famine relief work, with an average height of 7 ft. width 2 ft. The top of the wall is plastered with lime mortar with glass pieces embedded in it. Due to fencing it prevent encroachments and further degradation of site. To restore the vegetation cover; limited planting activities and construction of soil and water conservation devices were taken up during subsequent years. The area attained identity due to its dry stone wall fencing and it was conceived to be potential area for eco-tourism and therefore, it was subsequently named as "Machia Safari Park". There are ruins of an old Machia fort at the top of a hill in the centre of the park. The Machia fort was constructed by Maharaja Takhat Singh ji of Jodhpur state during 1850 and it was used as a "Shikaar Camp" (hunting camp). Later on Machia Fort was used as temporary



Map : Machia Safari Park, Jodhpur

jail during India's freedom struggle and many renowned freedom fighters like Jai Narain Vyas (ex Chief Minister of Rajasthan state) were also imprisoned in the fort. The Machia fort, having its history related to India's freedom struggle – the state Government of Rajasthan constructed a "freedom fighter monument" ('*Kirti Stambh*') in 1998, which is a black granite stone pillar engraved with twenty nine names of freedom fighters of Rajasthan in golden letters. The overall condition of Machia fort particularly "Janana Mahal" is in delapidated condition which may collapse at any time. There is an urgent need for restoration and conservation of such a important heritage monument.

OBJECTIVES

Before 1982, this area was unfenced and utilized as common grazing lands for livestock. Therefore, it was demarked and named as 'Machia Safari Desert park'. Presently, the area of this park is a reserve forest which is under the administrative control of Rajasthan State Forest Department and has the status of Biological park/sanctuary. This park was declared by the Revenue Department of Government of Rajasthan vide letter no. II9 (6) Forest/90 dated 1st July, 1990 under Rajasthan State Forest Act 1953 under code 29 (3) as a 'reserve forest' block. On January 1992 the park has been handed over to the wildlife wing of the state Forest Department for further development as a Wildlife sanctuary. The historical importance of Machia fort as a freedom fighter monument in the proximity of Jodhpur city (already tourism centre) and representing a typical rocky desert habitat, the area is proposed for development in the following thrust areas

- (i) Creation of Biological park,
- (ii) Promotion of Educational and Eco-tourism,
- (iii) Restoration of 'Machia fort' as a monument of freedom fight.

Very recently a scheme has been submitted by Wildlife wing of state Forest Department to Central Zoo Authority for development of Machia Safari Park with an objectives to develop zoological, fossil and botanical park along with a 'Lion Safari' to house two male Lions and six female ones in addition to one male and three female panthers.

Unfortunately, this park has not been considered to be of national (Priority I) or regional importance (Priority II) but merely of state's concern (Priority III). This resulted into limited use of Machia Safari Park only for tourist-cum-educational purposes.

GEOLOGY AND SOILS

The hills around Kailana and Arid Machia Safari Park are few outcrops of the main Aravalli ranges formed by weathered acidic Pre-Cambrian Malani type rhyolites comprising chiefly of fine, gritty and reddish Vidhyan type rocky sandstones deposits. Some granite boulders signify their presence in the sandstone hills, gravels and shallow sandy soil. The geological history of the area is principally a history of geological activities in the pre-Cambrian era. About 10 km to the west is a "Barli" village where buried type sandstones with an upper layer of alluvial deposits can be observed.

The soil varies from sandy to sandy-loam and gravelly in texture. It is brownish-yellow in colour and can be grouped as desert or semi-desertic soil. The soil is alkaline with pH ranging from 7.9–8.4. Humus content varies from 0.1–0.23% and ex. ca from 9.1–1.5 m.e% under area of study. Low humus and desertic climate is responsible for sparse vegetation.

CLIMATE

The area can be climatically classified under semi-arid region of India, receiving an average annual rainfall of 300 mm distributed over 20 rainy days restricted mainly to the summer months i.e. July–August. The annual maximum and minimum temperature ranges from 49°C to 20°C; morning and afternoon humidity values vary between 66% and 27% respectively, and average wind velocity is varied between 6.4 km/hr to 17.6 km/hr sometimes in summers it attain upto 36 to 96 km/hr. Thunderstorms, dust storms and hail storms are also prevalent in the area. As a result of high temperature and low humidity the evaporation exceeds precipitation and there is always lack of moisture in the soil resulting semi-arid type of vegetation in the park.

VEGETATION

Protection of vegetation from biotic interference is one of the most important methods to control and reclaim the vast deforested and barren tracts so commonly met within the country. These protected areas provide good opportunity to study the floral and faunal diversity in them. The Arid Machia Safari Park comprising hilly, rocky to gravelly terrain having ridges, valleys and gullies, buried sand stones having an upper layer of alluvial depositions, wind blown sandy and sandy to loamy alluvium, reservoir and water bodies etc. Due to such type of topography and climate the general vegetation of the park is typical desert scrub and thorny type. The vegetation over hills and in the valleys appears more dense and luxuriant during rainy season. The herbaceous ground cover with grasses and ephemerals flourishes well during the monsoon. During the summers only the woody tree species blooming otherwise the ground flora and herbaceous cover is quite dry.

On the bases of edaphic factor, the vegetation of the park may conveniently be classified under the following heads :

- i. Rocky (Hills, valleys and gullies) habitats
- ii. Sandy to loamy alluvium habitats
- iii. Marshy and aquatic habitats
- iv. Weeds and Aliens

i. Rocky habitats : The vast area of the park is comprising of hills, rocky to gravelly terrain having ridges, valleys, gullies and rock outcrops. These rocky hills are having very little amount of top soil with the result, the vegetation over these hills is very sparse, scanty and open and some of the rock outcrops are almost barren having typical desert scrub and thorny type. The common tree species recorded on the hills and valleys are *Acacia leucophloea*, *A. senegal*, *Anogeissus pendula*, *Balanites roxburghii*, *Capparis decidua*, *Cordia gharaf*, *Dichrostachys cinerea*, *Maytenus emarginatus*, *Securinega leucopyrus*, etc. near water reservoirs like ponds and lake *Acacia nilotica* subsp. *indica* is quite common. It is very interesting to note the occurrence of a rare and threatened species in the park namely *Anogeissus sericea* var. *nummularia*. The common shrubs noted in these habitats are *Cadaba fruticosa*, *Commiphora wightii*, *Euphorbia caducifolia*, *Grewia damine*, *G. tenax*,

Grewia villosa, *Lycium barbarum*, *Mimosa hamata*, *Rhus mysurensis*, *Senna auriculata*, *Ziziphus nummularia*, etc.

Among the clumps of trees and shrubs, some climbers and twiners like *Asparagus racemosus*, *Ceropegia bulbosa*, *Coccinia grandis*, *Cocculus hirsutus*, *C. pendulus*, *Corallocarpus conocarpus*, *C. epigaeus*, *Cryptostegia grandiflora*, *Leptadenia reticulata*, *Melothria maderaspatana*, *Pergularia daemia*, *Rivea hypocrateriformis*, *Sarcostemma viminalis*, etc make their appearance and form impenetrable community.

The ground flora particularly in valleys and gullies having more moisture, particularly during rainy season gives a glorious appearance of green carpet in the park area. The common herbs and undershrubs found here are : *Abutilon fruticosum*, *Anticharis senegalensis*, *Barleria acanthoides*, *Bidens biternata*, *Blainvillea acmella*, *Blepharis linariaefolia*, *Boerhavia diffusa*, *Cleome brachycarpa*, *C. scaposa*, *C. viscosa*, *Gmelina albescens*, *Convolvulus auricomus* var. *auricomus*, *Corbichonia decumbens*, *Corchorus depressus*, *C. tridens*, *C. trilobatus*, *Dicoma tomentosa*, *Dipteracanthus patulus* var. *alba*, *Euphorbia thymifolia*, *Evolvulus alsinoides*, *Fagonia indica*, *Glossocardia bosvalleae*, *Heliotropium marifolium* var. *wallichii*, *H. rariflorum*, *H. strigosum* subsp. *strigosum*, *Hibiscus micranthus*, *Indigofera cordifolia*, *I. oblongifolia*, *I. tinctoria*, *Justicia vahlii*, *Launaea resedifolia*, *Lepidagathis bandraensis*, *L. trinervis*, *Melhania futeyporensis*, *Monsonia senegalensis*, *Pavonia procumbens*, *Pulicaria angustifolia*, *Pupalia lappacea* var. *lappacea*, *Seddera latifolia*, *Sida cordata*, *S. cordifolia*, *S. spinosa*, *Tephrosia purpurea*, *T. strigosa*, *T. uniflora* subsp. *petrosa*, *Triumfetta pentandra*, *Vigna trilobata*, etc.

A common herbaceous root parasite *Striga gesnerioides* with its purplish-pink colour parasiting the *Lepidagathis trinervis* is also recorded in the rock crevices and moist-shady places.

Among the common grasses, which at some places in the rocky-gravelly habitats forms grasslands are – *Aristida adscensionis* var. *adscensionis*, *A. funiculata* var. *funiculata*, *Brachiaria lata* var. *pubescens*, *Chloris virgata*, *Cymbopogon martinii*, *Dichanthium annulatum*, *Elyonurus royleanus*, *Enneapogon cenchroides*, *E. desvauxii*, *E. persicus*, *E. schimperanus*, *Melanocenchris jacquemontii*, *Oropetium thomaeum*, *Sehima nervosum*, *Tetrapogon tenellus*, *Tripogon purpurascens*, etc. The grasslands and ground flora protects the soil from the action of rains and velocity of wind.

At certain places, particularly at high alluvium depositions on the banks of the water reservoirs the threat of fast spreading of *Prosopis juliflora* can be seen in the park.

ii. Sandy to loamy-alluvium habitats : At certain places in the park, land surfaces have been covered with recent or quaternary wind blown sandy and sandy to loamy alluvium. The trees and shrubs recorded over such habitats are : *Acacia senegal*, *Calotropis procera* subsp. *hamiltonii*, *Capparis decidua*, *Clerodendrum phlomoides*, *Maytenus emarginatus*, *Prosopis cineraria*, *Tecomella undulata*, *Ziziphus nummularia*, *Z. mauritiana* etc. In addition, a large number of annuals and perennials belonging to psammophytic to semixerophytic herbaceous ground cover, particularly during rainy season such area gives a glorious appearance of green carpet. The common herbs and undershrubs found here are : *Aerva javanica*, *Boerhavia repens*, *Commicarpus verticillatus*, *Crotalaria burhia*, *Digera muricata*, *Farsetia hamiltonii*, *Heliotropium zeylanicum*, *Indigofera argentea*, *I. hochstetteri*, *I. linifolia*, *I. linnaei*, *I. sessiliflora*, *Leptadenia pyrotechnica*, *Peristrophe paniculata*, *Sericostoma pauciflorum*, *Solanum virginianum*, *Tephrosia purpurea*, *Tribulus pentandrus*, etc.

The common herbaceous climber and creepers of these habitats are : *Citrullus colocynthis*, *Coccinia grandis*, *Cucumis callosus*, *C. melo* var. *momordica*, *C. prophetarum*, *Dactyliandra welwitschii*, *Ipomoea pes-tigridis*, *I. indica*, *Pergularia daemia* etc.

Among the common grasses mention may be made of *Aristida* spp., *Brachiaria lata* var. *pubescens*, *Cenchrus biflorus*, *C. pennisetiformis*, *Chloris virgata*, *Cymbopogon commutatus*, *C. jwarancusa* subsp. *jwarancusa*, *Eragrostis minor*, *Leptothrium senegalense*, *Stipagrostis pogonoptila*, *Tetrapogon tenellus* etc. Sometimes *Cyperus conglomerates* is also seen on sandy habitats. Near water reservoirs few trees of *Acacia nilotica* subsp. *indica* are also noted.

At the foot of some of the hills and hill outcrops the windward side of which obstruct the movement of sand, heavy deposition of alluvial sand is noticed. On such habitats the common plants of rocky habitats noted are *Acacia senegal*, *Anogeissus pendula*, *Commiphora wightii*, *Maytenus emarginatus*, *Moringa oleifera*, *Prosopis cineraria*, *Ziziphus nummularia*, etc.

The other common herbaceous ground flora of these habitats are similar as mentioned for sandy habitats.

Another mixed habitats of sandy-gravelly is also quite common in the park. In addition to woody plants the herbaceous ground flora of these habitats comprising of mainly species like *Anticharis senegalensis*, *Boerhavia diffusa*, *B. procumbens*, *Bouchea marrubifolia*, *Cleome brachycarpa*, *C. scaposa*, *Corchorus depressus*, *Dicoma tomentosa*, *Euphorbia clarkeana*, *E. granulata* var. *granulata*, *Fagonia indica*, *Heliotropium strigosum* subsp. *brevifolium*, *H. rariflorum*, *H. subulatum*, *Indigofera* spp., *Mollugo cerviana*, *M. nudicaulis*, *Sida tiagii*, *Tephrosia purpurea*, *Tribulus terrestris* etc. The common grasses noted here are *Aristida mutabilis*, *Cenchrus ciliaris*, *Chloris gayana*, *Dactyloctenium scindicum*, *Enneapogon* spp., *Melanocenchris jacquemontii*, *Ochthochloa compressa*, *Oropetium thameum* and *Tragus roxburghii*.

