

## THREATENED AND ENDANGERED NATIVE PLANTS OF KARACHI

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### ABSTRACT

In order to compile a "red data book" and to determine the threatened status of native plants of Karachi, a regular fortnightly visits were undertaken during 2009-2010. During this study, exotic plants, ruderals, weeds and naturalized species were not taken into consideration. For our study "Flora of Karachi" by S. M. H. Jafri (1966) was considered as base line. In that flora 403 species belonging to 72 families were included. According to our observation 135 species were assessed in threatened plants, out of them 8 species have already become extinct from our study area which also include *Tecomella undulata*, a tree with gorgeous flowers. Ten species are included as endangered plants, 25 plants belong to rare species while 28 species belong to vulnerable species. *Prosopis juliflora* and *Eucalyptus citriodora* are invasive species. In order to draw the attention about the threatened plants 20 photographs are presented. It is recommended that we should not destroy our native plants and should not regard them as nuisance or unwanted plants, instead we should conserve the wilderness and wild plants to preserve the species diversity and gene pool of our area. Autecologies of wild plants should be studied and ways and means should be developed to preserve them.

**Keywords:** Threatened, Invasive, Naturalized, Plants, Karachi.

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### INTRODUCTION

Plants constitute prime life supporting system. They form earth's soft green security blanket. This regulates the atmosphere, maintains hydrological cycle, feed the mankind and provide raw material for pharmaceutical and scientific purposes. It has been estimated that out of total plant species present world wide as many as 60000 plant species can become extinct by the year 2050. The extinction crises is a threat to mankind, the endurance of *Homo sapiens* is dependent upon the survival of rest of the species (Lewin 1986). The rainforest harboring a rich biological diversity have been disappearing at the rate of 50 acres per minute (Lyles & Martin, 1987). It has been estimated that with the disappearance of one plant some 30 odd species also vanish (Ehlich & Ehlich 1981). According to Nasir (1991) the majority of our native plants have never been examined for food, fiber or medicine, many are a potential source for pharmaceutical or industrial raw materials. It is interesting to note that world wide some 20 plants provide more than 85% of our food and only a few hundred species are cultivated widely. Unless drastic steps are taken many of our valuable plant species will disappear. Ahmed (2009) published a book entitled "Forest and wild life management" and Ali *et al* (1986) presented a phytogeographical analysis of the Phanerogams of Pakistan and Kashmir. The existence of *Urochondra setulosa*, a coastal halophyte around Karachi has been greatly jeopardized as a result of gradually increasing encroachment of the areas of its habitats for construction and other developmental purposes (Khan *et. al*, 1999). It is because of rapid colonization in the area that *Acacia nilotica* ssp *hemispherica*, endemic to Paradise Point, Karachi is near to extinction (D. Khan, *Pers. Comm.*).

Karachi is the largest industrial and commercial centre and as well as the largest air and sea port of the country. It is located between 24° 51' N and 67° 02' E. The present knowledge of the status of plants of Karachi is insufficient as no Red Data Book exists for the plants of Pakistan as well as for our area. Jafri (1966) published his Flora of Karachi which included plants within an area of 3,530 square kilometers of Karachi district. Karachi district is a fascinating area for plants collectors due to its varied type of habitats such as sea coast in the South, which include marshes, fixed and non fixed sand dunes, creeks calcareous hills, dried river beds, Flat Alluvial plains, rocky and stony mounds and streams of Lyari and Malir. The area extends from the sea coast to a distance about 50 km. towards the north and equally spreading from East to West. The area varies from sea level to about 60 meter above sea level.

