# 4

# *Status of regionally endemic and Indian endemic species occurring in Gujarat*

## 4.1 Introduction

The knowledge about distribution of species, as well as geographical patterns, constitutes crucial information for biodiversity conservation. Because of this, studies of both, species distribution and mechanisms that give them rise have increased since the awareness of biodiversity crisis. In the last few years, endemism has acquired importance in conservation biology since it is considered an outstanding factor for delimitation of conservation areas. The patterns of distribution of endemic plants, evolutionary history of the endemic centers have attracted attention of many biologists and phytogeographers throughout the world (Williamson, 1981; Hobohm, 2000; Jetz *et al.*, 2004; Mittermeier *et al.*, 2005; Nayar, 1996) and their study has explained the variations and the extent of overall species richness of the region (Whittaker *et al.*, 2001; Orme *et al.*, 2005).

Two main factors, the pattern of distribution and the concentration of endemic plants play a significant role in determining area of endemism. Major/macro areas of endemics are measured by the overall richness of endemic species in a wider prospective. While the minor areas are the small restricted pockets within the major areas, provide a stable environment for speciation shows high concentration of endemic plants (Singh *et al.* 2015).

## 4.2 Observations and discussion

Endemic and threatened list of plant species of Gujarat were scrutinized based on the available published and unpublished literature, Ph.D. theses and scientific paper/articles. The scrutiny is first of its kind that encompasses all angiosperms of the state based on an intensive review of literature and extensive field studies.

### 4.2.1 Regionally endemic species

Regional endemics based on the recent studies of BSI reveals that Gujarat state ranks 25$^{th}$ at national level having six species viz.,*Ischaemum sayajiraoi, Spodiopogon aristatus, Tephrosia jamnagarensis, Tamarix kutchensis, Helichrysum cutchicum* and *Rorippa cochlearioides* (Singh *et al*., 2015). Other than this even *Pycreus dwarkensis* was considered endemic, however, owing to its extended distribution in Pakistan (eFloras, 2017), it is no more endemic to the region. With the above understanding on priority basis the Comprehensive global threat assessments of endemic species with restricted distribution were assessed. Out of the six endemics, *Tephrosia jamnagarensis* was extensively analysed based on IUCN criteria, which was published online on the IUCN Red List (http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T96238744A96239894.en). The data of rest 5 species has been compiled and submitted to IUCN. Once the review by IUCN is over the data would be published. The details of these species have been discussed in the subsequent paragraphs.

### 4.2.1.1 IUCN Red List Assessment of *Tephrosia jamnagarensis* Santapau

## Taxonomy

| Kingdom | Phylum | Class | Order | Family |
|---|---|---|---|---|
| Plantae | Tracheophyta | Magnoliopsida | Fabales | Fabaceae |

**Taxon Name:** *Tephrosia jamnagarensis* Santapau

**Synonym(s):**

- *Tephrosia axillaris* A.R.Sm.

**Taxonomic Source(s):**

The Plant List. 2013. The Plant List Version 1.1. Available at: http://www.theplantlist.org/. (Accessed: July 2016).

**Identification Information:**

An erect, annual herb; stems simple or sparsely branched, covered with whitish appressed hairs. Leaves simple, 3-5.8 cm. long, 4-7 mm. broad, linear, glabrous above, densely hairy with silvery appressed hairs beneath, subobtuse and clearly apiculate at the apex, the base acute; lateral nerves 25-30 pairs, parallel among themselves; margin entire, with a nerve running from near the base to the apex very near the margin; the nerves are clear on the upper surface, covered with hairs but nearly equally distinct on the lower surface. Petioles 2-3 mm. long, very hairy; stipules subulate, 3-4 mm. long, very hairy. Flowers single or in pairs at practically all the axils of the leaves; peduncles about as long as or slightly shorter than the petioles, densely hairy. Calyx very hairy, 2-3 mm. long, the teeth subulate, filiform, hairy, sub-equal. Corolla bright-purple. Pod compressed, about 20x5 mm. densely hairy with greyish, patent hairs, oblique at both end, apiculate; seeds 5-6, reniform, dull or matt, brownish.

## Assessment Information

**Red List Category & Criteria:** Endangered B1ab(i,ii,iv)+2ab(i,ii,iv) ver 3.1

**Year Published:** 2017

**Date Assessed:** November 2, 2016

**Justification:**

The global distribution of *Tephrosia jamnagarensis* is currently restricted to the Jamnagar and Junagadh districts, Gujarat state, India. The plant was also reported to occur at two localities in southern Gujarat and Saurashtra (in 1980), but at present the plant is restricted to only one location based on the threat of overgrazing . The species is assessed as Critically Endangered since it has a very restricted geographic range, with an extent of occurrence (EOO) of 86 km², while the known area of occupancy (AOO) is just 8 km². The species is threatened by cattle grazing, a major threat in the region, which is resulting in the spread of invasive alien species such as *Senna uniflora.* Monitoring of the population size and trend is required. Additionally, threats to this species should be better studied.

## Geographic Range

**Range Description:**

Global distribution of *Tephrosia jamnagarensis* is currently restricted to the Jamnagar and Junagadh districts, Gujarat state, India. Earlier, the plant was also reported to occur from two localities in southern Gujarat and Saurashtra, but the presence of this species here is uncertain. From this distribution the plant is estimated to occur in just one location. The area of occupancy is 8 km², and the extent of occurrence (EOO) has declined from 22,096 km² (in 1980), to its current size of 86 km² (in 2015), which is a matter of serious concern. This tenfold decrease in the EOO is likely to be a result of cattle grazing, a major threat in the region, which is resulting in the spread of invasive alien species such as *Senna uniflora*.

**Country Occurrence:**

**Native:** India (Gujarat)

## Population

During surveys conducted in 2011, 2012, 2013, and 2014, 350, 300, 400 and 300 individuals respectively were observed at the locality of Khadkhambhaliya, Jamnagar.

In 2014, the plant was discovered at a new locality of Sagdividi, Junagadh, the small subpopulation was surveyed and found to comprise 100 individuals growing in agricultural hedges.

**Current Population Trend:** Decreasing

## Habitat and Ecology (see Appendix for additional information)

*Tephrosia jamnagarensis* is an annual herb found growing in savanna. It favours a particular environmental gradient determined by topography and salinity, and grows well in the semi-arid climate. The species has been recorded from undulating terrain, flat and hilly areas.

**Systems:** Terrestrial

## Use and Trade

The plant is not commercially traded. However, the presence of phytocomponents like flavonoids, steroids, terpenes and chalcones in aerial parts and seeds of *Tephrosia jamnagarensis* indicate that this plant may possess antioxidant properties and other biological activity which need to be further explored.

## Threats (see Appendix for additional information)

The main threat faced by the wild population of *Tephrosia jamnagarensis* is overgrazing by cattle. Such grazing activities are also responsible for the spread and establishment of invasive alien species like *Senna uniflora*, *Lantana camara*, etc.

## Conservation Actions (see Appendix for additional information)

The germplasm of *Tephrosia jamnagarensis* had been deposited by Junagadh Agriculture University (JAU) at the National Seed Gene bank, New Delhi India, for long term conservation (http://www.icar.org.in/files/ar0506/cs.pdf). *Ex situ* conservation and multiplication through micro- and macro-propagation techniques would help to secure the long-term survival of this species.


**Figure 14: Distribution map of *Tephrosia jamnagarensis***

Figure 15: *Tephrosia jamnagarensis* (Flower)

Figure 16: *Tephrosia jamnagarensis* (Fruiting)

### 4.2.1.2 IUCN Assessment of *Helichrysum cutchicum* (C.B.Clarke) R.S.Rao and Deshp.



**Draft**

Logo

## *Helichrysum cutchicum* - (C.B.Clarke) R.S.Rao & Deshp.

PLANTAE - TRACHEOPHYTA - MAGNOLIOPSIDA - ASTERALES - ASTERACEAE - Helichrysum - cutchicum

**Common Names:** No Common Names
**Synonyms:** Anaphalis cutchicum C.B.Clarke

| Red List Status |
|---|
| EN - Endangered, B2b(i,ii,iii,iv,v)c(i) (IUCN version 3.1) |

## Red List Assessment

### Assessment Information

**Date of Assessment:** 2018-01-01

**Assessor(s):** Rana, K.

**Regions:** Global

### Assessment Rationale

According to Nayar and Sastry (1987) this species is endemic to Gujarat, having small populations.

## Distribution

### Geographic Range

*Helichrysum cutchicum* was first described by Rao and Deshpande (1968) from Kachchh district, and is endemic to Indian plains, confined to arid and semi-arid regions of Gujarat state. Shah (1978) in his Flora of Gujarat, has stated its occurrence at Dhinodhar hills. Rao (1981) collected it from rocky hillocks at Bhuj and Dahisara, and stated as "rare and endemic to Kutch and Saurashtra". Bole and Pathak (1988) documented in the Flora of Saurashtra, growing at Abhapar, Beyt, Okhamandal, Laloi and Kota. The plant was also observed growing on hill slopes of Girnar hills in Junagadh district. Raole (1993) collected it from Nadibaugh Rakhal and Naliya. Rao (2002) noted the species from Kotda, Lakhpat, Mosuna, Nakhatrana and Nani Khakhar in Saurashtra and from Ravapar . During the same year, Pandey *et al.*, (2009) documented from Hamankhudi and Narayan Sarovar. Joshi *et al.* (2012) reported it from Tapkeshwari hill, and the consequent year Joshi *et al.* (2013) documented it from Banni, Bharasar, Kala dungar, Mandvi, Mundra and Sheh.

### Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 40 | - |

| Continuing decline in area of occupancy (AOO) | Qualifier | Justification |
|---|---|---|
| Yes | Observed | Earlier the AOO was 48km2, since the plant could not be relocated from an earlier mentioned vicinity in Saurashtra, its AOO is reduced to 40km2. |

| Extreme fluctuations in area of occupancy (AOO) | Justification |
|---|---|
| No | - |

### Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|

| | | |
|---|---|---|
| 7279.5 | true | calculated using GeoCAT |

| Continuing decline in extent of occurrence (EOO) | Qualifier | Justification |
|---|---|---|
| Yes | Inferred | - |

| Extreme fluctuations in extent of occurrence (EOO) | Justification |
|---|---|
| Yes | Earlier, the extent of occurrence was 19198km2 which has now reduced around 62%. |

## Locations Information

| Number of Locations | Justification |
|---|---|
| 12 | By the Grid Adjacency method, there are 12 locations (=subpopulations) of the plant. |

| Continuing decline in number of locations | Qualifier | Justification |
|---|---|---|
| Yes | Observed | Inspite of extensive field explorations, the species could not be collected from Saurashtra. |

| Extreme fluctuations in the number of locations | Justification |
|---|---|
| No | - |

## Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| No | - |

## Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | GeoCat | - | - | - | - |

## Biogeographic Realms

**Biogeographic Realm:** Indomalayan

# Occurrence

## Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India | Extant | Native | - | Resident |
| India -> Gujarat | Extant | Native | - | Resident |

# Population

Rao (2002) measured the values of density at Ravapar (6.1), Nakhatrana (4.8), Mosuna (4.1), Lakhpat (4.1), Desalpar (3.5) and Bhuj (0.66). Highest relative abundance of 26.73 is observed at Mosuna whereas Ravapar, Mosuna, Desalpar, Lakhpat and Bhuj localities showed 25.0, 24.74, 14.28, 16.74 and 0.51 respectively.

## Population Information

**Current Population Trend:** Decreasing

**Number of mature individuals (=population size):** 4809

| Extreme fluctuations? (in # of mature individuals) | Justification |
|---|---|
| No | - |

| Severely fragmented? | Justification |
|---|---|
| No | - |

| Continuing decline in mature individuals? | Qualifier | Justification |
|---|---|---|
| Yes | Inferred | - |

| Extreme fluctuations in the number of subpopulations | Justification |
|---|---|
| No | - |

| Continuing decline in number of subpopulations | Qualifier | Justification |
|---|---|---|
| Yes | Observed | Earlier there were 12 reported localities (=subpopulations) of the plant, which gradually decreased to only 10. |

**All individuals in one subpopulation:** No

## Population Reduction - Past

| Basis? |
|---|
| c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites) |

| Reversible? | Understood? | Ceased? |
|---|---|---|
| No | Yes | No |

# Habitats and Ecology

The species is present in a number of different major ecosystems types including forests (plains and hilly tracts), grasslands, agricultural hedges and wastelands.

## IUCN Habitats Classification Scheme

| Habitat | Season | Suitability | Major Importance? |
|---|---|---|---|
| 4.5. Grassland -> Grassland - Subtropical/Tropical Dry | resident | Suitable | Yes |

## Continuing Decline in Habitat

| Continuing decline in area, extent and/or quality of habitat? | Qualifier | Justification |
|---|---|---|
| Yes | Inferred | - |

## Life History

| Generation Length | Justification | Data Quality |
|---|---|---|
| 1 | The plant is an annual | good |

## Systems

**System:** Terrestrial

## Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Forb or Herb |

# Use and Trade

## General Use and Trade Information

**Species not utilized:** true

**No use/trade information for this species:** true

If the population of this species is established for mass scale extraction this may become potential source of saponins as indicated by Sabnis and Rao (1983).

| Subsistence: | Rationale: | Local Commercial: | Further detail including information on economic value if available: |
|---|---|---|---|
| No | - | No | - |

**National Commercial Value:** No

**International Commercial Value:** No

# Threats

During the study the livestock was seen grazing on plants, the threat gradient impact by nomadic grazing is moderate, but considering the pressure on the pastures, immediate actions should be taken to conserve this endemic and threatened plant species. The population of this endemic plant is on decline due to habitat disturbance in the form of grazing, soil erosion and human interference.

## Threats Classification Scheme

| Threat | Timing | Scope | Severity | Impact Score |
|---|---|---|---|---|
| 2.3.1. Agriculture & aquaculture -> Livestock farming & ranching -> Nomadic grazing | Ongoing | Unknown | Slow, Significant Declines | Unknown |

# Conservation

Introduction of available germplasm into botanic gardens and establishing techniques for mass scale propagation are suggested measures for *ex-situ* conservation. Protection of natural habitats would be the best effective step towards *in-situ* conservation.

## Conservation Actions In- Place

| Action Recovery Plan | Note |
|---|---|
| No | - |

| Systematic monitoring scheme | Note |
|---|---|
| No | - |

| Conservation sites identified | Note |
|---|---|
| Yes, over part of range | Naliya grasslands as a sanctuary would ensure safety from livestock grazing in addition to being a natural gene bank. |

| Occur in at least one PA | Note |
|---|---|
| Yes | It occurs in Barda Wildlife Sanctuary. |

| Percentage of population protected by PAs (0-100) | Note |
|---|---|
| 1-10 | The plant species occurs in 1 PA in Gujarat, which would ensure the long-term survival. |

| Invasive species control or prevention | Note |
|---|---|
| No | Exotic species like Prosopis juliflora is invading the whole habitat. |

| Harvest management plan | Note |
|---|---|
| Unknown | - |

| Successfully reintroduced or introduced benignly | Note |
|---|---|
| No | - |

| Subject to ex-situ conservation | Note |
|---|---|
| No | It is not conserved in any botanical garden, thus should conservation measures are strictly recommended. |

| Subject to recent education and awareness programmes | Note |
|---|---|
| No | - |

| Included in international legislation | Note |
|---|---|
| No | - |

| Subject to any international management/trade controls | Note |
|---|---|
| No | - |

## Important Conservation Actions Needed

| Conservation Actions | Note |
|---|---|
| 1.1. Land/water protection -> Site/area protection | - |

## Research Needed

| Research | Note |
|---|---|
| 1.2. Research -> Population size, distribution & trends | - |

## Ecosystem Services

## Ecosystem Services Provided by the Species

**Species provides no ecosystem services:** true

## Bibliography

Bole PV and Pathak JM. 1988. *Flora of Saurashtra*. Botanical Survey of India, Calcutta.

Joshi PN, Joshi EB and Jain BK. 2012. Ecology and conservation of threatened plants in Tapkeshwari Hill ranges in the Kachchh Island, Gujarat, India. *Journal of Threatened Taxa* 4(2): 2390-2397.

Nayar MP and Sastry ARK. 1987. *Red Data Book of Indian Plants*. Botanical Survey of India, Calcutta.

Rao RS and Deshpande UR. 1968. Helichrysum cutchicum (C.B. Cl.) R. Rao et Desh. - An interesting species from Western India. *Bulletin of the Botanical Survey of India* 10(2): 225-227.

Rao, V Rama. 2002. Distributional status survey of threatened plants of Gujarat. Department of Bio Science, Sardar Patel University.

Shah, G.L. 1978. *Flora of Gujarat State*. Sardar Patel University, Vallabh Vidyanagar.



**Specimen examined:***KRN* 33473 (BSJO), *Jain* 61828, *Raghawan* 114834,*VRR* 4756 (SPU)

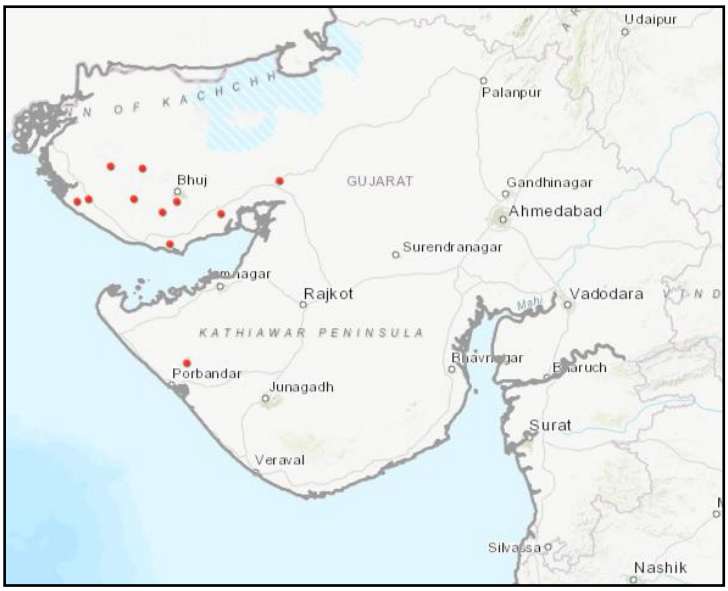


Figure 17: Distribution of *Helichrysum cutchicum*

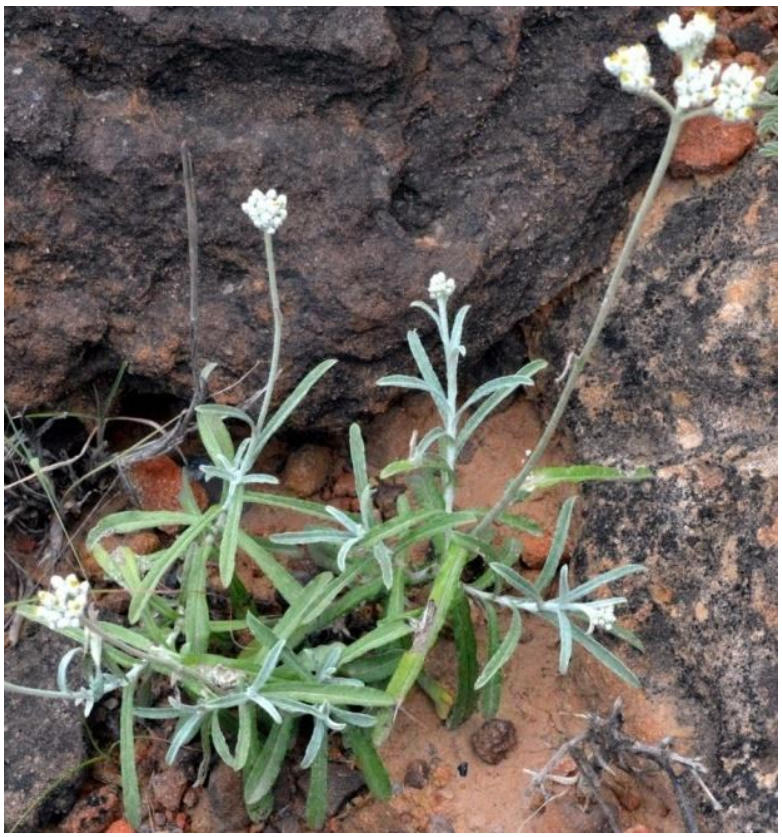

Figure 18: *Helichrysum cutchicum* in flowering

### 4.2.1.3 IUCN Red List Draft Assessment of *Tamarix kutchensis* B.V.Shetty and R.P.Pandey

**Draft**

Logo

## *Tamarix kutchensis* - B.V.Shetty & R.P.Pandey

PLANTAE - TRACHEOPHYTA - MAGNOLIOPSIDA - VIOLALES - TAMARICACEAE - Tamarix - kutchensis

**Common Names:** No Common Names
**Synonyms:** No Synonyms

| Red List Status | |
|---|---|
| CR - Critically Endangered, D (IUCN version 3.1) | |
| Possibly Extinct: | No |
| Possibly Extinct in the Wild: | No |
| Date Last Recorded (in the wild): | |

## Red List Assessment

### Assessment Information

**Regions:** Global

## Distribution

### Geographic Range

Endemic to India: Known only by the type collection, 02-02-1957. Gujarat: Kachchh, Mundra-Mandvi (*S.K. Jain* 11735 BSI).

### Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 12 | - |

### Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|
| 246.5 | true | - |

### Locations Information

| Number of Locations | Justification |
|---|---|
| 01 | - |

### Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| Yes | - |

### Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | - | - | - | - | - |

## Biogeographic Realms

**Biogeographic Realm:** Indomalayan

# Occurrence

## Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India -> Gujarat | Extant | Native | - | Resident |

# Population

## Population Information

**Number of mature individuals (=population size):** 20

# Habitats and Ecology

## IUCN Habitats Classification Scheme

| Habitat | Season | Suitability | Major Importance? |
|---|---|---|---|
| 3.5. Shrubland -> Shrubland - Subtropical/Tropical Dry | resident | Suitable | Yes |

## Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Shrub - small |

# Use and Trade

## General Use and Trade Information

**Species not utilized:** true

**No use/trade information for this species:** true

# Threats

## Threats Classification Scheme

**The threats to this species are unknown.** true

# Ecosystem Services

## Ecosystem Services Provided by the Species

| Insufficient Information Available | All coded services should have an importance score of 5 - Not Known. |
|---|---|
| true | - |

**Species provides no ecosystem services:** true

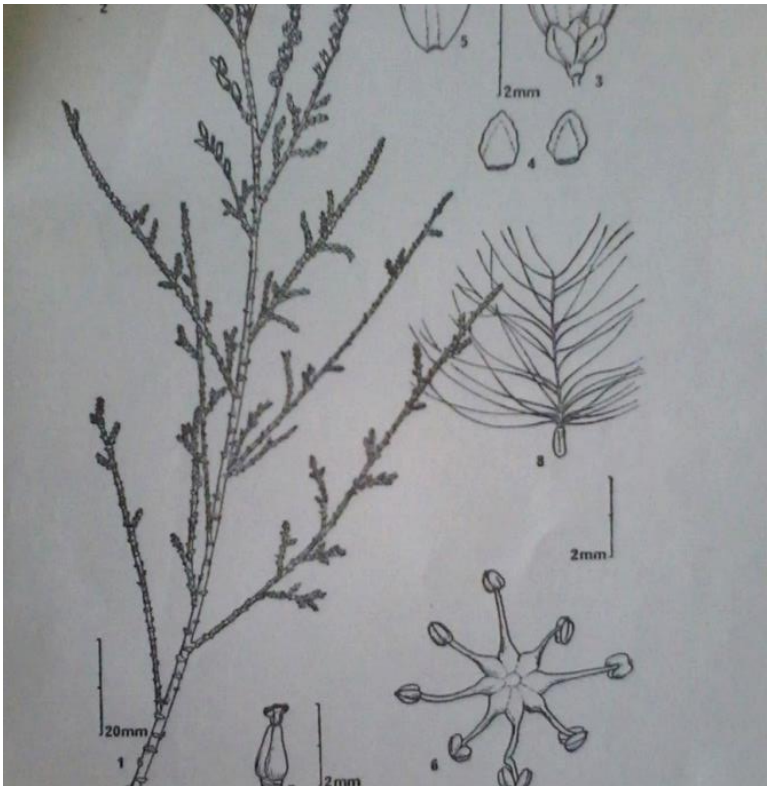


Figure 19: *Tamarix kutchensis* (original reprint)

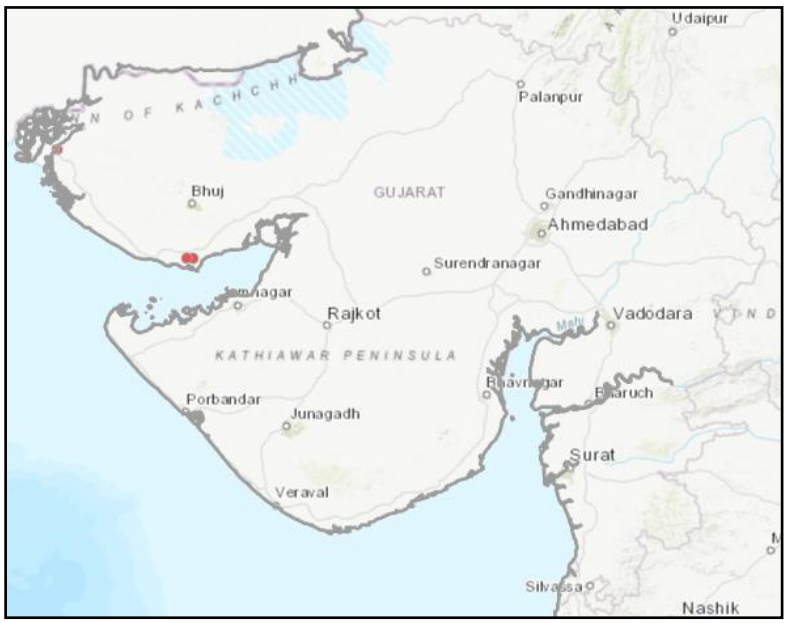


Figure 20: Distribution of *Tamarix kutchensis*

### 4.2.1.4 IUCN Red List Draft Assessment of *Rorippa cochlearioides* (Roth) Al-Shehbaz and Jonsell

**Draft**

Logo

## *Rorippa cochlearioides* - (Roth) Al-Shehbaz & Jonsell

PLANTAE - TRACHEOPHYTA - MAGNOLIOPSIDA - BRASSICALES - BRASSICACEAE - Rorippa - cochlearioides

**Common Names:** No Common Names
**Synonyms:** No Synonyms

| Red List Status |
|---|
| LC - Least Concern, (IUCN version 3.1) |

## Red List Assessment

### Assessment Information

**Regions:** Global

## Distribution

### Geographic Range

*Rorippa cochlearioides* is confined to central Gujarat only, growing as a weed in cultivated fields along river banks. It was collected from Narmada Dist. in Chopadi, Kalvat and Ninaighat by Pradeepkumar (1993), and from Gora and Kevadiya by Patel (1971). Shah and Patel (1971) discussed about its rarity in the article 'some noteworthy rare plants of Gujarat' and reported it from Suryakhadi. Karetala (1973) documented it from Bharuch Dist. and Hampheshwar in Chhota udepur Dist. Thaker (1974) also reported from Moti Chikli and Ambadungar in Chhota udepur Dist.

### Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 56 | - |

### Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|
| 6381 | true | - |

### Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| No | - |

### Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | - | - | - | - | - |

### Biogeographic Realms

**Biogeographic Realm:** Indomalayan

## Occurrence

## Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India -> Gujarat | Extant | Native | - | Resident |

# Population

Shah and Patel (1971) discussed on its rarity in 'some noteworthy rare plants of Gujarat'.

# Habitats and Ecology

An occasional weed in cultivated fields along river banks, rarely in moist river bed.

## Continuing Decline in Habitat

| Continuing decline in area, extent and/or quality of habitat? | Qualifier | Justification |
|---|---|---|
| Yes | Observed | - |

## Life History

| Generation Length | Justification | Data Quality |
|---|---|---|
| 01 | - | good |

## Systems

**System:** Terrestrial

## Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Forb or Herb |

# Use and Trade

## General Use and Trade Information

**No use/trade information for this species:** true

# Threats

The construction of Sardar Sarovar Dam on the River Narmada is a major threat to this species. Both environmentalists and social activists have raised serious questions about the projects. The studies done thus far have been found to be inadequate, as the government of Gujarat commissioned a study of the projects carried out by the department of botany, the M.S. University of Baroda, in just six months. The study did not take into consideration the seasonal temporal variations in the climate and many other important parameters, and it was commissioned only after the work on the project had begun. This project has submerged more than 10,000 ha of forest land, and flooded a large amount of agricultural and grazing land, situated close to the river Narmada, which was highly fertile and the only habitat of this endemic species.

## Threats Classification Scheme

| Threat | Timing | Scope | Severity | Impact Score |
|---|---|---|---|---|
| 7.2.10. Natural system modifications -> Dams & water management/use -> Large dams | Ongoing | Whole (>90%) | Very Rapid Declines | High Impact: 9 |

# Conservation

## Research Needed

| Research | Note |
|---|---|
| 1.1. Research -> Taxonomy | - |
| 1.2. Research -> Population size, distribution & trends | - |

## Ecosystem Services

### Ecosystem Services Provided by the Species

| Insufficient Information Available | All coded services should have an importance score of 5 - Not Known. |
|---|---|
| true | - |

## Bibliography


Karetala, YY. 1973. A contribution to the Floristic and Phytosociology of Chhota-Udepur Forests Division. Department of BioSciences, Sardar Patel University.

Pradeepkumar, G. 1993. Vegetational and Ecological studies of Shoolpaneshwar WLS. Department of Botany, The Maharaja Sayajirao University of Baroda.

Shah G.L. and Patel A.I. 1971. Some noteworthy plants of Gujarat. *Indian Forester* 97(11): 636-637.

Shah, G.L. 1978. *Flora of Gujarat State*. Sardar Patel University, Vallabh Vidyanagar.

Thaker, D.N. 1974. Floristic and ethnobotanical studies on Kawant range forests in Central Gujarat. Veer Narmad South Gujarat University.


Specimen examined: *DNT* 1555, 1900 (BARO), *Bedi* 148 (BARO), Kevadia, Suryakhadi: *Patel* 1162, 2610; Gora: *Shah* 13046.

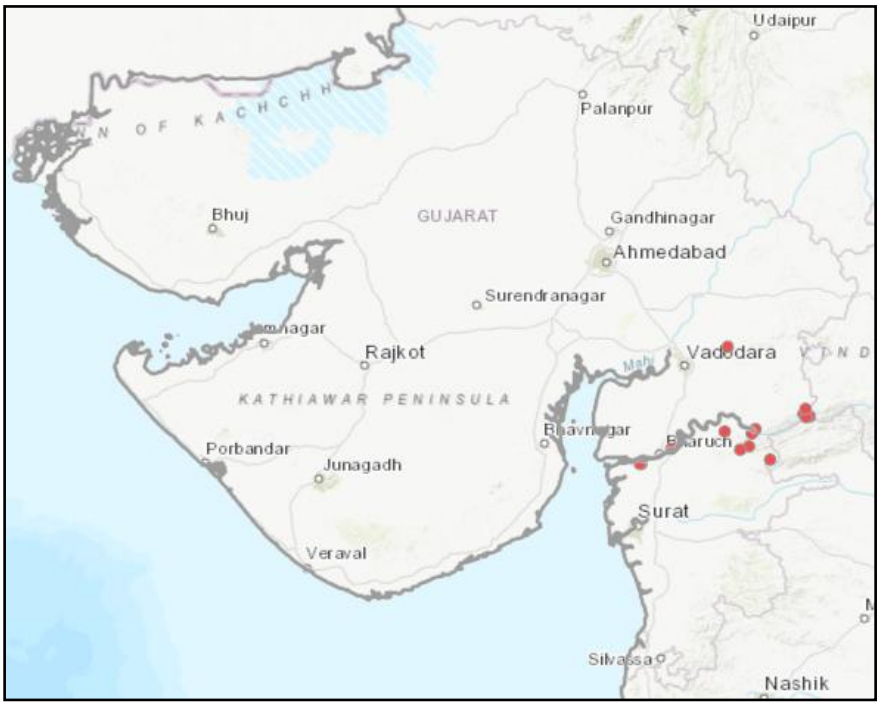


Figure 21: Distribution of *Rorippa cochlearioides*

### 4.2.1.5 IUCN Red List Assessment of *Ischaemum sayajiraoi* Raole and R.J. Desai

**Draft**

Logo

***Ischaemum sayajiraoi* - Raole & R.J.Desai**

PLANTAE - TRACHEOPHYTA - LILIOPSIDA - POALES - POACEAE - Ischaemum - sayajiraoi

**Common Names:** No Common Names
**Synonyms:** No Synonyms

| Red List Status |
|---|
| VU - Vulnerable, D2 (IUCN version 3.1) |

## Red List Assessment

### Assessment Information

**Regions:** Global

### Assessment Rationale

It is confined to western India

## Distribution

### Geographic Range

The species was discovered from Gujarat and is endemic here only, mostly concentrated in southern region. It was first collected and described from Vadodara Dist.: Bakrol, Bhayli (Raole *et al.*, 2011). Desai (2012) also collected it from the Dangs, Surat and Tapi Dist. Tadvi (2013) also mentioned about its presence in the Dangs forest, but without describing it or mentioning its specific locality.

### Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 20 | - |

### Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|
| 536.4 | true | - |

### Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| Yes | Number of locations is less than five, as it reported only from four districts of Gujarat state. |

### Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | - | - | - | - | - |

### Biogeographic Realms

**Biogeographic Realm:** Indomalayan

## Occurrence

### Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India -> Gujarat | Extant | Native | - | Resident |

## Habitats and Ecology

*Ischaemum sayajiraoi* is a component of monsoon graminaceous vegetation of the Vadodara district, where it receives 60 – 80 cm rainfall per annum, mostly during June – September. Here it is locally common on the edges of agricultural fields, seasonal wetlands and roadsides as a part of the natural vegetation. Common associates include *Oryza* spp., *Echinochloa colona* Link, *Eriochloa ramosa* Kuntze and *Nymphaea nouchali* Burm. f. (Raole *et al.* 2011)

### IUCN Habitats Classification Scheme

| Habitat | Season | Suitability | Major Importance? |
|---|---|---|---|
| 4.6. Grassland -> Grassland - Subtropical/Tropical Seasonally Wet/Flooded | resident | Suitable | Yes |

### Systems

**System:** Terrestrial

### Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Graminoid |

## Use and Trade

### General Use and Trade Information

**No use/trade information for this species:** true

## Threats

### Threats Classification Scheme

**The threats to this species are unknown.** true

## Conservation

### Research Needed

| Research | Note |
|---|---|
| 1.2. Research -> Population size, distribution & trends | - |

## Ecosystem Services

### Ecosystem Services Provided by the Species

| Insufficient Information Available | All coded services should have an importance score of 5 - Not Known. |
|---|---|

Specimen examined: *RJD* 33 (BARO)

| | |
|---|---|
| true | - |

## Bibliography


Desai RJ. 2012. Studies on Sedges & Grasses of South Gujarat. Department of Botany, The Maharaja Sayajirao University of Baroda.

Raole VM, Desai RJ and Veldkamp JF. 2011. Ischaemum sayajiraoi, a new species of Poaceae from Gujarat, India. *Kew Bulletin* 66: 303–306.

Tadvi DS. 2013. Floristic diversity of Dangs. Department of Botany, The Maharaja Sayajirao University of Baroda.