In the rocky hills and sandy-gravelly habitats following plant communities have been recorded in the Machia Safari Park on the basis of physiognomy and composition of species :

1. *Ochthochloa compressa* *Dactyloctenium scindicum* community – In sandy-alluvium to gravelly habitats.
2. *Cenchrus setigerus* *Ochthochloa compressa* *Dactyloctenium scindicum* community – On gravelly-rock outcrops.
3. Pure *Aristida adscensionis* var. *adscensionis* community – sandy to gravelly hummocky plains.
4. *Melanocenchris jacquemontii* *Heliotropium strigosum* community – In gravelly rocky outcrops.
5. *Grewia tenax* – *Commiphora wightii* community – On low hills.
6. *Euphorbia caducifolia* – *Ziziphus nummularia* community – On rock outcrops.
7. *Cymbopogon jwarancusa* community – In the crevices of exposed hill ridges and valleys.
8. *Prosopis juliflora* – Pure formation spreading near water reservoirs and right on some of the hills.
9. *Euphorbia caducifolia*, *Asparagus racemosus* and *Sarcostemma viminalis* – association on rock outcrops.
10. *Euphorbia caducifolia* with *Acacia senegal* association on rock outcrops.



View of Desert thorny scrub vegetation over rocky habitats.



View of rocky habitats, characteristic vegetation and Kailana lake



Euphorbia caducifolia Haines with
Acacia senegal (L.) Willd. – association on rock outcrops.



A population of free-floating *Lemna perpusilla* Torrey



Nelumbo nucifera Gaertn. – in blooming

iii. Marshy and aquatic habitats : There are eight watershed areas in the park. The northern portion of the twin lake of Takhatsagar-Kailana which is the main source of potable water for the Jodhpur city dwellers, is longitudinally extended into the south-western portion of the park. The Kailana lake with a filling capacity of 190 MCF and run-off area of 84 sq km is wholly situated within the park area. Besides, there are one perennial (Dhobi-talab) and three seasonal water holes (Balajinada, Bhomiya-nada and Kacholia-nada) are also present in Machia Safari Park. The banks of the reservoir and water bodies have depositions of heavy, loamy to clayey soil. This results in a fairly rich marshy and aquatic flora in the park. The hydrophytes of the park may be classified into following life-forms.

- (a) **Free floating :** *Lemna perpusilla*, *Nelumbo nucifera*, *Trapa natans* var. *bispinosa*.
- (b) **Attached with floating leaves or shoots :** *Potamogeton nodosus*.
- (c) **Suspended submerged :** *Hydrilla verticillata* and *Chara* spp.
- (d) **Attached submerged :** *Potamogeton pectinatus*, *Vallisneria spiralis* var. *denseserrulata*.
- (e) **Aquatic and/or amphibious emerged :** *Cyperus laevigatus*, *C. rotundus*, *Scirpus supinus*, *Typha angustata*, etc.
- (f) **Marshlands :** The common plants found in marshy habitats viz. near tanks, lakes, puddles, water streams are : *Alternanthera sessilis*, *Ammannia baccifera*, *A. octandra*, *Bacopa monnieri*, *Bergia ammannioides*, *Canscora diffusa*, *Dentella repens*, *Eclipta alba*, *Enicostema hyssopifolia*, *Gnaphalium polycaulon*, *Grangea maderaspatana*, *Lindernia parviflora*, *Ludwigia perennis*, *Marsilea aegyptiaca*, *Nesaea brevipes*, *Oxalis corniculata*, *Phyla nodiflora*, *Polygonum plebeium*, *Portulaca oleracea*, *P. quadrifida*, *Potentilla supina*, *Rotala densiflora*, *Sphaeranthus indicus*, *Vahlia digyna*, *Verbascum chinense*, *Vernonia cinerascens*, etc.

Sedges and grasses abound in marshy and swamy habitats, of which mention may be made of *Cyperus alulatus*, *C. bulbosus*, *C. cuspidatus*, *C. iria*, *C. laevigatus*, *C. rotundus* subsp. *rotundus*, *Echinochloa colonum*, *Eleocharis atropurpurea*, *E. geniculata*, *Eragrostis ciliaris*, *Fimbristylis quinquangularis*, *Kyllinga bulbosa*, *Mariscus squarrosus*, *Pycneus pumilus*, *Schoenoplectus roylei*, *S. supinus* subsp. *lateriflorus*, *Sporobolus helvolus*, etc.

Slightly away from the marshy habitats and in dried up tanks, ponds, puddles, where the soil is clayey, the following plants are noted : *Coldenia procumbens*, *Glinus lotoides*, *Grangea maderaspatana*, *Heliptropium ovalifolium*, *H. supinum*, *Polygonum plebeium*, *Pulicaria crispa*, *Sclerocarpus africanus*, *Trianthema portulacastrum*, etc.

iv. Weeds and Aliens : Though there is no cultivation in the park area but there are considerable number of weedy species of cultivated crops which have invaded along with the water course. Common among them are : *Aeschynomene indica*, *Alysicarpus monilifer* var. *monilifer*, *Amaranthus viridis*, *Aristolochia bracteolata*, *Borreria articularis*, *Celosia argentea*, *Chenopodium album*, *Commelina benghalensis*, *Convolvulus prostratus*, *Corchorus fascicularis*, *Crotalaria medicaginea*, *Cryptostegia grandiflora*, *Euphorbia clarkeana*, *E. hirta*, *E. indica*, *Gisekia pharnaceoides*, *Glossocardia bosvallea*, *Glossostigma diandra*, *Heliotropium europaeum* var. *lasiocarpum*, *Ipomoea verticillata*, *Leucas urticaefolia*, *Malva parviflora*, *Malvastrum coromandelianum*, *Merremia aegyptiaca*, *Nothosaerva brachiata*, *Oligochaeta rumosa*, *Peplidium maritimum*, *Phyllanthus amarus*,

Physalis minima, *Pulicaria crispa*, *Ruellia tuberosa*, *Rumex dentatus*, *Sclerocarpus africanus*, *Senna obtusifolia*, *Sesbania bispinosa*, *Solanum albicaule*, *S. virginianum*, *Trigonella occulta*, *Trianthema portulacastrum*, *Verbesina encelioides*, *Vernonia cinerea*, etc.

The common grasses and sedges associated with the weeds are : *Aristida adscensionis* var. *adscensionis*, *Brachiaria ramosa* var. *pubescens*, *Cenchrus ciliaris*, *Cynodon dactylon*, *Cyperus rotundus* subsp. *rotundus*, *Digitaria bicornis*, *D. ciliaris*, *Eragrostis ciliaris* var. *ciliaris*, *E. japonica*, *E. viscosa*, *Setaria verticillata*, *Sporobolus tenuissimus*, etc.

MATERIALS AND METHODS

The results of present study are based on intensive and extensive explorations, exhaustive study of the plants of the area by the authors spread over six years (1994-2000). Besides authors examined the specimens of earlier collectors deposited in the various Indian herbaria viz. BSA, CAL, DD, BLAT, LWG, BSI, JAC, etc.

The herbarium specimens collected by the authors, after identification have been deposited in the herbarium of the Botanical Survey of India, Jodhpur (BSJO) and Central National Herbarium, Howrah (CAL). An attempt has been made to bring the nomenclature of all the taxa up-to-date in accordance with latest International Code of Botanical Nomenclature, followed by common local name, habitats, status of occurrence, flowering and fruiting time, exact locality and collectors name and field numbers. The specimens cited in the text are arranged alphabetically under their respective families which are arranged according to the classification of Bentham and Hooker. The above results are presented at the end in a check-list form.

Besides check-list of plants reported from MSP the authors have also presented the bioperspective resources of MSP in a tabular form showing different uses of plants by local people, rare and threatened plants, important crop plants and their wild relatives, major vertebrate fauna and floral composition.

BIOPERSPECTIVE RESOURCES OF MACHIA SAFARI PARK

The natural resources of Jodhpur region and Thar desert have been worked out in greater details by Singh & Shetty (1976), Pandey & al. (1989), Chopra & Handa (1960), Gupta & al. (1966), etc. During the course of present study besides vegetation and checklist of plants, a list of about 64 economically important plants were recorded from Machia Safari Park along with their various uses. The same are appended in a tabular form for ready reference (Table 1).

RARE AND THREATENED PLANTS

The major causes for the loss of Biodiversity of desert are the increasing level of air and water pollution on account of rapid urbanization, industrial development, excessive grazing, use of variety of chemical fertilizers and pesticides, firewood and charcoal, defence activities, uncontrolled and over exploitation for commercial use, unscientific collection method of minor forest products, mining activities, natural calamities, socio-economic conditions of natives and loss of traditional knowledge of natives have attributed to negative impact or environmental eco-unbalance in general and the very survival of flora and fauna in particular.

Table 1. Bioperspective Resources of MSP and their various uses

S. No.	Plant Name	Fodder	Timber	Fire Wood	Gum & Resin	Seed Oil	Fibre	Tanning Industries	Dye	Food	Detergent	Non-Edible Oil	Refrigerant	Other Uses
1.	<i>Cocculus pendulus</i>								+					
2.	<i>Nelumbo nucifera</i>									+				
3.	<i>Argemone mexicana</i>					+								
4.	<i>Capparis decidua</i>		+	+										Fruits are used in pickles & vegetable
5.	<i>Pavonia zeylanica</i>						+							
6.	<i>Sida cordata</i>						+							
7.	<i>Sida cordifolia</i>						+							
8.	<i>Corchorus depressus</i>													Tonic, medicinal
9.	<i>Grewia damine</i>									+				
10.	<i>Grewia tenax</i>	+		+										Fruits edible
11.	<i>Grewia villosa</i>									+				
12.	<i>Tribulus terrestris</i>	+								+				
13.	<i>Balanites aegyptiaca</i>		+	+							+			Pharmaceutical Industry
14.	<i>Commiphora wightii</i>			+	+									
15.	<i>Azadirachta indica</i>		+	+	+	+				+				Soap & Pharmaceutical Industry
16.	<i>Maytenus emarginatus</i>	+	+											
17.	<i>Ziziphus nummularia</i>	+	+	+										Fruits edible, bark used in fermentation and distillation
18.	<i>Rhus mysurensis</i>	+		+						+				
19.	<i>Moringa oleifera</i>	+		+						+				Tender pods are used as vegetable
20.	<i>Aeschynomene indica</i>						+							

[illegible]

46.	<i>Tecomella undulata</i>		+											Wood used in carving
47.	<i>Pedaliium murex</i>													Watery sap with potential medicinal value
48.	<i>Clerodendrum phlomoides</i>	+				+								
49.	<i>Achyranthes aspera</i> var. <i>aspera</i>							+	+					
50.	<i>Aerva javanica</i>			+					+					
51.	<i>Amaranthus viridis</i>								+					
52.	<i>Chenopodium album</i>								+					
53.	<i>Aristolochia bracteolata</i>													Hair softner
54.	<i>Euphorbia caducifolia</i>			+					+					Latex medicinal
55.	<i>Ficus religiosa</i>		+						+					
56.	<i>Asparagus racemosus</i>								+					
57.	<i>Typha angustata</i>					+								Leaves for rope making
58.	<i>Cyperus rotundus</i> subsp. <i>rotundus</i>								+		+			Tubers medicinal
59.	<i>Brachiaria ramosa</i>	+												
60.	<i>Cenchrus ciliaris</i>	+												
61.	<i>Cymbopogon martinii</i>								+					
62.	<i>Dactyloctenium aegyptium</i>										+			
63.	<i>Dactyloctenium scindicum</i>								+					
64.	<i>Dichanthium annulatum</i>	+							+					

There are about 50 taxa of Angiosperms and one species of Gymnosperm, which are considered to be rare and threatened in Rajasthan (Pandey & al., 1983; Pandey & Shetty, 1985; Singh & Pandey, 1999). During the course of present study, about 33 rare and threatened taxa were recorded from Machia Safari Park. Of these two vulnerable species viz. *Commiphora wightii* and *Tecomella undulata*, which are of great economic importance are also occurring in Machia Safari Park.

Among the other rare and threatened taxa, two important ones, which were so far confined to their type location viz. *Alysicarpus monilifer* var. *venosa* (from Jaisalmer) and *Brachiaria ramosa* var. *pubescens* (so far, endemic to Karnataka) were also found in Machia Safari Park (MSP). The rest of the rare and threatened taxa from MSP are *Ammannia octandra*, *Anogeissus sericea* var. *nummularia*, *Arenaria serphyllifolia*, *Bidens biternata*, *Boerhavia procumbens*, *Canscora diffusa*, *Ceropegia bulbosa*, *Corallocarpus conocarpus*, *C. epigeus*, *Cymbopogon jwarancusa* subsp. *jwarancusa*, *Datura stromonium*, *Elyonurus royleanus*, *Indigofera argentea*, *I. sessiliflora*, *Leptadenia reticulata*, *Leptothrium senegalense*, *Lycium edgeworthii*, *Nesaea brevipes*, *Physalis angulata*, *Pulicaria rajputanae*, *Rotala densiflora*, *Sclerocarpus africanus*, *Senna obtusifolia*, *Sida tiagii*, *Striga gesnerioides* var. *gesnerioides*, *Tephrosia uniflora* subsp. *petrosa*, *Tripogon purpurascens*, *Triumfetta pentandra* and *Vahlia digyna*.

The occurrence of sizeable number of rare and threatened plants in Machia Safari Park clearly indicates the importance of the protected area and requires adequate measures for protection and conservation of plant diversity.