### MATERIALS AND METHODS

Jafri (1966) in his Flora of Karachi included 72 families 249 genera and 403 species, excluding some of the commonly cultivated and almost naturalized taxa. More than 35 % of the species mentioned in Flora of Karachi can now be included in the Red Data book for threatened species- which can further be categorized into:

- 1- Extinct Plants- Taxa which are no longer known to exist in the world after repeated researches in their type locality.
- 2- Endangered Plants- Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose habitats are reduced to an extent that they are in danger of extinction.
- 3- Vulnerable Plants- Taxa believed likely moved into the endangered category if the causal factors continue operating.
- 4- Rare Plants- Taxa with small population with restricted geographical area or habitat or are sparsely scattered over a wider area.
- 5- Indeterminate Plants- Taxa for which there is not enough information, but are known to be extinct, endangered, vulnerable, or rare.
- 6- Threatened Plants- All those taxa which are endangered, vulnerable, rare, or indeterminate can be included in threatened species.
- 7- Invasive Plants- Taxa which are introduced willfully or accidentally and are successfully spreading in the new area and are causing distribution to native and indigenous plants.
- 8- Ruderal plants- Plants growing in disturbed habitats, they are stress tolerant plants.
- 9- Weeds Plants- that tends to grow thickly where it is not wanted and to choke out some desirable plants.
- 10- Naturalized Plants- A plant of another country/region introduced into a new area where it is not native but it has acclimatized successfully.
- 11- Crop Plants- Vegetable, grain, hay, fruits and other agricultural plants grow in the fields.

**Ruderals**, weeds, naturalized plants and crop plants were not included in our study. In order to study the threatened plants of Karachi fortnightly visits were made in the study area. In our survey flora of Karachi by S. M. H. Jafri (1966) was considered as baseline study. Four decades before, it was a time when Karachi University Campus showed best representation of Flora of Karachi as more than 300 species were reported from this area alone but due to the unscientific and unscrupulous “cleanliness drive” against “wild bushes” or “wilderness” by “responsible people” for eliminating most of the species from this campus. At present some of the indigenous plants of Karachi can be observed in the protected and enclosed areas of Malir cantonment, Shah Faisal cantonment, Masroor Airport area and Korangi, PAF base area.

## RESULTS AND DISCUSSION

In this survey all the threatened plants were categorized on the basis of their habit as Trees, Shrubs, and Under-shrubs, Woody climbers, herbaceous climbers and Herbs. After survey we came to the conclusion that 135 species are the threatened. Among trees *Tecomella undulata* has become extinct from our locality beside it 3 other tree species (Table -1) can be included in endangered species 1 in rare category and 1 species that is *Mimosa hamata* has become a rare species. Two species viz. *Prosopis juliflora* and *Eucalyptus citriodora* are included in Invasive tree species.(Table-2)

In the same way 4 species of shrubs namely *Commiphora stocksiana*, *Rhus mysorensis*, *Breweria latifolia* and *Gymnosporia senegalensis* are included among rare species. 5 species of shrubs such as *Ehretia aspera*, *Ipomea carnea*, *Commiphora mukul*, *Cordia gharaf*, *Grewia tenax*, *Clerodendrum phlomooides*, *Euphorbia tirucalli* are included in Vulnerable species and 4 are included in rare species respectively, while *Grewia villosa* is amongst the endangered species. Among under- shrubs, 3 plants can be conveniently included in extinct species from the locality which include *Withania coagulans*, *Peganum harmala*, *Artemisia maritima* 5 species are listed in rare group of plants while 12 species are included in vulnerable species. Among woody climbers *Capparis cartilaginea* and *Merremia dissecta* is considered to be extinct from the area *Cadaba heterotricha*, *Maerua arenaria*, *Asparagus dumosus* are included in rare species while *Cocculus pendulus*, *Cocculus hirsutus*, *Ipomoea pes caprae* are covered in vulnerable species. Among herbs 4 species that is *Equisetum debile*, *Ephedra foliata*, *Dipcadi Erythraeum* and *Azolla pinnata* are considered as extinct species from the locality, while 26 species are rare. 9 come under the category of endangered species. 24 species are included in vulnerable category, 2 species are indeterminate. Among herbaceous climbers 2 species like *Pergularia daemia*, *Momordica balsamina* are included in rare category while single species *Cardiospermum halicacabum* is included in endangered species while rest of the 3 species like *Pentatropis spiralis*, *Cucumis prophetarum* and *Citrullus colocynthis* comes under the category of vulnerable species.