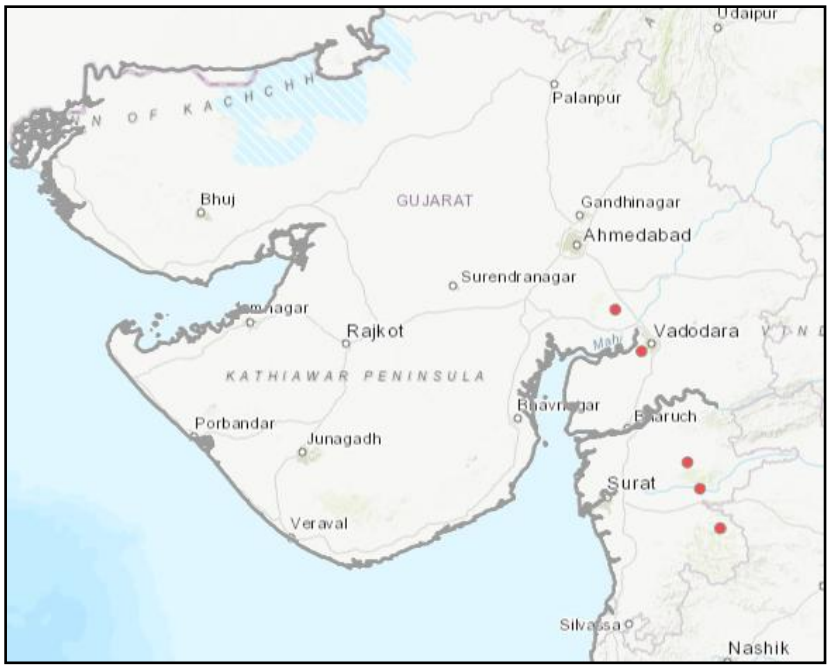


Figure 22: Distribution of *Ischaemum sayajiraoi*

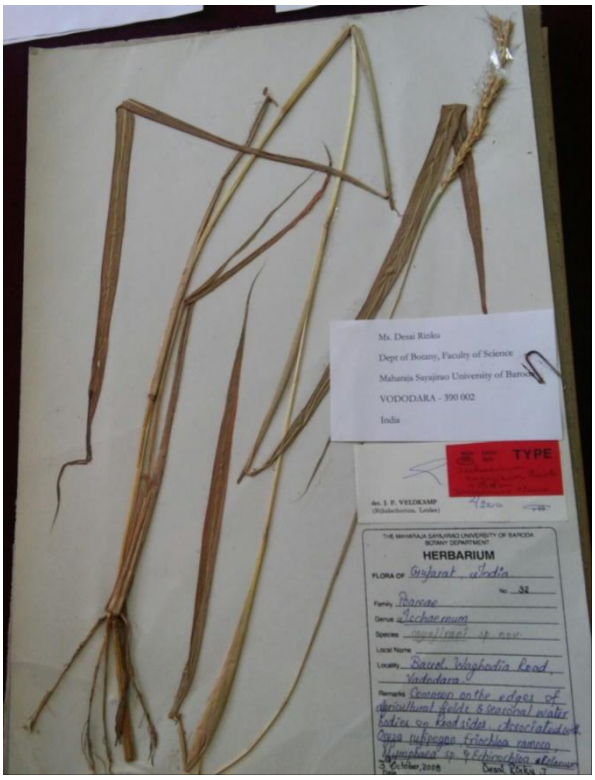


Figure 23: Type specimen of *Ischaemum sayajiraoi*

### 4.2.1.6 IUCN Red List Assessment of *Spodiopogon aristatus* R.J. Desai and Raole

**Draft**

Logo

## *Spodiopogon aristatus* - R.J.Desai & Raole

PLANTAE - TRACHEOPHYTA - LILIOPSIDA - POALES - POACEAE - Spodiopogon - aristatus

**Common Names:** No Common Names
**Synonyms:** No Synonyms

The specific epithet aristatus refers to the aristate apex of both the glumes of the sessile spikelet, which can be used as an identifying character for this species.

| Red List Status |
|---|
| VU - Vulnerable, D2 (IUCN version 3.1) |

## Red List Assessment

### Assessment Information

**Regions:** Global

## Distribution

### Geographic Range

*Spodiopogon aristatus* was first described from Bunadha in Tapi district, and is confined to the Dangs, Navsari, Surat and Valsad districts of southern Gujarat.

### Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 20 | - |

| Extreme fluctuations in area of occupancy (AOO) | Justification |
|---|---|
| No | - |

### Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|
| 4419.2 | true | - |

| Extreme fluctuations in extent of occurrence (EOO) | Justification |
|---|---|
| No | - |

### Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| Yes | Number of locations are restricted to 5 |

### Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | - | true | - | - | - |

### Biogeographic Realms

**Biogeographic Realm:** Indomalayan

# Occurrence

## Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India -> Gujarat | Extant | Native | - | Resident |

# Habitats and Ecology

The species is a component of monsoon and post-monsoon herbaceous vegetation of the Tapi and Valsad districts where it receives 90 – 120 cm rainfall per annum, mostly during June to September. Here it is locally common in shady places on roadsides as a part of the natural vegetation; growing in association with *Apluda mutica*, *Oplismenus burmanni*, *Oplismenus compositus* and *Dichanthium huegelii* alongwith bryophytes and pteridophytes.

## Systems

**System:** Terrestrial

## Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Graminoid |

# Use and Trade

## General Use and Trade Information

**No use/trade information for this species:** true

# Threats

## Threats Classification Scheme

**The threats to this species are unknown.** true

# Ecosystem Services

## Ecosystem Services Provided by the Species

| Insufficient Information Available | All coded services should have an importance score of 5 - Not Known. |
|---|---|
| true | - |

# Bibliography

Desai RJ. 2012. Studies on Sedges & Grasses of South Gujarat. Department of Botany, The Maharaja Sayajirao University of Baroda.

Desai, R.J. & Raole, V.M. 2012. Spodiopogon aristatus a new species of Poaceae from Gujarat, India. *Kew Bulletin* 67(1): 103 – 107.

Tadvi DS. 2013. Floristic diversity of Dangs. Department of Botany, The Maharaja Sayajirao University of Baroda.

Figure 24: *Spodiopogon aristatus* (Credit: Rinku Desai)

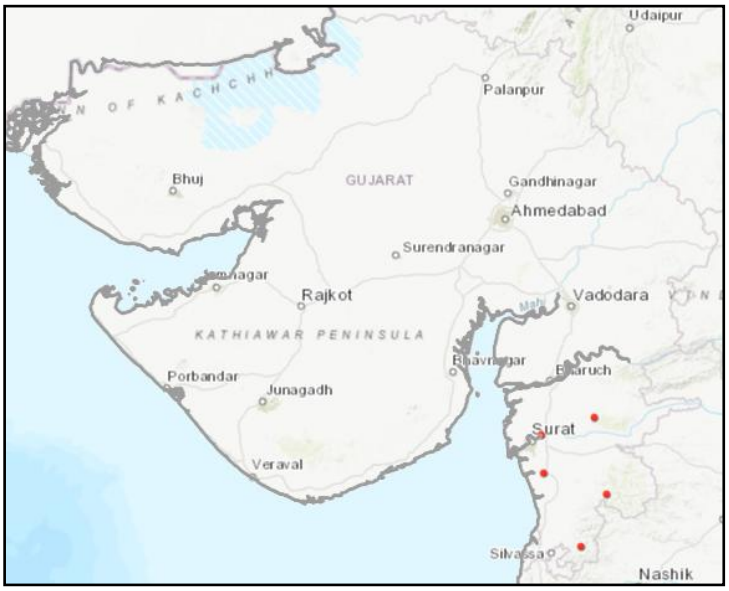


Figure 25: Distribution of *Spodiopogon aristatus*

### 4.2.2 Endemic angiosperms of India found in Gujarat

Endemic angiosperms of India are recently enumerated by BSI. The analysis have shown total of 4303 flowering plant species and infraspecfic taxa as strict endemics to the Indian political boundary (Singh *et al.*, 2015). Among them, dicotyledons dominate the endemic flora with 3170 taxa (72%) belonging to 723 genera under 127 families, whereas monocots are represented by 1133 taxa (26%) belonging to 254 genera under 27 families.

Gujarat which is a transition between the arid desert of Kutch to semi-arid zones of Saurashtra and Northern Gujarat (Aravalli track), on the otherside we have the semi-moist forest of Central Gujarat and the moist forest of Dangs (Western Ghats). However, with adjoining three states of peninsular India and Northern Western Ghats (The Dangs), the endemics found in Gujarat shows endemics found in peninsular India and that of Western Ghats. Additionally there are other endemics which do not belong to the above stated regions but to the Indian Sub-continent. Thus with above context Gujarat was analysed for the endemics of indigenous origin from India. Additionally, the present status assessment was undertaken to fullfill the existing lacunae on the status of distribution of Indian endemics found in Gujarat.

#### 4.2.2.1 Araceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 115 | 2000 |
| India | 29 | 162 |
| Gujarat | 14 | 27 |
| Indian endemics | 10 | 59 |
| Indian endemics found in Gujarat | 2 | 2 |

**Amorphophallus commutatus** (Schott) Engl.

Local names: *Suran, Jangali-Suran*

Habit: Herb

Fl. – Fr.: June – August

The inflorescence emits a very pungent and stinking smell, which indicates the presence of the plant even from a distant.

DSTR: Maharashtra, Goa, Karnataka and Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dahod Dist.: Bedi (1968) observed it growing under the shade of trees in forest areas of Ratanmahal sanctuary, and referred to as a weed in cultivated field.

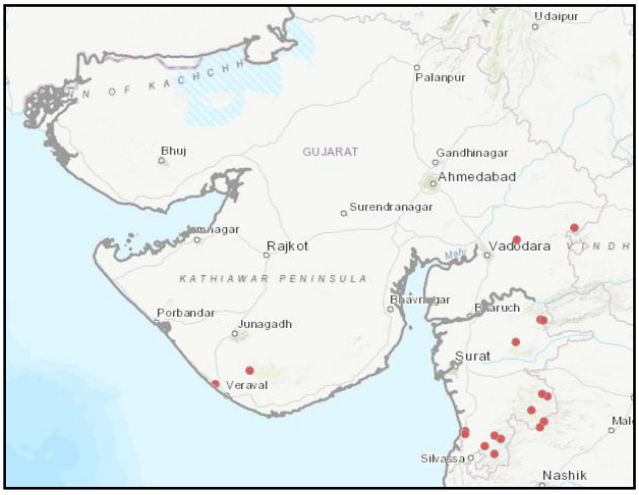


Figure 26: Distribution of *Amorphophallus commutatus*

Dang Dist.: Collected from Ahwa, Malegaon, Pipaldahad and Subir by Suryanarayana (1968) and stated to be occasional in the forests in shaded spots. Also, reported by Yadav (1979) from Galkund.

Gir somnath Dist.: Sisodia (2007) stated as rare, with 77 individuals found only in the western zone of the sanctuary.

Junagadh Dist.: It was reported from Chorwad in the Flora of Saurashtra (Bole and Pathak, 1988)

Narmada Dist. (Patel, 1971): Pradeepkumar (1993) noticed it to be common in deciduous forest areas of Mathavali, Sagai and Waghumar, during monsoon and post monsoon periods.

Panchmahal Dist.: Oza (1961) was able to observe this monoecious plant only on one occasion, and stated as rare; found half-way up the hill, in in rocky grounds in the forest undergrowth.

Surat Dist.: Yadav (1979) observed it as growing frequent in Umarpada.

Valsad Dist. (Inamdar and Patel, 1971): Reddy (1987) collected it from Pindval, and stated to be common and abundant in shady forest. Also documented by More (1972) from Pardi, and by Yadav (1979) from Parnera. The species was noted as common and abundant under the shades of the trees and in open wastelands, in

Dharampur, Kaprada and Nana Pondha ranges by Vora (1980). Rao (2012) noticed it to be growing commonly in hedges and in open lands in Kaprada.

Habitat: Rocky grounds in the forest undergrowth

Specimen examined: *Gpk* 549, 738, 1914, *Bedi* 2633, 3770 (BARO), *BS* 1110, 1306, 1781, 1442, *HMV* 37, 1853, *VHR* 317, *Dangs* 474, *Rajpipla* 475, *Valsad* 1575 (SPU)

EOO= 51,474.9 km$^2$

AOO= 72 km$^2$

No. of locations: 17

AOO density: 0.05

*Amorphophallus commutatus* is a widely distributed endemic species of western India. Since there are no threats recorded, it is assessed as **Least Concern**.

---

**Arisaema murrayi** (J.Graham) Hook.

Local names: *Vagari*

Habit: Herb

Fl. – Fr.: June – August

DSTR: This aroid is confined to Maharashtra, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015; Nayar *et al.* 2014)

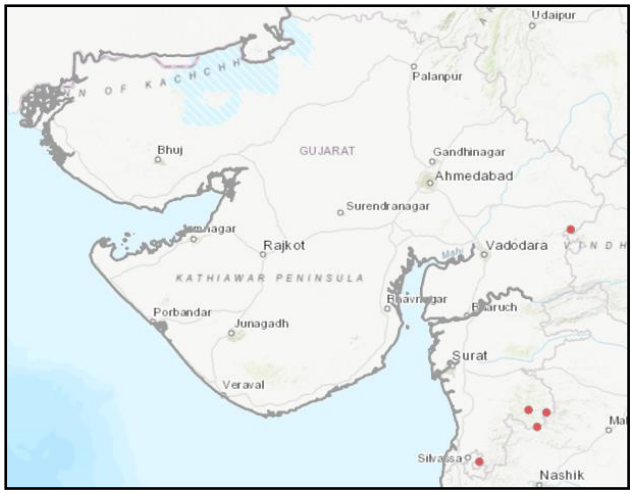


Figure 27: Distribution of *Arisaema murrayi*

DSTR Gujarat:

Dahod Dist.: Bedi (1968) reported the plant for the first time from Gujarat and noted it as uncommon species found in the forest outskirts near Kanjeta.

Dang Dist.: Tadvi (2013) collected it from the Dangs, without detailing any locality. However, in the present study it was collected from Goghli ghat, Gadad hilly slopes and Kotumdar forest near Saputara.

Valsad Dist.: It was reported from Valsad by Vora in 1980, later after three decades it was collected from Dahikhed by Rao (2012) where it was found growing occasional near hedges and in wastelands.

Figure 28: *Arisaema murrayi* in flowering

Habitat: Forest undergrowth

Specimen examined: *VHR* 2298 (VNSGU)

EOO= 7,280.7 km$^2$

AOO=20 km$^2$

No. of locations: 05

AOO density: 0

*Arisaema murrayi* is endemic to western India. Continuing decline in habitat quality and extent of suitable sites due to agricultural encroachment and urbanization are major ongoing threats. It is listed as **Vulnerable B2ab(iii)** based on its restricted occurrence.

### 4.2.2.2 Amaryllidaceae J. St.-Hil.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 85 | 1100 |
| India | 5 | 27 |
| Gujarat | 5 | 11 |
| Indian endemics | 2 | 8 |
| Indian endemics found in Gujarat | 2 | 2 |

**Crinum brachynema** Herb.

Habit: Herb

Fl. – Fr.: July – August

DSTR: This scapigerous herb is confined to Satara in Maharashtra (Mishra and Singh, 2001; Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: *C. brachynema* was reported for the first time for Gujarat

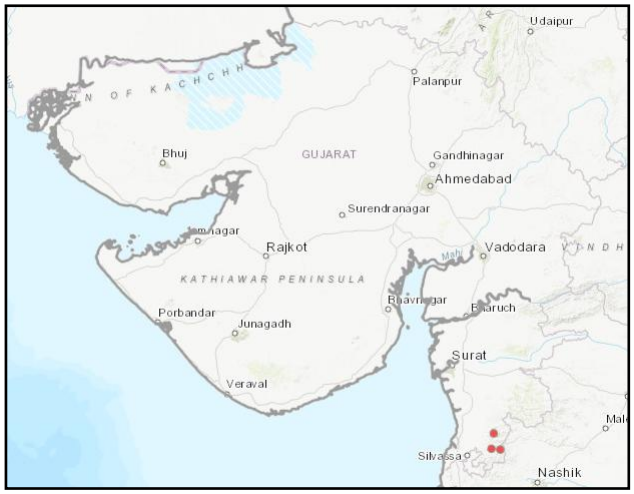


Figure 29: Distribution of *Crinum brachynema*

state from Dharampur forests (Inamdar, 1968), and also mentioned in the preliminary floristic survey of Valsad-Tithal-Dungri areas by Inamdar and Patel (1971), without stating any details of its occurrence. Later, Vora (1980) had also reported it from Dharampur range and commented to be an uncommon species. Then after three decades the species was noticed on the riverbanks of Kaprada (Rao, 2012).

Habitat: Hill slopes, forest undergrowth

Specimen examined: *HMV* 117, 1844 (SPU), *VHR* 1283 (VNSGU)

*Crinum brachynema* can be distinguished by its strap-shaped leaves, indistinct neck of bulb and funicular/nodding perianth. Cooke (1908) has been reported it common along hillslopes of Mahabaleshwar, but it could not re-collected from this locality since then. However, a single individual was noticed at Kate's point in Mahabaleshwar which was then planted in the experimental garden at BSI (Mishra and Singh, 2001). Later, Bachulkar (1993) reported its extended distribution up to Kas plateau.

EOO= 89.5 km$^2$

AOO= 12 km$^2$

No. of locations: 03

AOO density: 0

*C. brachynema* is harvested for its bulbs by the local villagers which is a major threat. And, due to its restricted distribution the species is assessed as **Endangered B1ab(i,iii,iv)**.

---

**Pancratium parvum** Dalzell

Habit: Herb

Fl. – Fr.: June – July

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: The species was reported for the first time by Inamdar and Patel (1971) in their preliminary

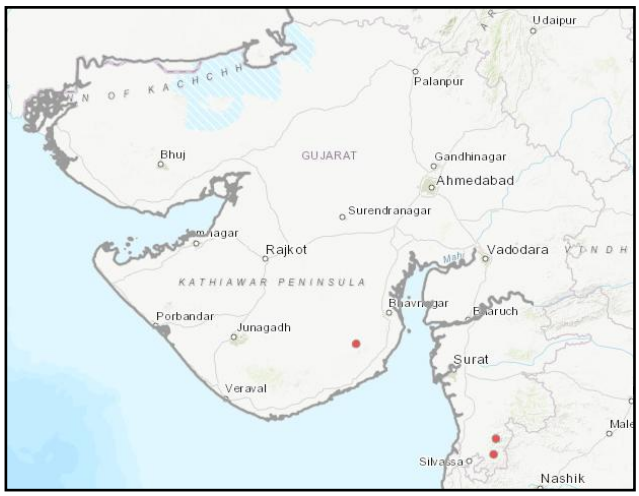


Figure 30: Distribution of *Pancratium parvum*

floristic survey of Valsad-Tithal-Dungri areas, without mentioning any specific locality for its occurrence. Later, the species was documented after two decades from Saurashtra region by Oza (1991) in his PhD work on taxonomical and ethnobotanical studies of and around Bhavnagar, but he did not mention any details about its vicinities. Since then, this geophyte could not be collected from the reported sites and is probably of **doubtful occurrence** in Gujarat state.

Habitat: Forest undergrowth

EOO= 1519.5 km$^2$

AOO= 12 km$^2$

No. of locations: 03

AOO density: 0

*P. parvum* is not stated in the Flora of Gujarat (Shah, 1978), but is mentioned in the checklists by Raghavan *et al*. (1981), GEC (1996), and Jani (2014). As the species offers insufficient information for a proper assessment of conservation status to be made it is considered as **Endangered B2ab(iii,iv).**

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#### 4.2.2.3 Asparagaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 128 | 2929 |
| India | 29 | 81 |
| Gujarat | 8 | 20 |
| Indian endemics | 2 | 12 |
| Indian endemics found in Gujarat | 2 | 2 |

**Chlorophytum borivilianum** Santapau and R.R.Fern.

Habit: Herb

Fl. – Fr.: June – July

DSTR: Rajasthan, Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

This species was first described by Santapau and Fernandes (1955), based on the collections made from Kanheri Caves in Salsette Island, near Bombay; type specimen (*Fernandes* 1810) deposited at Blatter. With matter of time the species has been reported from Rajasthan, Madhya Pradesh (Bordia *et al.* 1995).

DSTR Gujarat (Nayar *et al.* 2014):

Banaskantha Dist.: Danta (Meena, 2012), Jessore wildlife sanctuary

Dang Dist. (Shah, 1978; Tadvi, 2013): Shah and Suryanarayana (1967) recorded this species for the first time for Gujarat state from Ahwa; Suryanarayana (1968) found it occasionally on hilly slopes at Ahwa and Malegaon, growing alongwith *C. tuberosum*. Further, Rao (2002) noticed it to be "not so uncommon" from Ahwa, Waghai, Bardipada, Mahal and Kalibel, whereas Malegaon, Bardipada, Kalibel, Mahal, Subir, Waghai (Rao, 2002). It was collected from Ghoghli, Pimpri and Shivghat during the present investigation.

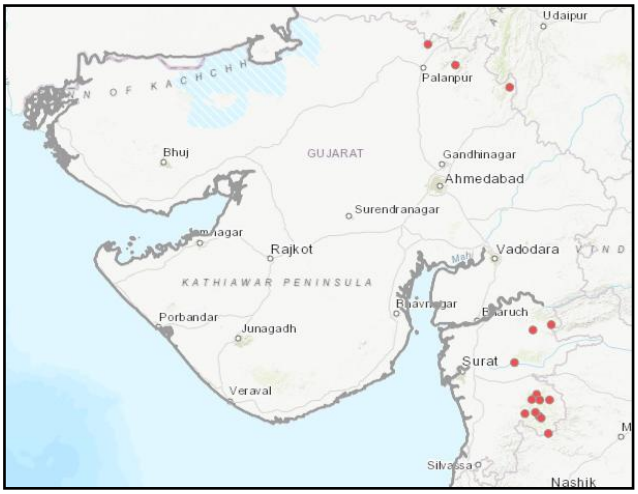


Figure 31: Distribution of *Chlorophytum borivilianum*

Narmada Dist. (Sharma, 2010): Dediapada, Sagai (Rao, 2002)

Sabarkantha Dist.: Vijaynagar

Surat Dist.

Habitat: Hill slopes, humus rich soils

Specimen examined: *BS* 1178, 1318, *VRR* 2227, 3642, 3790, 4698 (SPU)

*C. borivilianum* was threatened initially owing to over-exploitation for its aphrodisiac properties. Collection of this plant from the forest is strictly prohibited by the Forest Department. Consequent to this conservative measure, within couple of years, there is a positive trend in increasing the size of natural populations in different parts of Dangs. Due to high market value for tuberous roots, this plant is introduced into agriculture sector as a new commercial crop in different parts of Gujarat, Rajasthan, Madhya Pradesh and Maharashtra. GSFDC is providing its seeds at sizeable subsidies/free of cost to motivate the farmers. Agronomy of this potential herb is being worked out in several institutions including Gujarat Agriculture University, Anand and National Research Center for Medicinal and Aromatic plants, Boriavi.

EOO= 22,831 km$^2$

AOO= 60 km$^2$

No. of locations: 14

AOO density: 0.06

Since, some of its natural habitats *viz*. Bardipada, Kalibel and Mahal are included in Purna Wildlife Sanctuary, and its extraction from natural populations is prohibited, the species is relatively secured from the threat, and has been excluded from threatened category as mentioned in the Red Data Book. Hence, it is considered to be a **Near Threatened** species in the present assessment, in wild.

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**Chlorophytum malabaricum** Baker

Habit: Herb

Fl. – Fr.: June

DSTR: Maharashtra, Goa, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Suryanarayana (1968) stated it to be 'rare' and observed a few plants found scattered in Ahwa.

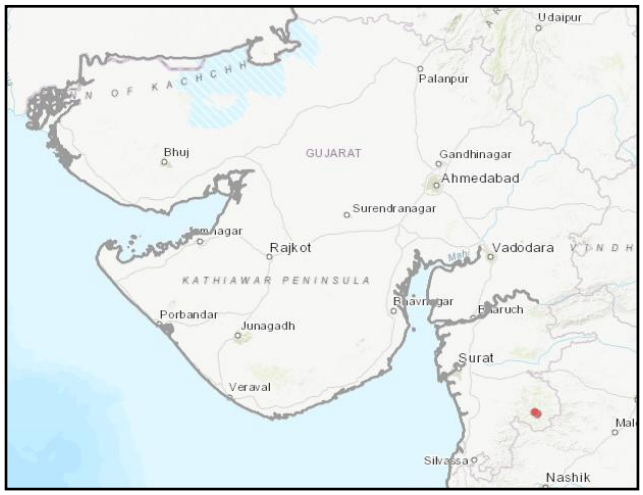


Figure 32: Distribution of *Chlorophytum malabaricum*

In the Flora of Gujarat (Shah, 1978) the species has been recorded based on Suryanarayana's collection (1968). Tadvi (2013) has reported the species without mentioning locality. Thus, the most authoritative documentation of this species was done by Suryanarayana in Gujarat.

Habitat: Open grasslands on hard gravelly soil

Specimen examined: *BS* 1118 (SPU)

EOO= NA

AOO= 8 $km^2$

AOO density: 0

No. of locations: 01

Based on IUCN criteria, *C. malabaricum* could not be collected thenafter and due to its restricted distribution, it is assessed to be **possibly Regionally Extinct**.

### 4.2.2.4 Orchidaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 735 | 17000 |
| India | 185 | 1309 |
| Gujarat | 14 | 34 |
| Indian endemics | 77 | 274 |
| Indian endemics found in Gujarat | 5 | 10 |

**Aerides maculosa** Lindl.

Habit: Herb

Fl. – Fr.: July – January

DSTR: Maharashtra, Goa, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

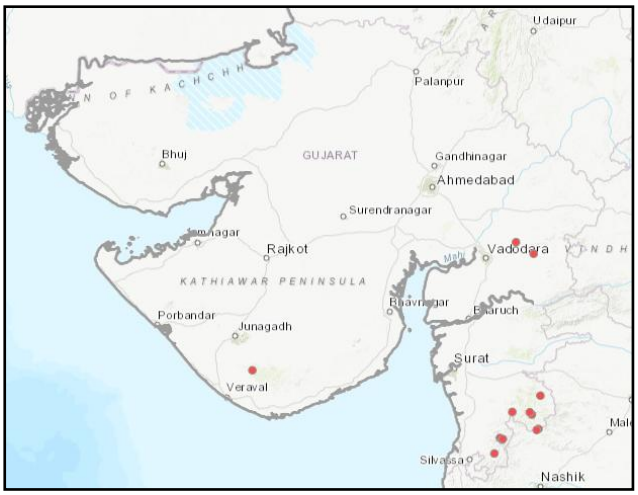


Figure 33: Distribution of *Aerides maculosa*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noticed it occasionally in Ahwa, Malegaon and Subir, growing on tall trees of *Garuga pinnata*, *Mangifera indica*, *Ougeinia oogeninsis*, *Syzygium cumini* and *Terminalia crenulata.*

Junagadh Dist.: Sasan-Gir

Navsari Dist.: Bansda

Panchmahal Dist.: Pavagadh (Oza, 1961), Jambughoda wildlife sanctuary (Nagar and Bhatt, 2015)

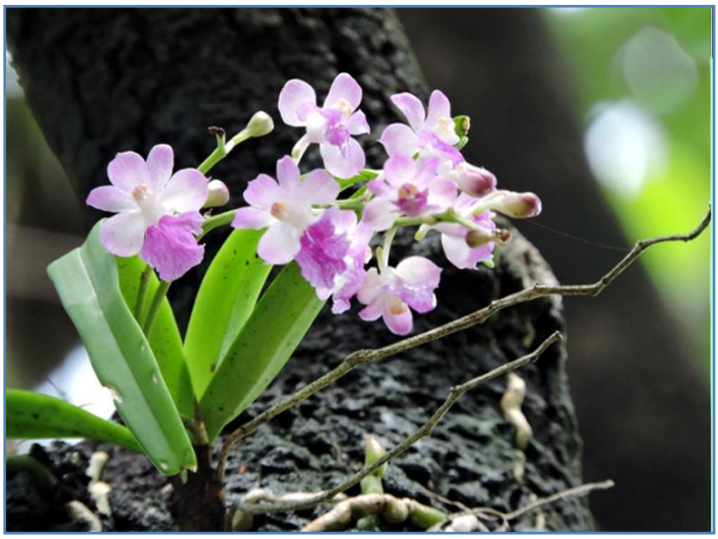

Figure 34: *Aerides maculosa* in flowering

Valsad Dist.: Reddy (1987) observed it to be a common epiphyte on *Acacia chundra*, *Mangifera indica* and *Terminalia crenulata* in Dhamni, Pangarbari and Kaprada; Rao (2012) also noticed it to be occasional in Kaprada.

Habitat: Epiphyte on *Mangifera indica, Terminalia crenulata*

Specimen examined: *MRB* 33432 (BSJO), *Oza* 907 (BARO), *BS* 558, 1115, 1168 (SPU), ASR 2896 (SPU)

EOO= 41,387 km$^2$

AOO= 52 km$^2$

No. of locations: 09

AOO density: 0.31

*Aerides maculosa* is noted as common and abundant at many locations. Moreover, no significant decline has been observed in its population in the past. It is present throughout a wide range with a large area of occupancy and extent of occurrence. Thus, the species is categorized as **Vulnerable B2ab(iii,iv)**.

---

**Dendrobium barbatulum** Lindl.

Habit: Herb

Fl. – Fr.: March – May

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

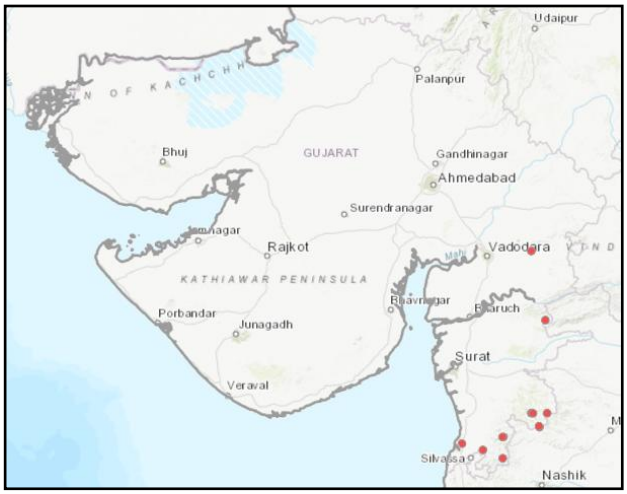

Figure 35: Distribution of *Dendrobium barbatulum*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) remarked it to be occasionally growing on *Lannea coromandelica*, *Mangifera indica*, *Meyna laxiflora* and *Ougeinia oogenensis* in Ahwa and Malegaon; Nagar and Bhatt (2015) noticed it from Don.


Figure 36: *Dendrobium barbatulum* in flowering

Narmada Dist. (Nagar and Bhatt, 2015): Pradeepkumar (1993) observed a few plants in Mohbi

Panchmahal Dist.: Jambughoda (Nagar and Bhatt, 2015)

Valsad Dist. (Nagar and Bhatt, 2015): Reddy (1987) noticed it to be

occasionally found on *Bombax ceiba, Madhuca* sp. and *Terminalia crenulata* in Girnara and Pangarbari; Rao (2012) observed it to be rare and found once at Varoli talat.

Habitat: Epiphyte on *Terminalia crenulata, Desmodium oojeinense*

Specimen examined: *MRB* 33417 (BSJO), *GPK* 1175, 1634 (BARO), *BS* 2963, 2759, 3066, 3083, *ASR* 2608, 4016, 3529(SPU)

EOO= 11,568 km$^2$

AOO= 48 km$^2$

No. of locations: 09

AOO density: 0.25

It is listed as **Vulnerable B1ab(i,iii,v)** based on its restricted occurrence and observed habitat degradation throughout its range.

---

**Dendrobium microbulbon** A.Rich.

Habit: Herb

Fl. – Fr.: December – May

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

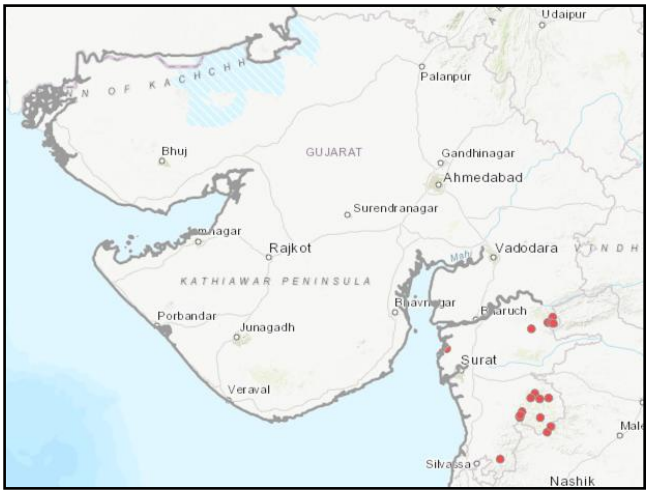


Figure 37: Distribution of *Dendrobium microbulbon*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it as rare in Ahwa and Malegaon; Rao (2002) collected it from Bardipada, Dungerda, Galkund, Kalibel, Kasa, Mahal and Subir

Narmada Dist.: Pradeepkumar (1993) observed it as growing infrequently in forest patches at Kokam, Mathavali, Sagai and Waghumar; Rao (2002) reported it from Dediapada, Fulsar and Piplod; in the present study it was collected from Ninai waterfalls

Navsari Dist.: Desai (1976) had seen few individuals of the species growing on *Terminalia crenulata* at Khambhala and Tadpada; Bansda

Surat Dist.: Zankhri

Valsad Dist.: Kaprada

Habitat: Epiphyte on *Mangifera indica,Tectona grandis* and *Terminalia crenulata.*

Specimen examined: *MRB* 33420 (BSJO), *BS* 2962, *VRR* 4823 (SPU)

EOO= 11,612 km$^2$

AOO= 72 km$^2$

No. of locations: 11

AOO density: 0.39

Figure 38: *Dendrobium microbulbon* in flowering

Shah (1978) mentioned the species to be "rare but locally abundant". Further, floristic studies conducted in other parts of South Gujarat adjacent to Dangs by Patel (1971), More (1972), Yadav (1979), Vora (1980), Reddy (1987) and Rao (2012) have not reported this plant. Habitat of *D. microbulbon* in Gujarat is mostly confined to the southern region. Live specimens from different localities have been introduced in the arboretum. It is assessed to be **Near Threatened**.

---

**Dendrobium ovatum** (L.) Kraenzl. [= *Epidendrum ovatum* L.]

Habit: Herb

Fl. – Fr.: February – March

DSTR: Maharashtra, Goa, Karnataka, Andhra Pradesh, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

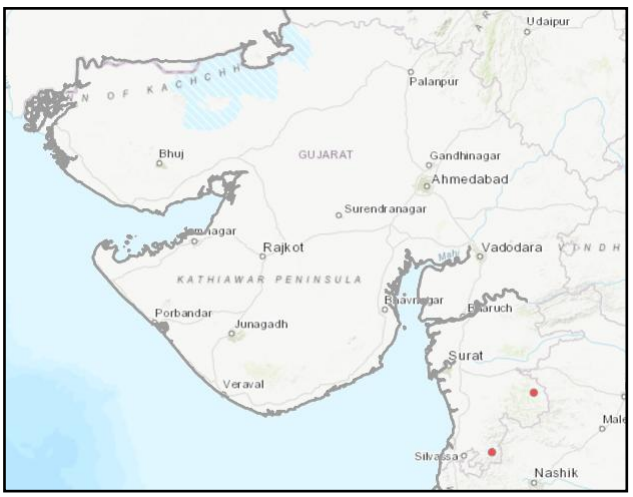


Figure 39: Distribution of *Dendrobium ovatum*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013):

Suryanarayana (1968) stated it to be rare, noticed only once on the trunk of *Garuga pinnata* at Subir.

Valsad Dist.: During the present work it was incidentally collected from Kaprada, while surveying *Bombax insigne*.

Specimen examined: *BS* 2701 (SPU), *Billore* 75892 (BSI)

Habitat: Epiphyte on *Bombax insigne* and *Garuga pinnata*

EOO= NA

AOO=8 km$^2$

No. of locations: 02

AOO density: 0

Several threats posed for this species in the wild, including road widening and logging in the Western Ghats region. There are also cases of people collecting the plants for their beautiful flowers. *D. ovatum* shows restricted distribution, owing to which it has been assessed as **Endangered B2ab(iii)**.


Figure 40: *Dendrobium ovatum* in flowering

---

**Eulophia ochreata** Lindl.

Habit: Herb

Fl. – Fr.: June – October

DSTR: Maharashtra, Karnataka, Andhra Pradesh (Nayar *et al.* 2014; Singh *et al.* 2015)

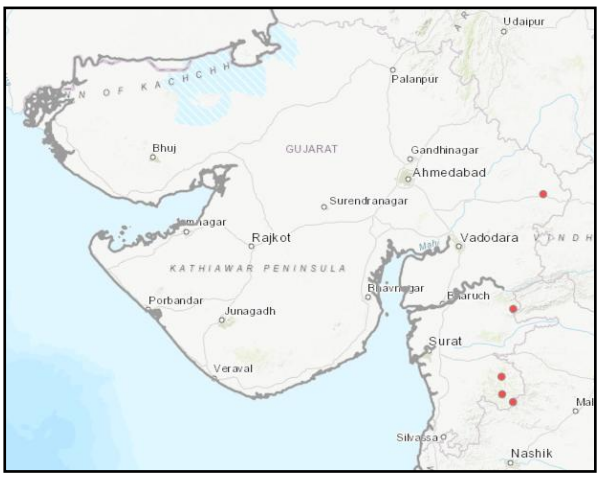


Figure 41: Distribution of *Eulophia ochreata*

DSTR Gujarat (Nayar *et al.* 2014): Santapau and Kapadia (1966) reported the occurrence of this species from Khodwa in Panchmahals district. Though, Shah (1978) did not report in the Flora of Gujarat. But, Raghavan *et al.* (1981) included this taxon in the checklist of Gujarat. Other documentation of Bhatt (1975) also failed to locate this taxon through his floristics and phytosociological survey of Panchmahal district. Even it was not recorded by other workers from southern Gujarat (Suryanarayana 1968, Patel 1971, More 1972, Desai 1976, Yadav 1979, Vora 1980, Reddy 1987, Rao 2012). Never the less, the plant was rediscovered from Mahal by Parabia *et al.* (2001), and recently it was collected from Ghogli ghat near Ahwa in Dangs (Nagar and Bhatt, 2015), and

collected from Kelda ghat in Shoolpaneshwar wildlife sanctuary during the present study.

Habitat: Hill slopes, humus rich soils

Specimen examined: *M.R. Bhatt* 127 (BARO)

Rare occurrence of this was also reported from Rajasthan (Shetty and Singh 1991). Availability of this species in Gujarat state is very scarce. Collected pseudobulbs have been introduced in to the arboretum. Further explorations are recommended to find out the possible localities and its populations dynamics.

EOO= 2829.6 km$^2$

AOO= 20 km$^2$

No. of locations: 05

AOO density: 0

*Eulophia ochreata* is evaluated as **Endangered** under the criterion **B1ab(iii)**.