IMPORTANT CROP PLANTS AND THEIR WILD RELATIVES

The wild relatives of cultivated plants are of considerable importance in studies on crop improvement and in providing baseline data on species relationships. Further, the wild relatives of

Table 2. List of cultivated species and their probable wild relatives

Cultivated species	Wild relatives and related species
<i>Amaranthus caudatus</i> L.	<i>A. viridis</i> , <i>A. hybridus</i> L. subsp. <i>cruentus</i> (L.) Thell. var. <i>paniculatus</i> (L.) Thell.
<i>Citrullus lanatus</i> (Thunb.) Mats. & Nakai	<i>C. colocynthis</i> (L.) Schrad.
<i>Corchorus capsularis</i> L.	<i>C. trilocularis</i> L.
<i>Cucumis melo</i> L.	<i>C. prophetarum</i> L.
<i>Cucumis sativus</i> L.	<i>C. callosus</i> (Rottl.) Congn.
<i>Physalis peruviana</i> L.	<i>P. minima</i> L.
<i>Portulaca pilosa</i> L. subsp. <i>grandiflora</i> (Hook.) Geesink	<i>P. oleracea</i> L.
<i>Setaria italica</i> (L.) P. Beauv. (Fox-tail millet)	<i>S. verticillata</i> (L.) P. Beauv.
<i>Solanum melongena</i> L.	<i>S. incanum</i> L., <i>S. virginianum</i> L.
<i>Vigna dalzelliana</i> (Kuntze) Verdcourt	<i>V. aconitifolia</i> (Jacq.) Marechal
<i>Vigna radiata</i> (L.) Wilczek (Green gram)	<i>V. trilobata</i> (L.) Verdcourt
<i>Ziziphus mauritiana</i> Lam.	<i>Z. nummularia</i> (Burm. f.) Wight & Arn.

cultivated plants and related species of agri-horticultural importance by and large, occur as components of disturbed, bio-edaphic communities within the major vegetation types. Disturbed grasslands and scrub jungles and similar open forest types are rich in such components. Prior to this, Singh & Pandey (1996) have studied wild relatives of cultivated plants in Indian desert (Rajasthan). During the course of present study 12 cultivated/crop plants with their 14 wild relatives were identified from Machia Safari Park (Table 2).

MAJOR FAUNA

The perusal of literature reveals a large number of vertebrate fauna, which includes mammals, birds, reptiles, fish and amphibians. An exhaustive report has been published by Dr. Mohnot in 1999. the impact of IGNP life canal on the fish fauna have been discussed in greater details by Mohan & Singh (2004). The avifauna has been studied by Bora & Goyal (1992), Bora & Rana (1994) and Chhangani (2002 & 2002-a).

I. Mammals : Hyaena (*Hyaena hyaena*), wolf (*Canis lupus*), desert fox (*Vulpus vulpus*), jackal (*Canis aureus*), desert cat (*Felis libyca*) are the main carnivores and scavengers of the MSP. Whereas the blue bull (*Boselaphus tragocamelus*), desert hare (*Lepus nigricollis*) are the main herbivores. Other mammals includes Hanuman langur (*Semnopithecus entellus*), wild boar (*Sus scrofa*) (Chhangani, 2002), porcupine (*Hystrics indica indica*), Grey Mongoose (*Herpestes edwardsi*), Small Indian Mongoose (*Herpestes auropunctatus*), etc.

II. Birds: A total of 87 species of water and terrestrial birds including resident and migratory has been observed in the MSP. Since 1993 the adjoining Kailana (Takhat Sagar and Pratap Sagar) store the water & for civil supply of Jodhpur city, the availability of water year round attracts large number of water birds. The avifauna of MSP includes three threatened birds species of world as per IUCN red list-2000.

III. Reptiles and Amphibians: A total 14 species of reptiles, turtle and two species of amphibians observed in the MSP including lizards and snakes of which many are threatened species.

IV. Fishes: After getting water from IGNP the diversity of the fish fauna has increased manifolds in the MSP, which also attracts the large number of migratory birds for food. This includes *Oxygaster baccaila*, *Labeo bata*, *Labeo gonius*, *Labeo rohita*, *Labeo calbasu*, *Puntius ticto*, *Puntius sarana*, *Puntius sarana*, *Puntius conchoni*, *Tor tor*, *Cirrhinoides mrigala*, *Catla catla*, *Cyprinus carpio communis*, *Labeo boggut*, *Noemacheilus botia botia*, *Mystus vittatus*, *Mystus cavasius*, *Wallago attu*, *Xenentodon cancila*, *Channa punctatus*, *Channa marulius*, *Chanda nana*, *Chanda baculis*, *Chanda ranga*, *Mastacembelus armatus armatus*, *Mastacembelus pancalus*, *Gadusia chaptra*, *Notopterus notopterus*, *Nandus nandus*, *Tilapia mossambica*, *Saccobranchus fossilis*, etc. (Mohan, D. & Singh S., 2004).

FLORAL COMPOSITION

The 304 taxa of vascular plants of Arid Machia Safari Park Kailana in Jodhpur are enumerated in the present paper belong to 196 genera under 66 families. Besides this a solitary pteridophyte was also collected from Arid Machia Safari Park. The following Table-3 gives the number and percentage of families, genera and species belonging to Dicotyledons and Monocotyledons.

Table 3. Statistical synopsis of the indigenous flora

Taxa	Families		Genera		Species	
	No.	%	No.	%	No.	%
Angiosperms						
Dicotyledons	58	87.87	156	79.60	232	76.24
Monocotyledons	8	12.13	40	20.40	72	23.76
Total	66	100.00	196	100.00	304	100.00

The families with 6 or more genera are :

1. Poaceae 24 genera (46 spp.)
2. Asteraceae 15 genera (19 spp.)
(Compositae)
3. Fabaceae 11 genera (24 spp.)
(Papilionaceae)
4. Cyperaceae 8 genera (16 spp.)
5. Amaranthaceae 8 genera (10 spp.)
6. Scrophulariaceae 8 genera (8 spp.)
7. Acanthaceae 7 genera (10 spp.)
8. Malvaceae 6 genera (10 spp.)
9. Convolvulaceae 6 genera (9 spp.)
10. Cucurbitaceae 6 genera (9 spp.)
11. Asclepiadaceae 6 genera (7 spp.)

The genera with 5 or more species are as follows :

- Heliotropium* L. (10 spp.)
Indigofera L. (8 spp.)
Cyperus L. (8 spp.)
Euphorbia L. (7 spp.)
Eragrostis Wolf. (5 spp.)

If the Fabaceae *s.l.* (Leguminosae) are taken into consideration as single family, it comprises of 19 genera and 37 species. Even then, Poaceae (Gramineae) occupies the first place, the second and third positions are being occupied by Fabaceae *s.l.* (Leguminosae) and Asteraceae (Compositae) respectively (Table 4).

Except for Poaceae and Cyperaceae (Total 62 species), the Monocotyledons are poorly represented. The remaining 10 species of monocotyledons are spread over 6 different families with barely 1 or 2 species. The ratio of species belonging to Monocotyledons and Dicotyledons is 1:3.2, of genera 1:3.9 and of families 1:7. Only a solitary representative of pteridophyte viz. *Marsilea aegyptiaca* Willd. (Marseliaceae) is reported from Arid Machia Safari Park.

The ratio of the total number of genera to species is 1:1.54 which is obviously on the lower side, when compared with the corresponding ratio for the whole of India which is estimated to be about 1:7. However, it is more or less comparable to the ratio for northern Gujarat 1: 1.83 (Saxton, 1922), Flora of Indian Desert 1:1.9 (Bhandari, 1978, 1990) and Flora of Rajasthan 1:2.4 (Shetty & Singh, 1987-

1993). The present analysis shows the small proportion of species to the number of genera and families for area under studied. Further, it also confirms to the general hypothesis that, within the same floristic region, the smaller the flora, the genera-species ratio will be smaller.

Table 4. Ten dominant families in Arid Machia Safari Park, Kailana, Jodhpur and adjoining region.

Flora of Arid Machia Safari Park (Present Study)	Flora of Rajasthan Shetty & Singh (1987-93)	Flora of Indian Desert Bhandari (1978)	Flora of India Hooker (1906)
Poaceae	Poaceae	Poaceae	Orchidaceae
Fabaceae (Papilionaceae)	Fabaceae (Papilionaceae)	Leguminosae	Leguminosae
Asteraceae	Asteraceae	Asteraceae	Poaceae
Cyperaceae	Cyperaceae	Convolvulaceae	Rubiaceae
Boraginaceae	Acanthaceae	Cyperaceae/ Malvaceae	Euphorbiaceae
Solanaceae	Euphorbiaceae	Cucurbitaceae	Acanthaceae
Amaranthaceae	Convolvulaceae	Acanthaceae	Asteraceae
Acanthaceae	Scrophulariaceae	Euphorbiaceae	Cyperaceae
Malvaceae	Lamiaceae	Scrophulariaceae	Lamiaceae
Convolvulaceae/ Cucurbitaceae/ Euphorbiaceae	Malvaceae	Amaranthaceae/. Boraginaceae	Urticaceae

A comparison of 10 dominant families (Table-4) of Arid Machia Safari Park, Jodhpur with those in the whole of Rajasthan State, Indian desert and India as a whole reveals that, while Orchidaceae captures the top position in the Flora of India (Hooker, 1906), which is lacking in all the rest of the floras. Where as Poaceae (Graminae) tops the list. Taking into consideration the top 3 positions which are being occupied by Poaceae (Gramineae), Fabaceae *s.l.* (Leguminosae) and Asteraceae (Compositae) respectively. The present study shows resemblance in general with the Flora of Rajasthan and Flora of Indian desert.

In the enumeration, the families are arranged according to Bentham & Hooker's system of classification with some adjustment according to the present day delimitations of certain families. The genera within the families and species within the genera are arranged in an alphabetical order. Attempts have been made to provide the correct name of the taxa dealt with as far as possible. For each taxon, its local name, locality, habitat, frequency, phenological data and specimens selected are given. The herbarium specimens are deposited in the herbarium of BSJO and CAL.

ENUMERATION

ANGIOSPERMS

DICOTYLEDONS

MENISPERMACEAE

Cocculus hirsutus (L.) Diels

Common name : Pilwan.

In rocky habitats, not common.

Fl. & Fr.: September – April.

MSP: Way to Machia Fort, Pandey & Padhye 14048.

Cocculus pendulus (J. R. & G. Forst.) Diels

Common name : Pilwan.

In rocky habitats, common throughout.

Fl. & Fr.: December – March.

MSP: Dhobi-nada, *Pandey & Padhye* 14239; *Ratan Singh* 416, 187, 186.

NELUMBONACEAE

Nelumbo nucifera Gaertn.

Common name : Kamal, Kamal Kakari, Kumudini.

In tanks, lakes, etc., abundant.

Fl. & Fr.: August – December.

MSP : Pool near temple, *Pandey & Padhye* 14219.

PAPAVERACEAE

Argemone mexicana L. forma *mexicana*

Common name : Satyanasi.

Winter season weed in waste places and neglected corners, common.

Fl. & Fr.: November – May.

MSP : Kailana, *Pandey* 14284.

FUMARIACEAE

Fumaria indica (Haussk.) Pugsley

Common name : Pithpaparo.

Winter season weed, common.

Fl. & Fr.: December – April.

MSP : Kailana, *A. N. Singh* 3573.

BRASSICACEAE

Farsetia hamiltonii Royle

Common name : Hiran Chabbo, Kag – pilang.

Habitat sandy, common.

Fl. & Fr.: Almost throughout the year.

MSP : Kailana, *Ratan Singh* 53.

CLEOMACEAE

Cleome gynandra L. var. *gynandra*

Common name : Safed bagro.

Weed in wastelands and neglected corners, common.

Fl. & Fr.: July – December.

MSP : Kailana, *B.V. Shetty* 214.

C. scaposa DC.

Common name : Bagro.

Habitat rocky, common.

Fl. & Fr.: August – December..

MSP : Kailana, *B. V. Shetty* 169; Way to Machia Fort, *Pandey & Padhye* 14045.

Cleome viscosa L.

Common name : Handi Bagro, Bagro, Gandhio.

Habitat rocky, fairly common.

Fl. & Fr.: August – November.

MSP : Way to Machia Fort and Bithari Pahari, *Pandey & Padhye* 14002, 14194; *B. V. Shetty* 26.

CAPPARACEAE

Cadaba fruticosa (L.) Druce

Common name : Dabi.

Habitat rocky, common.

Fl. & Fr.: November – August.

MSP : Way to Machia Fort, *Pandey & Padhye* 14286.

Capparis decidua (Forssk.) Edgew.

Common name : Ker, Keria, Kerro.

Habitats rocky to gravelly, common throughout.

Fl. & Fr.: Throughout the year.

MSP : Way to Machia Fort, *Pandey & Padhye* 14077, 14281; *Ratan Singh* 3.

Maerua oblongifolia (Forssk.) A. Rich.

Common name : Orapa.

In sandy-gravelly places, common.

Fl. & Fr.: October – March.

MSP : Kailana, *Ratan Singh* 185, 422, 424.

POLYGALACEAE

Polygala erioptera DC.

Common name : Chotti Phuli.

In mixed habitats, common.

Fl. & Fr.: August – October.

MSP : Dhobi nada, Bithari Pahari, *Pandey & Padhye* 14105, 14202; *A.N. Singh* 4316.

CARYOPHYLLACEAE

Arenaria serpyllifolia L.

Common name : Pithpaparo.

Habitat sandy, rare.

Fl. & Fr.: September – December.

MSP : Dhobi nada, *Pandey & Padhye* 14159.

PORTULACACEAE

Portulaca oleracea L.

Common name : Ram-jata.

In moist-sandy soil, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14006; *Ratan Singh* 319.

Portulaca quadrifida L.

Common name : Ram-jata, Luni.

In rocky to gravelly crevices, not common.

Fl. & Fr.: September – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14137; *G. L. Tiwari* 1124; *Ratan Singh* 321.

ELATINACEAE

Bergia ammannioides Heyne ex Roth

Common name : Jal Bhangro.

In marshy/aquatic habitats, common.

Fl. & Fr.: February – April.

MSP : Dhobi nada, *Pandey & Padhye* 14247; *B.V. Shetty* 246.

B. suffruticosa (Del.) Fenzl.

Common name : Kankario, Kharbuji, Rowan, Rai.

In dried up pools, ponds, etc. common.

Fl. & Fr.: September January.

MSP : Canal along Machia Fort, Kacholiya nada, *Pandey & Padhye* 14064, 14230; 14285; *B.V. Shetty* 289.

MALVACEAE

Abutilon fruticosum Guill. & Perr. var. fruticosum

Common name : Imarti.

Habitat rocky-gravelly, not common.