**Table 1. List of Threatened tree species.**

S.No	Species	Family	Status
1	<i>Capparis decidua</i> (Forssk.) Edgew	Capparidaceae	vulnerable
2	<i>Acacia Senegal</i> (Linn.) Willd.	Mimosaceae	vulnerable
3	<i>Acacia nilotica</i> (Linn) Delile	Mimosaceae	vulnerable
4	<i>Acacia nilotica</i> ssp hemisphrica	Mimosaceae	rare
5	<i>Prosopis cineraria</i> (Linn)Druce	Mimosaceae	vulnerable
6	<i>Salvadora oleoides</i> Dcne	Salvadoraceae	vulnerable
7	<i>Salvadora persica</i> L.	Salvadoraceae	vulnerable
8	<i>Zizyphus nummularia</i> (Burm.f.)Wight & Arn.	Rhamnaceae	vulnerable
9	<i>Euphorbia caducifolia</i> Haines.	Euphorbiaceae	vulnerable
10	<i>Tecomella undulata</i> (Sm) Seem	Bignoniaceae	extinct
11	<i>Tamarix aphylla</i> (L)Korst	Tamaricaceae	vulnerable
12	<i>Aegiceras corniculata</i> (L)Blanco	Primulaceae	endangered
13	<i>Nannorhops ritichiana</i> H.wendl	Palmae	vulnerable
14	<i>Mimosa hamata</i> Willd	Mimosaceae	rare
15	<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	vulnerable
16	<i>Cordia gharaf</i> (Forssk.) Ehren ex Asch	Boraginaceae	vulnerable
17	<i>Prosopis juliflora</i> Swartz	Mimosaceae	invasive
18	<i>Eucalyptus citriodora</i> (Hook)K.D.Hill&L.A. Johnson	Myrtaceae	invasive

**Table 2. List of Threatened shrub species.**

S.No	Species	Family	Status
1	<i>Commiphora stocksiana</i> Engler	Burseraceae	rare
2	<i>Commiphora mukul</i> (Hook. Fr.ex Stocks) Engler	Burseraceae	vulnerable
3	<i>Rhus mysorensis</i> Heyre ex Wight & Arn.	Anacardiaceae	rare
4	<i>Grewia villosa</i> Willd	Tiliaceae	endangered
5	<i>Grewia tenax</i> (Forssk) Aschers & Schweinf	Tiliaceae	vulnerable
6	<i>Clerodendrum phlomoides</i> Willd	Verbenaceae	vulnerable
7	<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	vulnerable
8	<i>Gymnosporia senegalensis</i> (Roxb) Bth	Celastraceae	rare
9	<i>Breweria latifolia</i> Bth. Ex Clark	Convolvulaceae	rare
10	<i>Ehretia aspera</i> Roxb	Boraginaceae	vulnerable
11	<i>Ipomoea carnea</i> Jacq.	Convolvulaceae	vulnerable

**Table 3. Threatened under shrub species.**

S.No	Species	Family	Status
1	<i>Dipteracanthus longifolius</i> Stocks	Acanthaceae	Vulnerable.
2	<i>Barleria acanthoides</i> Vahl	Acanthaceae	Vulnerable
3	<i>Peristrophe bicalyculata</i> (Vahl) Nees	Acanthaceae	Vulnerable
4	<i>Peganum harmala</i> L.	Zygophyllaceae	Extinct
5	<i>Rhazya stricta</i> Decne	Apocynaceae	Rare
6	<i>Pteropium oleveri</i> Taub & Spach	Apocynaceae	Rare
7	<i>Atriplex stocksii</i> (Wt.) Boiss	Chenopodiaceae	Vulnerable
8	<i>Haloxylon recurvum</i> (Woq.) Bunge	Chenopodiaceae	Vulnerable