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**Habenaria foliosa** A.Rich. [= *Habenaria foliosa* A.Rich. var. *gibsonii* (Hook.f.) Bennet; *Habenaria gibsonii* Hook.f. var. *foetida* Blatt. and McCann; *Habenaria gibsonii* Hook.f. var. *gibsonii*; *Habenaria gibsonii* Hook.f. var. *foliosa* (A. Rich.) Santapau and Kapadia]

Habit: Herb

Fl. – Fr.: July – September

DSTR: Maharashtra, Karnataka, Tamil Nadu (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Chhota udepur Dist.

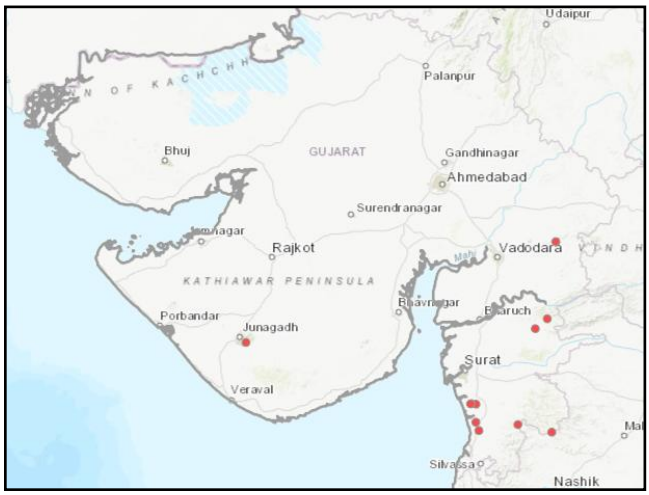

Figure 42: Distribution of *Habenaria foliosa*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) mentioned it to be rare; a few plants growing scattered in the dense rocky undergrowth on hilly slopes at Malegaon. Nagar and Bhatt (2015) noticed it on the slopes of Saputara peak.

Junagadh Dist.: Recently, Bhatt and Nagar (2014) reported it as an addition to the Flora of Saurashtra, collected from hill slopes of Datar hills.

Narmada Dist.: A few plants were observed at Namgir (Pradeepkumar, 1993), Ghatoli

Navsari Dist.: Kanai khadi, Mankunia, Vati, Vedchha

Valsad Dist.: Dungri, Ghadoi (Nagar and Bhatt, 2015)

Habitat: Hill slopes, forest undergrowth

Specimen examined: *MRB* 33423 (BSJO), *BS* 1332 (SPU), *Gpk* 1335, 1336 (BARO)

EOO= 38,951 km$^2$

AOO= 44 km$^2$

No. of locations: 10

AOO density: 0.09

*Habenaria foliosa* can be distinguished by its upwards leafy stem, subequal segments of petals and spur distrinctly clavate at apex. It is assessed to be **Vulnerable B2ab(ii,iii,iv)**.

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**Habenaria grandifloriformis** Blatt. and McCann

Habit: Herb

Fl. – Fr.: July – August

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

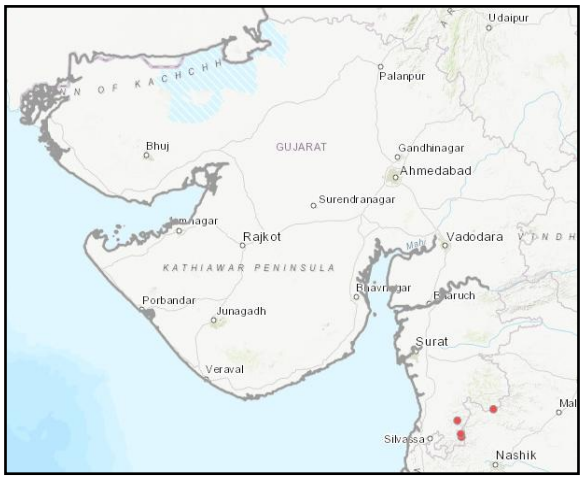

Figure 43: Distribution of *Habenaria grandifloriformis*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) observed it to be common, but scattered in grasslands at Malegaon and Saputara, gowing in association with *Ophiglossum* sp.

Valsad Dist.: Reddy (1987) noticed to be locally abundant, seen on moist grounds among grasses in open areas of Pindval and Sutharpada, Rao (2012) stated the orchid as occasional, growing on slopes especially in shady places at Vavar

Recently, Nagar and Bhatt (2015) also collected this plant from the above stated localities.

Figure 44: *Habenaria grandifloriformis* in flowering

Habitat: Hill slopes, humus rich soils

Specimen examined: *MRB* 33421 (BSJO), *BS* 1333, 1355, 1215, *VHR* 1700, *ASR* 3504, 3613 (SPU).

EOO= 460.3 km$^2$

AOO=16 km$^2$

No. of locations: 03

AOO density: 0.25

The ground orchid is confined only to two districts in southern Gujarat. Due to its sporadic distribution it is put under the **Endangered** category under the criterion **B1ab(iii, iv)**.

---

**Habenaria longicorniculata** J.Graham

Habit: Herb

Fl. – Fr.: August – September

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014)

DSTR Gujarat (Nayar *et al.* 2014):

Chhota udepur Dist.

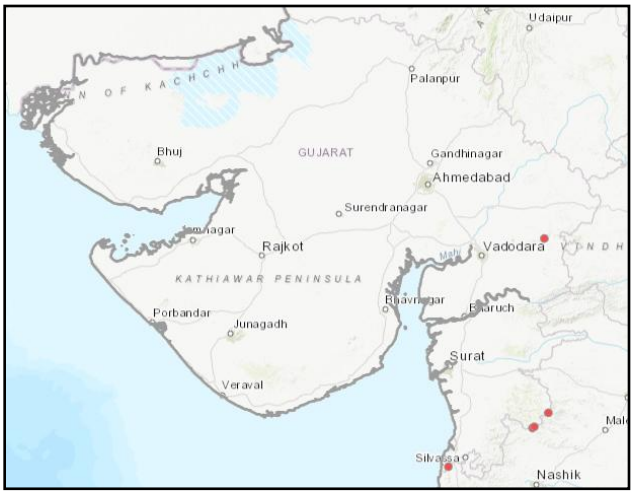


Figure 45: Distribution of *Habenaria longicorniculata*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) stated this terrestrial herb as rare, and noticed a few plants growing in dense forest undergrowth at Malegaon. During the present investigation it was collected from Chinchli and Saputara.

Valsad Dist.: Sanjan

Habitat: Hills, humus rich soils

Specimen examined: *BS* 1361, 1380 (SPU), *Raghavan* 121529 (BSI)

EOO = 11,639.4 km²

AOO = 20 km²

No. of locations: 04

AOO density: 0.2

The unusual length of the spur is typical of this species in the genus *Habenaria*.

The species is assessed to be **EndangeredB2ab(iii,iv)** due to its restricted area of occupancy and number of locations.

Figure 46: Flowering of *Habenaria longicorniculata*

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**Peristylus stocksii** (Hook.f.) Kraenzl. [= *Habenaria stocksii* Hook.f.]

Habit: Herb

Fl. – Fr.: July – September

DSTR: Maharashtra, Karnataka, Tamil Nadu (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Waghai

Narmada Dist.: Pradeepkumar (1993) noticed a few plants at Mohbi

Panchmahal Dist.: near Sukhi dam

Valsad Dist. (Nagar and Bhatt, 2015)

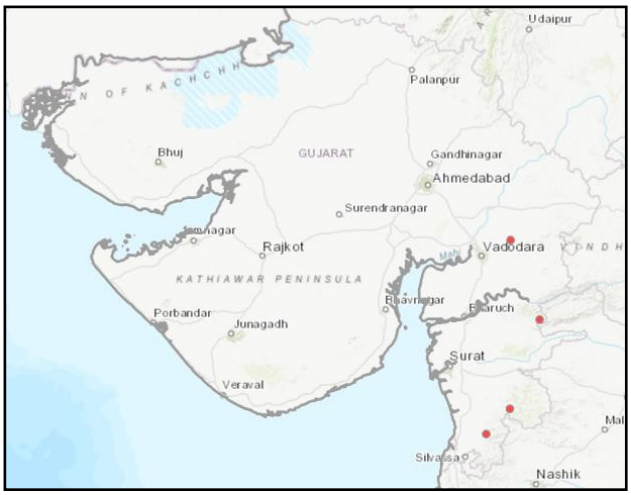


Figure 47: Distribution of *Peristylus stocksii*

EOO = 5681 km²

AOO = 16 km²

No. of locations: 04

AOO density: 0

Habitat: Hills, humus rich soils

Specimen examined: *MRB* 33430 (BSJO), *Gpk* 1384, 1396 (BARO)

*Peristylus stocksii* is confined to the northern and central region of the Western Ghats. Its distribution in Gujarat is very sporadic and reported from single localities in

central and southern region. It is categorized as **EndangeredB2ab(iii,iv)** based on its restricted area of occupancy.

### 4.2.2.5 Cyperaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 90 | 4000 |
| India | 39 | 580 |
| Gujarat | 21 | 136 |
| Indian endemics | 15 | 148 |
| Indian endemics found in Gujarat | 4 | 5 |

*Pycreus dwarkensis* was earlier considered as a narrow endemic to Saurashtra and Kachchh, but later it was observed to be distributed extensively in coastal areas from Somalia (Thulin 1993) and Oman (Lansdown, 2013) to Pakistan (Efloras.org). It is listed as **Least Concern** in the IUCN Red List as it is relatively widespread and is not known to face major threats at present at global level (Lansdown, 2013).

**Fimbristylis lawiana** (Boeckeler) J.Kern [= *Scirpus lawianus* Boeckeler]

Habit: Herb

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Anand Dist.: Umeta

Dang Dist.: Suryanarayana (1968) observed it to be common, scattered in open grasslands at Ahwa, Malegaon and Saputara, Parabia (1974) has collected from the same localities.

Vadodara Dist.: Nimeta (Parabia, 1974)

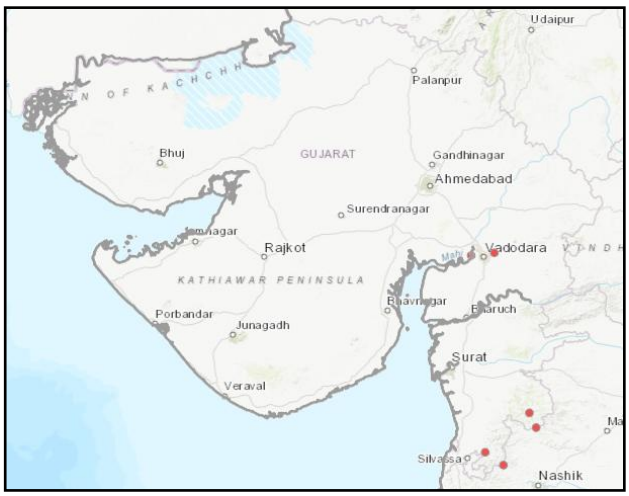


Figure 48: Distribution of *Fimbristylis lawiana*

Valsad Dist.: Reddy (1987) stated it as a rare species, found in open moist rocky grounds on hill top at Kaprada, whereas Rao (2012) observed it to be occasional in moist localities at Malghar in Kaprada.

Habitat: Grass fields, wastelands

Specimen examined: *BS* 1150, 1170, 1224, 1335, *ASR* 3550 (SPU)

EOO = 9925 km$^2$

AOO = 24 km$^2$

No. of locations: 06

AOO density: 0

The digitate arrangement of spikelets is a distinguishing feature. It is one of the first sedges to come up soon after the first few rains.*Fimbristylis lawiana* is endemic to the northern Western Ghats and shows its continuity in Gujarat. Since there were no threats recorded it was assessed as **Least Concern** in the IUCN Red List of Threatened Species, but in the present work, it is regionally assessed to be**Vulnerable** under the criterion **B1ab(i)**.

---

**Fimbristylis woodrowii** C.B. Clarke

Habit: Herb

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

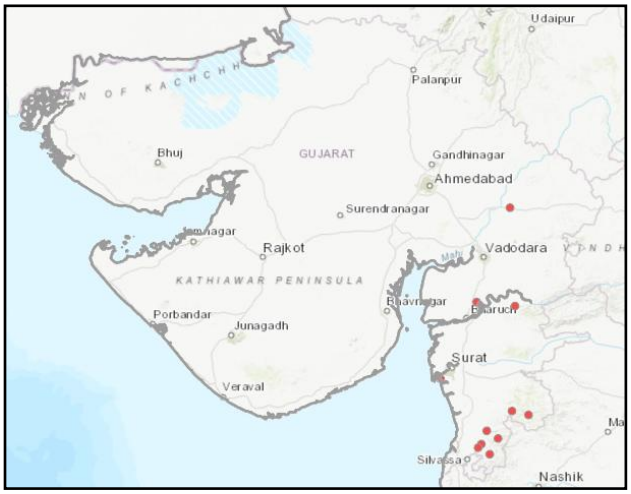

Figure 49: Distribution of *Fimbristylis woodrowii*

DSTR Gujarat (Nayar *et al.* 2014):

Bharuch Dist.: River Dhadhar at Shahpura

Dang Dist.: Suryanarayana (1968) observed it to be rare, found among moist grasses in Ahwa, and Parabia (1974) collected it from Waghai.

Narmada Dist. (Patel, 1971)

Panchmahal Dist.: Parabia (1974) collected it from Tuwa.

Surat Dist.: Joshi (1980) stated it to be a rare plant, collected once from wet soils near ditches around Dumas.

Vadodara Dist. (Parabia, 1974): banks of Dhadhar at Shahapura (Sabnis, 1962).

Valsad Dist.: The species was reported in preliminary floristic survey of Valsad-Tithal-Dungri areas (Inamdar and Patel, 1971), Reddy (1987) observed it to be rare, found with other grasses in moist grounds at Pangarbari, Rao (2012) mentioned it to be rare at Panas, Dharampur, Kaprada, Nana Pondha (Vora, 1980).

Specimen examined: *JVJ* 226 (BARO), *BS* 123, *ASR* 2757 (SPU)

EOO = 14,412 km$^2$

AOO = 44 km$^2$

No. of locations: 11

AOO density: 0

*Fimbristylis woodrowii* grows in grass fields, wastelands and roadsides. Ongoing decline in extent of suitable sites due to urbanization has been identified as a possible threat. It is analysed as **Near Threatened** species based on the number of locations throughout its range.

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**Fuirena tuwensis** M.B. Deshp.and G.L. Shah

Habit: Herb

Fl. – Fr.: October – November

DSTR: Dadra Nagar Haveli (Sabnis and Bedi, 1971), Madhya Pradesh (Singh *et al.* 2015), Karnataka (Sharma, 1984)

DSTR Gujarat: Panchmahal Dist.: Bakrol, Navagam, Tuwa, Veganpura (Deshpande, 1968; Parabia, 1974)

EOO = 3183.4 km$^2$

AOO = 20 km$^2$

Habitat: Wet places, river banks

No. of locations: 05

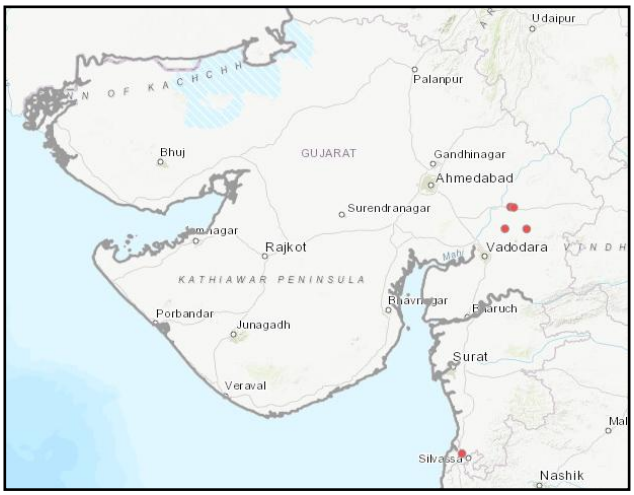


Figure 50: Distribution of *Fuirena tuwensis*

AOO density: 0

*Fuirena tuwensis*was discovered from Tuwa in Panchmahal district of central Gujarat, and later collected from nearby localities. Earlier it was considered a strict endemic to Gujarat, but later it was reported from surrounding territories, Dadra and Nagar Haveli and Madhya Pradesh. It is a widely distributed endemic species of western India. Since there are no threats recorded, it is globally assessed as **Least Concern** by Kumar (2013) in the IUCN Red List of threatened species, but in the present work, it is regionally assessed to be **Endangered B1ab(i,iii,iv)**.

---

**Pycreus malabaricus** C.B. Clarke

Habit: Herb

Fl. – Fr.: August – November

DSTR: Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

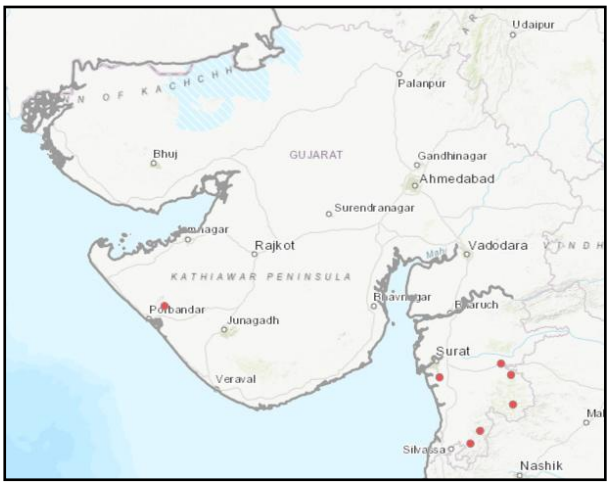


Figure 51: Distribution of *Pycreus malabaricus*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it to be rare, among moist grasses at Ahwa, Parabia (1974) also collected from the Dangs

Navsari Dist.: Maroli

Porbandar Dist.: Menon (1979) stated it to be rare, among grasses at Bileshwar

Tapi Dist.: Hindla, Songadh

Valsad Dist.: Reddy (1987) observed it to be rare, among grasses at Pindval, whereas Rao (2012) noticed it to be common in damp places at Kaprada

Habitat: Grass fields, damp localities

Specimen examined: *BS* 206, 214, *ASR* 3620, *ARM* 2436 (SPU)

EOO = 21,200.2 km$^2$

AOO = 28 km$^2$

No. of locations: 07

AOO density: 0

*Pycreus malabaricus* is listed as **Vulnerable B2ab(iii,iv)** as it is widespread (extent of occurrence more than 20,000 km$^2$.

---

**Scleria stocksiana** Boeckeler

Habit: Herb

Fl. – Fr.: August – September

DSTR: Rajasthan, Maharashtra, Karnataka (Singh *et al.* 2015; Nayar *et al.* 2014)


Figure 52: Distribution of *Scleria stocksiana*

DSTR Gujarat:

Sabarkantha Dist.: The plant was reported for the first time in Gujarat from Talod by Saxton and Sedgwick (1918)

Vadodara Dist.: Sabnis (1967) could not collect it, but included in his work on Sedgwick's authority (*Sedgwick* 252)

Habitat: Slopes, valleys, wastelands, paddy fields

EOO = NA

AOO = 8 km$^2$

No. of locations: 02

AOO density: 0

Since its last record of occurrence from Sabarkantha in 1962, *Scleria stocksiana*could not be collected, thus there is a possibility that the species might have become **Regionally Extinct**. Hence, it is very essential to relocate its population from suitable habitats.

### 4.2.2.6 Eriocaulaceae Martinov

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 13 | 1150 |
| India | 1 | 70 |
| Gujarat | 1 | 10 |
| Indian endemics | 1 | 69 |
| Indian endemics found in Gujarat | 1 | 2 |

**Eriocaulon cuspidatum** Dalzell

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

Habitat: Wet places

The species was reported in Gujarat from Kavant (Thaker, 1974), there is no further information regarding its distribution and population.

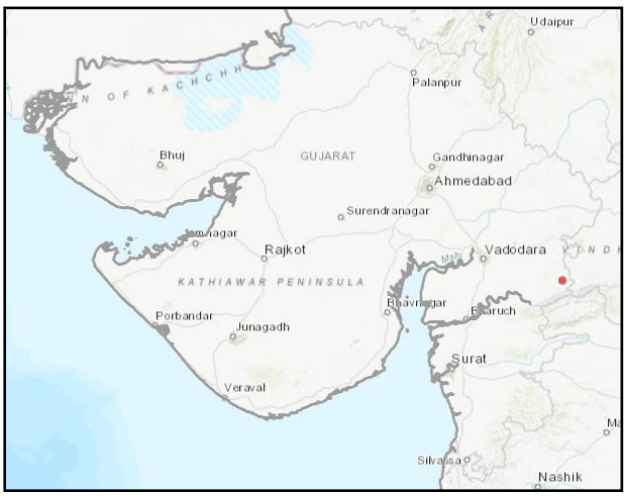


Figure 53: Distribution of *Eriocaulon cuspidatum*

Specimen examined: *DNT* 313, 1206 (BARO)

EOO = NA

AOO = 4 km$^2$

No. of locations: 01

AOO density: 0

Since 1974 the species could not be recollected, inspite of several studies on Kavant range in Chhota Udepur. Perhaps it is of doubtful occurrence and has been kept in the **Regionally Extinct** category.

**Eriocaulon elenorae** Fyson

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat

(Nayar *et al.* 2014):

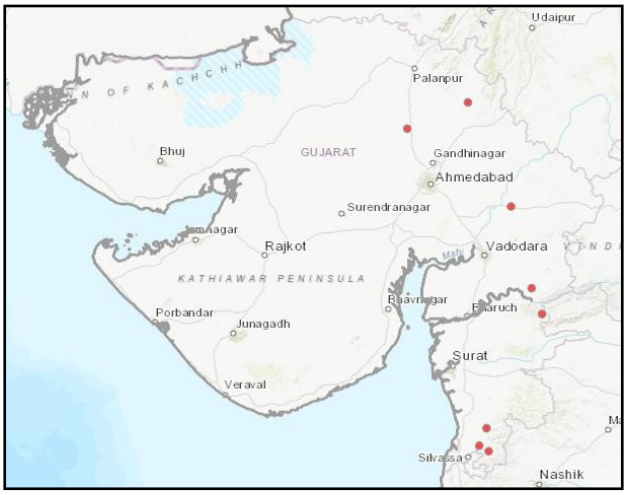


Figure 54: Distribution of *Eriocaulon elenorae*

Shah and Yogi (1974) have mentioned its occurrence in the additions to the flora of North Gujarat (Ahmedabad – Mehsana – Sabarkantha districts)

Narmada Dist. (Patel, 1971): Pradeepkumar (1993) stated the plant to be 'not common', observed in dry puddle vegetation at Kokam, Vankol (Yadav, 1979)

Panchmahal Dist.: Tuwa (Deshpande, 1968)

Sabarkantha Dist.: Idar

Valsad Dist.: Inamdar and Patel (1971) reported the species in the preliminary floristic survey of Valsad-Tithal-Dungri areas; Reddy (1987) observed it to be common in damp places and open cultivated fields at Dharampur, also collected by Rao (2012) from Kaprada, and Vora (1980) from Nana Pondha.

Habitat: Wet places, grass fields, wastelands

Specimen examined: *Gpk* 606, 607 (BARO), *ASR* 2237 (SPU)

EOO = 29,298.7 km$^2$

AOO = 32 km$^2$

No. of locations: 08

AOO density: 0

Based on the number of locations and area of occupancy it is categorized as **Vulnerable B2ab(iii,iv).**

### 4.2.2.7 Poaceae Barnhart

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 620 | 10000 |
| India | 243 | 1208 |
| Gujarat | 102 | 296 |
| Indian endemics | 86 | 335 |
| Indian endemics found in Gujarat | 18 | 27 |

There are eight percent of Indian endemic grasses found in Gujarat, of which two species *Ischaemum sayajiraoi* Raole and R.J. Desai and *Spodiopogon aristatus* R.J. Desai and Raole are restricted only to Gujarat. While, three species were earlier considered endemic but are now with extended distribution: *Cynodon barberi* Rang. and Tadul. reported from Sri Lanka, Myanmar, *Pseudanthistiria heteroclita* (Roxb.) Hook.f. from China, Bangladesh, and *Sorghum controversum* (Steud.) Snowden recorded from Burma, Ceylon and Pakistan.

Rest other endemic grasses are mostly concerted in southern Gujarat, with sporadic distributions in central and northern Gujarat, also Saurashtra. Though, Kachchh harbours one of the largest stretches of grassland in India, Banni grassland, still not any endemic species have been reported from this region. So this suggests there is a need of intensive field studies in Kachchh.

**Arthraxon inermis** Hook.f.

Habit: Herb

Fl. – Fr.: August – November

DSTR: Maharashtra, Goa, Karnataka (Singh *et al.* 2015)

DSTR Gujarat:

South Gujarat (Patel, 1965)

Junagadh Dist.: Menon (1979) observed it to be rare in shaded spots at Petwad

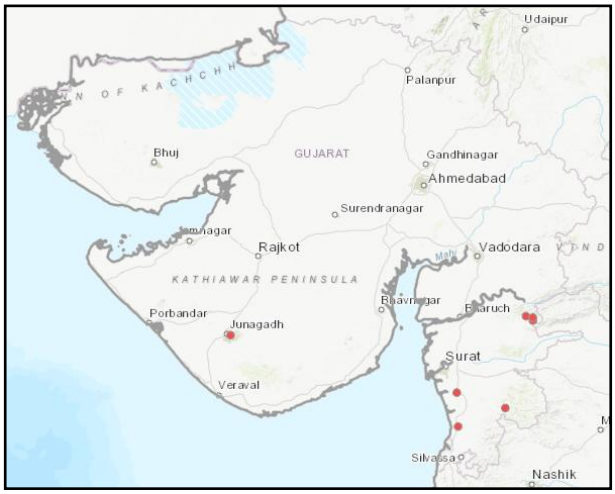


Figure 55: Distribution of *Arthraxon inermis*

Narmada Dist.: Pradeepkumar (1993) noticed in shaded places at Dabka, Namgir and Sagai

Desai (2012) collected it from Dangs, Navsari and Valsad Dist.

Habitat: on hills and hill slopes

Specimen examined: *ARM* 1492, 1562 (SPU), *Gpk* 905, 1073, *RJD* 743 (BARO)

EOO = 23,007.7 km$^2$

AOO = 28 km$^2$

No. of locations: 07

AOO density: 0

Based on the number of locations and area of occupancy it is categorized as **Vulnerable B2ab(iii,iv).**

---

**Arthraxon meeboldii** Stapf

Local name: *Pandadiu*

Habit: Herb

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Patel (1965) mentioned it to be ocuurring in southern Gujarat in his checklist on Grasses of Gujarat.

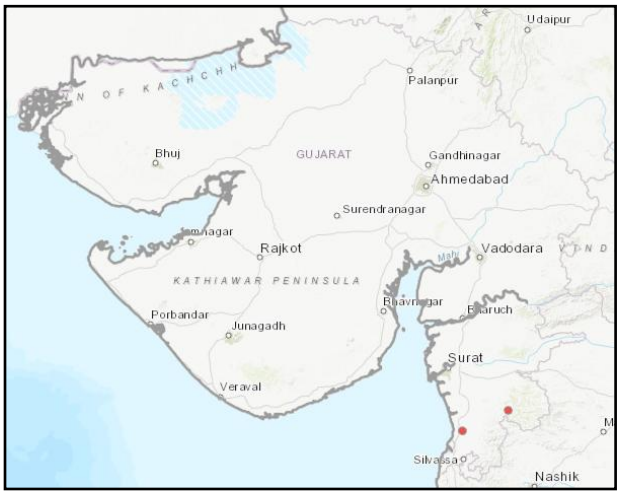


Figure 56: Distribution of *Arthraxon meeboldii*

Habitat: Hill slopes

EOO = NA

AOO = 8 km$^2$

No. of locations: 02

AOO density: 0

This plant is of **doubtful occurrence** and is reported to occur in Dangs and Valsad (southern Gujarat) in an unpublished report. It needs intensive field explorations to confirm its occurrence and further assessment. Hence, it is presently reported as **Data Deficient**.

**Arundinella ciliata** (Roxb.) Nees ex Miq.

Habit: Herb

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

The species was reported as a new record for Gujarat state by Desai (2012) from Dangs and Navsari Dist., and from Kaprada, Lavkar, Mandva, Nana Pondha villages of Valsad Dist.

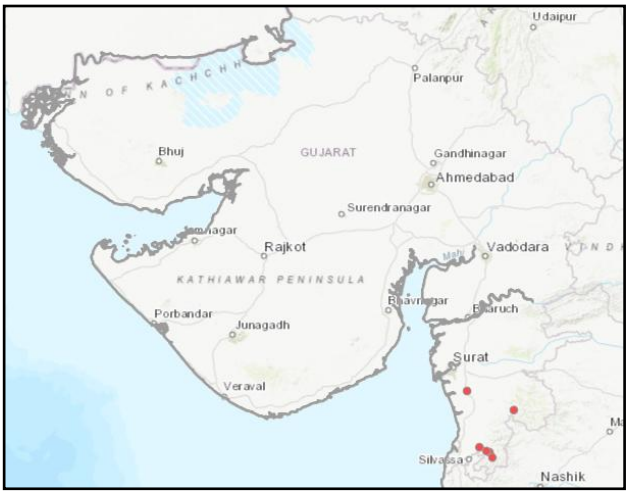


Figure 57: Distribution of *Arundinella ciliata*

Habitat: in moist open planes, along the streams

Specimen examined: *RJD* 98 (BARO)

EOO = 2030.8 km$^2$

AOO = 24 km$^2$

No. of locations: 06

AOO density: 0

Owing to its restricted distribution, number of locations and area of occupancy it is assessed as **Vulnerable B1ab(iii)+2ab(iii,iv).**

---

**Arundinella metzii** Hochst. ex Miq.

Local name: *Dhudu ghas*

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

South Gujarat (Patel, 1965; Desai, 2012)

Banaskantha Dist.: Dantiwada,

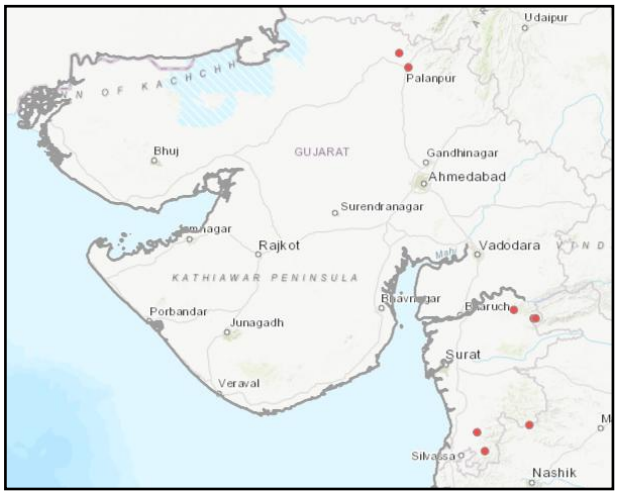


Figure 58: Distribution of *Arundinella metzii*

Palanpur (Patel, 2009)

Dang Dist.: Saputara (Yadav, 1979)

Narmada Dist.: Pradeepkumar (1993) noticed throughout in moist river beds at Kanjal, Sagai, Mohbi and Waghumar

Valsad Dist. (Vora, 1980): Reddy (1987) noticed it be rare, sub-gregarious in moist shaded places at Tutarkhed, while Rao (2012) observed it to be throughout in moist places at Kaprada

Habitat: moist areas, shady and rocky places

Specimen examined: *Gpk* 460, 628 (BARO), *ASR* 3209 (SPU)

EOO = 24,034.6 km$^2$

AOO = 32 km$^2$

No. of locations: 07

AOO density: 0.125

*Arundinella metzii* is observed as locally abundant and assessed to be **Vulnerable B2ab(iii,iv)** as its extent of occurrence exceeds the IUCN thresholds.

---

**Arundinella tuberculata** Munro ex Lisboa

Habit: Herb

Fl. – Fr.: August

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Rajkot Dist.: Bole and Pathak (1988) in Flora of Saurashtra, noted this plant at Valadhari

Habitat: moist, shady area

EOO = NA

AOO = 4 km$^2$

No. of locations: 1

AOO density: 0

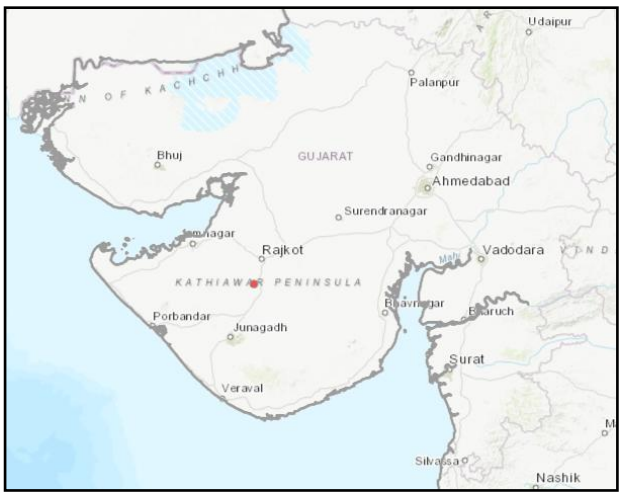


Figure 59: Distribution of *Arundinella tuberculata*

*Arundinella tuberculata* has a single record of occurrence in the Flora of the Saurashtra since past three decades, since then it has not been rediscovered. Due to its **doubtful occurrence**, it is presently designated to be **Regionally Extinct**.

---

**Capillipedium filiculme** (Hook.f.) Stapf [= *Andropogon filiculmis* Hook.f.]

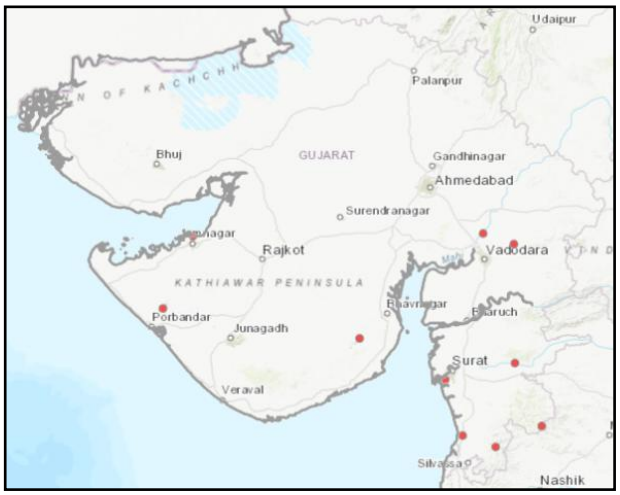

Figure 60: Distribution of *Capillipedium filiculme*

Local name: *Padariyu*

Habit: Herb

Fl. – Fr.: August – September

DSTR: Maharashtra, Goa, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Bhavnagar Dist.: Menon (1979) noticed it to be rare, in shaded places at Palitana; further Meena (2014b) enumerated in the floristic checklist of Bhavnagar based on the collection of A.R. Menon

Dang Dist.: Galkund (Yadav, 1979)

Jamnagar Dist. (Bole and Pathak, 1988)

Panchmahal Dist.: Chavan and Mehta (1958b) reported for the first time at Pavagadh, Oza (1961) observed it to be fairly common at half way up the hill, and on higher parts of the hill about 769 m.

Porbandar Dist.: Barda hill (Bole and Pathak, 1988)

Surat Dist. (Desai, 2012)

Tapi Dist. (Desai, 2012)

Vadodara Dist.: Shardadungri (Padate, 1973), Savli (Padate, 1969)

Valsad Dist.: Pendha (Yadav, 1979), More (1972) collected it from Parnera hill

Habitat: Rocky plateaus

Specimen examined: *RJD* 848 (BARO), *ARM* 2565, *PGM* 1969, 2144, 3086 (SPU)

EOO = 65,425.2 km$^2$

AOO = 40 km$^2$

No. of locations: 10

AOO density: 0

Based on the number of locations and area of occupancy it is categorized as **Vulnerable B2ab(iii,iv)**.