Fl. & Fr.: September January.

MSP : Way to Machia Fort, *Pandey & Padhye* 14017.

Hibiscus micranthus L. f.

Common name : Dokala.

In rocky habitats, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14142, 14114, 14251; *A.N. Singh* 4409.

Malva parviflora L.

Common name : Golio.

In moist places, not common.

Fl. & Fr.: December – March.

MSP : Dhobi nada, *Pandey & Padhye* 14248.

Malvastrum coromandelianum (L.) Garcke

Common name : Golari.

In moist-sandy habitats, common.

Fl. & Fr.: August January.

MSP : Kailana, *G. L. Tiwari* 611.

Pavonia procumbens (Wall. ex Wight & Arn.) Walp.

In rocky habitats, fairly common.

Fl. & Fr.: Almost throughout the year.

MSP : Kailana, A.N. Singh 4426.

***Pavonia zeylanica* (L.) Cav.**

In mixed habitats, throughout the area.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Machia Fort, Pandey & Padhye 14039, 14111; A.N. Singh 4388.

***Sida cordata* (Burm. f.) Borssum**

Common name : Bal, Adio-bal.

In rocky habitats, common.

Fl. & Fr.: August – October.

MSP : Kacholiya nada near Gate no. 3, Pandey & Padhye 14223; A.N. Singh 3249.

***S. cordifolia* L.**

Common name : Bal.

In rocky habitats, common.

Fl. & Fr.: September – December.

MSP : Kailana, A.N. Singh 3193.

***S. spinosa* L.**

Common name : Bal.

In rocky habitats, common.

Fl. & Fr.: September – January.

MSP : Way to Machia Fort, Pandey & Padhye 14023; A.N. Singh 4496.

****S. tiagii* Bhandari**

Common name : Bal.

In sandy-gravelly habitats, rare.

Fl. & Fr.: August – December.

MSP : Near Main gate, Pandey & Padhye 14187; B.V. Shetty 88.

STERCULIACEAE

Melhanianthus futteyporensis* Munro ex Mast. var. *futteyporensis

In rocky habitats, common.

Fl. & Fr.: August – October.

MSP : Kailana, P.J. Parmar 4860.

TILIACEAE

***Corchorus depressus* (L.) Stocks**

Common name : Chamkash, Cham-ghass, Baphuli, Munderi.

In rocky-gravelly habitats, common.

Fl. & Fr.: August – March.

MSP : Way to Dhobi nada, Pandey & Padhye 14127; G.L. Tiwari 654.

***C. fascicularis* Lam.**

In sandy-loam soil, common.

Fl. & Fr.: September – December.

MSP : Kailana, *B.V. Shetty* 145.

Corchorus tridens L.

Common name : Kagnasha.

In rocky habitats, common.

Fl. & Fr.: August – December.

MSP : Kailana, *B.V. Shetty* 118.

C. trilocularis L.

Common name : Kagle-ki-tambaku, Hardi Ka Ket.

In moist-rocky habitats, common.

Fl. & Fr.: July – November.

MSP : Kailana, *A.N. Singh* 3107.

Grewia damine Gaertn.

On low rocky hills, common.

Fl. & Fr.: September – November.

MSP : Way to Machia Fort, Bithari Pahari, *Pandey & Padhye* 14076, 14201.

G. tenax (Forssk.) Fiori

Common name : Gangaran, Gangerun, Gangan, Kankeran.

In rocky habitats, common.

Fl. & Fr.: August – January.

MSP : Way to Machia Fort, Gate no. 3, Bithari Pahari, *Pandey & Padhye* 14003, 14007, 14087, 14145, 14211; *G.P. Roy* 1538; *Ratan Singh* 2.

G. villosa Willd.

Common name : Gangeti, Lankas.

In rocky habitats, occasional.

Fl. & Fr.: July – October.

MSP : Way to Machia Fort, *Pandey & Padhye* 14014; *S. Moorthy* 79.

Triumfetta pentandra A. Rich.

In gravelly-rocky habitats, rare.

Fl. & Fr.: July – November.

MSP : Kailana, *B. V. Shetty* 167.

ZYGOPHYLLACEAE

Fagonia indica Burm. f. var. *indica*

Common name : Dhamaso.

In gravelly places, common.

Fl. & Fr.: September – March.

MSP : Way to Machia Fort, *Pandey & Padhye* 14026.

Tribulus lanuginosus L.

In gravelly-loamy habitats, rare.

Fl. & Fr.: January – December.

MSP : Kailana, *S. Moorthy* 74.

Tribulus pentandrus Forssk.

Common name : Kanti.

In sandy-gravelly habitats, not common.

Fl. & Fr.: August – November.

MSP : Kailana, A.N. Singh 4363.

T. terrestris L.

Common name : Kanki, Gokharu, Gokharu-butti.

Throughout the area, common.

Fl. & Fr.: September – December.

MSP : Way to Machia Fort, Dhobi nada, Kacholiya nada, Pandey & Padhye 14024, 14120, 14217, 14231; Ratan Singh 182.

GERANIACEAE

Monsonia senegalensis Guill. & Perr.

In rocky habitats, common.

Fl. & Fr.: September – November.

MSP : Kailana, B.V. Shetty 87; A.N. Singh 4360.

OXALIDACEAE

Oxalis corniculata L.

Common name : Khati, Khatari.

In moist habitats, common.

Fl. & Fr.: January – December.

MSP : Kailana, R.P. Pandey 1759.

BALANITACEAE

Balanites roxburghii Planch.

Common name : Hingoto, Hingotio, Hingorni.

In rocky-gravelly habitats, common.

Fl. & Fr.: December – July.

MSP : Kailana, Ratan Singh 59.

BURSERACEAE

***Commiphora wightii** (Arn.) Bhandari

Common name : Guggul, Guggal.

In rocky habitats, common.

Fl. & Fr.: September – May.

MSP : Way to Dhobi nada, Pandey & Padhye 14108; A.N. Singh 4491.

MELIACEAE

Azadirachta indica A. Juss.

Common name : Neemro, Neem.

In sandy-loam soil, common.
Fl. & Fr.: December – May.
MSP : Kailana, *D.M. Verma* 602.

CELASTRACEAE

Maytenus emarginatus (Willd.) Ding Hou

Common name : Kankero.
 On low rocky hillocks, common.
Fl. & Fr.: November – March.
MSP : Dhobi nada, *Pandey & Padhye* 14240; *Ratan Singh* 418; *G.P. Roy* 1537.

RHAMNACEAE

Ziziphus nummularia (Burm. f.) Wight & Arn.

Common name : Borti, Bordi, Jhar-bor.
 On mixed habitats, fairly common.
Fl. & Fr.: September – December.
MSP : Way to Machia Fort, *Pandey & Padhye* 14052; *B.V. Shetty* 171; *Ratan Singh* 6.

ANACARDIACEAE

Rhus mysurensis G Don

Common name : Danser.
 In rocky habitats, fairly common.
Fl. & Fr.: July – September.
MSP : Way to Machia Fort, Dhobi nada, *Pandey & Padhye* 14030, 14110.

MORINGACEAE

Moringa oleifera Lam.

Common name : Sanjano, Sanjana.
 In sandy-loam soil, common.
Fl. & Fr.: February – June.
MSP : Kailana, *S. Moorthy* 427.

FABACEAE

Aeschynomene indica L.

In moist-sandy habitats, common.
Fl. & Fr.: August – November.
MSP : Way to Dhobi nada, *Pandey & Padhye* 14153; *B.V. Shetty* 159.

Alysicarpus monilifer (L.) DC. var. **monilifer**

In moist-sandy rocky crevices, common.
Fl. & Fr.: August – October.
MSP : Machia Fort, Bithari Pahari, *Pandey & Padhye* 14053, 14208.

***Alysicarpus. monilifer** (L.) DC. var. **venosa** Blatt. & Hallb.

Common name : Leel.

In moist places, rare.

Fl. & Fr.: September – November.

MSP : Canal along Machia Fort, *Pandey & Padhye* 14068.

A. vaginalis (L.) DC.

In mixed habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Machia Fort, *Pandey & Padhye* 14132, 14215; *A.N. Singh* 3103.

Crotalaria burhia Buch.-Ham. ex Benth.

Common name : Shinio, Seenio.

In sandy habitats, common.

Fl. & Fr.: August – January.

MSP : Near main gate, *Pandey & Padhye* 14192; *Ratan Singh* 180.

C. medicaginea Lam.

Common name : Gugario.

In moist places, common.

Fl. & Fr.: July – November.

MSP : Way to Machia Fort, Dhobi talab, *Pandey & Padhye* 14235; *B.V. Shetty* 220.

Indigofera argentea Burm. f.

Common name : Neel, Moti neel.

In sandy habitats, rare.

Fl. & Fr.: August – October.

MSP : Kailana, *A. N. Singh* 4423.

I. cordifolia Heyne ex Roth

Common name : Bakario, Bekar.

In open rocky areas, abundant.

Fl. & Fr.: August – November.

MSP : Canal along Machia Fort, *Pandey & Padhye* 14062; *B.V. Shetty* 116.

I. hochstetteri Baker

Common name : Aadio-bekario, Chail.

In dry sandy soil, common.

Fl. & Fr.: August – November.

MSP : Bithari Pahari, *Pandey & Padhye* 14209; *G.L. Tiwari* 609.

I. linifolia (L. f.) Retz. var. **linifolia**

Common name : Lambio-Bekario.

In sandy habitats, common.

Fl. & Fr.: July – December.

MSP : Kailana, *B.V. Shetty* 117.

Indigofera linnaei Ali

Common name : Bakario.
In sandy habitats, common.
Fl. & Fr.: August – December.
MSP : Kailana, A.N. Singh 4408.

I. oblongifolia Forssk.

Common name : Goilia, Jhil.
In rocky-gravelly habitats, common.
Fl. & Fr.: September – March.
MSP : Near main gate, Pandey & Padhye 14188; G.L. Tiwari 650:

I. sessiliflora DC.

In sandy soil, rare.
Fl. & Fr.: July – October.
MSP : Kailana, Ratan Singh 51; B.V. Shetty 278.

I. tinctoria L.

Common name : Neel.
In moist- rocky places, common.
Fl. & Fr.: August – November.
MSP : Kailana, A.N. Singh 3579.

Melilotus indica (L.) All.

Common name : Methi, Metho, Gorhadal, Maroo.
In moist situations, common winter season weed.
Fl. & Fr.: December – March.
MSP : Kailana, A.N. Singh 3298.

Rhynchosia minima (L.) DC.

Common name : Chiri-Morio, Chiri-Motio, Kalta.
On bushes, shrubs etc., common.
Fl. & Fr.: August – November.
MSP : Way to Dhobi nada, Pandey & Padhye 14169, 14180; A.N. Singh 3102; B.V. Shetty 128.

Sesbania bispinosa (Jacq.) Wight

Common name : Ikad.
In moist-sandy places, common.
Fl. & Fr.: August – October.
MSP : Kailana, A.N. Singh 3112.

Tephrosia purpurea (L.) Pers.

Common name : Baunio, Biyani, Sarpankho, Bisoni.
In rocky-sandy habitats, common.
Fl. & Fr.: July – March.
MSP : Way to Machia Fort, Pandey & Padhye 14037; Ratan Singh 12.

Tephrosia strigosa (Dalz.) Santapau & Maheshw.

Common name : Jhino-Biyono.

In rocky habitats, common.

Fl. & Fr.: August – October.

MSP : Way to Dhobi nada, Bithari Pahari, *Pandey & Padhye* 14128, 14210; *A.N. Singh* 4314.

***T. uniflora** Pers. subsp. **petrosa** (Blatt. & Hallb.) Gillet & Ali

Common name : Bhaker-Biyani.

In rocky-gravelly habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Machia Fort, gate no. 3, *Pandey & Padhye* 14074, 14144; *B.V. Shetty* 93.

Trigonella occulta Delile ex DC.

Common name : Metho.

In moist-shady places, common.

Fl. & Fr.: February – March.

MSP : Dhobi nada, *Pandey & Padhye* 14242.

Vigna aconitifolia (Jacq.) Marechal

Common name : Moth.

In neglected corners and waste lands, common.

Fl. & Fr.: August – November.

MSP : Way to Machia Fort, *Pandey & Padhye* 14021.

V. trilobata (L.) Verd.

Common name : Jangli Moth, Arakh-Moth.

In rocky-gravelly places, common.

Fl. & Fr.: August – October.

MSP : Kailana, *B.V. Shetty* 122.

Zornia gibbosa Span

In moist-shaded localities, common.

Fl. & Fr.: August – October.

MSP : Kailana, *B.V. Shetty* 142.

CAESALPINIACEAE

Chamaecrista pumila (Lam.) V. Singh

In rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Machia Fort, *Pandey & Padhye* 14213; *A.N. Singh* 4315.

Parkinsonia aculeata L.

Common name : Bilayati Babul.

A Tropical American plant, planted.

Fl. & Fr.: March – June.

MSP : Kailana, *Pandey & Padhye* 14288.

Senna auriculata (L.) Roxb.

Common name : Anwal, Anwala.

In rocky-sandy habitats, common.

Fl. & Fr.: August – February.

MSP : Kailana, A.N. Singh 4359; B.V. Shetty 129.

S. obtusifolia (L.) Irwin & Barneby

In sandy-loam soil, rare.

Fl. & Fr.: August – November.

MSP : Kailana, B.V. Shetty 166.

S. occidentalis (L.) Link

Common name : Kesudo.

In neglected corners, waste lands, etc., common.

Fl. & Fr.: August – November.

MSP : Way to Machia Fort, Pandey & Padhye 14233.

MIMOSACEAE

Acacia leucophloea Willd.

Common name : Jhinjo, Urajio, Arjuna.

In rocky habitats, common.

Fl. & Fr.: August – February.