9	<i>Indigofera oblongifolia</i> Forssk	Fabaceae	Vulnerable
10	<i>Chrozophora obliqua</i> (Vahl) A. Juss	Euphorbiaceae	Vulnerable
11	<i>Andrachne aspera</i> Spreng	Euphorbiaceae	Rare
12	<i>Pavonia procumbens</i> (Wall) Boiss	Malvaceae	Vulnerable
13	<i>Gossypium stocksii</i> Mest	Malvaceae	Vulnerable
14	<i>Evolvulus alsinoides</i> L.	Convolvulaceae	Rare
15	<i>Bouchia marrubifolia</i> Schauer	Verbenaceae	Rare
16	<i>Solanum albicaule</i> Kotschy	Solanaceae	Vulnerable
17	<i>Solanum surratense</i> Burm	Solanaceae	Vulnerable
18	<i>Withania coagulans</i> (Stocks) Dund	Solanaceae	Extinct
19	<i>Lycium europaeum</i> L.	Solanaceae	Vulnerable
20	<i>Vernonia cinerascens</i> Schultz.Bip	Compositae	Vulnerable
21	<i>Artemisia maritime</i> L.	Compositae	Extinct
22	<i>Leptadaenia spartium</i> Wight	Asclepiadaceae	Vulnerable
23	<i>Crotolaria burhia</i> Ham	Fabaceae	Vulnerable
24	<i>Alhagi pseudalhagi</i> (Bieb) Desv.	Fabaceae	Vulnerable
25	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Vulnerable
26	<i>Senna obovata</i> Collad.	Fabaceae	Rare
27	<i>Sarcostemma stocksii</i> Hook	Asclepiadaceae	Rare
28	<i>Halopyrum mucronatum</i> (L.) Stapf	Poaceae	Vulnerable
29	<i>Limonium stocksii</i> (Boiss) Kuntze	Plumbaginaceae	Vulnerable

**Table 4. Threatened Woody climbers.**

S.No	Species	Family	Status
1	<i>Cadaba heterotricha</i> Stocks	Capparidaceae	Rare
2	<i>Maerua arenaria</i> (DC.) H & T	Capparidaceae	Rare
3	<i>Capparis cartilaginea</i> Decne	Capparidaceae	Extinct
4	<i>Merremia dissecta</i> (Pers.)Hallier.f.	Convolvulaceae	Extinct
5	<i>Asparagus dumosus</i> Baker	Aspargaceae	Rare
6	<i>Cocculus pendulus</i> (Forst)Diels	Menispermaceae	Vulnerable
7	<i>Cocculus hirsutus</i> (L.)Diels	Menispermaceae	Rare
8	<i>Ipomaea pes caprae</i> (L.)Sw.	Convolvulaceae	Vulnerable
9	<i>Pentatropis spiroilis</i> (Forsk.)	Asclepiadaceae	Vulnerable
10	<i>Oxystelma esculentum</i> (L.f) RBr	Asclepiadaceae	Rare
11	<i>Ochradenus baccatum</i> Del	Resedaceae	Rare

Unfortunately due to the population pressure, urbanization, industrialization, building of infra structures, over cutting, over grazing and “cleanliness drives” number our native plants are fast deteriorating thus we have observed that our indigenous Flora is fast disappearing. Thus invasive species like *Prosopis juliflora* and *Eucalyptus citriodora* are invading fast.

It is recommended that in the name of clearing of wilderness or cleanliness drives bulldozing, cutting, burning of wild plants should be stopped forth with to save some of the remaining representative of plant species of Karachi so as to preserve bio-diversity and gene pools for the benefits of generation to come.