---

**Capillipedium huegelii** (Hack.) A. Camus [= *Andropogon huegelii* Hack.]

Habit: Herb

Fl. – Fr.: August – September

DSTR: Andhra Pradesh, Tamil Nadu (Singh *et al.* 2015), Karnataka, Madhya Pradesh

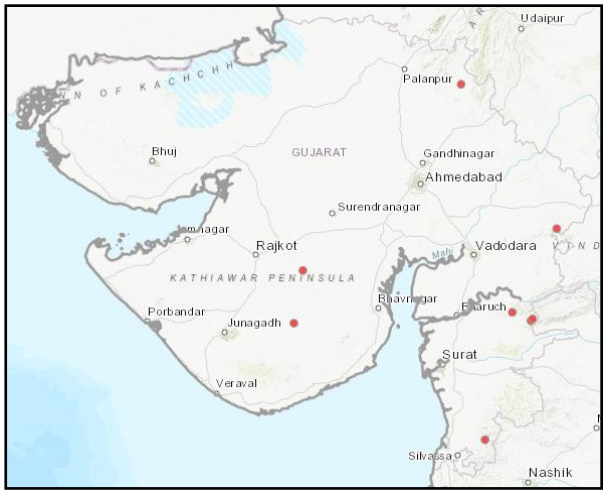

Figure 61: Distribution of *Capillipedium huegelii*

DSTR Gujarat:

South Gujarat (Patel, 1965)

Amreli Dist. (Menon, 1979)

Dahod Dist.: Bedi (1968) noted it to be common near moist spots at Bendol, and Ratanmahal temple

Narmada Dist.: Pradeepkumar (1993) observed it ocassionally in forest undergrowth at Kalvat, Kelda and Ninaighat

Rajkot Dist.: Menon (1979) noticed it to be rare, in stony ground and on rock crevices in river beds at Hingolgadh

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972)

Valsad Dist.: Pendha (Yadav, 1979)

Habitat: Rocky plateaus

Specimen examined: *Bedi* 945, 1845, 3105, *Gpk* 592, 799, 1252 (BARO), *ARM* 1564, 2309, 2323 (SPU)

EOO = 65,665.3 km$^2$

AOO = 32 km$^2$

No. of locations: 07

AOO density: 0.125

Its extent of occurrence exceeds the IUCN thresholds; however, based on the number of locations and area of occupancy it is assessed as **Vulnerable B2ab(iii,iv).**

**Coelorachis clarkei** (Hack.) Blatt.and McCann [= *Rottboellia clarkei* Hack.; *Mnesithea clarkei* (Hack.) de Koning and Sosef; *Manisuris clarkei* (Hack.) Bor ex Santapau]

Habit: Herb

Fl. – Fr.: September – October

DSTR: Jharkhand, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

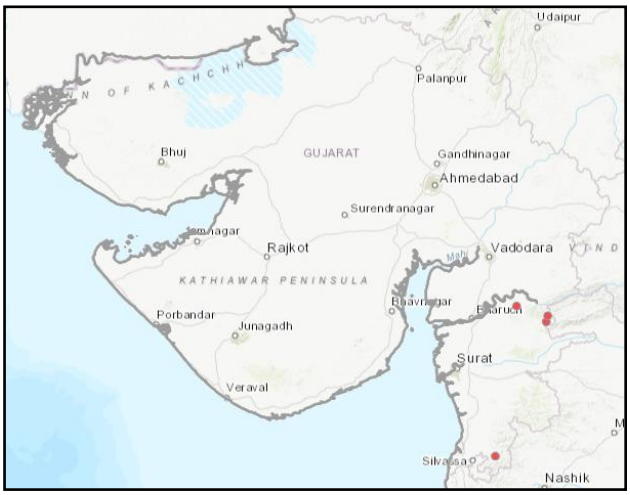

Figure 62: Distribution of *Coelorachis clarkei*

DSTR Gujarat (Nayar *et al.* 2014):

Narmada Dist.: Pradeepkumar (1993) noticed infrequently in shaded places at Khamar, Kokam and Sagai

Valsad Dist.: Kaprada (Desai, 2012)

Habitat: Hill peaks, moist grounds

Specimen examined: *Gpk* 958, 1187 (BARO), *RJD* 219 (BARO)

EOO = 3078.6 km$^2$

AOO = 16 km$^2$

No. of locations: 04

AOO density: 0

As the extent of occurrence is less than 5000 km$^2$ and number of locations are less than 5,*Coelorachis clarkei* is regionally assessed as **Endangered B1ab(iii,iv)**.

---

**Cymbopogon gidarba** (Buch.-Ham. ex Steud.) A. Camus [= *Andropogon gidarba* Steud.]

Habit: Herb

Fl. – Fr.: December – March

DSTR: Maharashtra, Andhra Pradesh, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Bharuch Dist.

Junagadh Dist.: Rare, at Girnar (Menon, 1979)

Mehsana Dist.: Kadi (Yogi, 1970)

Narmada Dist.: Rajpipla (Yogi, 1970)

Porbandar Dist.: Menon (1979) stated it to be rare in small patches in open rocky grounds at Girnar and Bileshwar

Sabarkantha Dist.: Yogi (1970) mentioned it to be common at Mahudi and Pahada; Bhatt (1971) and Bhatt & Sabnis (1972) could not collect the plant and state its occurrence on the basis of the Yogi's collection; Shah and Yogi (1974) listed the species in their work on additions to the flora of North Gujarat

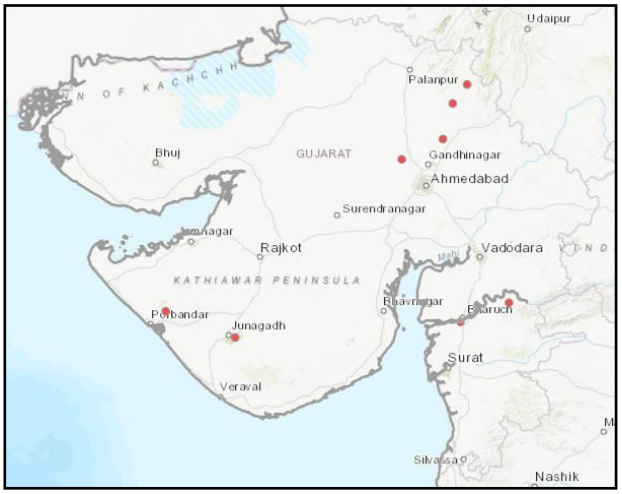

Figure 63: Distribution of *Cymbopogon gidarba*

Habitat: wastelands

Specimen examined: *Arm* 417, 1507, *Yogi* 462, 820, 1048, 1097, 2749, 1482 (SPU)

EOO = 55,065.5 km$^2$

AOO = 32 km$^2$

No. of locations: 08

AOO density: 0

Its extent of occurrence exceeds the IUCN thresholds; however, based on the number of locations and area of occupancy it is assessed as **Vulnerable B2ab(iii,iv).**

---

**Dimeria stapfiana** C.E. Hubb.and Pilg.

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): The plant was reported to be new record to the Flora of Gujarat state from Dharampur and Kaprada of Valsad

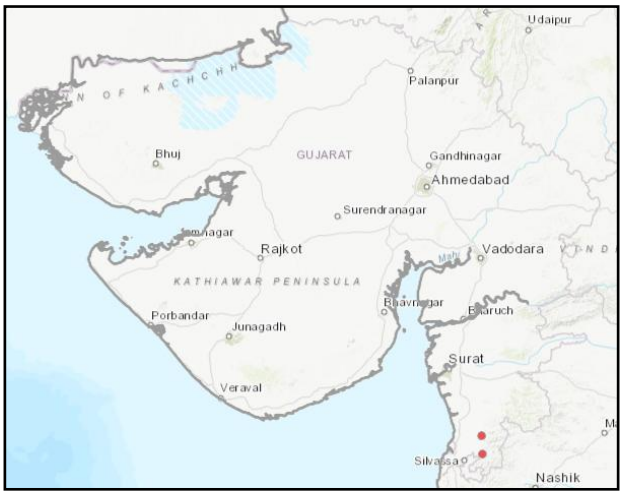

Figure 64: Distribution of *Dimeria stapfiana*

Dist. by Desai (2012).

Habitat: Hilly grasslands

Specimen examined: *RJD* 107 (BARO)

EOO = NA

AOO = 8 km²

No. of locations: 02

AOO density: 0

Owing to its number of locations and area of occupancy it is assigned to be **Vulnerable D2.**

---

**Glyphochloa forficulata** (C.E.C. Fisch.) Clayton [= *Manisuris forficulata* C.E.C.Fisch.]

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Dang Dist. (Tadvi, 2013): Gadvihir (Desai, 2012)

Habitat: Lateritic plateaus

Specimen examined: *RJD* 877 (BARO)

EOO = NA

AOO = 4 km²

No. of locations: 1

AOO density: 0

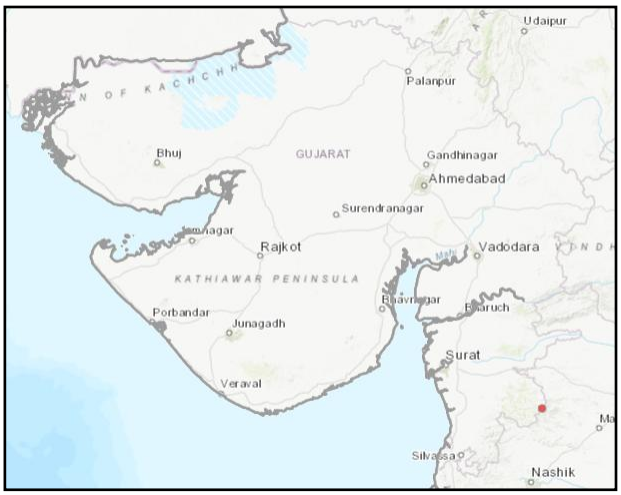


Figure 65: Distribution of *Glyphochloa forficulata*

*Glyphochloa forficulata* is endemic to the Western Ghats, and reported as a new record for Gujarat state from a single location in the Dangs (at the border of Gujarat state), and assessed as **Vulnerable D2**.

---

**Heteropogon ritchiei** (Hook.f.) Blatt. and McCann [= *Andropogon ritchiei* Hook.f.]

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Bhavnagar Dist.: Thadsar

Junagadh Dist.: Bole and Pathak (1988) observed it to be fairly common at Tulsishyam, and also noticed from near the temple on Rukhmani Dungar

Valsad Dist.: Kaprada (Desai, 2012)

Habitat: Hills, forest undergrowth

Specimen examined: *RJD* 179 (BARO)

EOO = 3180.3 km²

AOO = 12 km²

No. of locations: 03

AOO density: 0

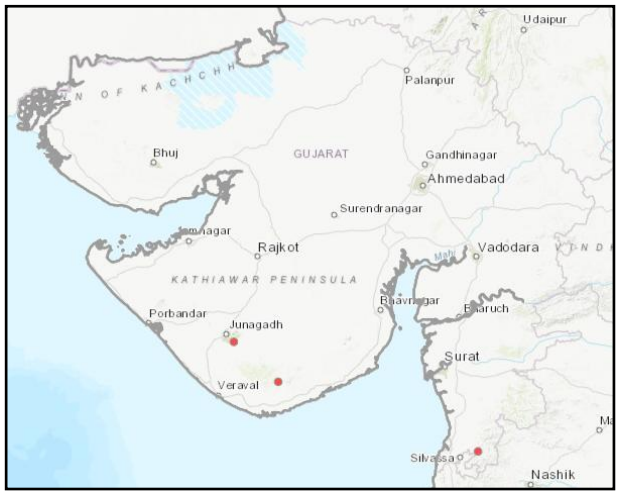


Figure 66: Distribution of *Heteropogon ritchiei*

*Heteropogon ritchiei* was reported for the first time in Gujarat in the Flora of Saurashtra, after a span of two decades it was rediscovered from southern Gujarat. Owing to its extent of occurrence and number of locations, it qualifies for the **Endangered** category under the criterion **B1ab(iii,iv)**.

---

**Isachne elegans** Dalzell ex Hook.f.

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Surat Dist.: Joshi (1980) noticed it to be **rare**, collected once from the wet banks of canal along Udhna-Magdalla road

Habitat: Moist grounds

Specimen examined: *JVJ* 1184 (BARO)

EOO = NA


Figure 67: Distribution of *Isachne elegans*

AOO = 8 km²

No. of locations: 01

AOO density: 0.5

The species was recorded from a road-side locality in the most developing city of Gujarat. Intensive explorations must be carried out to re-locate the plant and confirm its presence in Gujarat. It is presently evaluated as possibly **Regionally Extinct**.

---

**Ischaemum bombaiense** Bor

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: The species was endemic only to Maharashtra and reported as a new record for Gujarat state by Desai (2012) from Umarpada in Surat Dist.

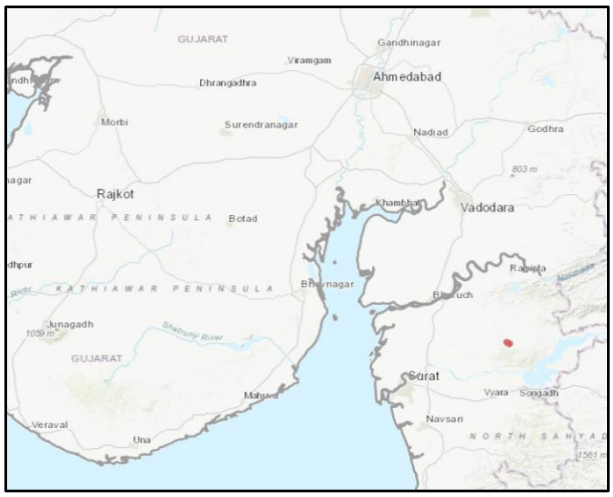


Figure 68: Distribution of *Ischaemum bombaiense*

Habitat: on rocky soils

Specimen examined: *RJD* 742 (BARO)

EOO = NA

AOO = 8 km²

No. of locations: 01

AOO density: 0.5

The unique feature of *Ischaemum bombaiense* is the presence of nodules on the upper glume of both sessile and pedicelled spikelets. Due to its limited area of occupancy and subpopulations, itis assessed as **Vulnerable D2**.

---

**Ischaemum diplopogon** Hook.f.

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Panchmahal Dist.: Pavagadh (Chavan and Mehta, 1958b)

Dang Dist. (Desai, 2012; Tadvi, 2013)

Habitat: Rocky riverbeds, moist hill slopes

Specimen examined: *RJD* 855 (BARO)

EOO = 2025.2 km²

AOO = 12 km²

No. of locations: 03

AOO density: 0

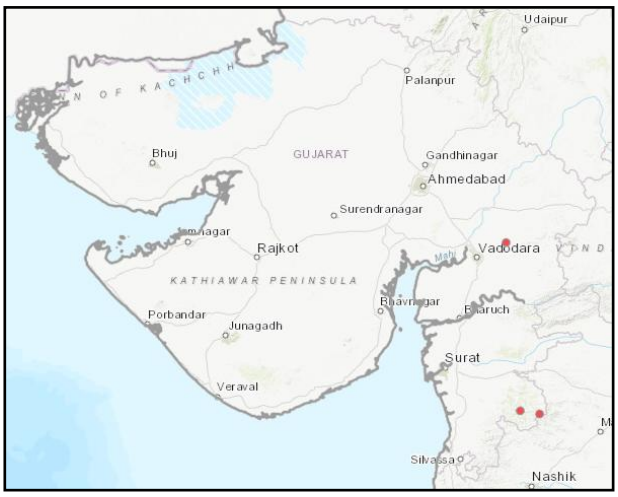


Figure 69: Distribution of *Ischaemum diplopogon*

The grass species is endemic only to Maharashtra and was reported for the first time from Pavagadh hill in central Gujarat, thereafter a long time-span of half-a-century it was rediscovered from southern Gujarat. Thus, owing to its area of occupancy and number of locations, it is assessed as **Vulnerable D2**.

---

**Ischaemum santapaui** Bor

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Girmal fall (Desai, 2012)

Tapi Dist. (Desai, 2012)

Valsad Dist.: Sanjan

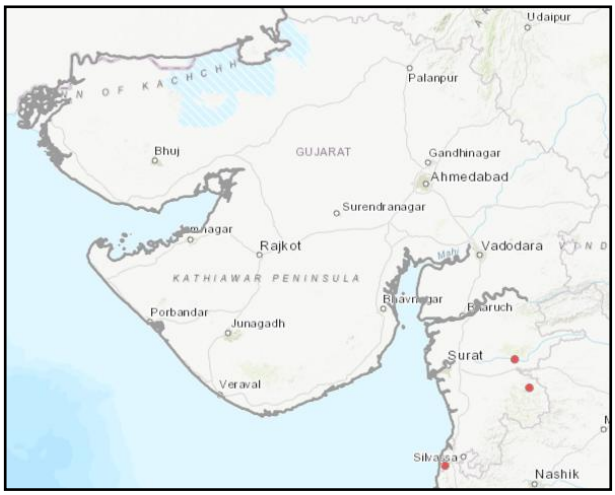


Figure 70: Distribution of *Ischaemum santapaui*

Habitat: Rocky slopes along streams and in cultivated fields

Specimen examined: *RJD* 558 (BARO), *Mishra* 176952, *Kulkarni* 107642 (BSI)

EOO = 2246.2 km²

AOO = 12 km²

No. of locations: 03

AOO density: 0

*Ischaemum santapaui* can be differentiated from others by its stilt-rooted culms, lower leaves tapering to base, lower glumes of sessile spikelet with nodules on rounded keels and lower glumes of pedicelled spikelets not winged. It is assessed to be **Vulnerable D2**.

---

**Iseilema anthephoroides** Hack.

Local names: *Mosi, Ghawala ghas*

Habit: Herb

Fl. – Fr.: July – October

DSTR: Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

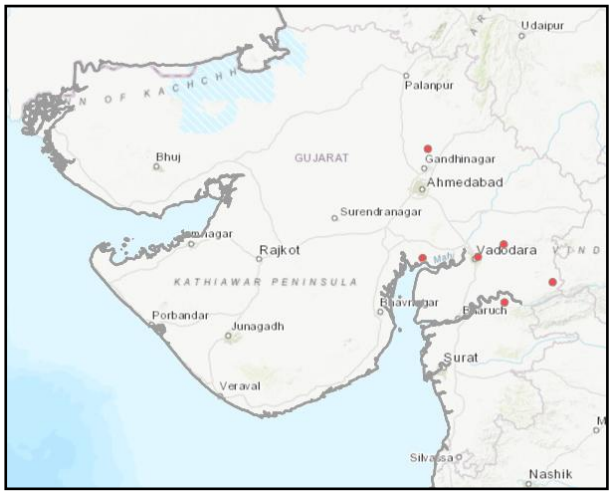

Figure 71: Distribution of *Iseilema anthephoroides*

DSTR Gujarat:

Anand Dist.: Bhagwanani (1980) noticed it to be common in wet muddy areas at Khambhat

Chhota udepur Dist.: Kavant (Thaker, 1974)

Gandhinagar Dist.: Mansa (Meena, 2014a)

Narmada Dist.: Rajpipla (Yadav, 1979)

Panchmahal Dist.: Pavagadh (Chavan and Mehta, 1958b), Oza (1961) noticed it in the plains, not observed on the hill proper

Vadodara Dist. (Chavan and Mehta, 1958a): Harni (Sabnis, 1967)

Habitat: Along riverbanks, irrigation channels, spread on the margin of shallow waterbodies or on wet soils.

Specimen examined: *Arm* 259, *PPB* 478 (BARO)

EOO = 11,698 km$^2$

AOO = 24 km$^2$

No. of locations: 06

AOO density: 0

*Iseilema anthephoroides*is categorized as **Vulnerable** based on the criterion **B1ab(i,iv).**

---

**Lophopogon tridentatus** (Roxb.) C.E.Hubb. [= *Andropogon tridentatus* Roxb.]

Habit: Herb

Fl. – Fr.: September – December

DSTR: Andhra Pradesh, Maharashtra, Madhya Pradesh, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Panchmahal Dist.: Sultanpur (Chavan and Mehta, 1958b), and Oza (1961) collected it from the banks of the talao at Pavagadh

Habitat: in wet localities

Specimen examined: *ARM* 248 (BARO)

EOO = NA

AOO = 8 km²

No. of locations: 02

AOO density: 0


Figure 72: Distribution of *Lophopogon tridentatus*

The species has been reported from locations in central Gujarat, but more than five decades before. After which it has not been documented again, extensive field studies are required. It is considered to be **Regionally Extinct.**

---

**Parahyparrhenia bellariensis** (Hack.) Clayton [= *Andropogon bellariensis* Hack.]

Local name: *Ratd*

Habit: Herb

Fl. – Fr.: August – October

DSTR: Andhra Pradesh, Karnataka (Singh *et al.* 2015)

DSTR Gujarat: Rajkot Dist. (Thakrar, 1987)

EOO = NA

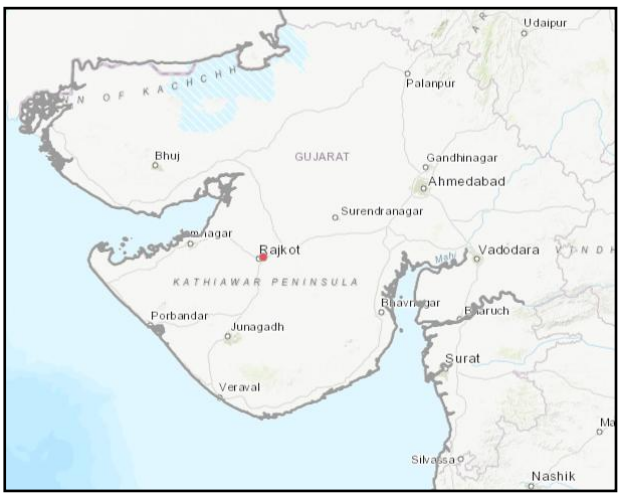


Figure 73: Distribution of *Parahyparrhenia bellariensis*

AOO = 4 km²

No. of locations: 01

AOO density: 0

Habitat: Occurs on mild slopes, under protection

The species is of **doubtful occurrence** in Gujarat. It is endemic to Andhra Pradesh and Karnataka, and not reported from adjoining states. It was reported before three decades Thakrar in his PhD thesis of Rajkot in Saurashtra without mentioning any precise locality, since then it has not been collected by any other expert. Presently, it is considered as **Data Deficient**, but intensive explorations need to be carried out.

---

**Spodiopogon rhizophorus** (Steud.) Pilg. [= *Andropogon rhizophorus* Steud.]

Local names: *Poladi, Thararo, Bhimradu*

Habit: Herb

Fl. – Fr.: September – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

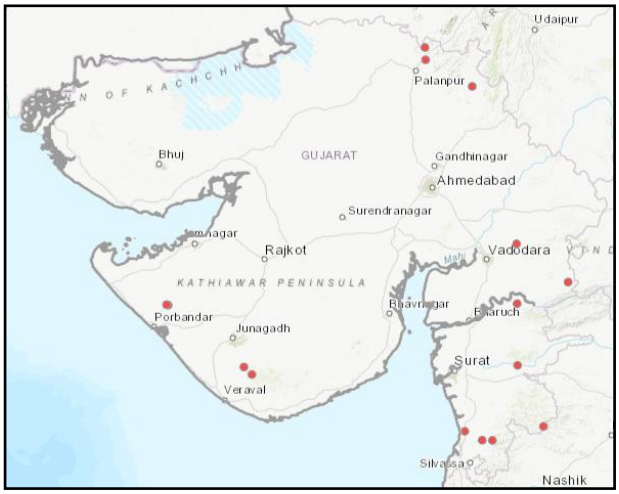


Figure 74: Distribution of *Spodiopogon rhizophorus*

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Saurashtra (Patel, 1965)

Banaskantha Dist.: Jessore, Balaram-Ambaji (Meena, 2012)

Chhota udepur Dist.: Kavant (Thaker, 1974)

Dang Dist. (Desai, 2012; Tadvi, 2013): Galkund (Yadav, 1979)

Devbhumi dwarka Dist.: Abhpara, Venu (Nagar, 2005)

Junagadh Dist.: Junvaniya, Sasan (Bole and Pathak, 1988)

Narmada Dist.: Rajpipla (Shah, 1967)

Pachmahal Dist.: Pavagadh (Chavan and Mehta, 1958b), Oza (1961) noted it in large patches, under the shade of trees, at higher parts of the hill

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972)

Tapi Dist. (Desai, 2012)

Valsad Dist. (Desai, 2012): Reddy (1987) observed it as occasional in forest undergrowth and along riverbeds at Sidhumbar and Tutarkhed, while Rao (2012) noticed it in stony ground in forest at Tiskari.

Habitat: Shady hill slopes

Specimen examined: *Oza* 550, *Arm* 214, 222, *RJD* 177 (BARO), *ASR* 2127, 3217 (SPU)

EOO = 112,551.7 km$^2$

AOO = 60 km$^2$

No. of locations: 14

AOO density: 0.07

Due to its wide range of occurrence it is assessed to be **Least Concern** species.

---

**Trilobachne cookei** (Stapf) Schenck ex Henrard [= *Polytoca cookei* Stapf]

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Saurashtra (Patel, 1965)

Dang Dist. (Tadvi, 2013): Bhenskatri (Desai, 2012)

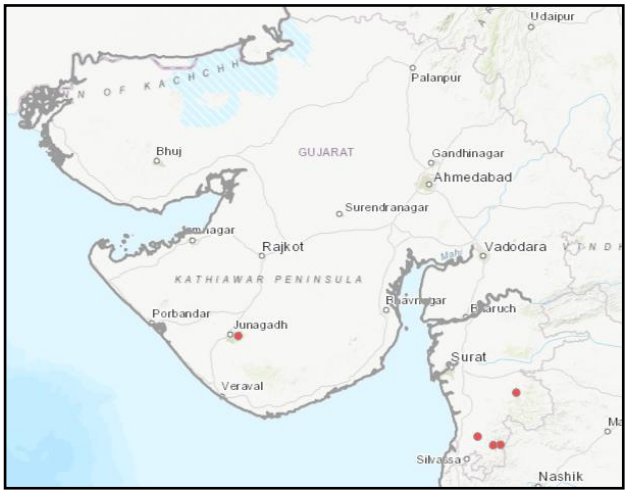


Figure 75: Distribution of *Trilobachne cookei*

Junagadh Dist.: E. Blatter recorded from the foot of Girnar, Junagadh (Bole and Pathak, 1988)

Valsad Dist.: Reddy (1987) observed it to be common in the forest undergrowth at Kapurnya, Moti Korval and Tamachhadi, whereas Rao (2012) noticed it to be rare at Tiskari

Habitat: Moist shady forest, Hill slopes

Specimen examined: *ASR* 2382, 3865 (SPU), *RJD* 856 (BARO)

EOO = 10,234.2 km$^2$

AOO = 20 km$^2$

No. of locations: 05

AOO density: 0

*Trilobachne cookei* is evaluated to be **Vulnerable** based on the criterion**B1ab(i,iii,iv)**.

---

**Triplopogon ramosissimus** (Hack.) Bor [= *Ischaemum ramosissimum* Hack.]

Habit: Herb

Fl. – Fr.: October

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dang Dist. (Desai, 2012; Tadvi, 2013)

Tapi Dist.: Tapti riverbank (Patel, 1965)

Valsad Dist.: Reddy (1987) observed it to be common in forest undergrowth at Khoba and Tamachhadi, and Rao (2012) noted it on rocky soils at Kaprada.

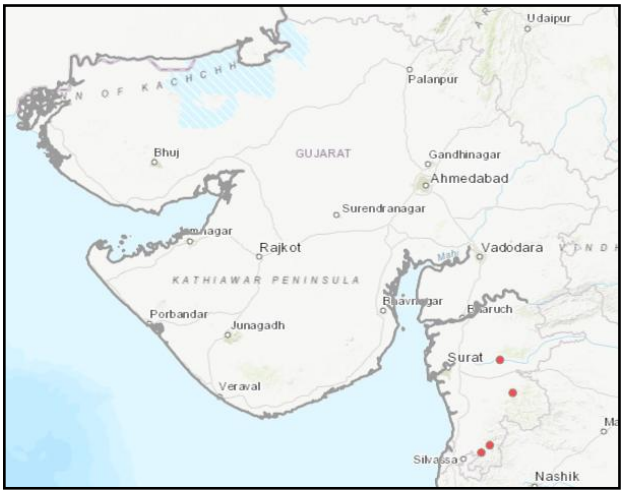


Figure 76: Distribution of *Triplopogon ramosissimus*

EOO = 1,113.2 km$^2$

AOO = 20 km$^2$

No. of locations: 05

AOO density: 0

Habitat: Rocky riverbeds, hill slopes

Specimen examined: *RJD* 472 (BARO)

As the plant is restricted in distribution it is assessed to be **Endangered B1ab(i,iii,iv)**.

---

**Tripogon jacquemontii** Stapf

Habit: Herb

Fl. – Fr.: August – September

DSTR: Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

South Gujarat (Patel, 1965)

Ahmedabad Dist.

Banaskantha Dist.: Amirgarh hills (Meena, 2012)

Chhota udepur Dist.: Kavant (Thaker, 1974)

Dang Dist. (Desai, 2012)

Gandhinagar Dist.: Kalol (Meena, 2014a)

Jamnagar Dist.: Bole and Pathak (1988) recorded from Jamvali, it was found in heavily-grazed grassland

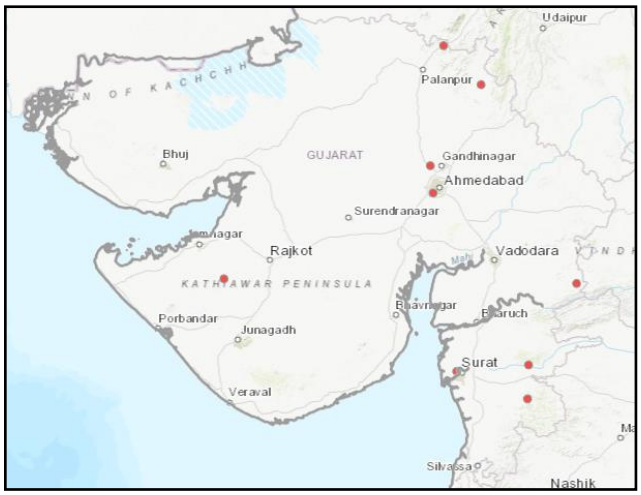

Figure 77: Distribution of *Tripogon jacquemontii*

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972)

Surat Dist. (Desai, 2012)

Tapi Dist. (Desai, 2012)

Habitat: Gravelly habitat, rocky soils, also found on trees in moist forest areas

Specimen examined: *RJD* 789 (BARO)

EOO = 76,431 km$^2$

AOO = 36 km$^2$

No. of locations: 09

AOO density: 0

based on the above calculated range of occurrence and occupany, *Tripogon jacquemontii* is assessed to be **Vulnerable B2ab(iii,iv)**.

---

**Tripogon lisboae** Stapf

Habit: Herb

Fl. – Fr.: July – October

DSTR: Rajasthan, Maharashtra, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Chhota udepur Dist.: Thaker (1974) observed in muddy soils along river banks at Kavant

Dang Dist.

Narmada Dist.: Kevadiya

Habitat: Rocky soils

Specimen examined: *DNT* 1046 (BARO)

EOO = 2186 km²

AOO = 12 km²

No. of locations: 03

AOO density: 0

It is reported from central and southern Gujarat only, hence it is kept under the **EndangeredB1ab(iii,iv)+2ab(iii,iv)**.

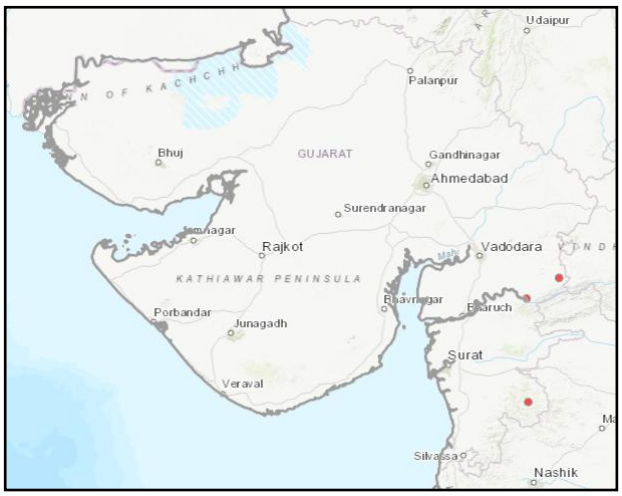

Figure 78: Distribution of *Tripogon lisboae*

### 4.2.2.8 Zingiberaceae Martinov

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 48 | 900 |
| India | 22 | 190 |
| Gujarat | 4 | 11 |
| Indian endemics | 18 | 86 |
| Indian endemics found in Gujarat | 2 | 4 |

**Curcuma decipiens** Dalzell

Habit: Herb

Fl. – Fr.: June – December

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Banaskantha Dist.: Hathidhara forest (Meena, 2012)

Narmada Dist.: Fulsar, Sagai

Valsad Dist.: Kaprada

Specimen examined: *KRN* 245 (BARO)

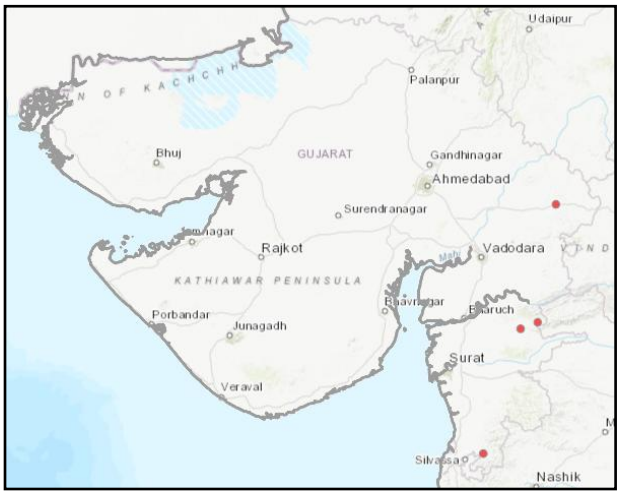

Figure 79: Distribution of *Curcuma decipiens*

Figure 80: *Curcuma decipiens*

Habitat: Forest undergrowth, Hill slopes

EOO = 2536 km$^2$

AOO = 16 km$^2$

No. of locations: 04

AOO density: 0

The species was reported as a new record for Gujarat before six years from northern Gujarat, while in the present investigation, it was found to be locally abundant in southern Gujarat. Still extensive studies are required to know its population size and threats faced by the species. Owing to its restricted range of occurrence it is put in the **Endangered** category under the criterion **B1ab(i,iii,iv,v)**.

---

**Curcuma inodora** Blatt. [= *Curcuma purpurea* Blatt.]

Local names: *Kapuria*

Habit: Herb

Fl. – Fr.: August – September

DSTR: Andhra Pradesh, Maharashtra, Karnataka (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Banaskantha Dist.: Khaiwad, Danta (Meena, 2012)

Chhota udepur Dist.: Ambadungar, Kadipani, Mithibor (Desai, 2002), Kavant (Thaker, 1974)

Dahod Dist.: Bedi (1968) found it to be fairly common in the hilly forest regions, especially at higher altitudes; often noted under the shade of the trees, sub-gregarious in habit. Bedi observed the plants in open places on Ratanmahal plateau, and Devgadh Baria.

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noticed it to be **common**, scattered or in loose patches, in the undergrowth of the forests at Ahwa, Malegaon and Subir.

Gir somnath Dist. (Santapau and Raizada, 1954; Sisodia, 2007)

Junagadh Dist.: Sapnes, Sasan (Menon, 1979), Girnar, Junvaniya (Bole and Pathak, 1988)

Mehsana Dist. (Shah and Yogi, 1974)

Narmada Dist.: Pradeepkumar (1993) observed it to be **common** in the forest undergrowth at Mathavali, Sagai and Shisha

Panchmahal Dist.: Pathak and Oza (1959) and Oza (1961) noted it to be **abundant**, near Machi

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972)

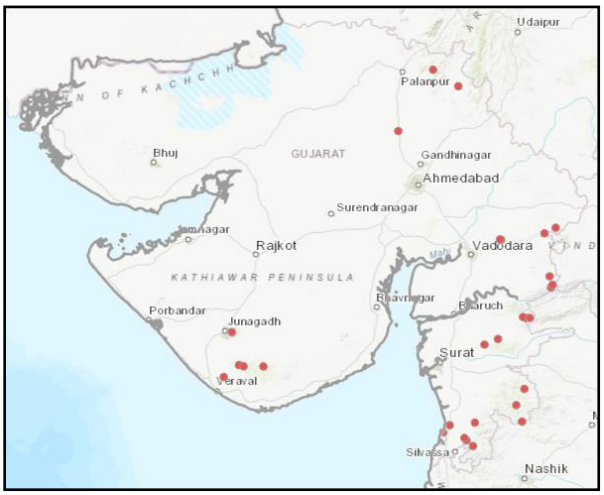

Figure 81: Distribution of *Curcuma inodora*

Surat Dist.: Umarpada (Yadav, 1979)

Valsad Dist. (Inamdar and Patel, 1971; Patel, 1971): Amba Talat, Moolgam (Reddy, 1987), Kaprada (Rao, 2012), Nana Pondha (Vora, 1980), Chival, Parnera, Udwada (More, 1972)

Habitat: Forest undergrowth

Specimen examined: *Oza* 900, 901, 953, *Bedi* 24, 251, 2970, *Gpk* 208, 1772 (BARO), *BS* 1142, 1203, 1521 (SPU)

EOO = 97,932.5 km$^2$

AOO = 116.0 km$^2$

No. of locations: 26

AOO density: 0.1

*Curcuma inodora* is one amongst other plants to come up with the onset of monsoon and thrives till the end of the season. The plant is attractive when in full bloom, and owing to its wide range of distribution it is assessed as **Least Concern**.

---

**Curcuma pseudomontana** J. Graham

Habit: Herb

Fl. – Fr.: July – October

DSTR: Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dahod Dist.

Narmada Dist.

Panchmahal Dist.: Machi (Chavan and Oza, 1960), Oza (1961) observed it to be fairly common and very abundant

EOO = 3521.5 km$^2$

AOO = 12.0 km$^2$

No. of locations: 03

AOO density: 0

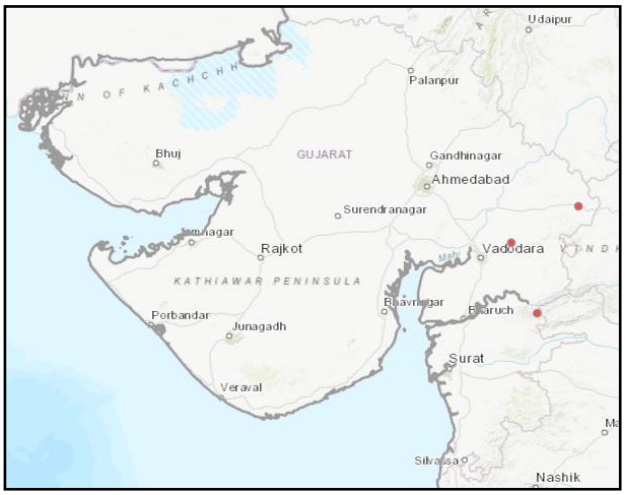


Figure 82: Distribution of *Curcuma pseudomontana*

Specimen examined: *Oza* 39, 899, 986 (BARO)

This is a relatively uncommon species of *Curcuma,* as compared to the previous two. It is mostly concerted in central Gujarat, and due to its restricted distribution, it is categorized **Endangered B1ab(iii,v).**

---

**Zingiber nimmonii** (J. Graham) Dalzell [= *Alpinia nimmonii* J. Graham; *Zingiber cernuum* Dalzell]

Local name: *Jungli aadu*

Habit: Herb

Fl. – Fr.: January – February

DSTR: Maharashtra, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Dang Dist. (Tadvi, 2013): Suryanarayana (1968) observed several fruits of this plant seen just above the surface of the ground in the undergrowth of dense forests at Mahal but aerial portions dried up (18th February, 1968).