MSP : Kailana, A.N. Singh 3164

A. nilotica (L.) Willd. ex Del. subsp. **indica** (Benth.) Brenan

Common name : Babul, Banwal.

In moist-rocky-clayey soil, common.

Fl. & Fr.: Throughout the year.

MSP : Way to Dhobhi nada, Pandey & Padhye 14174; R.P. Pandey 6177.

A. senegal (L.) Willd.

Common name : Kumatio, Kumbat, Kumatiyo-robeej.

In rocky habitats, fairly common.

Fl. & Fr.: July – January.

MSP : On and around Machia Fort hills, Pandey & Padhye 14067, 14088, 14091; G.P. Roy 1540.

Dichrostachys cinerea (L.) Wight & Arn.

Common name : Kolai.

In rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Machia Fort, Pandey & Padhye 14212.

Leucaena latisiliqua (L.) Gillis

Common name : Su-Babul, Pardeshi-banwal.

A Tropical American plant, planted.

Fl. & Fr.: February – May.

MSP : Way to Machia Fort, Pandey & Padhye 14258; A.N. Singh 3791.

Mimosa hamata Willd.

Common name : Jinjani, Jinjanio.

In gravelly-rocky habitats, common.

Fl. & Fr.: August – February.

MSP : Way to Gate no. 3, *Pandey & Padhye* 14143; *B.V. Shetty* 131; *Ratan Singh* 18.

Prosopis juliflora (Sw.) DC.

Common name : Bilayati Banwalio, Angreji Banwal.

Native of Tropical and Tropical America, well naturalized in open areas, often planted.

Fl. & Fr.: Almost throughout the year.

MSP : Throughout the area, *Pandey & Padhye* 14283; *Kailana*, *Ratan Singh* 62.

P. cineraria (L.) Druce

Common name : Khejari, Khejaro.

In sandy-gravelly habitats, not common.

Fl. & Fr.: March – June.

MSP : *Pandey & Padhye* s.n.

ROSACEAE

Potentilla supina L.

In moist-clayey habitats, fairly common.

Fl. & Fr.: August – March.

MSP : Way to gate no. 3, Dhobi nada, *Pandey & Padhye* 14181, 14246; *G.L. Tiwari* 1123.

VAHLIACEAE

Vahlia digyna (Retz.) Kuntze

Common name : Agio, Noli.

In marshy habitats, rare.

Fl. & Fr.: October – February.

MSP : *Kailana*, *B.V. Shetty* 161.

COMBRETACEAE

Anogeissus pendula Edgew.

Common name : Dhauro, Dhok, Dhau, Endrok.

In rocky-gravelly habitats.

Fl. & Fr.: September – April.

MSP : Machia fort hills, Bithari Pahari, *Pandey & Padhye* 14082, 14200; *S.Moorthy* 37.

***A. sericea** Brandis var. **nummularia** King ex Duthie

Common name : Dhauro, Indrok, Indoko.

On low rocky hillocks, endemic, rare.

Fl. & Fr.: July – April.

MSP : Way to Machia Fort, *Pandey & Padhye* 14079; *S.Moorthy* 39.

LYTHRACEAE

***Ammannia baccifera* L.**

Common name : Jal-Bhangro.

In moist-aquatic habitats, common.

Fl. & Fr.: Almost throughout the year.

MSP : Canal along Machia Fort, *Pandey & Padhye* 14269; *D.M. Verma* 587.

*****A. octandra* L. f.**

Common name : Bhangro.

In moist places, common.

Fl. & Fr.: October – January.

MSP : Kacholiya nada, *Pandey & Padhye* 14228.

*****Nesaea brevipes* Koehne**

Common name : Jal-Bhangro.

In moist habitats, not common.

Fl. & Fr.: September – December.

MSP: Kacholiya nada, *Pandey & Padhye* 14229.

**** *Rotala densiflora* (Roth ex Roem. & Schult.) Koehne**

In moist-aquatic habitats, not common.

Fl. & Fr.: September – December.

MSP : Machia forest, *Pandey & Padhye* 14008.

ONAGRACEAE

***Ludwigia perennis* L.**

In moist-clayey soil, common.

Fl. & Fr.: August – September.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14152, 14172.

TRAPACEAE

***Trapa natans* L. var. *bispinosa* (Roxb.) Makino**

Common name : Singharo, Pani Patasa Singharo.

In tanks and pools, abundant.

Fl. & Fr.: September – November.

MSP : Pool near Kailana temple, *Pandey & Padhye* 14220.

CUCURBITACEAE

***Citrullus colocynthis* (L.) Schrad.**

Common name : Tumbo, Turo, Tumba.

In sandy-gravelly places, common creeper.

Fl. & Fr.: January – December.

MSP : Kailana, *A.N. Singh* 3124.

Coccinia grandis (L.) J. O. Voigt

Common name : Gol, Golan, Golenda, Shiv-lingi.

In sandy-gravelly habitats, common climber on *Euphorbia caducifolia* Haines.

Fl. & Fr.: Almost throughout the year.

MSP : Kailana, B.V. Shetty 1773.

***Corallocarpus conocarpus** (Dalz. & Gibs.) Hook. f.

Common name : Kadvi-Mirchi-Bel.

In moist to rocky habitats, rare.

Fl. & Fr.: August – December.

MSP : Kailana, G.L. Tiwari 632.

C. epigaeus (Rottl. & Willd.) Hook. f.

Common name : Kadawi-nai.

In rocky-gravelly habitats, rare.

Fl. & Fr.: August – November.

MSP : Kailana, G.L. Tiwari 627.

Cucumis callosus (Rottl.) Cogn.

Common name : Kachri, Kachrio.

In gravelly-sandy places, common.

Fl. & Fr.: August – November.

MSP : Kailana, A.N. Singh 140.

C. melo L. var. **momordica** Duthie & Fuller

Common name : Kachro Kakario.

In sandy habitats, common.

Fl. & Fr.: August – December.

MSP : Kailana, Ratan Singh 21.

C. prophetarum L.

Common name : Khat-Kachario.

In gravelly, low hillocks, occasional.

Fl. & Fr.: August – January.

MSP : Kailana, A.N. Singh 4420.

Dactyliandra welwitschii Hook. f.

Common name : Badi Ankh Phootani Bel.

In sandy-gravelly places, common climber on bushes.

Fl. & Fr.: August – November.

MSP : Kailana, B. V. Shetty 120.

Melothria maderaspatana (L.) Cogn.

Common name : Ankh Phutani Bel, Aunkharo.

In rocky-gravelly habitats, common.

Fl. & Fr.: July – December.

MSP : Kailana, B.V. Shetty 121.

AIZOACEAE

Trianthema portulacastrum L.

Common name : Safed Santho, Dhedo Santo, Santo, Hato.

In moist-sandy places, common.

Fl. & Fr.: August – December.

MSP : Near main gate, *Pandey & Padhye* 14189; *G. P. Roy* 1535.

MOLLUGINACEAE

Corbichonia decumbens (Forssk.) Exell

In rocky-sandy habitats, common.

Fl. & Fr.: August – December.

MSP : On and around Machia Fort, *Pandey & Padhye* 14016; *B.V. Shetty* 178.

Gisekia pharnaceoides L. var. **pharnaceoides**

Common name : Morang, Sareli, Sareli-Morang.

In moist-sandy-loam soil, common.

Fl. & Fr.: August – November.

MSP : Kailana, *R.P. Pandey* 1757.

Glinus lotoides L.

Common name : Hata, Bakada, Matter, Dholakani.

In muddy-clayey dried up tanks, pools, etc., common.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14175, 14241.

Mollugo nudicaulis Lam.

Common name : Hirlo, Rangatio-Khar.

In gravelly-sandy soil, common.

Fl. & Fr.: September – November.

MSP : Canal along Machia Fort, Kacholiya nada near Bhomiaji ka Than, *Pandey & Padhye* 14056, 14224; *B.V. Shetty* 101.

RUBIACEAE

Borreria articularis (L. f.) F. N. Will.

Common name : Agio.

In moist-sandy places, not common.

Fl. & Fr.: August – November.

MSP : Way to Dhobinada, Bithari Pahari, *Pandey & Padhye* 14135, 14199.

Dentella repens (L.) J. & G. Forst.

Common name : Jal-buti.

In moist habitats, common.

Fl. & Fr.: Most part of the year.

MSP : Kailana, *A.N. Singh* 4312.

Kohautia aspera (Heyne ex Roth) Brem.

In sandy habitats, occasional.

Fl. & Fr.: August – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14130; *B.V. Shetty* 137.

ASTERACEAE (COMPOSITAE)

Bidens biternata (Lour.) Merr. & Sherff ex Sherff

In rocky habitats, rare.

Fl. & Fr.: August – October.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14168.

Blainvillea acmella (L.) Philipson

In rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B.V. Shetty* 163.

Dicoma tomentosa Cass.

Common name : Vajardanti, Ubio-til-kant.

In rocky-gravelly habitats, not common.

Fl. & Fr.: September – December.

MSP : Bithari Pahari, Kailana, *Pandey & Padhye* 14198; *B.V. Shetty* 103.

Eclipta alba (L.) Hassk.

Common name : Jal-Bhangro.

In moist and marshy habitats, common.

Fl. & Fr.: August – March.

MSP : Canal along Machia Fort, way to Dhobinada, *Pandey & Padhye* 14065, 14173, 14273, 14278; *B.V. Shetty* 164; *A.N. Singh* 3109.

Glossocardia bosvallea (L. f.) DC.

In rocky-gravelly shady localities, not common.

Fl. & Fr.: July – October.

MSP : Near main gate, *Pandey & Padhye* 14193; *B.V. Shetty* 91.

Gnaphalium polycaulon Pers.

Common name : Kharsiya.

In moist-dumpy places, common.

Fl. & Fr.: November – March.

MSP : Machia, *Pandey & Padhye* 14253; *Ratan Singh* 419.

Grangea maderaspatana (L.) Poir.

In moist-dumpy places, not common.

Fl. & Fr.: Almost throughout the year.

MSP : Dhobi nada, *Pandey & Padhye* 14244.

Launaea procumbens (Roxb.) Ramayya & Rajagopal

Common name : Van-gobi.

In moist habitats, Common.
Fl. & Fr.: September – April.
MSP : Kailana, *B.V. Shetty* 262.

Launaea resedifolia (L.) Kuntze

Common name : Phulavalo-unt-kantalo, Dud-Phad.
 In rocky habitats, occasional.
Fl. & Fr.: Throughout the year.
MSP : Kailana, *B.V. Shetty* 257.

Oligochaeta ramosa (Roxb.) Wagenitz

Common name : Mundi.
 In sandy-loam soil, common winter season weed.
Fl. & Fr.: October – March.
MSP : Kailana, *B.V. Shetty* 212.

Parthenium hysterophorus L.

Common name : Kangras Ghass.
 Native of Mexico and W. Indies, naturalized as a common weed in wastelands and open forest.
Fl. & Fr.: Throughout the year.
MSP : Around Machia Fort hills, *Pandey & Padhye* 14270.

Pulicaria angustifolia DC.

Common name : Soneli.
 In rocky low hillocks, occasional.
Fl. & Fr.: September – November.
MSP : Way to Machia Fort, Bithari Pahari, *Pandey & Padhye* 14043, 14196; *B.V. Shetty* 202.

P. crispa (Forssk.) Benth. & Hook. f.

Common name : Dhola-lizzru.
 In moist – clayey soil, common.
Fl. & Fr.: January – December.
MSP : Kailana, *B.V. Shetty* 388.

***P. rajputanae Blatt. & Hallb.**

Common name : Dhola-Lizzru.
 In moist-shaded places, rare.
Fl. & Fr.: September – January.
MSP : Way to Machia Fort, *Pandey & Padhye* 14069.

****Sclerocarpus africanus Jacq. ex Murr.**

Common name : Pili Mundi.
 In moist-shaded localities, common.
Fl. & Fr.: August – November.
MSP : Machia Fort, Way to Dhobi nada, *Pandey & Padhye* 14081, 14179.

Sphaeranthus indicus L.

Common name : Nar-Mundi.

In moist places and dried up tanks, common.

Fl. & Fr.: October – April.

MSP : Near Bhomiaji ka Than, *Pandey & Padhye* 14284; *A.N. Singh* 3574.

***Verbesina encelioides* (Cav.) Benth. & Hook. f. ex A. Grey**

Common name : Chandra Mukhi.

Near moist open places, common.

Fl. & Fr.: June – September.

MSP : Kailana, *A. N. Singh* 3261.

***Vernonia cinerascens* Sch.-Bip.**

In wet and shady places, not common.

Fl. & Fr.: August – December.

MSP : Way to Machia Fort, Dhobi nada, *Pandey & Padhye* 14040, 14078, 14129.

***V. cinerea* (L.) Less.**

Common name : Dholi-Puspi.

In mixed habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Machia Fort, Gate no. 3, *Pandey & Padhye* 14051, 14146, 14262.

ASCLEPIADACEAE

***Calotropis procera* (Ait.) Ait. f. subsp. *hamiltonii* (Wight) Ali**

Common name : Aak, Madar, Akaro.

In open places, common.

Fl. & Fr.: Throughout the year.

MSP : Machia, *Pandey & Padhye* 14274; *Ratan Singh* 63.

*** *Ceropegia bulbosa* Roxb.**

Common name : Hedulo, Alu.

In rocky habitats, twiners on *Euphorbia caducifolia* Haines, rare.

Fl. & Fr.: July – December.

MSP : Kailana, *G. L. Tiwari* 625-A.

***Leptadenia pyrotechnica* (Forssk.) Decne.**

Common name : Khimp, Khimparo.

In mixed habitats, common throughout the area.

Fl. & Fr.: August – January.

MSP : Kailana, *G.P. Roy* 1548.

**** *L. reticulata* (Retz.) Wight & Arn.**

Common name : Andho-Khip.