**Table 5. Threatened hebeaceous climber species.**

S.No	Species	Family	Status
1	<i>Cucumis prohetarum</i> L.	Cucurbitaceae	Vulnerable
2	<i>Cardiospermum helicacabum</i> L.	Sapindaceae	Endangered
3	<i>Pergularia daemia</i> (forssk) Blatt & McCann.	Asclepiadaceae	Rare
4	<i>Momordica balsamina</i> L.	Cucurbitaceae	Rare
5	<i>Citrullus colocynthis</i> (L.) Schrader	Cucurbitaceae	Vulnerable
6	<i>Convolvulus glomeratus</i> Choisy in DC.	Convolvulaceae	Vulnerable
7	<i>Convolvulus microphyllous</i> Sieb	Convolvulaceae	Vulnerable

**Table 6. Threatened Herbaceous Plants.**

S.No	Species	Family	Status
1	<i>Aristolochia bracteata</i> Retz	Aristolochiaceae	Endangered
2	<i>Senna holocericea</i> Fresen	Caesalpinaceae	Vulnerable
3	<i>Senna angustifolia</i> Vahl	Caesalpinaceae	Vulnerable
4	<i>Achyranthes aspera</i> L.	Amaranthaceae	Vulnerable
5	<i>Pupalia lappacea</i> (L.)Juss	Amaranthaceae	Endangered
6	<i>Boerhaavia verticilata</i> Poir	Boraginaceae	Indeterminate
7	<i>Commelina albescense</i> Hasskarl	Commelinaceae	Indeterminate
8	<i>Equisetum debile</i> L.	Equisetaceae	Extinct
9	<i>Ephedra foliate</i> (Boiss)	Ephedraceae	Extinct
10	<i>Panicum turgidum</i> L.	Poaceae	Endangered
11	<i>Hydrilla verticillata</i> Rich	Hydrocharitaceae	Vulnerable
12	<i>Vallisneria spiralis</i> L.	Hydrocharitaceae	Rare
13	<i>Najas minor</i> L.	Najadaceae	Rare
14	<i>Potamogeton perfoliatus</i> L.	Potamogetonaceae	Rare
15	<i>Potamogeton pectinatus</i> L.	Potamogetonaceae	Rare
16	<i>Zannichelia palustris</i> L.	Potamogetonaceae	Rare
17	<i>Lemna minor</i> L.	Lemnaceae	Rare
18	<i>Wolffia arrhiza</i> (L.)Wimm	Lemnaceae	Rare
19	<i>Panicum antidotale</i> Retz	Poaceae	Vulnerable
20	<i>Paspalum germinatum</i> (Forssk)Stapf.	Poaceae	Vulnerable
21	<i>Cymbopogon jawarancusa</i> (Jones) Schult.	Poaceae	Vulnerable
22	<i>Andrachne aspera</i> Spreng.	Euphorbiaceae	Rare
23	<i>Asphodelus tenuifolius</i> Cavan	Commelinaceae	Liliaceae
24	<i>Farsetia jacquemontii</i> H & T.	Cruciferae	Rare
25	<i>Lasiurus hirsutus</i> (Forssk) Boiss	Poaceae	Endangered
26	<i>Aeleuopus logopoides</i> (L.)Trin.ex.Thw	Poaceae	Rare
27	<i>Lolium temulentum</i> L.	Poaceae	Rare
28	<i>Juncus maritimus</i> Lam	Junaceae	Vulnerable
29	<i>Cymbopogon schoenenthus</i> (L.)Spreng	Poaceae	Vulnerable
30	<i>Dipcadi erythraeum</i> Medic	Amaranthaceae	Extinct
31	<i>Nothoserua bracteata</i> Wt	Amaranthaceae	Vulnerable
32	<i>Coronopus didymus</i> L	Brassicaceae	Vulnerable
33	<i>Monosonia senegalensis</i> Guill & Perr	Geraniaceae	Rare
34	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Vulnerable
35	<i>Euphorbia prostrata</i> Ait.	Euphorbiaceae	Vulnerable
36	<i>Malva parviflora</i> L	Malvaceae	Vulnerable