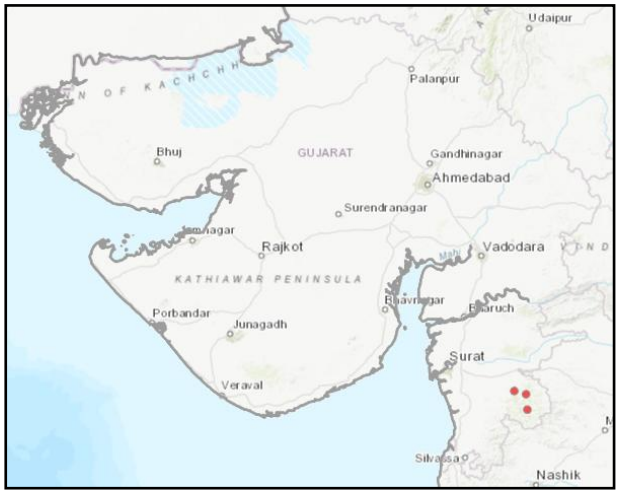


Figure 83: Distribution of *Zingiber nimmonii*

Habitat: Dense forest undergrowth

Specimen examined: *BS* 3004 (SPU)

EOO = 112.8 km$^2$

AOO = 12.0 km$^2$

No. of locations: 03

AOO density: 0

The species is endemic to the Western Ghats and in Gujarat it is restricted only to the Dangs district. Based upon its extent of occurrence and number of locations it is evaluated to be **Endangered B2ab(ii,iii,iv).**

### 4.2.2.9 Ranunculaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 58 | 1900 |
| India | 28 | 193 |
| Gujarat | 3 | 5 |
| Indian endemics | 9 | 30 |
| Indian endemics found in Gujarat | 1 | 2 |

**Clematis hedysarifolia** DC.

Local name: *Maruvel*

Habit: Climber

Fl. – Fr.: October – December

DSTR: Maharashtra, Goa, Karnataka, Kerala (Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) reported it as a frequent climber on small trees/large shrubs in open forests of Saputara and Subir. In absence of support, it is trailing. Later it was noted at Shamgahan (Patel, 2013), Ahwa (*MCJ157*, Joshi 1978), Borkhal, Sunda (Yadav, 1979), Malegaon, Sagbara (Gopal, 1983)

Narmada Dist.: Sagbara

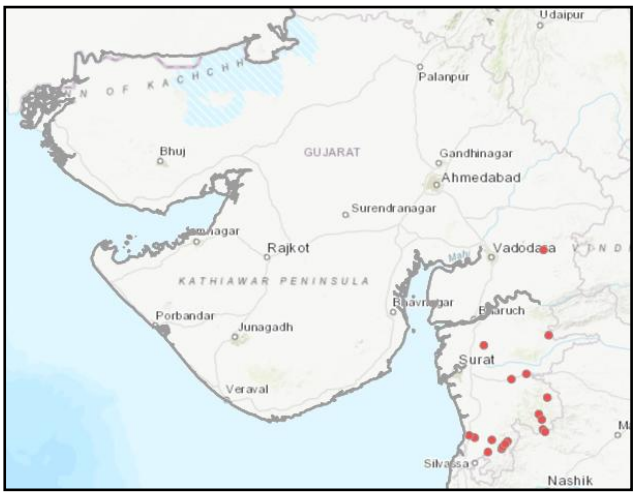


Figure 84: Distribution of *Clematis hedysarifolia*

Panchmahal Dist.: Vajpur (Patel, 2013)

Tapi Dist.: Songadh, Vyara

Valsad Dist.: Pangarbari, Pindval, Vagval, Tamachhadi (Reddy, 1987; Patel, 2013), Penda (Yadav, 1979), Varoli (Rao, 2012), Jogvel, Malanpada, Nana Pondha, Vahial (Vora, 1980), Rabada, Parnera (More, 1972)

Habitat: Climbing on small trees

Specimen examined: *MCJ* 157, *BS* 2069, 2386, 1900, *ASR* 2341, 2788, 2849, 3194, *YSS* 276 (SPU)

EOO = 12,222.4 km$^2$

AOO = 72.0 km$^2$

No. of locations: 16

AOO density: 0.12

As the number of locations is more than 10, it is classified to be **Near Threatened**.

---

**Clematis heynei** M.A. Rau [= *Clematis triloba* B. Heyne ex Roth]

Habit: Climber

Fl. – Fr.: October – March

DSTR: Madhya Pradesh, Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist.: Saputara (Patel, 2013)

Narmada Dist.

Navsari Dist.: Unai

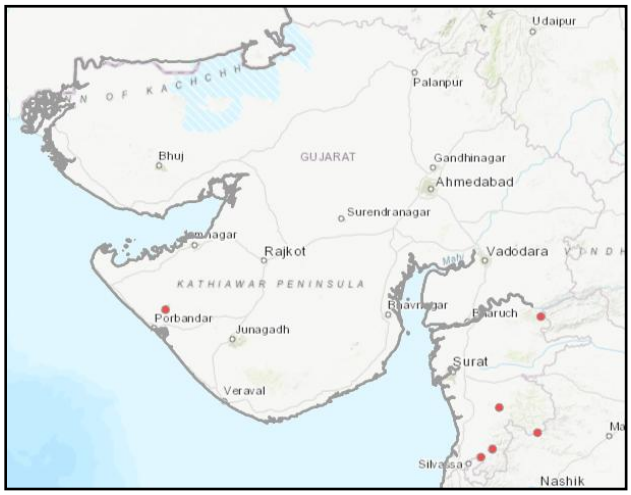


Figure 85: Distribution of *Clematis heynei*

Porbandar Dist.: Barda (Thakar, 1910)

Valsad Dist.: Patel (2013) has reported it on the authority of Reddy (1987), to be rare on low forest trees, and Rao (2012) also noticed it to be rare at Varoli Talat

Habitat: Growing on trees with short height in forests.

Specimen examined: *SLP* 705, *ASR* 2389 (SPU)

EOO = 37,366 km$^2$

AOO = 28.0 km$^2$

No. of locations: 06

AOO density: 0.14

This species is relatively less common than the previous *Clematis* species, but due to its distribution range in Saurashtra it is considered **Vulnerable B2ab(iii,iv)**.

### 4.2.2.10 Begoniaceae C. Agardh

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 5 | 920 |
| India | 1 | 55 |
| Gujarat | 1 | 2 |
| Indian endemics | 1 | 19 |
| Indian endemics found in Gujarat | 1 | 1 |

**Begonia crenata** Dryand.

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015)

DSTR Gujarat:

Central Gujarat (Shah, 1978)

Bhavnagar Dist.: Oza (1991) reported it from Bhavnagar without precise locality, but provided a brief description.

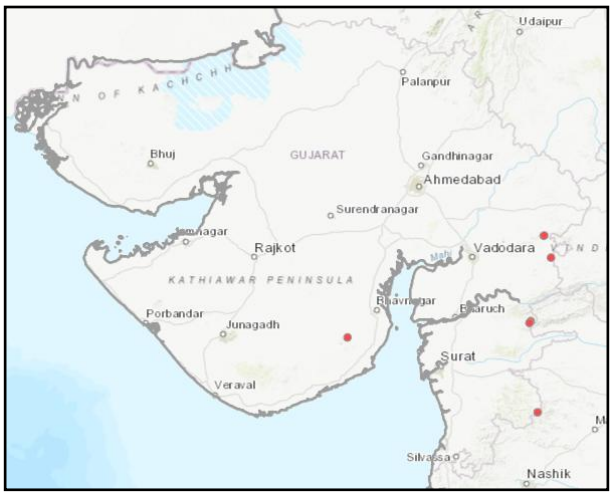


Figure 86: Distribution of *Begonia crenata*

Chhota udepur Dist.: Karetala (1973) had reported *B. crenata* for the first time from Gujarat with brief description. It was noticed from Mogra and Marchipani by Desai (2002), with following description "10-15 cm tall herb with slender glabrous stem".

Dang Dist.: It was also reported from southern Gujarat by Tadvi (2013), but without any precise locality or details.

Narmada Dist.: Pradeepkumar (1993) collected it from Ninai waterfalls, with brief description and a photograph.

Specimen examined: *Mo* 1734 (SPU), *Gpk.* 1545, 1546 (BARO)

EOO = 22,726 km$^2$

AOO = 28 km$^2$

No. of locations: 05

AOO density: 0.28

During present work, we made intensive field studies to confirm its presence and we came across a new record of *Begonia* for Gujarat state: *Begonia picta* Smith that is widely distributed in other states and adjoining countries too. Still the occurrence of *B. crenata* remains to be doubtful and thus kept under the **Data Deficient** category**.**

### 4.2.2.11 Cucurbitaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 134 | 965 |
| India | 31 | 94 |
| Gujarat | 17 | 39 |
| Indian endemics | 11 | 20 |
| Indian endemics found in Gujarat | 2 | 2 |

**Corallocarpus conocarpus** (Dalzell and A.Gibson) Hook.f. [=*Aechmandra conocarpa* Dalzell and A.Gibson]

Habit: Climber

Fl. – Fr.: June – August

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: This species is listed by Cooke from Gujarat on the authority of Dalzell and Gibson citing localities Malpore and Gundar; rare (Shah, 1978).

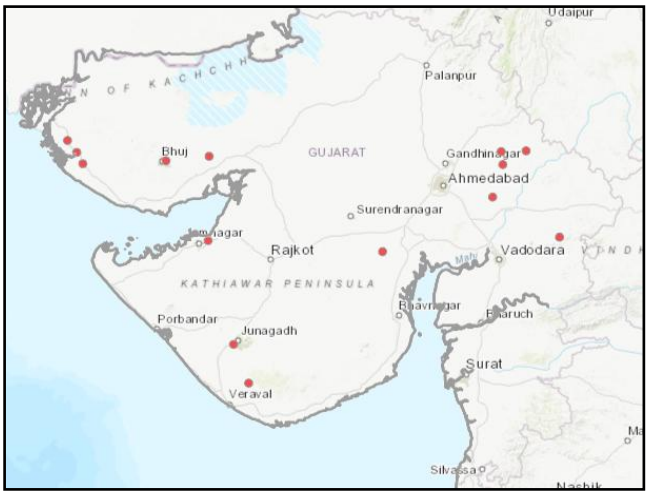


Figure 87: Distribution of *Corallocarpus conocarpus*

Ahmedabad Dist.: Dhandhuka (Patel *et al.*, 2014)

Arvalli Dist.: Dhansura (Patel, 2013)

Bharuch Dist.: Malpore (Patel, 2013)

Gir somnath Dist. (Sisodia, 2007)

Jamnagar Dist.

Junagadh Dist.

Kachchh Dist. (Patel *et al.*, 2011): Sural Bhit, Bhuj, Wadsar, Tregdi (Joshi *et al.*, 2013), bustard sanctuary (Mandvi-Naliya), Chamra, Bhujpar, Kharai-Vayor

Kheda Dist.: Muvada, Ladvel (Patel, 2013)

Figure 88: *Corallocarpus conocarpus*(Credit: P.N. Joshi)

Sabarkantha Dist.: Netrawali (Parmar, 2012), Bayad, Merhan (Patel, 2013)

Habitat: Agricultural hedges, Dry sandy soils

Specimen examined: *SLP* 89 (SPU), *KRN* 95 (BARO)

EOO = 81,633.7 km$^2$

AOO = 56 km$^2$

No. of locations: 14

AOO density: 0

This climber is endemic to the Western Ghats only, however it is not reported from southern Gujarat which is a part of Sahyadri ranges. Though as per the criteria it is assessed **Least Concern**, it was noticed uncommon in the present field studies.

---

**Solena amplexicaulis** (Lam.) Gandhi [= *Bryonia amplexicaulis* Lam.]

Habit: Climber

Fl. – Fr.: July – October

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Chhota udepur Dist.

Dang Dist. (Tadvi, 2013): Shamgahan (Patel, 2013)

Narmada Dist.: Dediapada (Patel, 2013), Mathavali, Ninaighat, Patvali (Pradeepkumar, 1993)

Panchmahal Dist.: Pavagadh (Oza, 1961)

Tapi Dist.: Vyara

Valsad Dist.: Dharampur, Pariya-Pardi, Navtad (Patel, 2013), Kaprada (Rao, 2012)

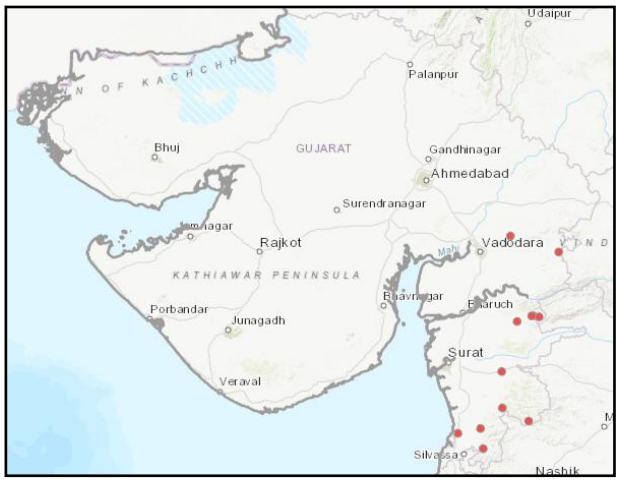


Figure 89: Distribution of *Solena amplexicaulis*

Habitat: Hilly tracts, Forest margins, Riverine fringes

Specimen examined: *SLP* 581 (SPU), KRN 194 (BARO)

EOO = 14,658.4 km$^2$

AOO = 48 km$^2$

No. of locations: 11

AOO density: 0.08

This climber is endemic to the Western Ghats and also shows occurrence in southern Gujarat with somewhat extended distribution till central Gujarat, but is kept under the **Near Threatened** category as the number of locations is more than 10.

### 4.2.2.12 Fabaceae Lindl.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 800 | 19000 |
| India | 198 | 1248 |
| Gujarat | 98 | 365 |
| Indian endemics | 59 | 274 |
| Indian endemics found in Gujarat | 19 | 31 |

**Alysicarpus hamosus** Edgew. [= *Alysicarpus procumbens* (Roxb.) Schindl.; *Hedysarum procumbens* Roxb.]

Habit: Herb

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Anand Dist.: Khambhat (Bhagwanani, 1980)

Banaskantha Dist.: Koteshwar (Meena, 2012)

Bharuch Dist.: Gumandev

Bhavnagar Dist.: Palitana (Menon, 1979; Meena, 2014b)

Chhota udepur Dist.: Kavant (Thaker, 1974)

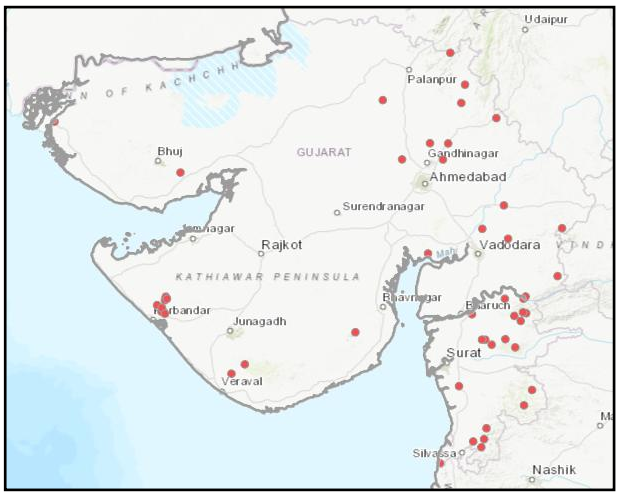

Figure 90: Distribution of *Alysicarpus hamosus*

Dahod Dist.: Bedi (1968) noted it to be fairly **common** everywhere, more frequent in open grassy places at Ratanmahal, also collected from Devgadh baria

Dang Dist. (Tadvi, 2013): Ahwa, Subir (Suryanarayana, 1968)

Devbhumi dwarka Dist.: Abhapar, Kileshwar, Ghumli, (Nagar, 2005)

Gandhinagar Dist.: Halisa (Meena, 2014a), Mansa

Gir somnath Dist. (Santapau and Raizada, 1954; Sisodia, 2007)

Junagadh Dist.: Sasan (Menon, 1979), Kansianes

Kachchh Dist.: Meva Rakhal (Bhatt, 1993), Guhar (Pandey *et al.*, 2009), Ningal

Mehsana Dist.: Kadi

Narmada Dist.: Fulsar, Gichad, Namgir, Zadoli (Pradeepkumar, 1993), Gora, Gumandev, Kevadiya, Rajpipla (Patel, 1971)

Navsari Dist.

Panchmahal Dist.: Pavagadh (Oza, 1961), Tuwa (Deshpande, 1968)

Patan Dist.

Porbandar Dist.: Godhana, Satvirda, Adityana, Ranavav (Nagar, 2005)

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971), Samalaji, Bamaraji (Parmar, 2012), Idar, Prantij

Surat Dist. (Joshi, 1980): Pataldevi, Umarpada, Vankal (Yadav, 1979)

Tapi Dist.

Vadodara Dist. (Sabnis, 1967): Savli (Padate, 1973)

Valsad Dist.: Dhamni (Yadav, 1979), Reddy (1987) observed it to be common in small patches among open grasses and cultivated fields at Avdha and Tutarkhed, and Bhagwanani (1980) noticed it at Umbergaon; Rao (2012) collected it from Kaprada; Vora (1980) noted it at Nana Pondha

Habitat: Common among grasses in cultivated fields, wastelands and along roadside

Specimen examined: *Bedi* 3152, 3270, 3451, *KRN* 88 (BARO), *ASR* 3234, 2139, 1516, *Ahwa* 423 (SPU)

EOO = 172,244.69 km$^2$

AOO = 192 km$^2$

No. of locations: 46

AOO density: 0.04

The plant is commonly occurring among grasses in cultivated fields, wastelands and along roadside throughout Gujarat in all five agroclimatic zones. It is **Least Concern** as it is widely distributed throughout the state.

---

**Alysicarpus pubescens** J.S.Law

Local name: *Samervo*

Habit: Herb

Fl. – Fr.: September – December

DSTR: Bihar, Madhya Pradesh, Maharashtra, Karnataka, West Bengal (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

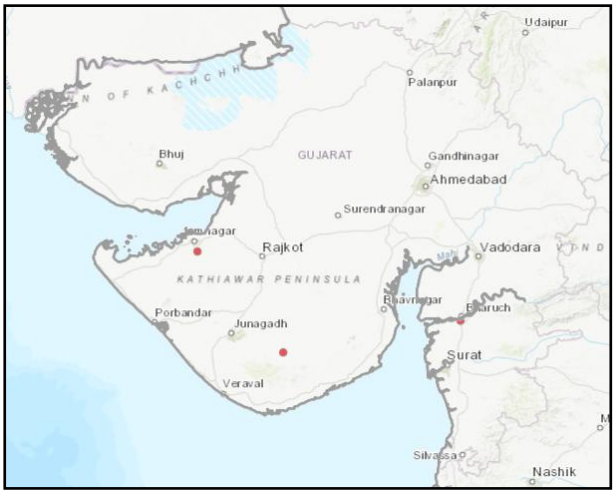


Figure 91: Distribution of *Alysicarpus pubescens*

Amreli Dist.: Gopal (1983) collected it from Dhari and stated its ethnobotanical uses.

Bharuch Dist.: Cooke (1901-1908) mentioned in the Flora of Bombay presidency without mentioning any precise locality

Jamnagar Dist.: Ranjit Sagar (Santapau, 1962)

Specimen examined: *GVG* 158 (SPU)

EOO = 13,460.56 km$^2$

AOO = 12 km$^2$

No. of locations: 03

AOO density: 0

The plant is reported from northern and central India alongwith the Western Ghats. **Vulnerable B1ab(i,ii,iv).**

---

**Bauhinia foveolata** Dalzell [= *Piliostigma foveolatum* (Dalzell) Thoth.]

Local name: *Moti chamuli, Bhoot chamul*

Habit: Tree

Fl. – Fr.: October – March

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Dang Dist. (Shah, 1978; Tadvi, 2013): Ahwa (Yadav, 1979), Suryanarayana (1968) observed it to be occasional at Malegaon, Pipaldahad and Saputara, while in the present studies it was noticed at Bardipada, Gadad and Morzira

Narmada Dist. (Sharma, 2010)

Navsari Dist.: Mankunia, Raybor

Surat Dist.: Divtan

Tapi Dist.: Hindla

Valsad Dist.: Fatepur, Ulaspedhi (Reddy, 1987), Mandva (Rao, 2012), Moti Korval (Rao, 2002), Kaprada, Nana Pondha (Vora, 1980), Chavshala

Habitat: Hill peaks

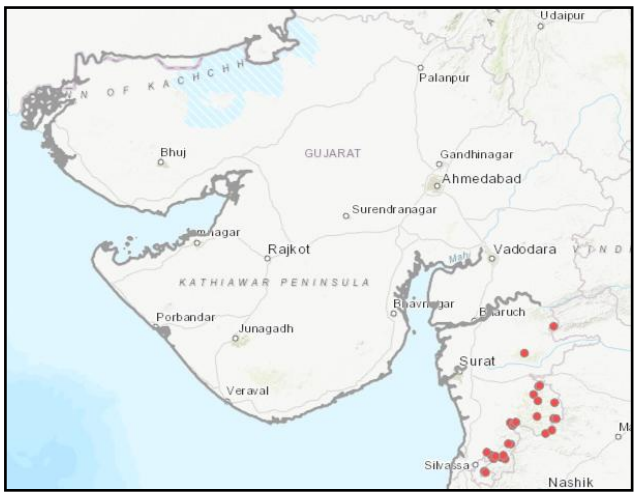


Figure 92: Distribution of *Bauhinia foveolata*

Specimen examined: *KRN* 33504 (BSJO), *BS* 552, 1106, 2445, 2243, 1010, *VRR* 2295 (SPU)

EOO = 6300.45 km²

AOO = 108 km²

No. of locations: 14

AOO density: 0.48

The specific name *foveolata* probably refers to shining reddish-yellow pits on the undersurface of the leaves. The tree is endemic to only two states of the Sahyadri

ranges and shows its extended distribution on hilly slopes in all districts of southern Gujarat. **Near Threatened** because of its number of locations.


Figure 93: *Bauhinia foveolata*

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**Cajanus sericeus** (Baker) Maesen [= *Atylosia sericea* Baker]

Habit: Shrub

Fl. – Fr.: August – December

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Chhota udepur Dist.: Ambadungar (Thaker, 1974)

Dang Dist. (Chavan and Oza, 1966)

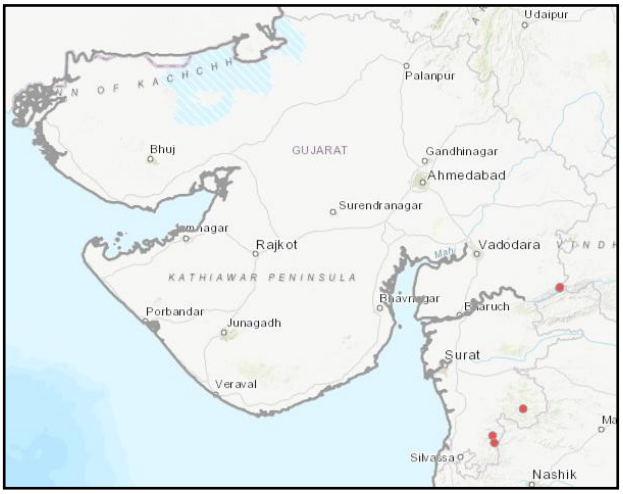


Figure 94: Distribution of *Cajanus sericeus*

Valsad Dist.: Reddy (1987) stated it to be rare to frequent in the forest undergrowths at Moti Korval and Pangarbari

Specimen examined: *ASR* 3634, 3895 (SPU), *KRN* 143 (BARO)

EOO = 1904.34 km$^2$

AOO = 20 km$^2$

No. of locations: 04

AOO density: 0.2

Besides the Western Ghats, this shrub is also reported from Andhra Pradesh. It shows very rare occurrence in Gujarat. First time it was reported from the Dangs without specific location, later it was reported from central region, then after a decade it was again reported from southern zone. After which it has still not been documented by any worker, thus extensive field studies are required to relocate this shrub. **Endangered B1ab(iii)**

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**Clitoria annua** J.Graham [=*Clitoria biflora* Dalzell]

Local name: *Ubhi Garani*

Habit: Herb

Fl. – Fr.: July – October

DSTR: Rajasthan, Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

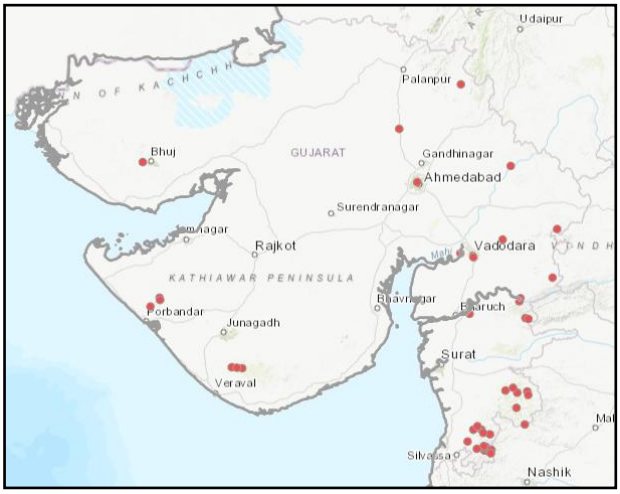


Figure 95: Distribution of *Clitoria annua*

Ahmedabad Dist. (Meena, 2014a)

Anand Dist.: Umeta

Banaskantha Dist.: Rinchhidiya (Meena, 2012)

Chhota udepur Dist.: Dolariya (Desai, 2002), Kavant (Thaker, 1974; Desai, 2002)

Dahod Dist.: Bedi (1968) noticed it to be fairly common as an undergrowth of forest of Ratanmahal, and during present investigation it was observed to be near Kanjeta, Bendol and Panam.

Dang Dist. (Tadvi, 2013): Ahwa, Malegaon, Subir (Suryanarayana, 1968)

Devbhumi dwarka Dist.: Abhapar, Ghumli (Nagar, 2005)

Gir somnath Dist. (Sisodia, 2007)

Junagadh Dist.: Sasan (Menon, 1979), Junvaniya (Santapau, 1962)

Kachchh Dist. (Patel *et al.*, 2011)

Mehsana Dist. (Shah and Yogi, 1974)

Narmada Dist.: Gumina, Mathavali, Sagai (Pradeepkumar, 1993), Kevadia, Gora, Jhagadiya (Patel, 1971)

Panchmahal Dist.: Pavagadh (Oza, 1961)

Porbandar Dist.: Godhana (Thakar, 1910)

Sabarkantha Dist. (Parmar, 2012): Khedbrahma (Bhatt, 1971)

Vadodara Dist.: Laxmi Vilas palace compound

Valsad Dist. (Patel RM, 1971): Ghotan (Rao, 2012), Kaprada, Nana Pondha (Vora, 1980), Hedri

Habitat: Shady places, edges of cultivated fields

Specimen examined: *Bedi* 515, 1464, 3280, 3449, *KRN* 123 (BARO), *BS* 1918 (SPU)

EOO = 135,781.05 km$^2$

AOO = 172 km$^2$

No. of locations: 36

AOO density: 0.16

This beautiful herb is reported from our adjoining states Rajasthan and Maharashtra, it is frequently found in agricultural hedges in southern Gujarat, while it is found at high altitude in Saurashtra and Kachchh. It becomes **Least Concern** due to wide range of occurrence.

Figure 96: *Clitoria annua* in flowering

**Crotalaria filipes** Benth. [= *Crotalaria filipes* var. *filipes*]

Local names: *Makhmali-adadiyo, Ghatio, Jhunjhuno*

Habit: Herb

Fl. – Fr.: October – February

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it occasionally growing among short grasses at Ahwa, and Gopal (1983) observed it from Waghai

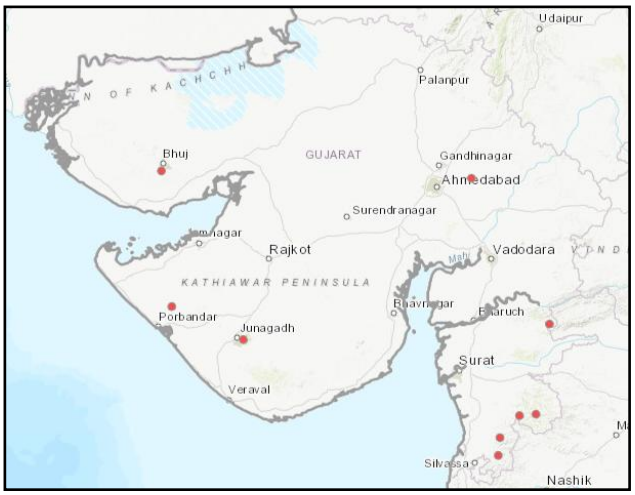

Figure 97: Distribution of *Crotalaria filipes*

Junagadh Dist.: Girnar (Santapau, 1962)

Kachchh Dist. (Patel *et al.*, 2011)

Kheda Dist.: Utkantheshwar (Gopal, 1983)

Narmada Dist.

Porbandar Dist. (Thakar, 1910)

Valsad Dist. (Patel RM, 1971; Vora, 1980): Avdha, Kaprada (Rao, 2012)

Habitat: Growing among short grasses

Specimen examined: *BS* 401 (SPU), *KRN* 125 (BARO)

EOO = 91,322.59 km$^2$

AOO = 36 km$^2$

No. of locations: 09

AOO density: 0

This is the smallest species of the genus in the study area. It was observed in open rocky areas, edges of grassland, roadsides, etc. It is endemic to the Western Ghats and regionally assessed as **Vulnerable B2ab(iii,iv)**.

Figure 98: *Crotalaria filipes* var. *filipes* in flowering and fruiting

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**Crotalaria filipes** var. **trichophora** (Baker) T.Cooke [= *Crotalaria trichophora* Benth. ex Baker f.]

Habit: Herb

Fl. – Fr.: September – October

DSTR: Bihar, Maharashtra, Karnataka, West Bengal (Nayar *et al.* 2014; Singh *et al.* 2015)

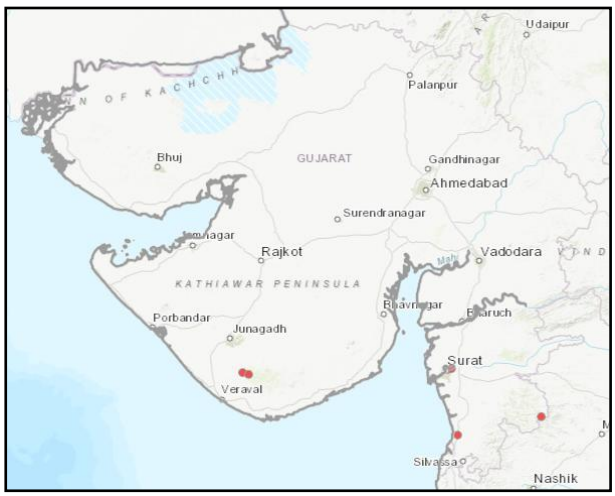


Figure 99: Distribution of *Crotalaria filipes* var. *trichophora*

DSTR Gujarat:

Dang Dist. (Tadvi, 2013): Don

Gir somnath Dist. (Santapau and Raizada, 1954)

Junagadh Dist.: Junvaniya (Santapau, 1962)

Surat Dist.: Nana Varachha (Joshi, 1980)

Valsad Dist. (Patel RM, 1971)

Habitat: Riverbanks, Hill peaks

Specimen examined: *JVJ* 409 (BARO), *KRN* 126 (BARO)

EOO = 12,581.18 km$^2$

AOO = 20 km²

No. of locations: 05

AOO density: 0

This variety of the previously discussed species shows its record of occurrence from northern-western India along with the Western Ghats. In Gujarat, it shows occurrence in Saurashtra and southern portion, and is vulnerable because of its extent. Yet it is **Vulnerable B1ab(iii,iv)+2ab(iii,iv)** due to less EOO, AOO, number of locations.

Figure 100: *Crotalaria filipes* var. *trichophora*

**Crotalaria leptostachya** Benth.

Local name: *Janglisan*

Habit: Shrub

Fl. – Fr.: October – November

DSTR: Maharashtra, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

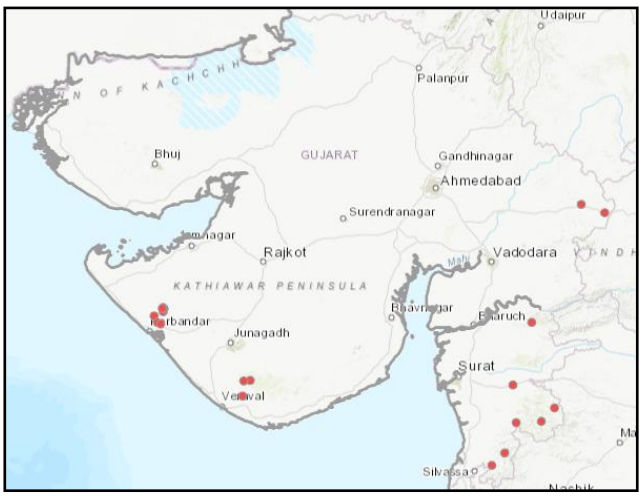


Figure 101: Distribution of *Crotalaria leptostachya*

Dahod Dist.: Bedi (1968) stated it to be rare, noted only few plants at the foot of Kanvara dungar and Padaliya

Dang Dist. (Tadvi, 2013): Ahwa, Pipaldahad (Suryanarayana, 1968)

Devbhumi dwarka Dist.: Abhapar, Kileshwar, Venu, Ghumli (Nagar, 2005)

Gir somnath Dist. (Sisodia, 2007)

Junagadh Dist.: Junvaniya, Sasan (Santapau, 1962)

Kheda Dist.: Shamariya

Narmada Dist.: Pradeepkumar (1993) observed it infrequently at Kalvat and Shamariya

Navsari Dist.: Bansda

Porbandar Dist.: Godhana, Satvirda, Adityana, Ranavav (Nagar, 2005)

Tapi Dist.: Vyara

Valsad Dist.: Hedri, Kaprada (Rao, 2012)

Figure 102: *Crotalaria leptostachya*

Habitat: Open grasslands

Specimen examined: *Gpk* 1725, *Bedi* 1991, *KRN* 128, *Dipa* 947, 976 (BARO), *BS* 1776 (SPU)

EOO = 78,964.78 km$^2$

AOO = 76 km$^2$

No. of locations: 14

AOO density: 0.26

This shrub is endemic to the Western Ghats, and is widely distributed in Gujarat. Based on the number of lcoations and wide extent of occurrence it is considered to be **Least Concern.**

---

**Crotalaria notonii** Wight and Arn.

Habit: Shrub

Fl. – Fr.: September – November

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Kachchh Dist. (Patel *et al.*, 2011)

Surat Dist.: Dumas (Cooke, 1901-1908)

EOO = 667.65 km²

AOO = 12 km²

No. of locations: 02

AOO density: 0.33

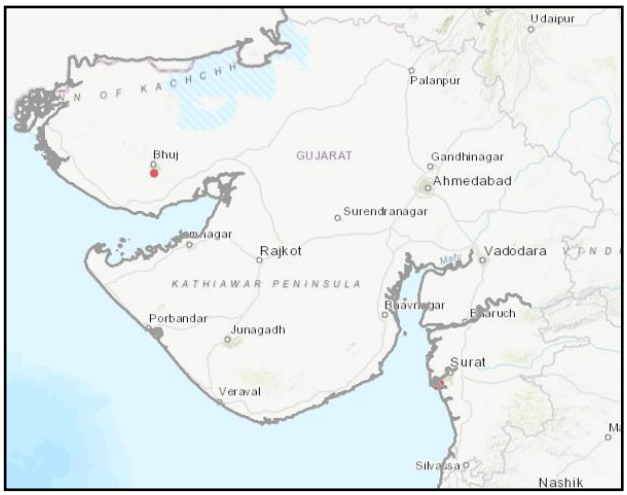


Figure 103: Distribution of *Crotalaria notonii*

Bhagwanani (1980) stated it to be rare, and failed to collect this plant from Dumas. The shrub is an endemic to the Sahyadri ranges, and shows its distribution on the coastal tract in southern Gujarat. Based on the criteria **D2** where the number of locations is less than 5 and area of occupancy is less than 20 km², it falls under the **Vulnerable** category.