In rocky-gravel habitats, rare.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Dhobi nada, Machia Fort, *Pandey & Padhye* 14184, 14221.

Pentatropis spiralis (Forssk.) Decne.

Common name : Aakari-bel.

In gravelly-rocky habitats, not common.

Fl. & Fr.: September – January.

MSP : Machia fort, Kailana, *Pandey & Padhye* 14086; *S.Moorthy* 80.

Pergularia daemia (Forssk.) Chiov.

Common name : Gadariari-bel, Menda-singi.

In dry rocky habitats, common.

Fl. & Fr.: March – December.

MSP : Kailana, *G P. Roy* 1539.

Sarcostemma viminalis (L.) R. Br. subsp. **viminalis**

Common name : Khursani-tanto, Khir-khimp.

On rocky hills, occasional.

Fl. & Fr.: August – November.

MSP : Way to gate no. 3, *Pandey & Padhye* 14148.

PERIPLOCACEAE

Cryptostegia grandiflora R. Br.

Common name : Vilayati-Akaro, Rubber-bel.

In open moist neglected places, common.

Fl. & Fr.: July – April.

MSP : Machia fort, near gate no. 3, *Pandey & Padhye* 14085, 14237.

GENTIANACEAE

**** Canscora diffusa** (Vahl) R. Br.

In marshy habitats, very common.

Fl. & Fr.: September – March.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14093.

BORAGINACEAE

Coldenia procumbens L.

In moist-clayey soil, common.

Fl. & Fr.: September – May.

MSP : Kailana, *A. N. Singh* 3101.

Heliotropium europaeum L. var. **lasiocarpum** (Fisch. & Mey.) Kazmi

Common name : Pili-bui.

In moist places, common.

Fl. & Fr.: August – March.

MSP : Kailana, Machia, *R. P. Pandey* 6181; *Pandey & Padhye* 14290.

H. marifolium Retz. var. **marifolium**

Common name : Choti Santari.

In sandy-gravelly habitats, common.

Fl. & Fr.: September – March.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14264.

***Heliotropium marifolium* Retz. var. *wallichii* C. B. Clarke**

In sandy-rocky terrain, fairly common.

Fl. & Fr.: September – March.

MSP : Way to Machia fort, *Pandey & Padhye* 14042.

***H. ovalifolium* Forssk.**

Common name : Kundan.

In dried up ponds, pools and near moist places, very common.

Fl. & Fr.: September – April.

MSP : Canal along Machia fort, Dhobi nada, way to gate no. 3, *Pandey & Padhye* 14055, 14116, 14134, 14140.

***H. rariflorum* Stocks**

Common name : Kharsani, Kharchan.

On rocky low hills, common.

Fl. & Fr.: September – December.

MSP : Machia, *Pandey & Padhye* 14001.

H. strigosum* Willd. subsp. *strigosum

In gravelly habitats, common.

Fl. & Fr.: September – December.

MSP : Canal along Machia Fort, *Pandey & Padhye* 14066.

***H. strigosum* Willd. subsp. *brevifolium* (Wall.) Kazmi**

In sandy to gravelly habitats, common.

Fl. & Fr.: September – March.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14138.

***H. subulatum* (Hochst. ex DC.) Vatke**

Common name : Kalli-bui.

In sandy-gravelly mixed habitats, common.

Fl. & Fr.: Almost throughout the year.

MSP : Kailana, *B.V. Shetty* 168.

***H. supinum* L.**

Common name : Rui-bui.

In dried up tanks and moist-clayey soil, abundant.

Fl. & Fr.: September – March.

MSP : Way to Dhobi nada, Machia fort, *Pandey & Padhye* 14186, 14257.

***H. zeylanicum* (Burm. f.) Lam.**

In sandy soil, common.

Fl. & Fr.: August – March.

MSP : Kailana, *Ratan Singh* 11.

Sericostoma pauciflorum Stocks ex Wight

Common name : Ligguroo.

In sandy habitats, common.

Fl. & Fr.: August – September.

MSP : Kailana, *Ratan Singh* 46.

Trichodesma indica (L.) var. **amplexicaule** (Roth) Cooke

Common name : Sial-kanto.

In waste lands, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14112; *A.N. Singh* 3115; *B.V. Shetty* 152.

EHRETIACEAE

Cordia gharaf (Forssk.) Ehrenb. ex Asch.

Common name : Goondi.

In rocky habitats, particularly in valleys, common.

Fl. & Fr.: March – June.

MSP : Machia, Kailana, *Pandey & Padhye* 14297; *Ratan Singh* 68.

CONVOLVULACEAE

Convolvulus auricomus (A. Rich.) Bhandari var. **auricomus**

Common name : Rota-bel.

In sandy soil and among rocky crevices, common.

Fl. & Fr.: September – November.

MSP : Kailana, *A.N. Singh* 3117; *Ratan Singh* 322.

C. prostratus Forssk.

Common name : Sankhpushpi, Santari, Santer.

In mixed habitats, fairly common throughout the area.

Fl. & Fr.: August – December.

MSP : Kailana, *Ratan Singh* 181.

Evolvulus alsinoides (L.) L.

Common name : Sankh Puspi, Phooli.

On rocky habitats, not common.

Fl. & Fr.: July – November.

MSP : Way to Machia fort, Dhobi nada, Bithari Pahari, *Pandey & Padhye* 14018, 14106, 14197; *B.V. Shetty* 141.

Ipomoea pes-tigridis L.

Common name : Amar-bel.

In sandy soil amidst grasses, common.

Fl. & Fr.: August – December.

MSP : Kailana, *A.N. Singh* 3113; *B.V. Shetty* 153.

***Ipomoea sindica* Stapf**

Common name : Rota-bel.

In sandy soil, common.

Fl. & Fr.: August – November.

MSP : Kailana, A. N. Singh 3104; B. V. Shetty 156.

***I. verticillata* Forssk.**

In sandy-gravelly habitats, not common.

Fl. & Fr.: August – September.

MSP : Way to Dhobi nada, Pandey & Padhye 14107.

***Merremia aegyptia* (L.) Urban**

Common name : Rota-bel.

In sandy-loam soil, not common.

Fl. & Fr.: August – December.

MSP : Kailana, B.V. Shetty 158.

***Rivea hypocrateriformis* (Desr.) Choisy**

Common name : Rota-bel.

In rocky habitats, woody climber on *Prosopis juliflora* (Sw.) DC. and *Euphorbia caducifolia* Haines.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, Kailana, Pandey & Padhye 14164; Ratan Singh 188.

***Seddera latifolia* Hochst. & Steud.**

In rocky habitats, common.

Fl. & Fr.: September – March.

MSP : Way to Machia fort, Dhobi nada, Kailana, Pandey & Padhye 14029, 14122; Ratan Singh 327.

SOLANACEAE***Datura innoxia* Mill.**

Common name : Dhaturu.

In waste lands and neglected corners, common.

Fl. & Fr.: September – March.

MSP : Way to Machia fort, Pandey & Padhye 14260.

***D. stramonium* L.**

Common name : Dhaturu.

In waste places, rare.

Fl. & Fr.: December – May.

MSP : Way to Machia fort, Pandey & Padhye 14259.

***Lycium barbarum* L.**

Common name : Morali.

In sandy-loam soil, common.

Fl. & Fr.: September – December.

MSP : Kailana, Ratan Singh 192; G. P. Roy 1549.

**** Lycium edgeworthii Dun.**

Common name : Morali.

In waste lands, particularly on rocky habitats, common.

Fl. & Fr.: September – January.

MSP : Hathī Canal, near gate no. 3, *Pandey & Padhye* 14222.

**** Physalis angulata L.**

In mixed habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Machia fort, *Pandey & Padhye* 14232.

P. minima L.

Common name : Chirphoti, Pipat.

In sandy-loam soil, common.

Fl. & Fr.: August – December.

MSP : Kailana, *B.V. Shetty* 157.

Solanum albicaule Kotschy ex Dunal

Common name : Nar-kanta.

In moist places, common.

Fl. & Fr.: August – December.

MSP : Kailana, *S. Moorthy* 71.

S. incanum L.

Common name : Dholi Ringni.

In sandy-gravelly soil, common.

Fl. & Fr.: August – March.

MSP : Kailana, *B.V. Shetty* 314.

S. nigrum L.

Common name : Makoi.

In waste lands and neglected corners of forest, common.

Fl. & Fr.: Almost throughout the year.

MSP : Machia, *Pandey & Padhye* 14280; Kailana, *Ratan Singh* 421.

S. virginianum L.

Common name : Bhur-Ringni, Bhur-hingani, Ringani, Adkuntali.

In mixed habitats, common.

Fl. & Fr.: Most part of the year.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14121, 14275; *Ratan Singh* 316.

Withania somnifera (L.) Dunal

Common name : Aasgandha, Asav-gandha.

In sandy-moist soil, occasional.

Fl. & Fr.: Throughout the year.

MSP : Kailana, *G. L. Tiwari* 1121.

SCROPHULARIACEAE

Anticharis senegalensis (Walp.) Bhandari

Common name : Dhunnya, Dharno Ghass, Jehri rukhari.

In rocky-gravelly habitats, fairly common.

Fl. & Fr.: August – October.

MSP : Machia fort, Kailana, Pandey & Padhye 14005; B.V. Shetty 150.

Bacopa monnieri (L.) Wettst.

Common name : Jal – Bhangaro.

In moist-clayey soil, fairly common.

Fl. & Fr.: Throughout the year.

MSP : Kailana, R. P. Pandey 1760.

Glossostigma diandra (L.) Kuntze

In moist-clayey soil, common.

Fl. & Fr.: August – October.

MSP : Kailana, A.N. Singh 4484.

Lindenbergia indica (L.) Vatke

Common name : Pili puspi.

In moist-shady rock crevices, common.

Fl. & Fr.: July – March.

MSP : Kailana, A.N. Singh 3157.

Lindernia parviflora (Roxb.) Haines

In marshy-muddy habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Dhobi nada, Pandey & Padhye 14157.

Peplidium maritimum (L. f.) Asch.

In moist-clayey soil, common.

Fl. & Fr.: November – March.

MSP : Kailana, G. L. Tiwari 1117.

Striga gesnerioides (Willd.) Vatke var. **gesnerioides**

Common name : Missi.

Herbaceous root parasite on *Lepidagathis trinervis* Wall. ex Nees, particularly on rocky habitats, rare.

Fl. & Fr.: August – October.

MSP : Way to gate no. 3, Kailana, Pandey & Padhye 14139; S. Moorthy 38.

Verbascum chinense (L.) Sant.

In moist places, common.

Fl. & Fr.: January – April.

MSP : Canal along Machia fort, Kailana, Pandey & Padhye 14268; S. Moorthy 404.

BIGNONIACEAE

Tecoma stans (L.) Juss. ex Kunth

Common name : Pilli buti.

Native of South America, planted for its beautiful flowers.

Fl. & Fr.: March – April.

MSP : Machia fort, *Pandey & Padhye* 14250.

* **Tecomella undulata** (Sm.) Seem.

Common name : Rohiro, Rohira.

In sandy habitats, not common.

Fl. & Fr.: January – April.

MSP : Kailana, *G. P. Roy* 1547.

PEDALIACEAE

Pedaliium murex L.

Common name : Gokhru-Kanti, Gokhru-butti.

In waste lands, common.

Fl. & Fr.: August – December.

MSP : Way to Machia fort, *Pandey & Padhye* 14234.

Sesamum indicum L.

Common name : Til, Teel.

In sandy-loam soil, escape from cultivation, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B.V. Shetty* 149.

ACANTHACEAE

Barleria acanthoides Vahl

Common name : Bajardanti, Chapari.

In rocky habitats, fairly common.

Fl. & Fr.: September – November.

MSP : Way to Machia fort, Dhobi nada, Kailana, *Pandey & Padhye* 14027, 14089, 14126, 14279; *S. Moorthy* 36.

Blepharis linariifolia Pers.

In rocky-gravelly habitats, common.

Fl. & Fr.: August – December.

MSP : Kailana, *B.V. Shetty* 179.

Dipteracanthus patulus (Jacq.) Nees var. **patulus**

In open rocky habitats, not common.

Fl. & Fr.: July – November.

MSP : Kailana, *S. Moorthy* 75.

Dipteracanthus patulus (Jacq.) Nees var. **alba** (Saxton) Bhandari

On low rocky hillocks, common throughout the year.

Fl. & Fr.: July – October.

MSP : Way to Machia fort, *Pandey & Padhye* 14038.

Note : Flowers are nocturnal.

Justicia simplex D. Don

In mixed habitats, common throughout the area.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14136.

J. vahlii Roth

Common name : Makhania ghass, Gungi-butti.

In rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B.V. Shetty* 119.

Lepidagathis bandraensis Blatter

Common name : Kantalo, Unt-Kantalo.

In rocky habitats, common.

Fl. & Fr.: Almost throughout the year.

MSP : On way to Machia fort, *Pandey & Padhye* 14009, 14054, 14255.

L. trinervis Wall. ex Nees

In rocky habitats, common.

Fl. & Fr.: November – April.

MSP : Kailana, *S. Moorthy* 43.

Peristrophe paniculata (Forssk.) Brummitt

Common name : Kagner.

In rocky-sandy habitats, common.

Fl. & Fr.: September – January.

MSP : Kailana, *A.N. Singh* 3116.

Ruellia tuberosa L.

In moist-shady places, common.

Fl. & Fr.: August – November.

MSP : Kailana, *A.N. Singh* 4494.

VERBENACEAE

Chascanum marrubifolium Fenzl ex Walp.

Common name : Bai, Bui.

In sandy-gravelly habitats, common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Bithari Pahari, Kailana, *Pandey & Padhye* 14036, 14195;
Ratan Singh 19.

Clerodendrum phlomoides L. f.

Common name : Arni, Yerna.

In sandy-loamy soil, common.

Fl. & Fr.: August – March.