37	<i>Senra incana</i> Cav.	Malvaceae	Vulnerable
38	<i>Ammania baccifera</i> L.	Lythraceae	Vulnerable
39	<i>Trichodesma amplexcaule</i> Roth	Boraginaceae	Endangered
40	<i>Arnebia hispidissima</i> (Sieber)DC Prodr	Boraginaceae	Endangered
41	<i>Lippia nodiflora</i> (L) L.C.Rich Rr.B	Verbenaceae	Vulnerable
42	<i>Leucas urticifolia</i> (Vahl)	Labiatae	Rare
43	<i>Physalis minimal</i> Sp.P.L.	Solanaceae	Vulnerable
44	<i>Anticharis linearis</i> (Bth)Hochst ex Asch	Scrophulariaceae	Rare
45	<i>Kickxia ramosissima</i> (Wall.)Janchen	Scrophulariaceae	Rare
46	<i>Malvastrum coromandelianum</i> L.	Malvaceae	Vulnerable
47	<i>Schweinfurthia papilionacea</i> (Burm.f.) Boiss	Papilionaceae	Rare
48	<i>Bacopa monnieri</i> (L)Pennell	Scrophulariaceae	Rare
49	<i>Lindenbergia indica</i> (L)Kuntze	Scrophulariaceae	Rare
50	<i>Pedalum murex</i> L.	Pedaliaceae	Rare
51	<i>Cistanche tubulosa</i> Wigh,Icon.,t	Orbanchaceae	Rare
52	<i>Oldenlandia retrosa</i> Boiss	Acanthaceae	Rare
53	<i>Erigeron Canadensis</i> Willd	Compositae	Rare
54	<i>Blumea obliqua</i> (L.)Druce	Compositae	Rare
55	<i>Enhydra fluctuans</i> Lour	Compositae	Rare
56	<i>Pistia stratiotes</i> L.Sp.PL.	Araceae	Vulnerable
57	<i>Salvia santolinifolia</i> Boiss	Labiatae	Rare
58	<i>Inula granteoides</i> Boiss	Compositae	Vulnerable
59	<i>Urochondra setulosa</i> (Trin) C.E.Hubbard	Poaceae	Vulnerable

## CONCLUSION AND RECOMMENDATION

1. Detailed studies of native plants of Karachi should be carried out in protected areas of Malir cantonment Air base, Shah Faisal cantonment Air Base, Masroor airport area, Korangi PAF air base area, and Paradise Point.
2. Extent of damage of natural habitat should be assessed for Paradise point, Clifton beach, Port Qasim area, University of Karachi Campus, Gadap area and Malir area.
3. Autecologies of native plants should be carried out to devise means and methods to revive their status.
4. Ethno botanical uses of native plants should also be studied.
5. Nurseries of native plants should be developed by Karachi University, Hamdard Botanical Garden, Local bodies, Horticultural Department and Cantonment boards.
6. Wild plants and wilderness should not be treated as waste lands instead the wild plants as well as their habitat should be conserved.
7. A culture should be developed through media and educational institutions to protect, own, and patronize the native plants..
8. Tissue cultural technology and biotechnology should be used to revive some of the endangered plants.

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*Acacia senegal**Euphorbia caducifolia**Euphorbia tirucalli**Salvadora oleoides**Cordia gharaf**Grewia villosa**Capparis decidua**Ipomea pes-caprae**Alhagi pseudalhagi**Cocculus pendulus*

Fig.1. Some threatened plants of Karachi.

Sulaiman, I. M., M.K. Pandit and c.R. Babu (1991). *Proceedings of the International Symposium of Plant Life of South Asia*. 235-239. Ali, S. I. & Ghaffar, A. (Eds).

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*Commiphora mukul*



*Prosopis juliflora*



*Acacia senegal*



*Cordia myxa*



*Pentatropis spiralid*



*Maerua arenaria*



*Withania coagulans*



*Tamarix aphylla*



*Lycium europaeum*



*Indigofera oblongifolia*

Fig. 2. Some threatened plants of Karachi.

(Accepted for publication June 2010)