---

**Crotalaria pusilla** B. Heyne ex Roth

Habit: Herb

Fl. – Fr.: September – October

DSTR: Bihar, Maharashtra, Madhya Pradesh, Goa, Karnataka, Odisha, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

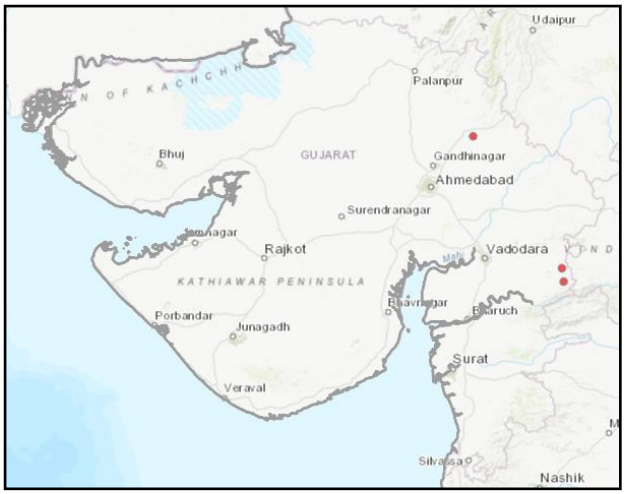


Figure 104: Distribution of *Crotalaria pusilla*

Chhota udepur Dist.: Thaker (1974) observed it to be fairly common, observed in open areas of the forest along with grasses at Kavant and Luni

Sabarkantha Dist.: Bavsar (Saxton and Sedgwick, 1918)

Specimen examined: *DNT* 381, 1183, 1222, *KRN* 145 (BARO)

EOO = 590.4 km²

AOO = 12 km²

No. of locations: 03

AOO density: 0

*Crotalaria pusilla* is documented from central and northern Gujarat and due to its restricted distribution it is categorized as **Vulnerable D2**.

---

**Crotalaria vestita** Baker

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Madhya Pradesh, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

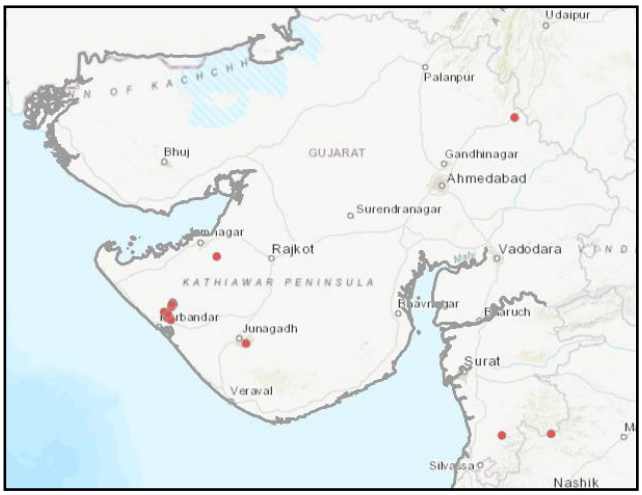


Figure 105: Distribution of *Crotalaria vestita*

Arvalli Dist.: Shamlaji

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it to be fairly common in the undergrowth on hilly slopes at Malegaon and Saputara

Devbhumi dwarka Dist.: Nagar (2005) noticed it from Abhapar, Kileshwar, Venu and Ghumli

Jamnagar Dist.: Matwa (Santapau, 1962)

Junagadh Dist.: Bordevi (Santapau, 1962)

Porbandar Dist.: Godhana, Satvirda, Adityana, Ranavav (Nagar, 2005)

Valsad Dist.

Habitat: Undergrowth on hilly slopes

Specimen examined: *BS* 808, 872, 2772 (SPU), *KRN* 146 (BARO)

EOO = 80,709.23 km$^2$

AOO = 56 km$^2$

No. of locations: 08

AOO density: 0.43

The herbaceous species is sporadically distributed throughout Gujarat, except Kachchh and thus it is **Vulnerable B2ab(iii,iv)**.

**Desmodiastrum belgaumense** (Wight) A.Pramanik and Thoth. [= *Alysicarpus belgaumensis* Wight]

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et. al.*, 2015): Panchmahal Dist.: Oza (1961) noted it among grasses at Pavagadh

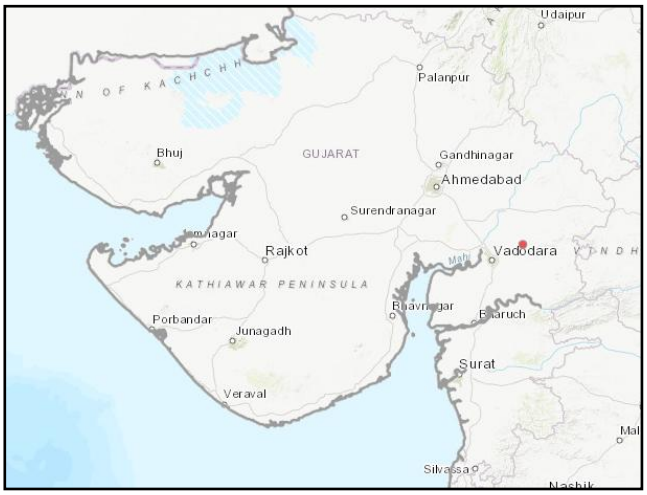


Figure 106: Distribution of *Desmodiastrum belgaumense*

EOO = NA

AOO = 4 km²

No. of locations: 1

AOO density: 0

*Desmodiastrum belgaumense* was reported only once from Pavagadh hill before a half-century, after which it could not be relocated; hence it is **Regionally Extinct** from the region.

---

**Desmodiastrum racemosum** var. **rotundifolium** (Baker) A.Pramanik and Thoth. [= *Desmodium rotundifolium* Baker; *Alysicarpus beddomei* Schindl.; *Desmodium ritchie* Sanjappa]

Habit: Herb

Fl. – Fr.: August – September

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Banaskantha Dist.: Meena (2012) recently collected it from Balaram-Ambaji wildlife sanctuary

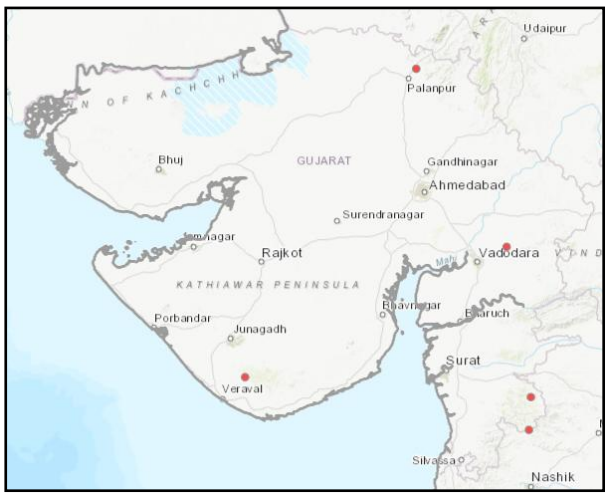


Figure 107: Distribution of *Desmodiastrum racemosum* var. *rotundifolium*

Dang Dist. (Sanjappa, 1977; Tadvi, 2013): Suryanarayana (1968) observed it to be occasional, but abundant and subgregarious at Malegaon, Saputara, Subir

Gir somnath Dist. (Santapau, 1962; Sisodia, 2007)

Panchmahal Dist.: Oza (1961) noted it to be common at the base of Pavagadh

Habitat: Growing among grasses

Specimen examined: *Oza* 61 (BARO), *BS* 1897, 2009 (SPU)

EOO = 71,468.8 km$^2$

AOO = 20 km$^2$

No. of locations: 05

AOO density: 0

The herbaceous species is distributed intermittently throughout Gujarat, except Kachchh and thus it is **Endangered B2ab(iii,iv)**.

---

**Flemingia tuberosa** Dalzell [= *Moghania tuberosa* (Dalzell) Kuntze]

Habit: Herb

Fl. – Fr.: September

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Sanjappa, 1992; Singh *et. al.*, 2015): Valsad Dist.: Arnala (Patel, 2013)

Habitat: Grassland

Specimen examined: *SLP* 730 (SPU)

EOO = NA

AOO = 4 km$^2$

No. of locations: 1

AOO density: 0

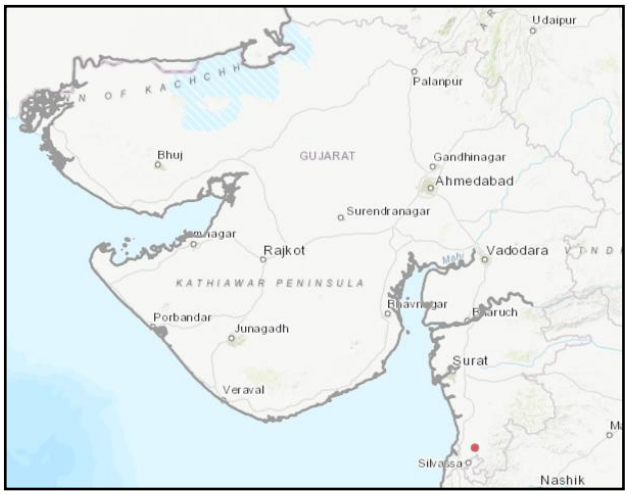


Figure 108: Distribution of *Flemingia tuberosa*

The geophyte is endemic to the Western Ghats and listed by Raghvan *et al*. (1981) without any precise locality. Later, it was collected growing in large grasslands in Valsad by Patel (2013) during his investigation on climbing plants of Gujarat. Owing to the number of individuals (criterion **D**) its regional status is **Critically Endangered**.

---

**Geissaspis tenella** Benth.

Habit: Herb

Fl. – Fr.: August – December

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al*. 2014; Singh *et al*. 2015)

DSTR Gujarat: Dang Dist. (Tadvi, 2013)

EOO = 19.0 km$^2$

AOO = 12 km$^2$

No. of locations: 02

AOO density: 0.33

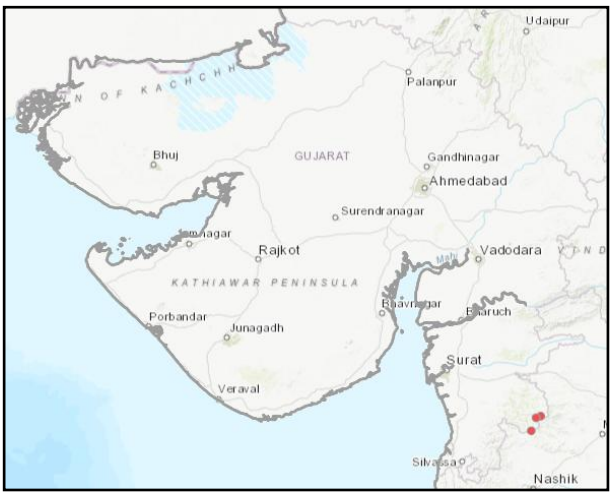


Figure 109: Distribution of *Geissaspis tenella*

This species was reported for the first time for Gujarat from the Dangs before five years. And due to limited distribution it is regionally designated to be **Critically Endangered C2a(i)**.

Figure 110: *Geissaspis tenella* (Credit: Dipak Tadvi)

**Hardwickia binata** Roxb.

Local name: *Anjan*

Habit: Tree

Fl. – Fr.: October – February

DSTR: Andhra Pradesh, Bihar, Goa, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (Singh *et al.* 2015)

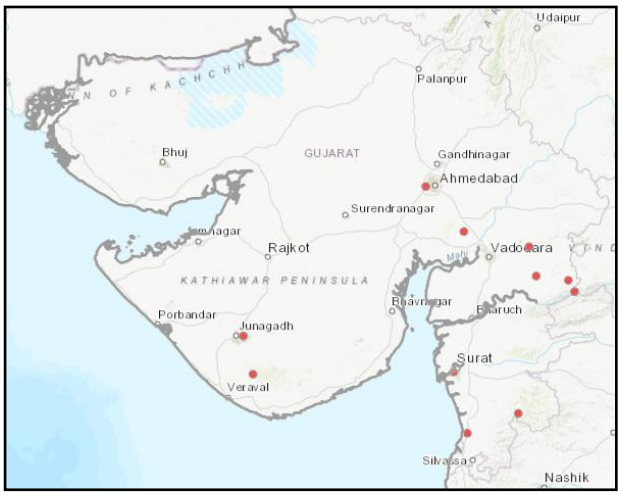


Figure 111: Distribution of *Hardwickia binata*

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Ahmedabad Dist. (Meena, 2014a)

Anand Dist. (Anjaria, 2002)

Chhota udepur Dist.: Kavant, Hampeshwar (Thaker, 1974), Lachhras (Desai, 2002)

Dang Dist.: Waghai

Gir somnath Dist. (Sisodia, 2007)

Junagadh Dist.: Girnar (Santapau, 1962)

Panchmahal Dist.: Shivrajpur

Surat Dist.: Cotton Research Farm nursery (Joshi, 1980)

Valsad Dist.: More (1972) stated it to be 'rare tree, with a hard durable wood', and noted two individuals near eastern side of the Parnera hill

Habitat: Deciduous forest

Specimen examined: *DNT* 1051, 1182 (BARO), *PGM* 1593, 1601 (SPU)

EOO = 60,988.77 km$^2$

AOO = 44 km$^2$

No. of locations: 11

AOO density: 0

The tree is considered as one of the best timberwood species, and is sporadically distributed amongst different states of India. In Gujarat, it is documented to occur from Saurastra, central and southern Gujarat, with relatively more occurrence in

central region. Due to its intermittent distributional pattern its EOO analysis designates the species to be **Least Concern**.

Figure 112: *Hardwickia binata*

Figure 113: *Hardwickia binata* in fruiting

**Indigofera angulosa** Edgew.

Habit: Shrub

Fl. – Fr.: November – December

DSTR: Maharashtra, Madhya Pradesh, Rajasthan (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Junagadh Dist.: Gir forest (Sanjappa, 1977)

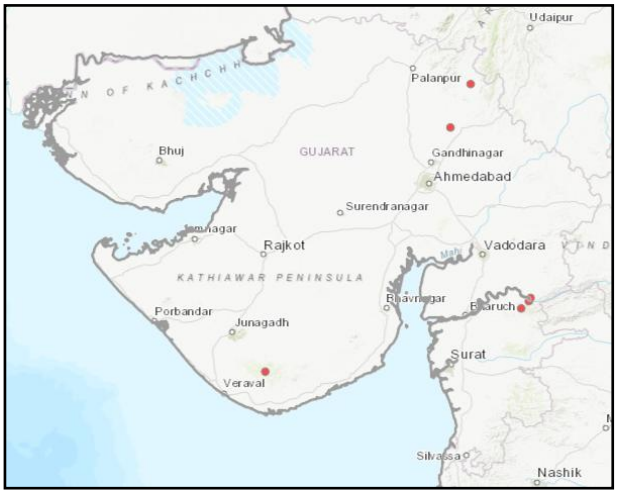


Figure 114: Distribution of *Indigofera angulosa*

Narmada Dist.: Gora, Junaraj (Patel, 1971), Shah and Patel (1971) discussed about its rarity in the article 'some noteworthy rare plants of Gujarat' and reported it from Lal-Darvaja and Thevadia

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Sanjappa, 1977), Derol Jagir (Parmar, 2012)

Habitat: Forest undergrowth

Specimen examined: Lal-Darvaja: *Patel* 1946, 2447, 2452; Thevadia: *Patel* 3351 (BARO)

EOO = 39,656.1 km$^2$

AOO = 24 km$^2$

No. of locations: 05

AOO density: 0.17

In absence of the torulose pods which are typical of this species, it is likely to be confused with *Indigofera subulata* Vahl. This shrub is found growing in forest undergrowth and is reported from all three adjoining states. While, in Gujarat it is reported to occur in three districts from south, north and Saurashtra regions due to which it becomes **Endangered B2ab(iii,iv)**.

---

**Indigofera coerulea** var. **monosperma** (Santapau) Santapau [= *Indigofera articulata* var. *monosperma* Santapau]

Local name: *Karumuli*

Habit: Shrub

Fl. – Fr.: September – October

DSTR: Rajasthan (Singh *et al.* 2015)

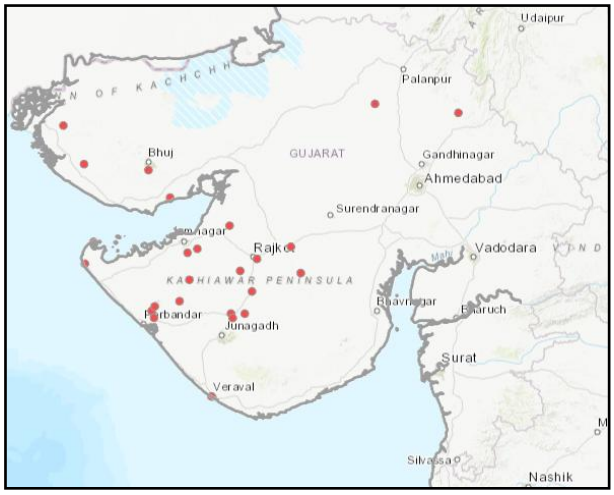


Figure 115: Distribution of *Indigofera coerulea* var. *monosperma*

This taxon was first described by Santapau (1958) under *Indigofera articulata* Gouan. var. *monosperma* Sant, based on the holotype collected from sandy soils in the coastal area at Dwarka in 1953. Later on Santapau made a new combination and named it *I. coerulea* Roxb. var. *monosperma* Roxb. Malhotra and Wadhwa (1973) reported this rare plant from Jamnagar district without any precise locality. Rare occurrence of this taxon was also traced from Hingolgadh in Saurashtra by (Menon 1979). Rao (1981) has collected this rare taxon from Bhadreswar in Kachchh. He found this species growing in hard sandy soils. According to Nayar and Sastry (1988) this species is rare and endemic to Gujarat (Kachchh, Saurashtra) and Rajasthan (Pali).

DSTR Gujarat (Sanjappa, 1992; Singh *et al.* 2015):

Devbhumi dwarka Dist.: Dwarka railway line, Okha

Gir Somnath Dist.: Veraval (Gopal, 1983)

Jamnagar Dist. (Malhotra and Wadhwa, 1973): Latipur (Rao, 2002), Laloi, Ranjit Sagar (Santapau, 1962), Vijarkhi (Nagar, 2005), Jamjodhpur

Junagadh Dist.: Petwad (Menon, 1979), on Rajkot road

Kachchh Dist. (Shah, 1978; Patel *et al.*, 2011): Bhadreshwar (Rao, 1981), Mindhiyari (Pandey *et al.*, 2009), Tapkeshwari (Joshi *et al.*, 2012), Kunathia

Patan Dist.

Porbandar Dist.: Ranavav, Barda

Rajkot Dist.: Hingolgadh (Menon, 1979), Chibhda, Gondal, Jetalsar, Khirsara, Pradhyuman Park (Santapau, 1962; Nagar, 2008)

Sabarkantha Dist.: Bhadresar (Parmar, 2012)

Surendranagar Dist.: Chotila (Santapau, 1962), Jupara

Habitat: Sandy to gravelly soils

Specimen examined: *KRN* 33502, 33471 (BSJO), *VRR* 4750 (SPU), *ARM* 2272 (BARO)

EOO = 78,706.6 km$^2$

AOO = 100 km$^2$

No. of locations: 25

AOO density: 0

This single-seeded variety of *Indigofera coerulea* is restricted only to two states Gujarat and Rajasthan. It shows sporadic distribution from Saurashtra, Kachchh and northern region in Gujarat, which is in continuity with Rajasthan. As per its range analysis it is **Least Concern**.

Since the natural habitat at some places is very narrow (hedges around agricultural fields) it may get disturbed or might be completely removed in the future. Mass cultivation of this rare plant will not only conserve it but also make it a potential source of alkaloids and saponins as these compounds are reported in leaves and root bark (Rao 1981). Seeds were collected from Dhrol and have been conserved at the arboretum.


Figure 116: *Indigofera coerulea* var. *monosperma*: A. Habit, B. Fruiting, C. Inflorescence

**Indigofera prostrata** Willd.

Habit: Herb

Fl. – Fr.: August – December

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, West Bengal, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

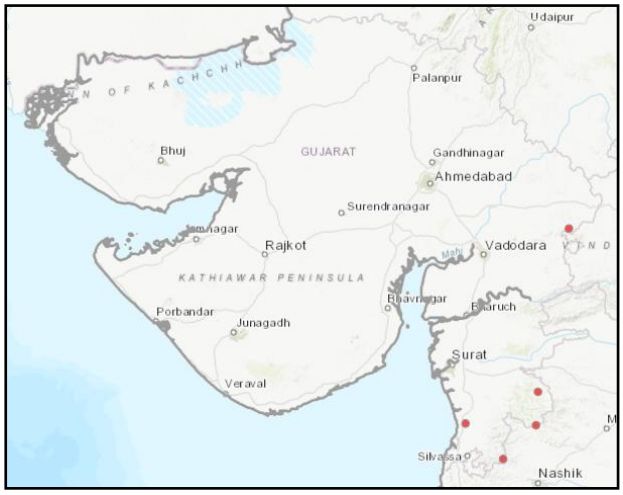


Figure 117: Distribution of *Indigofera prostrata*

Dahod Dist.: Bedi (1968) mentioned it to be rare, noted only at few places, growing in dense clumps along with other tall grasses on Ratanmahal hill.

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) stated as locally abundant and noted it often in loose patches among grasses at Subir, while during the present study it was collected from Malegaon and Saputara

Valsad Dist. (Vora, 1980): Viraxet (Rao, 2012), Ghadoi (Patel RM, 1971)

Habitat: Among grasses

Specimen examined: *Bedi* 3447 (BARO), *BS* 1915, 1464, 1658, 1715 (SPU)

EOO = 10,432.9 km$^2$

AOO = 20 km$^2$

No. of locations: 05

AOO density: 0

This prostrate herb occurs intermittently in central and southern zones of Gujarat and assessed to be **Vulnerable B1ab(i,iii,iv).**

**Indigofera uniflora** Roxb.

Habit: Herb

Fl. – Fr.: July – March

DSTR: Andhra Pradesh, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

This herbaceous species was reported in Gujarat by BSI (Singh *et. al*., 2015) on the authority of Raghavan *et al*. (1981), without stating any locality or district. Due to lack of required information to assess the species is presently designated as **Data Deficient**.

---

**Mimosa prainiana** Gamble

Habit: Tree

Fl. – Fr.: August – December

DSTR: Andhra Pradesh (Singh *et. al*., 2015)

This tree is reported only from Andhra Pradesh and then directly in Gujarat (Singh *et. al*., 2015) without any specific location. Because of scarceness of basic information to assess the species, it is presently categorized as **Data Deficient**.

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**Pterocarpus marsupium** subsp. **acuminatus** (Prain) Thoth. [= *Pterocarpus marsupium* var. *acuminatus* Prain]

Local name: *Biyo*

Habit: Tree

Fl. – Fr.: April – July

DSTR: Bihar, Rajasthan, Maharashtra, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et. al*., 2015):

Banaskantha Dist.: Jessore

Bhavnagar Dist.: Kadamgiri (Meena, 2014b)

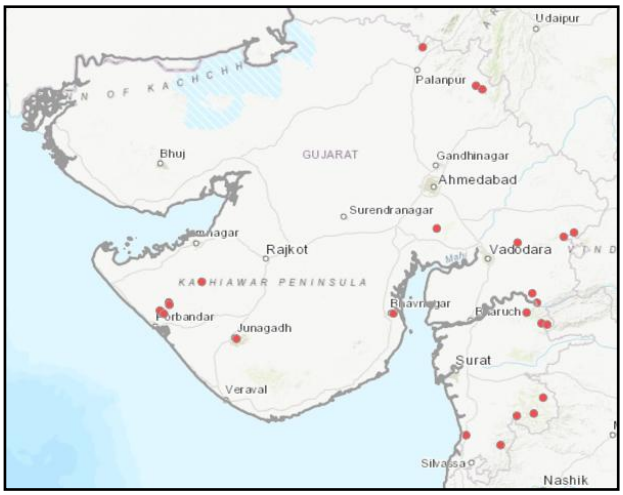


Figure 118: Distribution of *Pterocarpus marsupium* subsp. *acuminatus*

Chhota udepur Dist.: Alwa (Thaker, 1974), Mithibor at Dolariya (Desai, 2002)

Dahod Dist.: Bedi (1968) documented it as not common, and noticed to be evenly distributed in almost all the hilly forest regions. Often noted on Ratanmahal plateau near Vagh ni machi Tiger path and on Kanvara dungar Bachelor hill, Bendol.

Dang Dist. (Tadvi, 2013): Ahwa, Subir, while Suryanarayana (1968) stated it to be "rather rare"

Devbhumi dwarka Dist.: Abhapar, Ghumli (Nagar, 2005)

Jamnagar Dist.: Laloi (Santapau, 1962)

Junagadh Dist. (Santapau, 1962)

Narmada Dist.: Junaraj, Mathavali, Ninaighat (Pradeepkumar, 1993), Kevadiya

Panchmahal Dist. (Bhatt, 1975)

Porbandar Dist.: Barda (Thakar, 1910), Godhana, Satvirda (Nagar, 2005)

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971), Damavas (Bhatt and Sabnis, 1972)

Valsad Dist. (Inamdar and Patel, 1971; Vora, 1980): Parnera (More, 1972), Marala (Patel RM, 1971), Hedri

Habitat: Deciduous forest

Specimen examined: *Bedi* 1054, 3597 (BARO), *BS* 2658, 1552 (SPU)

EOO = 111,684.4 km$^2$

AOO = 100 km$^2$

No. of locations: 23

AOO density: 0.08

This is a very popular tree with several uses, and is also reported form surrounding states of Gujarat. It is occurring throughout in the state except Kachchh, and the timber size is relatively bigger in southern region may be due to favourable climatic conditions. Thus it is also listed as one of the heritage trees of the Dangs due to its gigantic growth. Because it represents sporadic occurrence it is **Least Concern**.

---

**Senna montana** (Roth) V.Singh [= *Cassia montana* Roth]

Local name: Shrub

Fl. – Fr.: July – October

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et. al.*, 2015):

Devbhumi dwarka Dist.: Kileshwar (Nagar, 2005)

Junagadh Dist. (Santapau, 1962): Bordevi,


Figure 119: Distribution of *Senna montana*

Ramnath

Porbandar Dist.: Barda (Thakar, 1910), Naliadhar, Satvirda (Nagar, 2005)

Habitat: Dry deciduous forest

EOO = 441.6 km²

AOO = 28 km²

No. of locations: 03

AOO density: 0.57

This shrub is documented from the Western Ghats and Andhra Pradesh. In Gujarat, it is restricted only to the dry deciduous forests of Saurashtra, and due to such restricted distribution it becomes **Endangered B1ab(iii)+2ab(iii).**

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**Sesbania procumbens** (Roxb.) Wight and Arn. [= *Aeschynomene procumbens* Roxb.]

Habit: Herb

Fl. – Fr.: February – March

DSTR: Andhra Pradesh, Maharashtra, Madhya Pradesh, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et. al.*, 2015):

Vadodara Dist. (Sabnis, 1967)

EOO = NA

AOO = 4 km²

No. of locations: 1

AOO density: 0

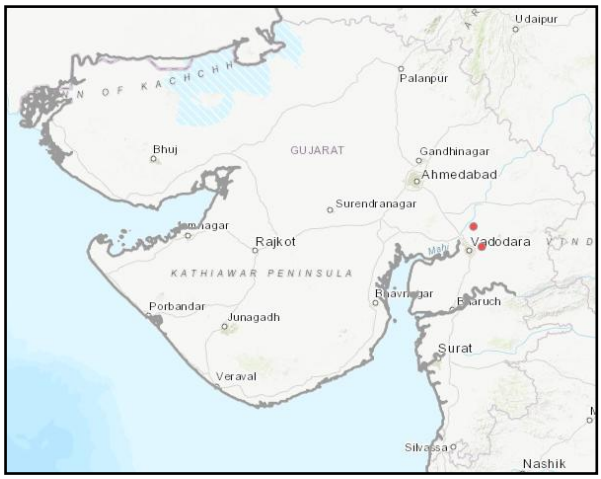


Figure 120: Distribution of *Sesbania procumbens*

This plant species which is endemic to the Western Ghats and Andhra Pradesh was reported before a half-century from central Gujarat, after which it shows no record of occurrence, so might be it is **Regionally Extinct**.

---

**Smithia setulosa** Dalzell

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et. al.*, 2015):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) observed it occasionally in patches of forest undergrowth and at hilly slopes of Saputara

Valsad Dist.: Dharampur

Habitat: Undergrowth on hilly slopes

Specimen examined: *BS* 1867, 2238, 2272 (SPU)

EOO = 197.69 km$^2$

AOO = 12 km$^2$

No. of locations: 02

AOO density: 0.33

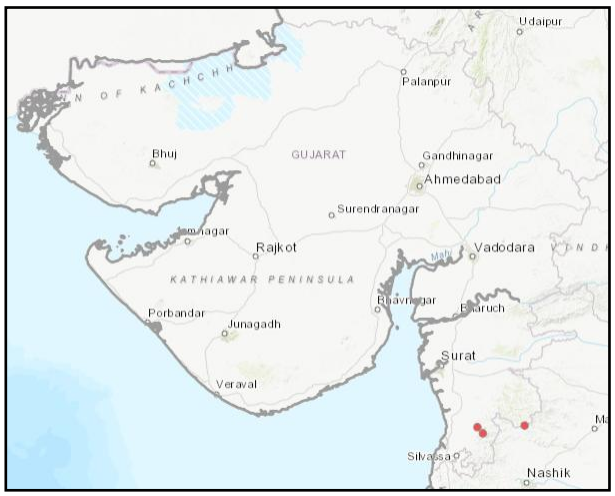

Figure 121: Distribution of *Smithia setulosa*

This herb is endemic only to the Sahyadri ranges, and shows its extended distribution to southern Gujarat which is further northern limit of the ranges. Hence because of its restricted distribution it is **Endangered B1ab(iii, iv)+2ab(iii)**.

---

**Tephrosia collina** V.S.Sharma

Habit: Shrub

Fl. – Fr.: August – October

DSTR: Rajasthan, Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Sanjappa, 1992; Singh *et. al.*, 2015):

Jamnagar Dist.: Jamjodhpur (Nagar, 2007; Bhambra, 2015)

Kachchh Dist.: Adesar (Raghavan *et al.*,

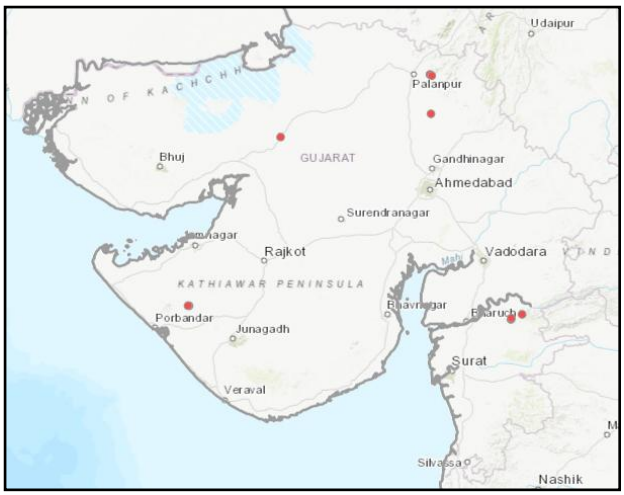

Figure 122: Distribution of *Tephrosia collina*

1981)

Mehsana Dist.: Salipur, Vadnagar

Narmada Dist.: Rajpipla (Shah, 1978), Junaraj

Sabarkantha Dist.: Dhandha (Parmar, 2012)

Habitat: Grassland

Specimen examined: *KRN* 174 (BARO)


Figure 123: *Tephrosia collina*: A. Habit, B. Flower, C. Fruiting

EOO = 62,505.26 km$^2$

AOO = 36 km$^2$

No. of locations: 06

AOO density: 0.25

*Tephrosia collina* was described from Rajasthan. Later it was reported from Gujarat where it is found to be growing amongst grasses in Saurashtra, Kachchh, northern and southern region, and is assessed as **Vulnerable B2ab(i,ii,iii,iv,v).**

---

**Vigna khandalensis** (Santapau) Sundararagh.and Wadhw [= *Phaseolus khandalensis* Santapau]

Habit: Herb

Local name: *Badmung*

Fl. – Fr.: September – October

DSTR: Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et. al*., 2015):

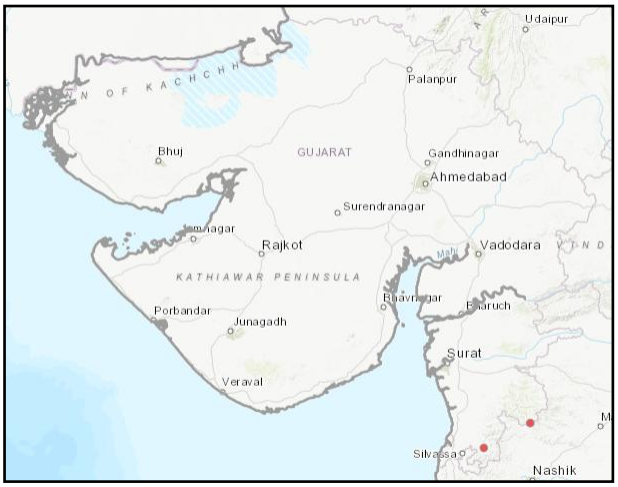


Figure 124: Distribution of *Vigna khandalensis*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noticed it gregarious on hilly slopes along ghat road at Saputara only

Valsad Dist.: Kaprada

Habitat: Hilly slopes, roadside on ghat

Specimen examined: *BS* 1863, 2228 (SPU)

EOO = NA

AOO = 8 km$^2$

No. of locations: 02

AOO density: 0

Figure 125: *Vigna khandalensis* (Credit: Dipak Tadvi)

This herb is endemic only to the Sahyadri ranges, and shows its extended distribution to southern Gujarat that is northern limit of the ranges. Because of its restricted distribution it is **Endangered B2ab(ii,iii,iv)**.

### 4.2.2.13 Euphorbiaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 321 | 7950 |
| India | 84 | 523 |
| Gujarat | 19 | 67 |
| Indian endemics | 28 | 114 |
| Indian endemics found in Gujarat | 4 | 10 |

**Acalypha malabarica** Müll.Arg. [= *Ricinocarpus malabaricus* (Müll.Arg.) Kuntze]

Local name: *Dadaro*

Habit: Herb

Fl. – Fr.: July – October

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015)

DSTR Gujarat:

Ahmedabad Dist. (Meena, 2014a)

Banaskantha Dist.: Palanpur (Meena, 2012)

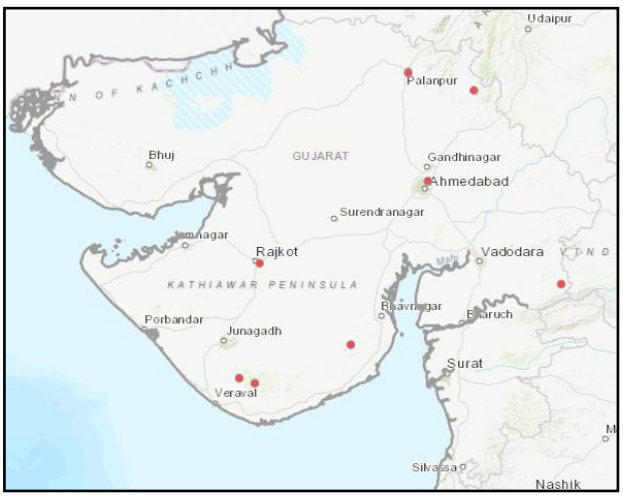


Figure 126: Distribution of *Acalypha malabarica*

Bhavnagar Dist.: Oza (1991) and Baxi (2003) reported it in their PhD theses, without mentioning any precise locality or voucher specimens.

Chhota Udepur Dist.: Thaker (1974) reported it as a common weed in agricultural lands and along the forest paths at Kavant range.

Gir somnath Dist. (Santapau and Raizada, 1954)

Junagadh Dist.: Sasan (Bole and Pathak, 1988)

Rajkot Dist.: Gondal irrigation lake, Pradhyuman park (Bole and Pathak, 1988)

Sabarkantha Dist. (Parmar, 2012): Damavas (Bhatt, 1971)

Specimen examined: *Thaker* 5, 60, 1596 (BARO)

EOO = 65,567.85 km$^2$

AOO = 32 km$^2$

No. of locations: 08

AOO density: 0

This herb is sporadically distributed in Gujarat except Kachchh and southern Gujarat. As it forms a large convex polygon, it becomes **Vulnerable B2ab(iii,iv)**.

---

**Euphorbia coccinea** B.Heyne ex Roth [= *Chamaesyce coccinea* (B.Heyne ex Roth) Soják]

Habit: Herb

Fl. – Fr.: June – October

DSTR: Rajasthan, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Daman & Diu: Binojkumar (1993) in his taxonomic revision of the genus *Euphorbia* in India, reported from Daman airport and Delvada, based on Ansari's collection.

Figure 127: Distribution of *Euphorbia coccinea*

Habitat: On gravelly soil along stream beds

Specimen examined: *Ansari* 98538 (BSI)

EOO = 80.5 km$^2$

AOO = 12 km$^2$

No. of locations: 02

AOO density: 0.33

This species is reported from adjoining states of Gujarat, though it is not reported within the political boundaries of the state, it still lies within a very close proximity. And due to this edge effect we cannot ignore the occurrence records, so it is considered an **Endangered B2ab(ii,iii,iv)**.