MSP : Kailana, *Ratan Singh* 190.

Phyla nodiflora (L.) E. Greene

Common name : Lal-Butti

In moist places, common.

Fl. & Fr.: Almost throughout the year.

MSP : Canal along Machia fort, Kailana, *Pandey & Padhye* 14060, 14271; *A. N. Singh* 3110.

LAMIACEAE (LABIATAE)

Leucas urticaefolia (Vahl) R. Br.

Common name : Pani hari, Pintar.

In moist-sandy-loam soil, common.

Fl. & Fr.: October – February.

MSP : Kailana, *B.V. Shetty* 162.

Ocimum canum Sims.

Common name : Bapji, Ramtulasi.

In mixed habitats, not common, often planted.

Fl. & Fr.: Throughout the year.

MSP : Kailana, *S. Moorthy* 42.

NYCTAGINACEAE

**** Boerhavia procumbens** Banks ex Roxb.

In gravelly to sandy soil, common.

Fl. & Fr.: January – December.

MSP : On Machia fort hillocks, Kailana, *Pandey & Padhye* 14083, 14218; *B. V. Shetty* 175.

B. repens L.

Common name : Satha, China wari.

In sandy-loam soil, common.

Fl. & Fr.: Almost throughout the year.

MSP : Kailana, *Ratan Singh* 5.

Commicarpus verticillatus (Poir.) Standl.

Common name : Pungalio.

In sandy soil, common.

Fl. & Fr.: August – March.

MSP : Kailana, *Ratan Singh* 60.

AMARANTHACEAE

Achyranthes aspera L. var. **aspera**

Common name : Andhi-Jalo, Apamarg, Undo-Kantio, Katio-bhuratio, Unta-ghada.

In mixed habitats, common.

Fl. & Fr.: January – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14170.

A. aspera L. var. **argentea** (Thw.) Hook. f.

In rocky-sandy habitats, common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14022; *B.V. Shetty* 94.

Aerva javanica (Burm. f.) Juss. ex Schult. var. **javanica**

Common name : Bui, Buari.

In sandy habitats, not common.

Fl. & Fr.: July – December.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14049; *Ratan Singh* 52.

Alternanthera sessilis (L.) R. Br. ex DC.

In marshy-moist habitats, not common.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Dhobi nada, Machia fort, *Pandey & Padhye* 14166, 14256, 14277.

Amaranthus hybridus L. subsp. **cruentus** (L.) Thell. var. **paniculatus** (L.) Thell.

In waste lands and neglected corners of forest, common.

Fl. & Fr.: January – December.

MSP : Way to Machia fort, *Pandey & Padhye* 14214.

A. viridis L.

Common name : Arak-Chandeo.

In moist-sandy soil, common.

Fl. & Fr.: March – October.

MSP : Kailana, *Ratan Singh* 326.

Celosia argentea L.

Common name : Imarti, Kukari, Makhamal.

In sandy-loam soil, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B. V. Shetty* 154.

Digera muricata (L.) Mart.

Common name : Lolaru.

In sandy soil, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14124; *B.V. Shetty* 86.

Nothosaerva brachiata (L.) Wight

In sandy-moist habitats, common.

Fl. & Fr.: September – November.

MSP : On Machia fort, Dhobi nada, Kailana, *Pandey & Padhye* 14090, 14092, 14182; *Ratan Singh* 420.

Pupalia lappacea* (L.) Juss. var. *lappacea

Common name : Undio-bhurat.

In rocky habitats and wastelands, common.

Fl. & Fr.: August – January.

MSP : Way to Machia fort, Dhobi nada, Kailana, *Pandey & Padhye* 14019, 14117; *B.V. Shetty* 133.

CHENOPODIACEAE

***Chenopodium album* L.**

Common name : Chilaro.

In moist localities, common.

Fl. & Fr.: September – February.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14178.

***C. murale* L.**

Common name : Goyalo.

In mixed habitats, common.

Fl. & Fr.: November – April.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14263.

POLYGONACEAE

Polygonum plebeium* R. Br. var. *plebeium

In moist-clayey soil, not common.

Fl. & Fr.: September – October.

MSP : Way to Machia fort, *Pandey & Padhye* 14015.

***P. plebeium* R. Br. var. *indica* (Heyne ex Roth) Hook. f.**

In moist-clayey habitats, common.

Fl. & Fr.: September – March.

MSP : Way to gate no. 3, Dhobi nada, *Pandey & Padhye* 14141, 14176, 14243.

***Rumex dentatus* L.**

Common name : Jangli-Palak.

In moist places, common.

Fl. & Fr.: January – April.

MSP : Kailana, *R. P. Pandey* 6184.

ARISTOLOCHIACEAE

***Aristolochia bracteolata* Lam.**

Common name : Hukka-bel, Jufa, Aulosa.

In dried up tanks, pools, ponds etc., common.

Fl. & Fr.: July – December.

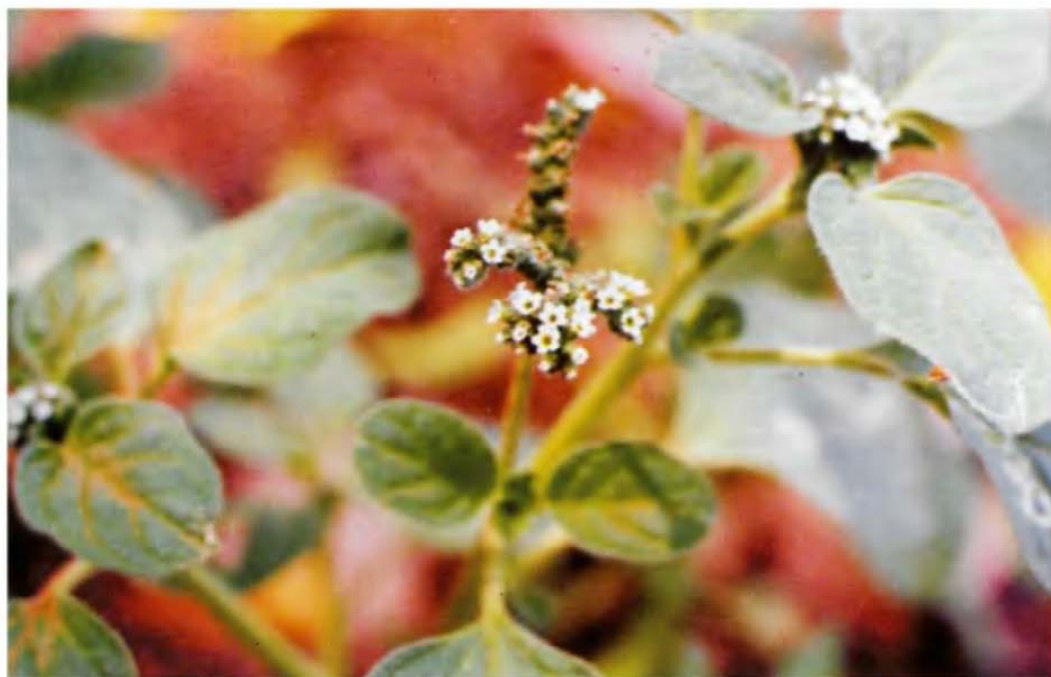
MSP : Kailana, *A. N. Singh* 3114, 4317; *Ratan Singh* 323.



Sarcostemma viminale (L.) R. Br. – in blooming.



Dipteracanthus patulus (Jacq.) Nees var. *alba* (Saxton) Bhandari – a common component of rocky habitats.



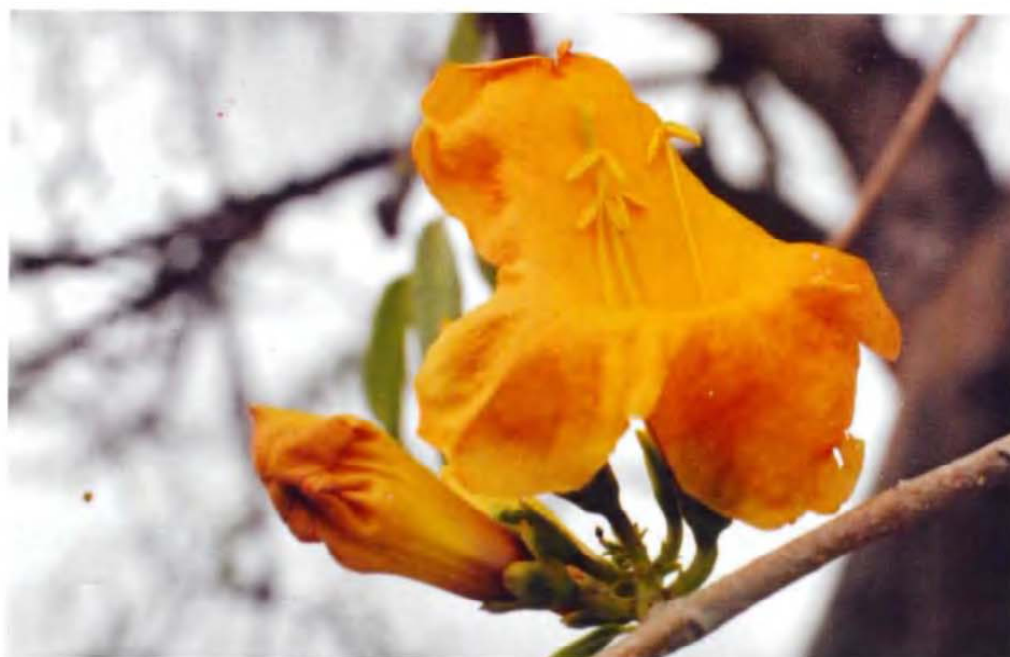
Heliotropium europaeum L. var. *lasiocarpum* (Fisch. & Mey.) Kazmi



Pedalium murex L. – a highly medicinal plant in blooming.



A common root parasite – *Striga gesnerioides* (Willd.) Vatke



Tecomella undulata (Sm.) Seem. (Desert teak) – a vulnerable species in blooming.

EUPHORBIACEAE

Euphorbia caducifolia Haines

Common name : Thor, Danda-thor.

On barren rocky habitats, fairly common.

Fl. & Fr.: December – April.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14249; *S. Moorthy* 425.

E. clarkeana Hook. f.

Common name : Dudheli.

In moist habitats, common.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14131; *Ratan Singh* 183.

E. granulata Forssk. var. **granulata**

Common name : Dudheli.

In rocky-gravelly habitats, common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14044; *Ratan Singh* 44.

E. heyneana Spreng.

In mixed habitats, common.

Fl. & Fr.: October – March.

MSP : Dhobi nada, *Pandey & Padhye* 14245.

E. hirta L.

Common name : Dhedi-dudheli, Dudhi.

In sandy-gravelly habitats, common throughout.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14118, 14276; *Ratan Singh* 318.

E. indica Lam.

Common name : Dudheli.

In moist-sandy-clayey places, not common.

Fl. & Fr.: January – December.

MSP : Kailana, *A. N. Singh* 3108.

E. thymifolia L.

In rocky-loamy soil, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14156.

Phyllanthus amarus Schum. & Thom.

Common name : Gugario.

In moist-sandy-loam soil, very common.

Fl. & Fr.: Almost throughout the year, but more profusely during rainy season.

MSP : Canal along Machia fort, way to Dhobi nada, *Pandey & Padhye* 14058, 14119.

Securinega leucopyrus (Willd.) Muell.-Arg.

Common name : Ghat-bor.

In gravelly-rocky habitats, not common.

Fl. & Fr.: June – September.

MSP : Kailana, B. V. Shetty 132.

MORACEAE

Ficus religiosa L.

Common name : Pipal, Pipali.

Planted near habitations.

Fl. & Fr.: March – June.

MSP : Way to Machia fort, Pandey & Padhye 14265.

MONOCOTYLEDONS

HYDROCHARITACEAE

Hydrilla verticillata (L. f.) Royle

Common name : Jal-buti.

Submerged aquatic plant, common.

Fl. & Fr.: September – November.

MSP : Way to gate no. 3, Kailana, Pandey & Padhye 14151; B. V. Shetty 300.

Vallisneria spiralis L. var. **denseserrulata** Makino

Common name : Sewal.

Submerged aquatic herb, common.

Fl. & Fr.: February – November.

MSP : Kailana, A.N. Singh 4481; G. L. Tiwari 1115.

LILIACEAE

Asparagus racemosus Willd.

Common name : Satawar, Satawari, Narkanto.

Perennial climber on *Euphorbia caducifolia* Haines, frequently common.

Fl. & Fr.: August – December.

MSP : Way to gate no. 3, Machia fort, Kailana, Pandey & Padhye 14147, 14287; S. Moorthy 423.

Urgenia indica (Roxb.) Kunth

Common name : Jangli – Kando.

In rocky habitats, very common.

Fl. & Fr.: February – May.

MSP : Kailana, R. P. Pandey 6178.

COMMELINACEAE

Commelina albescens Hassk.

Common name : Bhakar, Bokhana.

In moist gravelly to rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14115; *B. V. Shetty* 92.

C. benghalensis L.

Common name : Bakhana.

In moist-loamy soil, common.

Fl. & Fr.: August – December.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14177; *B. V. Shetty* 84.

TYPHACEAE

Typha angustata Bory & Chaub.

Common name : Paan.

In marshy-muddy habitats, abundant.

Fl. & Fr.: August – June.

MSP : Kailana, *S. Moorthy* 401.

LEMNACEAE

Lemna perpusilla Torrey

Common name : Jal-buti.

Tiny, free-floating aquatic plant, abundant.

Fl. & Fr.: July – September.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14163.

POTAMOGETONACEAE

Potamogeton nodosus Poir.

Common name : Jal-buti.

Submerged aquatic herb, common.

Fl. & Fr.: May – September.

MSP : Kailana, *A. N. Singh* 4483.

P. pectinatus L.

Common name : Jal-buti.