---

**Euphorbia deccanensis** V.S.Raju [= *Euphorbia linearifolia* Roth, *Chamaesyce linearifolia* (Roth) J. Sojak]

Habit: Herb

Fl. – Fr.: October

DSTR: Andhra Pradesh, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Shah (1978) reported in the Flora of Gujarat

Devbhumi dwarka Dist.: Beyt Dwarka

Jamnagar Dist.

Habitat: Rocky crevices and gravelly soils

Specimen examined: *Madhusoodan* 13452 (CALI), *Fischer* 4311 (CAL)

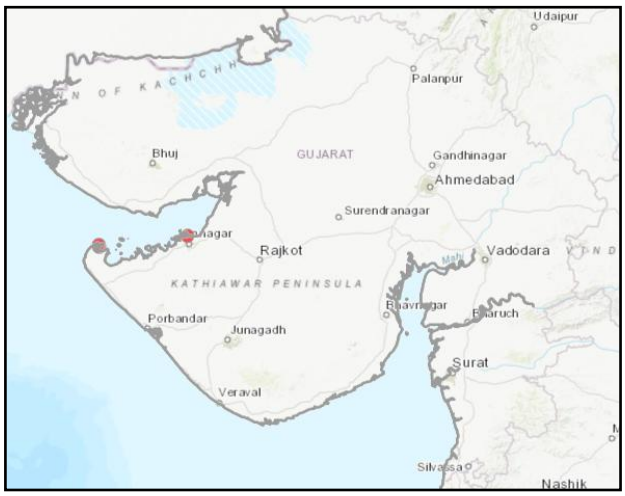


Figure 128: Distribution of *Euphorbia deccanensis*

EOO = 94.82 km²

AOO = 12 km²

No. of locations: 02

AOO density: 0.33

This herb is occurring only on the coastal tracts of Saurashtra, and is **Critically Endangered C2a(i)**.

---

**Euphorbia elegans** Spreng. [= *Chamaesyce elegans* (Spreng.) Soják]

Local name: *Unaravan*

Habit: Herb

Fl. – Fr.: Mar – May

DSTR: Maharashtra, Madhya Pradesh, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

Porbandar Dist.: In the Flora of Saurashtra, Bole and Pathak (1988) reported it from Bhad, Garej, Kadachh and Madhavpur

Habitat: Hill slopes, grasslands, waste places

EOO = 163.9 km²

AOO = 16 km²


Figure 129: Distribution of *Euphorbia elegans*

No. of locations: 04

AOO density: 0

This herb is reported only from the coastal tracts of Saurashtra, **Endangered B1ab(i,iii,iv)**.

---

**Euphorbia perbracteata** Gage [= *Tithymalus perbracteatus* (Gage) Soják]

Local name: *Litali*

Habit: Herb

Fl. – Fr.: December – April

DSTR: Andhra Pradesh, Bihar, Maharashtra, Madhya Pradesh, Goa, Odisha, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Daman: Dhabel near tank (Binojkumar, 1993)

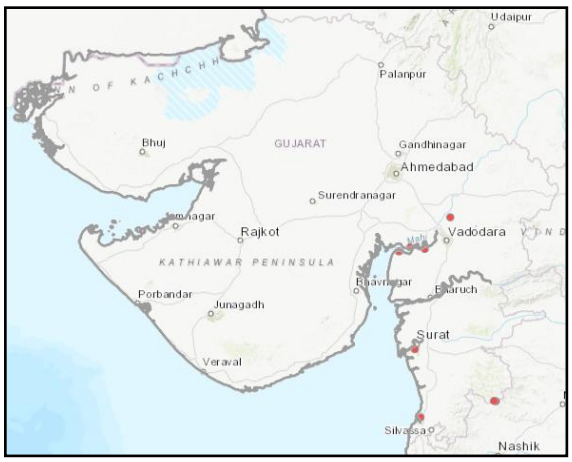

Figure 130: Distribution of *Euphorbia perbracteata*

DSTR Gujarat (Nayar *et al.* 2014):

Anand Dist.: Dhuvaran

Bharuch Dist.: Kavi

Dang Dist. (Tadvi, 2013): Malegaon, Saputara

Surat Dist.: Joshi (1980) reported it as rare plant during his study.

Vadodara Dist.: Padate (1973) reported it as a weed from cultivated fields of Savli Taluka.

Habitat: Weed in waste lands and moist areas

Specimen examined: *JVJ* 403, 1978, *Padate* 2663, 2982 (BARO)

EOO = 17,125 km$^2$

AOO = 36 km$^2$

No. of locations: 07

AOO density: 0.125

The species is recorded from central and southern Gujarat along with Daman territory. **Vulnerable B1ab(i,iii).**

Whole plant

Flowering

**Euphorbia pycnostegia** Boiss. [= *Euphorbia pycnostegia* var. *pycnostegia*]

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) reported it as occasional on the hilly slopes along Malegaon – Saputara.

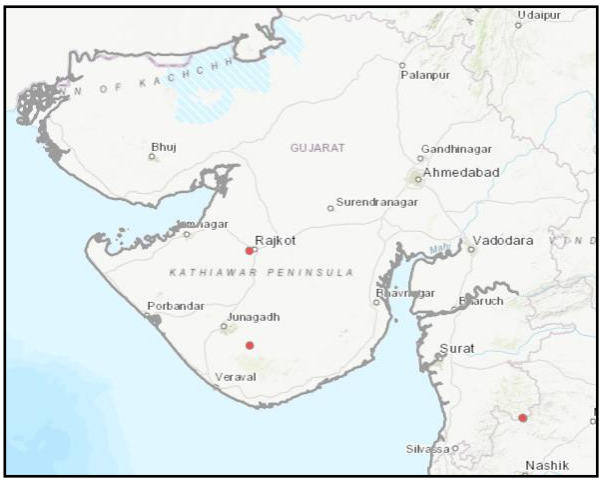


Figure 131: Distribution of *Euphorbia pycnostegia*

Junagadh Dist.: Visavadar (Bole and Pathak, 1988)

Rajkot Dist. (Bole and Pathak, 1988)

Habitat: Grass fields and forest boudnaries

Specimen examined: *BS* 804, 1865, 2223 (SPU), *Talbot* 2065 (BSI)

EOO = 16,846.3 km$^2$

AOO = 16 km$^2$

No. of locations: 03

AOO density: 0.25

This species is restricted only to Maharashtra and Karnataka, and was first recorded for Gujarat state from the Dangs, after which it has been mentioned in the Flora of Saurashtra. It has been three decades, the plant has not been rediscovered from

Gujarat, and so extensive field explorations need to be carried out to update its current status. However, based on its distribution analysis it is **Vulnerable B1ab(ii,iii,iv)**.

---

**Euphorbia pycnostegia** var. **zornioides** (Boiss.) Santapau [= *Euphorbia zornioides* Boiss.]

Habit: Herb

Fl. – Fr.: August – October

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Binojkumar (1993) in his taxonomic revision of the genus *Euphorbia* in India, reported from Savardem and Valpai road in Daman district, based on Singh's authority

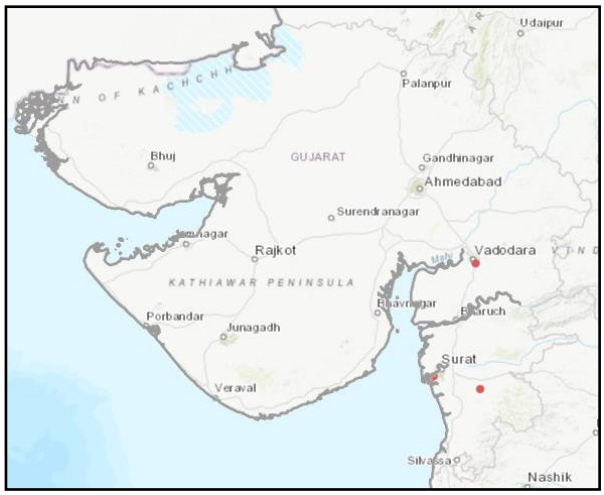


Figure 132: Distribution of *Euphorbia pycnostegia* var. *zornioides*

Surat Dist.: Bhimpor, Dumas, Magdalla

Vadodara Dist.: Pratapnagar (Patil and Sabnis, 1982)

Habitat: Cultivated fields, mixed with grasses, hill slopes and grassy lands

Specimen examined: *N.P. Singh* 124598 (BSI)

EOO = 4,014.6 km$^2$

AOO = 16 km$^2$

No. of locations: 04

AOO density: 0

This variety of the previously discussed species is widely distributed in Indian states, it occurs all along the Western Ghats besides its record from Andhra Pradesh. While in Gujarat it occurs in central and southern Gujarat, also its record from Daman has been considered in the present EOO analysis (due to edge effect of political boundaries). Further, this plant variety needs to be collected again, as it was last reported before two decades. And due to its restricted distribution it is **Endangered B1ab(iii, iv)+2ab(ii, iii, iv).**

**Euphorbia sebastinei** Binojk. and N.P.Balakr. [= *Chamaesyce sebastinei* (Binojk. and N.P.Balakr.) V.S.Raju]

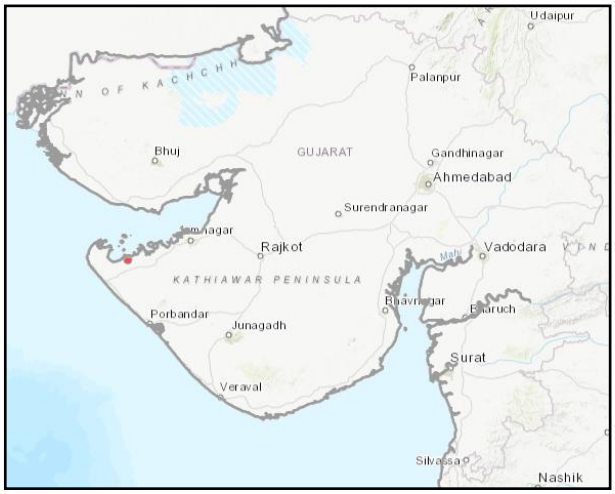

Figure 133: Distribution of *Euphorbia sebastinei*

Habit: Herb

Fl. – Fr.: March – June

DSTR: Andhra Pradesh, Maharashtra, Uttar Pradesh (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015): During the taxonomic revision of the genus *Euphorbia* in India Binojkumar (1993) described it as a new species from Devbhumi dwarka Dist.

Jamnagar Dist.: Parmar (2008) noted on the way to Dwarka

Habitat: Moist gravelly soil

EOO = NA

AOO = 8 km$^2$

No. of locations: 2

AOO density: 0

Specimen examined: *Sebastine* 5975 (CAL), *Kaul* 9061 (LWG)

**Data Deficient**.

---

**Homonoia retusa** (Graham ex Wight) Müll. Arg. [= *Adelia retusa* Graham ex Wight]

Figure 134: Distribution of *Homonoia retusa*

Habit: Shrub

Fl. – Fr.: November – April

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Narmada Dist.: Gora, Kevadia (Patel, 1971), Surpan

EOO = 32.49 km$^2$

AOO = 16 km$^2$

No. of locations: 02

AOO density: 0.5

It could not be collected inspite of intensive field visits, though its allied species *H. riparia* was found to be growing abundantly. This wetland shrub is restricted to the Western Ghats only with its only record of occurrence from the riverbanks of Narmada in Gujarat. And it's been more than four decades, the plant has not been documented by any worker; **Regionally Extinct**.

---

**Mallotus polycarpus** (Benth.) Kulju and Welzen [= *Trewia polycarpa* Benth.; *Trewia nudiflora* var. *polycarpa* (Benth.) Susila and N.P.Balakr.]

Habit: Tree

Fl. – Fr.: December – June

DSTR: Maharashtra, Madhya Pradesh, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Narmada Dist.

Dang Dist.: Ahwa, Don, Saputara

Valsad Dist.: Jogvel, Lavkar, Ozarda, Sildha (Vora, 1980), Reddy (1987) has occasionally observed this species in the interior part of the forests in Barpuda, Gundiya and Pangarbari, While Rao (2012) has reported it as rare species from the Amba forests of Dharampur.

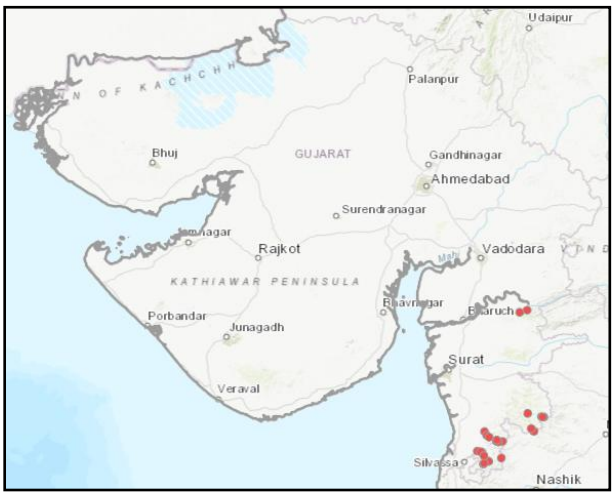


Figure 135: Distribution of *Mallotus polycarpus*

Specimen examined: *ASR* 2310, 2531, 3115, *VHR* 1882 (SPU)

EOO = 6442.58 km²

AOO = 100 km²

No. of locations: 15

AOO density: 0.4

This tree is commonly distributed in southern Gujarat, and also occurs in adjoining states. **Near Threatened**.

Figure 136: *Mallotus polycarpus*

Figure 137: *Mallotus polycarpus* in flowering

### 4.2.2.14 Malpighiaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 68 | 1100 |
| India | 4 | 25 |
| Gujarat | 4 | 5 |
| Indian endemics | 2 | 11 |
| Indian endemics found in Gujarat | 1 | 1 |

**Aspidopterys cordata** (B.Heyne ex Wall.) A.Juss. [= *Hiraea cordata* B.Heyne ex Wall.]

Habit: Climber

Local name: *Ghativel*

Fl. – Fr.: September – January

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): Dang Dist. (Chavan and Oza, 1966): Patel (2013) reported it as rare from the hilly forests of Dangs and Saurashtra. Ahwa, Malegaon, Pipaldahad, Shamgahan (Suryanarayana, 1968)

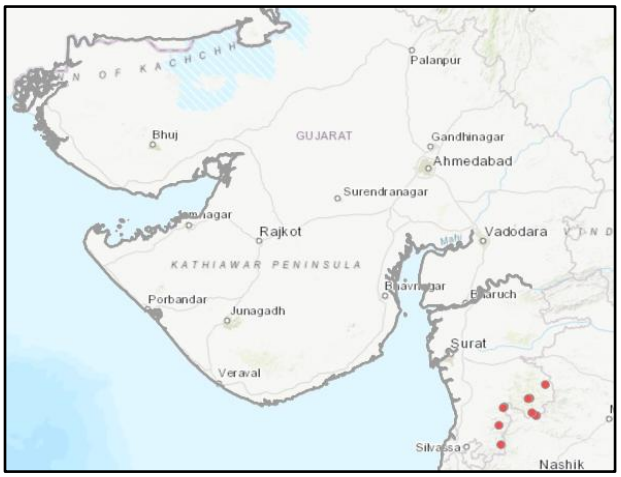


Figure 138: Distribution of *Aspidopterys cordata*

Navsari Dist.: Mankunia

Valsad Dist.: Pangarbari, Sutharpada (Reddy, 1987; Patel, 2013)

Habitat: Climbing on small bushes or large trees

Specimen examined: *BS* 1901, *SLP* 704, 715, 2295, 3877 (SPU)

EOO = 1552.31 km$^2$

AOO = 40 km$^2$

No. of locations: 07

AOO density: 0.3

It has been reported from three districts of southern Gujarat and due to its restricted distribution it is **Endangered B1ab(iii)+2ab(iii, iv)**.

### 4.2.2.15 Phyllanthaceae Martinov

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 58 | 2099 |
| India | 17 | 146 |
| Gujarat | 8 | 23 |
| Indian endemics | 5 | 33 |
| Indian endemics found in Gujarat | 2 | 2 |

**Phyllanthus lawii** J.Graham [= *Diasperus lawii* (J.Graham) Kuntze; *Phyllanthus juniperinoides* Müll.Arg.]

Habit: Shrub

Fl. – Fr.: November

DSTR: Andhra Pradesh, Jharkhand, Madhya Pradesh, West Bengal, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)


Figure 139: Distribution of *Phyllanthus lawii*

DSTR Gujarat (Nayar *et al.* 2014):

Bharuch Dist.: Kabirvad

Chhota udepur Dist.: Hampheshwar

Narmada Dist.: Garudeshwar, Kevadiya

Specimen examined: *KRN* 183 (BARO)

EOO = 140.3 km$^2$

AOO = 16 km$^2$

No. of locations: 04

AOO density: 0

Figure 140: *Phyllanthus lawii*

This shrub has its occurrence in several states of India, and in Gujarat it is reported from three districts of central and southern Gujarat, but lie in a very close proximity. **Vulnerable D2**.

### 4.2.2.16 Salicaceae Mirb.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 54 | 1269 |
| India | 9 | 52 |
| Gujarat | 4 | 7 |
| Indian endemics | 7 | 19 |
| Indian endemics found in Gujarat | 1 | 1 |

**Flacourtia montana** J.Graham

Habit: Tree

Fl. – Fr.: December – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist.: Ahwa, Mahal, Malegaon

Gir somnath Dist. Sisodia (2007) reported it from the Gir National park and provided the information about its frequency, density and abundance.

Junagadh Dist.

Panchmahal Dist.: Oza, (1961) and Chavan and Oza (1962) reported it from the lower half of the Pavagadh hills.

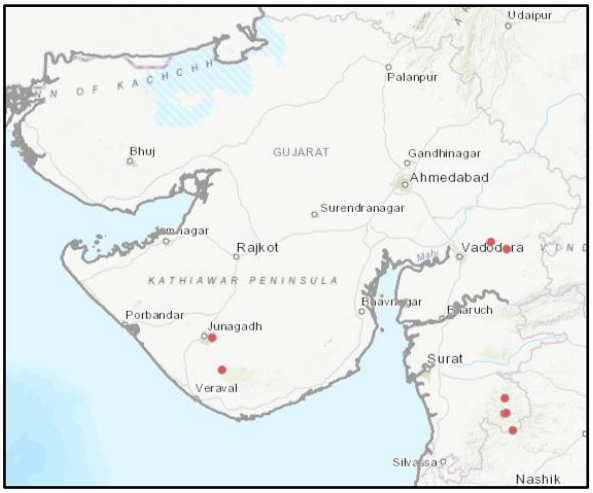


Figure 141: Distribution of *Flacourtia montana*

Specimen examined: *Sisodia* 228, *Oza* 402, 408 (BARO)

EOO = 40,398.3 km²

AOO = 32 km²

No. of locations: 07

AOO density: 0.12

The tree was first time recorded for Gujarat state from Pavagadh hills in 1961, and later reported from Saurashtra. Based on the analysis of EOO it is **Vulnerable B2ab(i,iii,iv)**.

### 4.2.2.17 Rhamnaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 58 | 900 |
| India | 15 | 68 |
| Gujarat | 2 | 16 |
| Indian endemics | 9 | 36 |
| Indian endemics found in Gujarat | 1 | 3 |

**Ziziphus caracutta** Buch.-Ham.ex Roxb.

Habit: Tree

Fl. – Fr.: April – June

DSTR: Bihar, Madhya Pradesh, Odisha, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist.: Malegaon

Junagadh Dist.: Sasan (Hiran river)

Valsad Dist.

EOO = 5100 km²

AOO = 16 km²

No. of locations: 03

AOO density: 0.25

This tree is restricted to Saurashtra and southern Gujarat, and is **Vulnerable D2**.

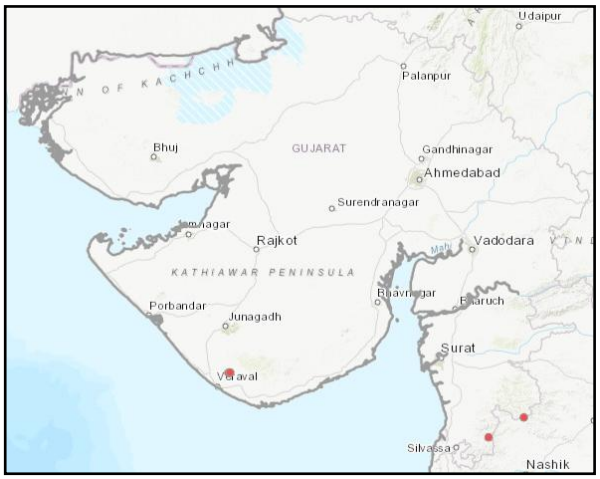


Figure 142: Distribution of *Ziziphus caracutta*

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**Ziziphus horrida** Roth

Habit: Shrub

Fl. – Fr.: July – December

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Ahmedabad Dist. (Meena, 2014a): Yogi (1970) reported it as a rare species in the waste land of Kadi

Amreli Dist.: Dhari (Menon, 1979)

Banaskantha Dist.: Ambaji (Meena, 2012)

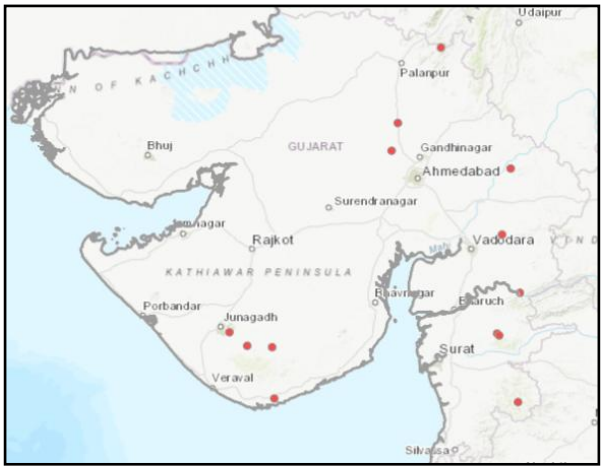


Figure 143: Distribution of *Ziziphus horrida*

Dang Dist.: Suryanarayana (1968) reported it as a rare species. He observed only two individuals of this species from Ahwa.

Gir somnath Dist.: Una (Menon, 1979)

Junagadh Dist.: Ramnath, Visavadar (Menon, 1979)

Mahisagar Dist.: Lunawada

Mehsana Dist. (Shah and Yogi, 1974)

Narmada Dist.: Kevadiya (Patel, 1971)

Panchmahal Dist.: Bhatt (1975) observed it to be very rare, while Oza (1961)

Pavagadh

Surat Dist.: Chandrapada, Umarpada

Habitat: Usually found in gravelly lands

Specimen examined: *Yogi* 2744, *BS* 2091, 2451 (SPU)

EOO = 81,572.65 km$^2$

AOO = 52 km$^2$

No. of locations: 12

AOO density: 0.08

The shrub is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

---

**Ziziphus williamii** Bhandari and Bhansali

Habit: Tree

Fl. – Fr.: August – October

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

Ahmedabad Dist.

Bharuch Dist.

Devbhumi dwarka Dist.: Beyt, Shankhodhar island

Kachchh Dist.: Rudramata

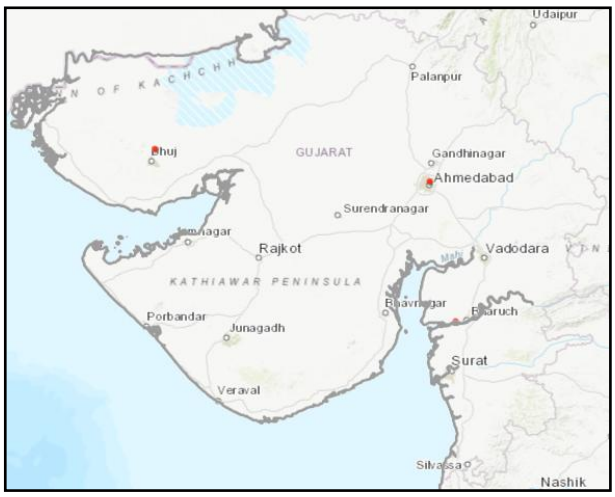


Figure 144: Distribution of *Ziziphus williamii*

EOO = 45,040.7 km$^2$

AOO = 24 km$^2$

No. of locations: 04

AOO density: 0.33

This tree spcies was described the author of Flora of Indian Desert, and it shows very sporadic distribution in Kachchh, Saurashtra and central Gujarat. Due to a wide range of occurrence it becomes **Endangered B2ab(ii,iii,iv)**.

### 4.2.2.18 Cleomaceae

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 12 | 257 |
| India | 5 | 18 |
| Gujarat | 3 | 13 |
| Indian endemics | 1 | 4 |
| Indian endemics found in Gujarat | 1 | 1 |

**Cleome simplicifolia** Hook.f.and Thomson

Habit: Herb

Fl. – Fr.: October – February

DSTR: Maharashtra (Singh *et al.* 2015)

DSTR Gujarat:

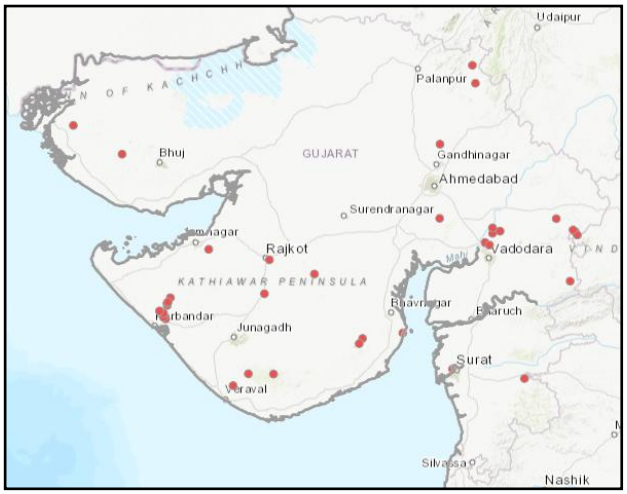

Figure 145: Distribution of *Cleome simplicifolia*

Bhavnagar Dist. (Oza, 1991): Menon (1979) collected from Palitana; further Meena (2014b) noticed it **common** as weed in fallow open fields, exposed wastelands and low hillocks at Hathab and Shatrunjaya dam

Chhota udepur Dist. (Karetala, 1973; Desai, 2002): Kavant (Thaker, 1974)

Dahod Dist.: Ratanmahal (Bedi, 1968), Pipargota (Bedi, 1962), Tokarva (Bedi, 1962), while it was commonly seen as a weed in cultivated fields, both on plains and in hilly regions of Devgadh Baria

Devbhumi dwarka Dist.: Bhanvad (Santapau, 1962)

Gandhinagar Dist.: Mansa

Gir somnath Dist. (Sisodia, 2007)

Jamnagar Dist.: Vijarkhi dam (Santapau, 1962), Abhapar, Kileshwar, Venu, Ghumli (Nagar, 2005)

Junagadh Dist.: Sapnes, Sasan (Menon, 1979)

Kachchh Dist. (Patel *et al.*, 2011): Nakhatrana (Bhatt, 1993), Mindhiyari (Pandey *et al.*, 2009)

Kheda Dist.: Matar (Bedi, 1960)

Panchmahal Dist.: Chari (Bedi, 1961)

Porbandar Dist.: Godhana, Satvirda, Adityana, Ranavav (Thakar, 1910; Nagar, 2005)

Rajkot Dist.: Hingolgadh (Menon, 1979), Gondal, Pradhyuman park (Santapau, 1962)

Sabarkantha Dist.: Dan Mahudi (Bhatt, 1968), Khedbrahma (Yogi, 1970; Bhatt, 1971; Parmar, 2012)

Surat Dist.: Rander (Joshi, 1980)

Vadodara Dist.: Savli, Vasanpura, Lachhanpura, Mokshi, Manjusar (Padate, 1969; Padate, 1973)

Habitat: Riverbanks, growing amongst grasses

Specimen examined: *JVJ* 981,*Bedi* 774, 1907, 2163, 3396 (BARO), *SNP* 1301 (SPU), *Meena* 24290, 24560 (BSJO), *R.S. Rao* 63644, 63775 (CAL)

EOO = 143,813 $km^2$

AOO = 144 $km^2$

No. of locations: 27

AOO density: 0.25

This herbaceous species is commonly found growing amongst grasses and along riverbanks. It occurs sporadically throughout all parts of Gujarat and due to wuch wide range it is **Least Concern**.

---

### 4.2.2.19 Malvaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 116 | 2300 |
| India | 40 | 130 |
| Gujarat | 22 | 93 |
| Indian endemics | 7 | 24 |
| Indian endemics found in Gujarat | 3 | 4 |

**Abelmoschus tuberculatus** var. **deltoidefolius** T.K.Paul and M.P.Nayar

Habit: Undershrub

Fl. – Fr.: August – October

DSTR: Rajasthan, Madhya Pradesh (Singh *et al.* 2015)

DSTR Gujarat: Parmar and Singh (2003) reported this taxon from Narayan sarovar in Kachchh Dist. in their work on 'interesting plant records from Gujarat', further Pandey *et al.* (2009)noted it fromMindhiyari

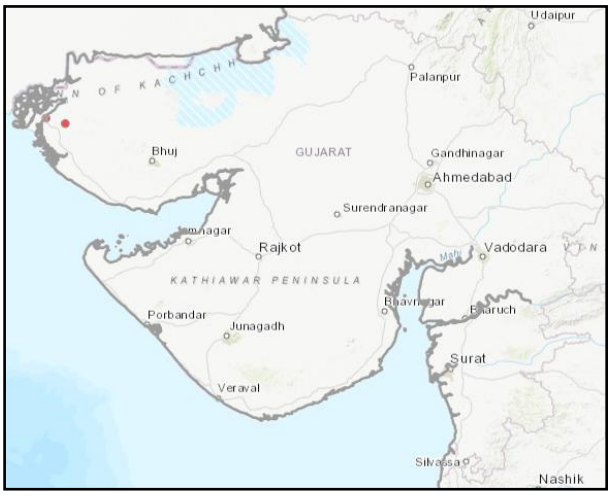

Figure 146: Distribution of *Abelmoschus tuberculatus* var. *deltoidefolius*

Habitat: In scrub forests, in dry sandy habitat

EOO = NA

AOO = 8 km$^2$

No. of locations: 02

AOO density: 0

Specimen examined: *V. Singh* 15717 (BSJO)

Easily distinguishable from other related species by its capsules which are densely studded with bristles bearing tubercles, and from type variety by its deltoid leaves and densely villous leaves. This variety is restricted only to two localities in Kachchh by field experts from BSI, and due to its restricted distribution, it is **Vulnerable D2**.

---

**Erinocarpus nimmonii** J.Graham [= *Erinocarpus nimmoanus* Mast.]

Habit: Tree

Fl. – Fr.: September – February

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dang Dt: Waghai

Valsad Dist.: Kaprada

Specimen examined: *Shevade* 397, 105, *KRN* 101 (BARO)

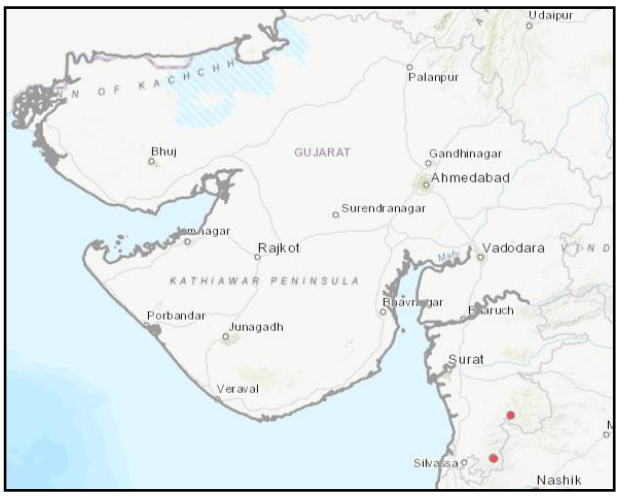

Figure 147: Distribution of *Erinocarpus nimmonii*

EOO = 24.4 km$^2$

AOO = 12 km²

No. of locations: 02

AOO density: 0.33

This tree species is endemic to the Western Ghats, and shows extended distribution in two districts of the northern most ghats, *i.e.* Dangs and Valsad in southern Gujarat. Additionally, the plant has been conserved in the evergreen plot of Waghai Botanical Garden at Dangs, whereas in Valsad it was collected from hilly slopes near Jaura-Jauri falls. Due to its restricted distribution it is assessed as **Vulnerable D2**.


Figure 148: *Erinocarpus nimmonii* (flower)

Figure 149: *Erinocarpus nimmonii* (fruit)

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**Eriolaena stocksii** Hook.f.and Thomson ex Mast.

Local name: *Budjaridahu, Budjari Dhamun*

Habit: Tree

Fl. – Fr.: June – August

DSTR: Bihar, Maharashtra, Goa, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

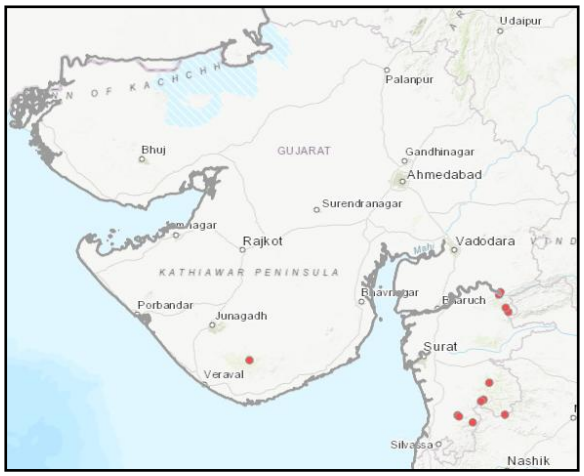


Figure 150: Distribution of *Eriolaena stocksii*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) reported it as a rare plant, and collected few individuals from the top of Gira,

Giri, and Taola hills at Saputara, Shah and Suryanarayana (1968) also reported from Saputara, Gopal (1983) noted it at Waghai, while in the present work, it was observed at Kalibel

Junagadh Dist.: Menon (1979) collected it from Sapnes, and stated it to be very rare.

Narmada Dist.: Rajpipla (Gopal, 1983), Gora, Piplod, Sagai (Sharma, 2010), Thavadia

Valsad Dist.: Amba talat, Wilson hill

Habitat: Hill peaks, slopes

Specimen examined: *KRN* 33487 (BSJO), *ARM* 1876, *BS* 2247, 3074 (SPU)

EOO = 24,386.6 $km^2$

AOO = 48 $km^2$

No. of locations: 08

AOO density: 0.33

This tree with beautiful yellow flowers is found on hill peaks and slopes of the forests of southern Gujarat and Saurashtra. **Vulnerable B2ab(iii,iv).**

---

#### 4.2.2.20 Combretaceae R. Br.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 17 | 480 |
| India | 6 | 41 |
| Gujarat | 5 | 16 |
| Indian endemics | 3 | 12 |
| Indian endemics found in Gujarat | 1 | 2 |

**Anogeissus sericea** var. **nummularia** King ex Duthie [= *Anogeissus rotundifolia* Blatt. and Hallb.]

Habit: Tree

Fl. – Fr.: January – April

DSTR: Rajasthan, Punjab (Singh *et al.* 2015)

The var. *nummularia* was discovered from Rajasthan by King and Duthie (1903). Blatter and Halberg (1919) stated it as confined to dry lands of Rajasthan, with restricted distribution. Bhandari (1978) documented it from Anjar, Pali, Jodhpur and Udaipur, and commented to be very rare in Rajasthan.

DSTR Gujarat (Singh *et al.* 2015): Based on earlier reports and primary field studies made in different parts in Gujarat, Pandey *et al.* (1983), and Kothari and Hajra (1983) considered this species as very rare and restricted to Gujarat, Punjab and Rajasthan. In the Flora of Gujarat, Shah (1978) has mentioned about

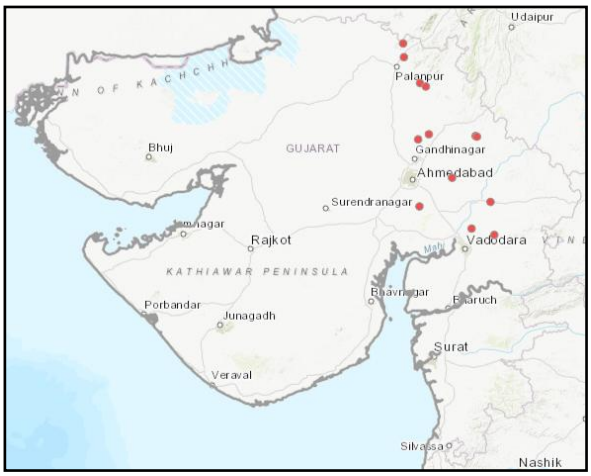


**Figure 151: Distribution of *Anogeissus sericea* var. *nummularia***

*A. sericea* from Pavagadh, Panchmahals and North Gujarat for Gujarat flora without specifying any variety.

Arvalli Dist.: Mahudi, Vatrak

Banaskantha Dist.: Balaram temple, Jessore sanctuary (Rajendrakumar and Kalavathy, 2010; Meena, 2012)

Gandhinagar Dist.: Mansa

Kheda Dist.

Mehsana Dist.: Sudasana, Taranga hill (Rajendrakumar and Kalavathy, 2010)

Panchmahal Dist.: Tuwa, Pavagadh

Sabarkantha Dist.: Modasa (Parmar, 2012)

Vadodara Dist.: Rao (2002) noted its three individuals growing in agricultural edges at Karachiya village

Specimen examined: *VRR* 3791 (SPU), *KRN* 301 (BARO)

EOO = 11,512 km$^2$

AOO = 52 km$^2$

No. of locations: 12

AOO density: 0.08

This species may be mistaken for *A. pendula* Edgew. from which it can be separated by the silky branches and silky undersides of leaves. This endemic tree variety does not occur in the Western Ghats unlike most of the trees rather is documented from Punjab and Rajasthan. Rao (2002) discussed about the rarity causes: habitats of this species at Karachiya are unsecured as the two individuals growing on the edges of

agricultural fields were found to be logged. It presently assessed as **Near Threatened** species.