Submerged aquatic herb, common.

Fl. & Fr.: February – November.

MSP : Kailana, *B. V. Shetty* 298.

CYPERACEAE

Cyperus alulatus Kern

In marshy habitats, common.

Fl. & Fr.: September – November.

MSP : Kailana, *B. V. Shetty* 98.

Cyperus atkinsonii C. B. Clarke

Common name : Mothio.

In marshy habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14128.

C. bulbosus Vahl

Common name : Moth.

In marshy habitats, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B. V. Shetty* 95; *S. Moorthy* 81-A.

C. compressus L.

In moist-sandy open places, common.

Fl. & Fr.: August – November.

MSP : Kailana, *B. V. Shetty* 310.

C. cuspidatus Kunth

In moist habitats, common.

Fl. & Fr.: August – October.

MSP : Kailana, *A. N. Singh* 3275.

C. iria L.

Common name : Moth.

In moist-marshy habitats, common.

Fl. & Fr.: September – December.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14162.

C. laevigatus L.

In moist-clayey habitats, common.

Fl. & Fr.: November – March.

MSP : Way to Machia fort, Canal along Machia fort, *Pandey & Padhye* 14272, 14282.

C. rotundus L. subsp. **rotundus**

Common name : Motho, Mothio.

In marshy habitats, common.

Fl. & Fr.: Almost throughout the year.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14261; *S. Moorthy* 81-B.

Eleocharis atropurpurea (Retz.) Presl

In marshy habitats, very common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14096; *B. V. Shetty* 97.

E. geniculata (L.) Roem. & Schult.

In marshy habitats, common.

Fl. & Fr.: August – April.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14161.

Fimbristylis quinquangularis (Vahl) Kunth

In marshy habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Kacholiya nada, *Pandey & Padhye* 14133, 14165, 14225.

Kyllinga bulbosa P. Beauv.

In open waste lands, particularly in sandy habitats, common.

Fl. & Fr.: July – November.

MSP : Kailana, *S. Moorthy* 70.

Mariscus squarrosus (L.) C. B. Clarke

In marshy habitats, common.

Fl. & Fr.: August – December.

MSP : Kailana, *B. V. Shetty* 306.

Pycnus pumilus (L.) Nees ex C. B. Clarke

In moist-marshy habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14171.

Schoenoplectus roylei (Nees) Lye

In moist-marshy habitats, common.

Fl. & Fr.: September – December.

MSP : Way to gate no. 3, Kailana, *Pandey & Padhye* 14149, 14185; *B. V. Shetty* 96.

S. supinus (L.) Palla subsp. **lateriflorus** (Gmelin) Koyama

In marshy habitats, fairly common.

Fl. & Fr.: September – October.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14097.

POACEAE (GRAMINEAE)

Aristida adscensionis L. var. **adscensionis**

Common name : Lamp, Lampro.

In rocky-sandy habitats, fairly common.

Fl. & Fr.: August – October.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14070; *A.N. Singh* 3130.

A. funiculata Trin. & Rupr. var. **funiculata**

Common name : Lamp.

In rocky-sandy habitats, very common.

Fl. & Fr.: September – November.

MSP : Way to Machia fort, Dhobi nada, Kailana, *Pandey & Padhye* 14041, 14113; *B.V. Shetty* 108.

A. mutabilis Trin. & Rupr.

Common name : Lamp.

In dry sandy-gravelly habitats, rare.

Fl. & Fr.: August – November.

MSP : Kailana, *Ratan Singh* 23.

Brachiaria lata (Schumach.) C. E. Hubb. var. **pubescens** C. E. Hubb.

In sandy-rocky habitats, common.

Fl. & Fr.: August – November.

MSP : Kailana, B. V. Shetty 110; Ratan Singh 24.

B. ramosa (L.) Stapf var. **ramosa**

Common name : Murat.

In mixed habitats, common.

Fl. & Fr.: July – November.

MSP : Way to Machia fort, Pandey & Padhye 14216.

**** B. ramosa** (L.) Stapf var. **pubescens** Basappa & Muniyamma

In moist-clayey soil, common.

Fl. & Fr.: August – October.

MSP : Near main gate, way to Machia fort, Pandey & Padhye 14025, 14190.

Cenchrus biflorus Roxb.

Common name : Bhurat, Bhurtio, Bkut.

In sandy hummocky plains, common.

Fl. & Fr.: August – December.

MSP : Kailana, B. V. Shetty 115; R. P. Pandey 1765; Ratan Singh 48.

C. ciliaris L.

Common name : Dhaman, Dhamanio.

In sandy to gravelly habitats, common.

Fl. & Fr.: August – December.

MSP : Near main gate, canal along Machia fort, Kailana, Pandey & Padhye 14071, 14191; Ratan Singh 69; B. V. Shetty 104.

C. pennisetiformis Hochst. & Steud. ex Steud.

Common name : Dhamanio.

In sandy habitats, not common.

Fl. & Fr.: August – December.

MSP : Way to Machia fort, Pandey & Padhye 14050.

C. setigerus Vahl

Common name : Dhaman.

In mixed habitats, fairly common.

Fl. & Fr.: August – November.

MSP : Bithari Pahari, Pandey & Padhye 14203; Ratan Singh 13; G. L. Tiwari 1126.

Chloris gayana Kunth

In sandy-gravelly habitats, not common.

Fl. & Fr.: August – October.

MSP : Way to Dhobi nada, Pandey & Padhye 14100.

C. virgata Sw.

Common name : Choto aranio, Chinki.

In sandy-rocky habitats, common.

Fl. & Fr.: July – November.

MSP : Kailana, B. V. Shetty 127.

Cymbopogon commutatus (Steud.) Stapf

Common name : Bhuraro, Sugani.

In dry sandy habitats, common.

Fl. & Fr.: March – May.

MSP : Kailana, Ratan Singh 17.

C. jwarancusa (Jones) Schult. subsp. **jwarancusa**

Common name : Buraro.

In sandy habitats, rare.

Fl. & Fr.: August – December.

MSP : Kailana, S. Moorthy 32.

C. martinii (Roxb.) Watson

Common name : Motio.

Near moist-rocky places, common.

Fl. & Fr.: August – December.

MSP : Way to Machia fort, Bithari Pahari, Pandey & Padhye 14012, 14204.

Cynodon dactylon (L.) Pers.

Common name : Dub, Dub ghass, Dob.

In mixed habitats, common throughout the area.

Fl. & Fr.: January – December.

MSP : Machia fort, Kailana, Pandey & Padhye 14252; Ratan Singh 315.

Dactyloctenium aegyptium (L.) Willd.

Common name : Makaro, Manchi.

In marshy habitats, common.

Fl. & Fr.: September – January.

MSP : Way to Dhobi nada, Machia fort, Pandey & Padhye 14160, 14266.

D. scindicum Boiss.

Common name : Tantia, Ubio-gantio, Tantia ghass.

In dry sandy-gravelly habitats, not common.

Fl. & Fr.: September – January.

MSP : Bithari Pahari, Kailana, Pandey & Padhye, 14207; S. Moorthy 30.

Dichanthium annulatum (Forssk.) Stapf

Common name : Karad.

In mixed habitats, common.

Fl. & Fr.: August – December.

MSP : Kacholiya nada, Kailana, Pandey & Padhye 14227; Ratan Singh 54.

D. foveolatum (Del.) Roberty

Common name : Buari.

In dried up tanks, rock crevices, common.

Fl. & Fr.: August – December.

MSP : Way to Machia fort, Dhobi nada, gate no. 3, Kailana, *Pandey & Padhye* 14033, 14103, 14150; *G. P. Roy* 1531.

***Digitaria bicornis* (Lam.) Roem. & Schult.**

In moist-humid places, not common.

Fl. & Fr.: July – November.

MSP : Way to Machia fort, *Pandey & Padhye* 14020.

***D. ciliaris* (Retz.) Koel.**

Common name : Jharanio.

In moist-sandy shady places, common.

Fl. & Fr.: August – October.

MSP : Kailana, *B. V. Shetty* 109; *Ratan Singh* 25.

***D. pennata* (Hochst.) T. Cooke**

In open waste lands, not common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Bithari Pahari, *Pandey & Padhye* 14010, 14031, 14205.

***Echinochloa colona* (L.) Link**

Common name : Jirio.

In moist-marshy habitats, fairly common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14098, 14155.

***Elyonurus royleanus* Nees ex A. Rich.**

In dry rocky habitats, rare.

Fl. & Fr.: August – November.

MSP : On way to Machia fort, *Pandey & Padhye* 14046.

***Enneapogon cenchroides* (Lichst. ex Roem. & Schult.) C. E. Hubb.**

Common name : Sushia ghass, Sushia-ri pinch.

In rocky habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14125.

***E. desvauxii* P. Beauv.**

On open rocky-gravelly habitats, not common.

Fl. & Fr.: August – December.

MSP : Way to Machia fort, Dhobi nada, *Pandey & Padhye* 14047, 14075, 14123.

Enneapogon persicus Boiss.

On dry rocky slopes, common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Bithari Pahari, *Pandey & Padhye* 14013, 14206.

E. schimperanus (Hochst. ex A. Rich.) Renvoize

In dry rocky-gravelly habitats, fairly common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, *Pandey & Padhye* 14028, 14267.

Eragrostis amabilis (L.) Wight & Arn. var. **amabilis**

In moist-marshy habitats, common.

Fl. & Fr.: September – December.

MSP : Dhobi nada, *Pandey & Padhye* 14154.

E. ciliaris (L.) var. **ciliaris**

Common name : Poongyo.

In sandy-moist habitats, common.

Fl. & Fr.: August – November.

MSP : Way to Machia fort, canal along Machia fort, Kailana, *Pandey & Padhye* 14034, 14073; *B. V. Shetty* 107.

E. japonica (Thunb.) Trin.

In moist-sandy-loam soil, common.

Fl. & Fr.: September – December.

MSP : Kacholiya nada, Kailana, *Pandey & Padhye* 14226; *B. V. Shetty* 148.

E. minor Host

In sandy habitats, common.

Fl. & Fr.: September – November.

MSP : Canal along Machia fort, Kailana, *Pandey & Padhye* 14057; *B. V. Shetty* 123.

E. viscosa (Retz.) Trin.

In moist-shaded damp places, not common.

Fl. & Fr.: August – November.

MSP : Canal along Machia fort, *Pandey & Padhye* 14061.

Leptothrium senegalense (Kunth) W. D. Clayton

In sandy habitats, rare.

Fl. & Fr.: August – October.

MSP : Kailana, *Ratan Singh* 50.

Melanocenchris jacquemontii Jaub. & Spach.

On low hillocks, fairly common.

Fl. & Fr.: August – October.

MSP : Way to Machia fort, *Pandey & Padhye* 14011, 14035.

***Ochthochloa compressa* (Forssk.) Hilu**

Common name : Ganthio, Gantio ghass.

In open gravelly-sandy habitats, fairly common.

Fl. & Fr.: September – December.

MSP : Machia fort, Kailana, *Pandey & Padhye* 14032; *B. V. Shetty* 114; *Ratan Singh* 4.

***Oropetium thomaeum* (L. f.) Trin.**

Common name : Surshia.

On low hillocks, fairly common.

Fl. & Fr.: August – October.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14104; *S. Moorthy* 77.

***Sehima nervosum* (Rottl.) Stapf**

Common name : Seran.

On low hillocks and gravelly habitats, common.

Fl. & Fr.: September – December.

MSP : Way to Machia fort, Kailana, *Pandey & Padhye* 14080; *S. Moorthy* 34.

***Setaria verticillata* (L.) P. Beauv.**

In sandy-loam soil, fairly common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14167; *R. P. Pandey* 1758.

***Sporobolus helvolus* (Trin.) Th. Dur. & Schinz.**

In moist-sandy to gravelly habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14099; *S. Moorthy* 82; *B.V. Shetty* 146.

***S. tenuissimus* (Schränk) Kuntze**

In moist-shady habitats, not common.

Fl. & Fr.: August – December.

MSP : Canal along Machia fort, Dhobi nada, *Pandey & Padhye* 14059, 14101.

***Stipagrostis pogonoptila* (Jaub. & Spach.) De Winter**

In sandy hummocky plains, occasional.

Fl. & Fr.: August – October.

MSP : Kailana, *Ratan Singh* 61.

***Tetrapogon tenellus* (Koen. ex Roxb.) Chiov.**

Common name : Kagio, Chinki.

In rocky-sandy habitats, common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, Kailana, *Pandey & Padhye* 14102; *B. V. Shetty* 112; *S. Moorthy* 35.

Tragus roxburghii Panigrahi

Common name : Kantio–Bhurat.

In sandy-gravelly plains, common.

Fl. & Fr.: August – November.

MSP : Kailana, *Ratan Singh* 20.

**** Tripogon purpurascens** Duthie

In open dry rocky habitats, rare.

Fl. & Fr.: May – August.

MSP : Kailana, *S. Moorthy* 77-A.

PTERIDOPHYTES

MARSELIACEAE

Marsilea aegyptiaca Willd.

In marshy habitats, very common.

Fl. & Fr.: September – November.

MSP : Way to Dhobi nada, *Pandey & Padhye* 14094.

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भारतीय वनस्पति सर्वेक्षण, जोधपुर-342008**

सार संक्षेप

प्रस्तुत आलेख में 196 वंशों और 66 कुलों में पाए जाने वाली 304 जातियों की जांच सूची प्रस्तुत है। 64 उपयोगी पौधों की सूची एवं 33 संकटग्रस्त पौधों के बारे में ध्यानाकर्षित किया गया है। पुष्पीय विश्लेषण के अलावा 12 सिंचित / फसली पौधे एवं 14 वाइल्ड रेलिटिव माचिया सफारी पार्क में विद्यमान हैं। आलेख में इस पार्क में पाए जाने वाली जीव विविधता के बारे में भी बताया गया है।