---

**Anogeissus sericea** Brandis

Local name: *Dhaudo, Dhankra*

Habit: Tree

Fl. – Fr.: January – April

DSTR: Rajasthan, Madhya Pradesh, Maharashtra (Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

Ahmedabad Dist. (Meena, 2014a)

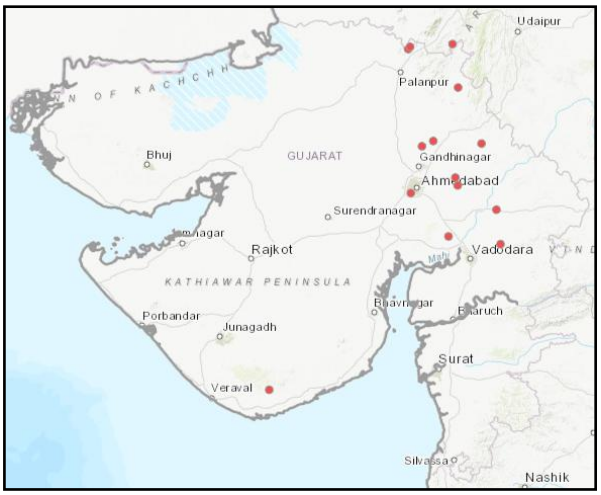


Figure 152: Distribution of *Anogeissus sericea*

Anand Dist.: Anjaria (2002) reported it to be new record for Anand district, but without discussing about its exact locality or any details

Arvalli Dist.: Yogi (1970) observed it to be common on hilly slopes of Mahudi, and Saxton & Sedgwick (1918) found it from Modasa and Vatrak

Banaskantha Dist.: Meena (2012) reported it from Jessore wildlife sanctuary

Gandhinagar Dist.: Yogi (1970) noticed a few plants noted near the margin of a cultivated field at Mansa, and Gopal (1983) collected it from Moti Pavathi

Junagadh Dist.: Menon (1979) noticed few trees on the hilly slopes at Ghodawadi and stated it to be rare

Panchmahal Dist.: Deshpande (1968) noticed it to be common in hedges along road sides and cultivated fields at Tuwa; Shah (1978) documents it from Pavagadh hills

Sabarkantha Dist.: Bhatt (1971) and noted few trees in the forests at Mama na pipla, later Bhatt and Sabnis (1972) again re-cited the same locality in their work on further contributions to the flora and vegetation of Khedbrahma

Specimen examined: *Deshpande* 742, 1902, *Bhatt* 2634, *Dipa* 481, 1209 (BARO), *ARM* 1647, *Yogi* 480, 568 (SPU)

EOO = 42,887.6 km$^2$

AOO = 56 km$^2$

No. of locations: 13

AOO density: 0.07

Perhaps due to its record of occurrence in Saurashtra it is assessed to be **Near Threatened**.

---

**Lythraceae J. St.-Hil.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 26 | 580 |
| India | 9 | 51 |
| Gujarat | 10 | 26 |
| Indian endemics | 3 | 19 |
| Indian endemics found in Gujarat | 2 | 2 |

The species *Ammannia desertorum* Blatt. & Hallb. was earlier considered to be strictly endemic to Gujarat is now been reported from Tharparkar in Pakistan. So, presently there are two Indian endemic species occurring in Gujarat.

---

**Ammannia nagpurensis** T.Mathew and M.P.Nayar

Habit: Herb

Fl. – Fr.: October – November

DSTR: Maharashtra (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Junagadh Dist.: Sasangir to Junvaniya (Mathew and Nayar, 1989)

Navsari Dist.: Unai (Mathew and Nayar, 1989)

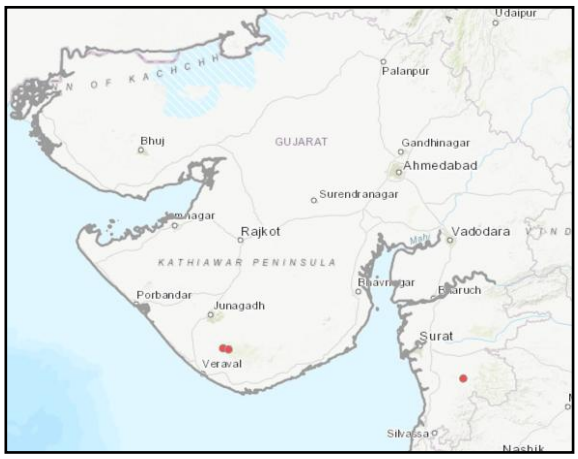


Figure 153: Distribution of *Ammannia nagpurensis*

EOO = 294 km$^2$

AOO = 12 km$^2$

No. of locations: 02

AOO density: 0.33

Cooke (1996) merged this species with *Ammannia multiflora*, later Diwakar (2001) revalidated the species. This herbaceous species was first described by field experts

of BSI and is endemic to Maharashtra and Gujarat only. In the same manuscript, the authors have stated its distribution in two localities from Saurashtra and southern Gujarat. Anitha (2013) reported it to be endemic only to Nagpur, and assessed as**Endangered B1ab(ii,iii)+2ab(ii,iii).**

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**Lagerstroemia microcarpa** Wight

Local name: *Hino, Nano Bondaro*

Habit: Tree

Fl. – Fr.: May – December

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

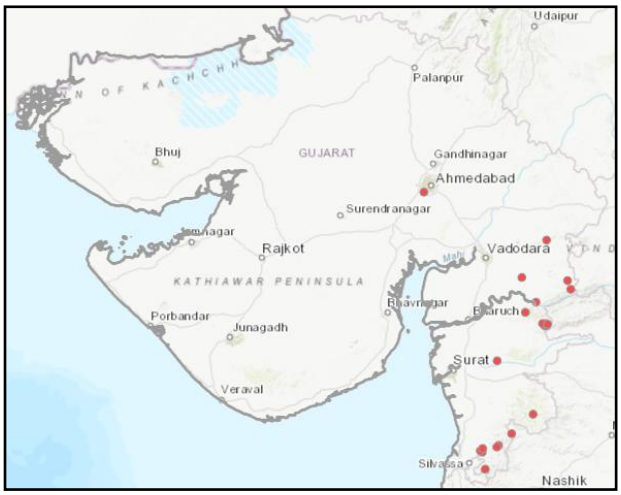


Figure 154: Distribution of *Lagerstroemia microcarpa*

Ahmedabad Dist. (Meena, 2014a)

Chhota udepur Dist.: Desai (2002) observed it to be occasional at Kadipani, Adtia, Satun, Raipur, Kundai and Ghantoli-songir; Thaker (1974) noted it to be fairly common, in the forests on the plains and hillocks of Kavant forest range.

Dang Dist.: Suryanarayana (1968) observed it to be fairly common in the Dangs

Narmada Dist.: Patel (1971) noted it from Junaraj and Kevadiya; during the present study, it was collected from Kelda, Kokati, Ninaighat, Sagai and Shisha

Figure 155: *Lagerstroemia microcarpa* in fruiting

Valsad Dist.: Vora (1980) collected it from Bildha, Jogvel, Nana Pondha and Panas; Rao (2012) stated it to be occasional, and noted few plants at Umli. In the present work it was collected from Hedri and Pendha

Specimen examined: *DNT* 915, *KRN* 303 (BARO), *VHR* 1828 (VNSGU)

EOO = 26,499.2 km$^2$

AOO = 84 km$^2$

No. of locations: 14

AOO density: 0.33

**Near Threatened**.

---

### 4.2.2.22 Myrtaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 145 | 5970 |
| India | 4 | 134 |
| Gujarat | 8 | 17 |
| Indian endemics | 3 | 50 |
| Indian endemics found in Gujarat | 1 | 1 |

**Syzygium salicifolium** (Wight) J.Graham [= *Eugenia salicifolia* Wight; *Syzygium heyneanum* (Duthie) Gamble; *Eugenia heyneana* Duthie]

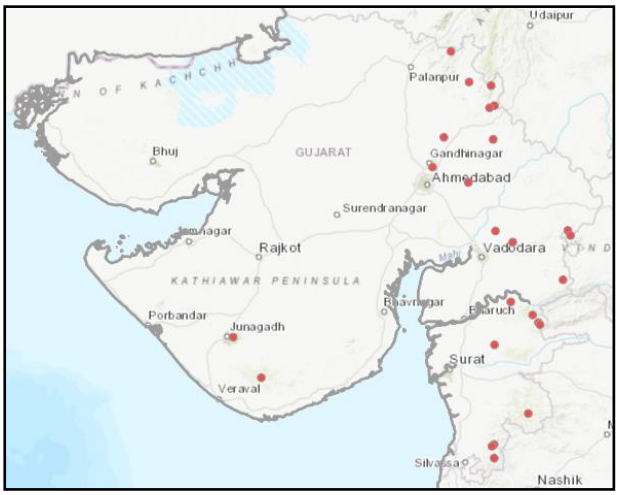

Figure 156: Distribution of *Syzygium salicifolium*

Local name: *Jal Jamuni, Jal Jambu*

Habit: Tree

Fl. – Fr.: April – May

DSTR: Maharashtra, Goa, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Shah (1978) has stated to be 'not common' in the flora of Gujarat.

Arvalli Dist.: Modasa, Vatrak (Saxton and Sedgwick, 1918), Mahudi

Banaskantha Dist.: Gannapipadi, Ambaji (Meena, 2012)

Chhota udepur Dist.: Kavant (Thaker, 1974)

Dahod Dist.: Bedi (1968) observed it to be very common on and along the beds of streams in the hilly forest regions, subgregarious at Ratanmahal, while Gopal (1983) collected it once from Bhuvera

Dang Dist.: Tadvi (2013) mentioned it from the Dangs without stating any locality

Gandhinagar Dist. (Meena, 2014a)

Gir somnath Dist.: Sisodia (2007) analysed the frequency (9.77), density (2.14) and abundance (0.57) of this species in the Gir national park

Junagadh Dist.: Menon (1979) observed it to be frequent in riverbeds or ravines

Narmada Dist.: Gopal (1983) reported it from Rajpipla in his ethnobotanical studies in different parts of Gujarat; further Pradeepkumar (1993) collected it from Kelda, Sagai and Waghumar

Panchmahal Dist.: Deshpande (1968) reported it to be common in the beds of river Bochod

Sabarkantha Dist.: Yogi (1970) collected it from Pahada; Bhatt (1971) observed it to be very common along the streams and river banks in Khedbrahma; however, Bhatt and Sabnis (1972) re-stated it in their work on further contributions to the North Gujarat; Parmar (2012) reported it from Vijanagar and Dholwani

Surat Dist.: Zankhvav (Yadav, 1979)

Vadodara Dist.: Padate (1973) observed a few plants in the bed of a stream at Kamalpura

Valsad Dist. (Vora, 1980): Yadav (1979) collected it from Hedri and Pendha, while Rao (2012) has stated it to be planted along roadsides at Kaprada

Habitat: Near streams in the forest

Specimen examined: *Gpk* 556, 997, *Bedi* 2314, 2315, 2407, *Bhatt* 1812, *Padate* 2083, 2084 (BARO), *Deshpande* 1293, 1912, *GVG* 1057, 4097, 4099 (SPU)

EOO = 95,052.5 $km^2$

AOO = 100 $km^2$

No. of locations: 22

AOO density: 0.22

This endemic tree species is commonly found near streams in the forest, and is widely distributed throughout Gujarat except Kachchh. Due to its wide range of occurrence, it becomes **Least Concern**.

### 4.2.2.23 Burseraceae Kunth

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 18 | 649 |
| India | 7 | 19 |
| Gujarat | 3 | 5 |
| Indian endemics | 3 | 5 |
| Indian endemics found in Gujarat | 1 | 1 |

**Boswellia serrata** Roxb. ex Colebr.

Local name: *Gugal, Sali, Saledi, Dupalio*

Habit: Tree

Fl. – Fr.: December – April

DSTR: Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Maharashtra, Goa, Andhra Pradesh, West Bengal, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

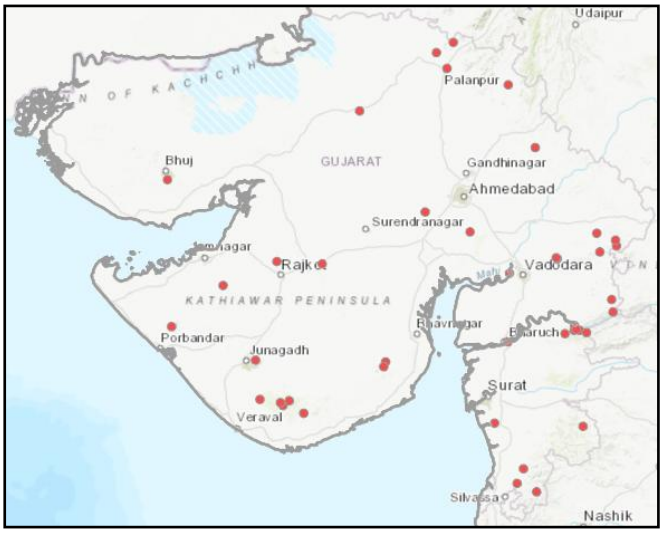


Figure 157: Distribution of *Boswellia serrata*

DSTR Gujarat: Shah (1978) mentioned in the Flora of Gujarat, to be throughout in deciduous forests

Ahmedabad Dist.: Kundal

Arvalli Dist.: Modasa

Banaskantha Dist.: Jessore (Meena, 2012), Dantiwada, Palanpur (Patel, 2009)

Bharuch Dist.

Bhavnagar Dist.: Meena (2014b) enumerated in his checklist of floristic diversity of Bhavnagar district, reported from Shatrunjaya hill - Palitana

Chhota udepur Dist.: Kevdi, Kundal, Satun (Desai, 2002), Kavant (Thaker, 1974), Ambadungar (Thakkar, 1971)

Dahod Dist.: Bedi (1961) first reported it from Dhanpur; later Chavan *et al.* (1963) mentioned it from Devgadh Baria. Further Bedi (1968) noticed it to be fairly common on hilly slopes of Kanvara dungar, Chari, Alindra and Bendol

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it to be rare, and collected it once in the forest about 10 kms from Subir

Gir somnath Dist. (Santapau and Raizada, 1954): Sisodia (2007) studied its frequency (11.92), abundance (0.93) and density (0.34) in the Gir National Park

Jamnagar Dist.: Laloi (Santapau, 1962)

Junagadh Dist.: Sapnes, Tulsishyam (Menon, 1979), Kankai (Santapau, 1962), Sasan (Gopal, 1983)

Kachchh Dist. (Patel *et al.*, 2011)

Kheda Dist.: Matar (Bedi, 1962)

Mahisagar Dist.

Narmada Dist.: Gora, Junaraj (Patel, 1971); Pradeepkumar (1993) stated it to be 'not common' and observed mostly in the degraded forest areas towards the northern periphery of the sanctuary at Dhirkhadi, Mokhdi, Surpan and Thavadia

Navsari Dist.

Panchmahal Dist.: Machi, Pavagadh (Oza, 1961)

Patan Dist.: Satun

Rajkot Dist.: Menon (1979) collected it from Hadala

Sabarkantha Dist.: Bhatt (1971) observed it to be fairly common in hilly forests on slopes at Khedbrahma, Idar (Yogi, 1970), Kotda (Parmar, 2012), Modasa (Saxton and Sedgwick, 1918; Parmar, 2012)

Surat Dist.: Kevdi

Surendranagar Dist.: Chotila (Santapau, 1962), Rampara

Valsad Dist.: Chavshala (Yadav, 1979), Dharampur (Gopal, 1983; Reddy, 1987), Kaprada, Nana Pondha (Vora, 1980)

Habitat: Deciduous forest

Specimen examined:*Bedi* 1222, 2010, 2423, 2614, *Bhatt* 369, 1874, 2592, *Gpk* 708, 860, *DNT* 1518 (BARO), *BS* 2388, *ARM* 1279, 1739, 2025, 1686, 1868 (SPU), *R.S.Rao* 63755 (BSI)

EOO = 140,532.2 km$^2$

AOO = 168 km$^2$

No. of locations: 35

AOO density: 0.17

This endemic tree is commonly found in the deciduous forests widely distributed throughout Gujarat. Due to its extensive EOO it becomes **Least Concern**.

---

#### 4.2.2.24 Amaranthaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 71 | 850 |
| India | 20 | 60 |
| Gujarat | 22 | 52 |
| Indian endemics | 5 | 5 |
| Indian endemics found in Gujarat | 1 | 1 |

**Achyranthes coynei** Santapau

Habit: Shrub

Fl. – Fr.: September – March

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Kachchh Dist.: Satish *et al.*(2015) recorded the species from Kalo Dungar, as a first record to the Flora of Gujarat

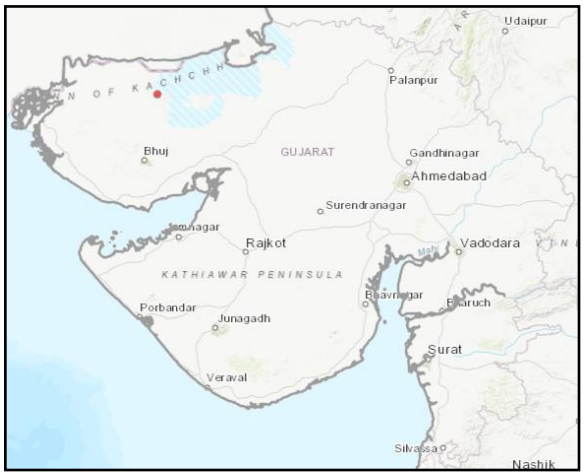

Figure 158: Distribution of *Achyranthes coynei*

Specimen examined: *KRN* 33500 (BSJO)

EOO = NA

AOO = 4 km$^2$

No. of locations: 1

AOO density: 0

The species is endemic to northern Western Ghats, and is recently reported as a new record for Gujarat state from a single locality in Kachchh district. **Critically Endangered B2ab(iii,iv).**

### 4.2.2.25 Loranthaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 70 | 1300 |
| India | 9 | 49 |
| Gujarat | 6 | 9 |
| Indian endemics | 8 | 25 |
| Indian endemics found in Gujarat | 1 | 1 |

The parasitic shrub, *Tolypanthus lageniferus* (Wight) Tiegh. was earlier considered endemic, but now shows its extended distribution in Thailand.

**Dendrophthoe falcata** var. **coccinea** (Talbot) Santapau [= *Loranthus longiflorus* var. *coccinea* Talbot]

Habit: Shrub

Fl. – Fr.: February – March

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

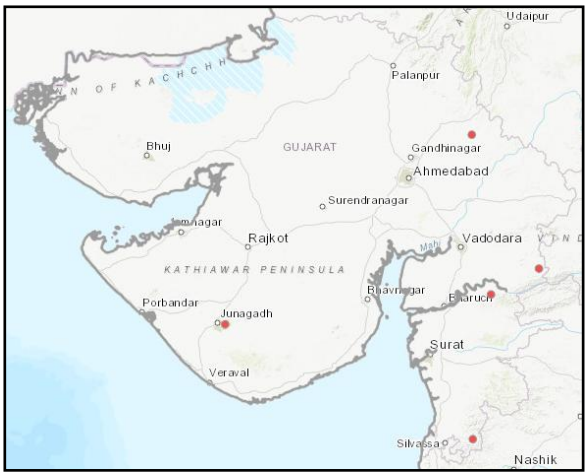

Figure 159: *Dendrophthoe falcata* var. *coccinea*

Arvalli Dist.: Modasa

Chhota udepur Dist.: Thaker (1974) observed as a partial parasite on *Madhuca* sp. in Kavant forest range

Junagadh Dist.: Bole and Pathak (1988) in their Flora of Saurashtra collected it from Girnar

Narmada Dist.: Rajpipla (Shah, 1967)

Valsad Dist.: Rao (2012) noted it growing on *Terminalia crenulata* in Kaprada, and observed it to be 'rare'

Specimen examined: *DNT* 1634 (BARO), *VHR* 1395 (VNSGU)

EOO = 63,788 km$^2$

AOO = 20 km$^2$

No. of locations: 05

AOO density: 0

This epiphytic shrub is endemic to the northern portion of Western Ghats. Though in Gujarat, it shows a very scattered distribution in all different zones except Kachchh, thus designating it to be **Vulnerable B2ab(iii,iv)**.

### 4.2.2.26 Balsaminaceae A. Rich.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 2 | 488 |
| India | 2 | 203 |
| Gujarat | 1 | 4 |
| Indian endemics | 1 | 169 |
| Indian endemics found in Gujarat | 1 | 1 |

In India, 83% of the total members of the family Balsaminaceae are endemic to a single genus *Impatiens*. Presently in Gujarat, it is represented by single Indian endemic species *I. minor*, so more extensive field explorations should be carried out as there is possibility of getting new discoveries for the state. Earlier the species, *I. balsamina* var. *coccinea* (Wall.) Hook.f. was considered endemic, but now it shows extended distribution in Pakistan.

**Impatiens minor** (DC.) Bennet [= *Balsamina minor* DC.; *Impatiens kleinii* Wight and Arn.]

Habit: Herb

Fl. – Fr.: August – November

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014)

DSTR Gujarat (Nayar *et al.* 2014):

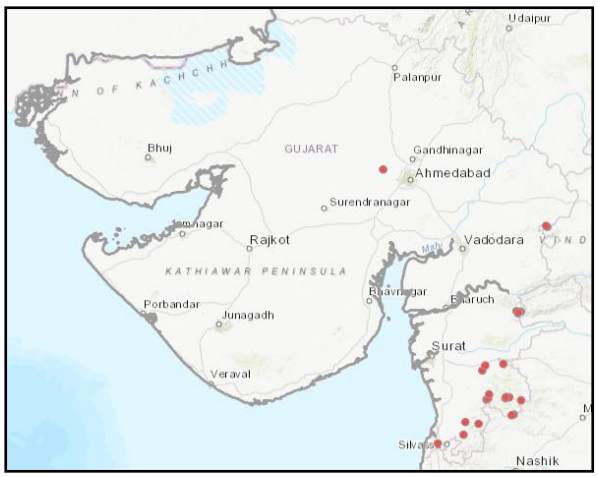


Figure 160: *Impatiens minor*

Dahod Dist.: Bedi (1961) observed it to be common in southern part of Ratanmahal hills, especially on slopes south of Banvaro and Alindra, whereas 'very rare' on the hills to the north of Panam river

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noticed it to be common in the dense forest undergrowth at Ahwa and Malegaon

Mehsana Dist.: Medha

Narmada Dist.: Pradeepkumar (1993) observed it infrequently in the interior of forests at Shisha

Navsari Dist.: Bansda, Vati

Tapi Dist.: Gaumukh, Vyara

Valsad Dist.: Reddy (1987) observed it to be rare in the forest undergrowths at Pangarbari, Rao (2012) also noticed it to be rare and found under the shade of trees at Ozarda, while in the present work it was collected from Bilpudi and Boralai

Specimen examined: *Bedi* 429, 1439, 3012, *Gpk* 1855, 1856 (BARO), *BS* 1206, 1250, 1415, 148, *ASR* 2751 (SPU)

EOO = 37,463.67 km$^2$

AOO = 100 km$^2$

No. of locations: 14

AOO density: 0.44

Figure 161: *Impatiens minor*

This small endemic herb is endemic to the Western Ghats, and shows extensive range of occurrence in central and southern Gujarat which is also the northern limit of Sahyadris. **Near Threatened**.

### 4.2.2.27 Boraginaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 154 | 2500 |
| India | 43 | 209 |
| Gujarat | 10 | 41 |
| Indian endemics | 14 | 33 |
| Indian endemics found in Gujarat | 2 | 2 |

**Adelocaryum coelestinum** (Lindl.) Brand [= *Cynoglossum coelestinum* Lindl.; *Paracaryum coelestinum* (Lindl.) C.B.Clarke]

Local name: *Nisurdhi*

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

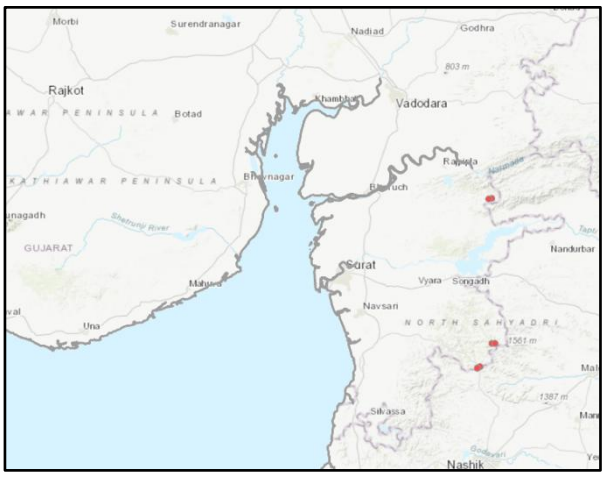


Figure 162: Distribution of *Adelocaryum coelestinum*

DSTR Gujarat:

Dang Dist.: Tadvi (2013) reported it from the Dangs without mentioning any specific locality, however in the present study it was found common at Don and Saputara

Narmada Dist.: Pradeepkumar (1993) observed it to be rare and noticed few plants at Shisha, and during the present study it was collected near a small stream in Ninai

Specimen examined: *Gpk* 1125, 1126, *KRN* 334 (BARO)

EOO = 812.67 km$^2$

AOO = 24 km$^2$

No. of locations: 03

AOO density: 0.5

Figure 163: *Adelocaryum coelestinum* in flowering

This herbaceous endemic is restricted to the Western Ghats only. It was first reported in Gujarat as a new record from Shoolpaneshwar wildlife sanctuary, then after two decades it was rediscovered for the state from the Dangs, which also shows continuity of occurrence in the northern limits of the ghats. **Endangered B1ab(ii,iii,iv)+2ab(ii,iii, iv).**

---

**Cordia domestica** Roth

Local name: *Godadio sag*

Habit: Tree

Fl. – Fr.: May – August

DSTR: Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

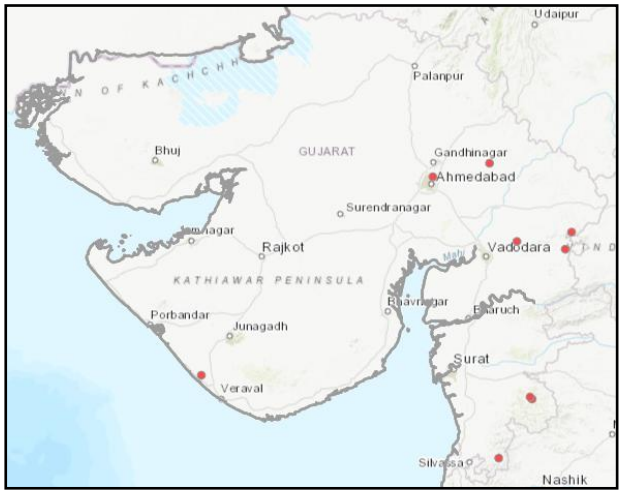


Figure 164: Distribution of *Cordia domestica*

DSTR Gujarat: Shah (1978) reported from Saurashtra, Panchmahal and Chhota udepur, in the flora of Gujarat

Ahmedabad Dist. (Meena, 2014a)

Chhota udepur Dist. (Shah, 1978): Koraj (Desai, 2002)

Dahod Dist.: Rao (2002) could collect it once from Popatkuwa, in Ratanmahal sanctuary

Dang Dist. (Tadvi, 2013): Yadav (1979) noticed it to be very rare, seen only once at Mahal along the banks of river Purna

Junagadh Dist.: Mangrol (Santapau, 1953; Bole and Pathak, 1988)

Panchmahal Dist. (Shah, 1978)

Sabarkantha Dist.: Parmar (2012) reported it from from Bayad, mentioned in the checklist of vascular plants from Sabarkantha district

Valsad Dist.: Reddy (1987) reported it from Kaprada forests

Specimen examined: *Dangs* 464, 465, *VRR* 3936 (SPU)

EOO = 73,483 km$^2$

AOO = 36 km$^2$

No. of locations: 08

AOO density: 0.11

This tree species is reported by various workers and occurs sporadically in central and southern Gujarat, along with one locality from Saurashtra too, making its EOO wide and categorizing the species to be **Vulnerable B2ab(iii,iv)**.

---

**Apocynaceae Juss.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 215 | 2100 |
| India | 47 | 119 |
| Gujarat | 41 | 64 |
| Indian endemics | 11 | 20 |
| Indian endemics found in Gujarat | 7 | 7 |

**IUCN Red List Draft Assessment of *Ceropegia odorata***

Figure 166: Flower of *Ceropegia odorata*

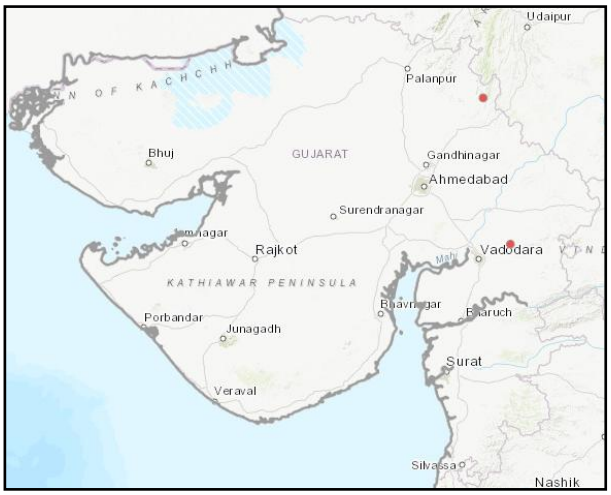


Figure 165: Distribution of *Ceropegia odorata*

**Draft**

Logo

## *Ceropegia odorata* - Nimmo

PLANTAE - TRACHEOPHYTA - MAGNOLIOPSIDA - GENTIANALES - APOCYNACEAE - Ceropegia - odorata

**Common Names:** Sulati-khutti (Marathi), Vahodiyo, Kundher, Khaloro (Gujarati)
**Synonyms:** Ceropegia blatteri McCann

Twinning herbs; leaves membranous, sparsely hairy; tuberous roots; peduncle up to 2 cm long; flowers fragrant, yellow; calyx shorter than corolla; corona biseriate; corolla lobes shorter than tube; corolla tube gradually dilated towards base.

**Taxonomic Note:**
Flowers yellow, fragrant.

| Red List Status |
|---|
| EN - Endangered, D (IUCN version 3.1) |

# Red List Assessment

## Assessment Information

**Date of Assessment:** 2017-11-25

**Assessor(s):** Rana, K.

**Regions:** Global

## Assessment Rationale

The species is a sparsely distributed Indian endemic, with a restricted distribution and an area of occupancy of just 28 km². Based on the threats of collection for its medicinal properties, and degradation in its habitat quality as a result of this collection, this species is estimated to occur in just seven locations. With evidence of continuing decline in area of occupancy, extent of occurrence, the area/quality of its habitat, number of locations, and the number of mature individuals, it is assessed here as Endangered under criterion B2ab(i,ii,iii,iv,v) and as there are less than 100 known individuals also as Endangered under criterion D.

# Distribution

## Geographic Range

Endemic to western India. After its type collection (1839) it has been reported from Pavagadh hill of Gujarat (Sabnis & Bedi 1971) and Mount Abu, Rajasthan (Ansari 1984). It has also been reported from Toranmal forests in Maharashtra (Jagtap *et al.*, 2004). Later, Yadav and Kambale (2008) collected it from Kasara Ghat, Murbad and Karjat region of Maharashtra. Singh *et al.* (2014) noted the species in wild at Bhoste Ghat (Khed), Matwan (Dapoli) and Hatiwale (Rajapur) in Ratnagiri District of Maharashtra. Mujaffar *et al.* (2004) noticed it from Nepanagar in Madhya Pradesh. At present no individuals are known from the Pavagadh Hills and at Mount Abu. Recently Patel *et al.*, (2017) collected it from Vijaynagar forest in Gujarat.

## Area of Occupancy (AOO)

| Estimated area of occupancy (AOO) - in km2 | Justification |
|---|---|
| 28 | As it occupies seven grid cells of 4km2, so the total area occupied would be 25km2 |

| Continuing decline in area of occupancy (AOO) | Qualifier | Justification |
|---|---|---|
| Yes | Observed | AOO was 40km2 during 1984; however, the plant could not be relocated from Pavagadh and Mount Abu. Hence the area of occupancy declined to 28km2 (at present). |

| Extreme fluctuations in area of occupancy (AOO) | Justification |
|---|---|
| No | - |

## Extent of Occurrence (EOO)

| Estimated extent of occurrence (EOO)- in km2 | EOO estimate calculated from Minimum Convex Polygon | Justification |
|---|---|---|
| 182175.9 | true | - |

| Continuing decline in extent of occurrence (EOO) | Qualifier | Justification |
|---|---|---|
| Yes | Observed | Earlier the species had a wide extent till Mount Abu in Rajasthan, its EOO was 206564.7km2 which gradually declined to 182175.9km2, since 1984 till date. |

| Extreme fluctuations in extent of occurrence (EOO) | Justification |
|---|---|
| No | - |

## Locations Information

| Number of Locations | Justification |
|---|---|
| 7 | The present number of locations is seven, as per Grid adjacency method. As there is no major threatening event affecting, hence the number of |

subpopulations are considered as the number of locations.

| Continuing decline in number of locations | Qualifier | Justification |
|---|---|---|
| Yes | Observed | Earlier the number of locations as per grid adjacency was nine based on the herbarium specimen information and other references. |

| Extreme fluctuations in the number of locations | Justification |
|---|---|
| No | - |

## Very restricted AOO or number of locations (triggers VU D2)

| Very restricted in area of occupancy (AOO) and/or # of locations | Justification |
|---|---|
| No | - |

## Elevation / Depth / Depth Zones

**Elevation Lower Limit (in metres above sea level):** 20

**Elevation Upper Limit (in metres above sea level):** 1200

## Map Status

| Map Status | How the map was created, including data sources/methods used: | Data Sensitive? | Justification | Geographic range this applies to: | Date restriction imposed: |
|---|---|---|---|---|---|
| Done | - | - | - | - | - |

## Biogeographic Realms

**Biogeographic Realm:** Indomalayan

# Occurrence

## Countries of Occurrence

| Country | Presence | Origin | Formerly Bred | Seasonality |
|---|---|---|---|---|
| India | Extant | Native | - | - |
| India -> Gujarat | Extant | Native | - | - |
| India -> Madhya Pradesh | Extant | Native | - | - |
| India -> Maharashtra | Extant | Native | - | - |
| India -> Rajasthan | Extant | Native | - | - |

# Population

Species is poorly represented in Indian herbaria (Kambale, 2015). During field surveying less than 100 individuals were located, distributed sporadically in varied small subpopulations. The subpopulation of Matwan near Dapoli in Maharashtra has the largest number of individuals to be 25.

## Population Information

**Current Population Trend:** Decreasing

**Number of mature individuals (=population size):** 94

| Extreme fluctuations? (in # of mature individuals) | Justification |
|---|---|
| No | - |

| Severely fragmented? | Justification |
|---|---|
| No | - |

| Continuing decline in mature individuals? | Qualifier | Justification |
|---|---|---|
| Yes | - | - |

| Extreme fluctuations in the number of subpopulations | Justification |
|---|---|
| No | - |

| Continuing decline in number of subpopulations | Qualifier | Justification |
|---|---|---|
| Yes | Inferred | In Gujarat, the species was recorded from Pavagadh hill by Sabnis & Bedi (1971). Several explorations were carried out periodically by various experts (Punjani 1997; Patel 2003, 2013; Pandey 2011; Meena 2012; Parmar 2012; Desai 2013); however, they could not re-collect this taxon from Pavagadh. |

**All individuals in one subpopulation:** No

**Number of mature individuals in largest subpopulation:** 25

| Number of | Justification | Subpopulation | Subpopulation | Number of | Subpopulation | Qualifier | Location | Number of | Location | Location | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Subpopulations | | Details | description | mature individuals | trend | | type | Subpopulations | bounding box | coordinates | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | - | - | - | - | - | - | - | - | - | - | - |

## Population Reduction - Past

| Basis? |
|---|
| c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, d) actual or potential levels of exploitation, e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites) |

| Reversible? | Understood? | Ceased? |
|---|---|---|
| No | Yes | No |

## Population Reduction - Future

| Basis? |
|---|
| c) a decline in area of occupancy, extent of occurrence and/or quality of habitat |

## Population Reduction - Ongoing

| Basis? |
|---|
| a) direct observation, b) an index of abundance appropriate for the taxon, c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, d) actual or potential levels of exploitation, e) the effects of introduced taxa,hybridization, pathogens, pollutants,competitors or parasites |

| Understood? | Ceased? |
|---|---|
| Yes | No |

# Habitats and Ecology

Grows in rocky areas amidst grasses and around the bushes in association with *Chlorophytum tuberosum* (Roxb.) Baker, *Dendrocalamus strictus* (Roxb.) Nees, *Terminalia elliptica* Willd., *Tylophora fasciculata* Buch.-Ham. ex Wight and *Wrightia tinctoria* R.Br. (Kambale, 2015).

## IUCN Habitats Classification Scheme

| Habitat | Season | Suitability | Major Importance? |
|---|---|---|---|
| 6. Rocky areas (eg. inland cliffs, mountain peaks) | - | Suitable | - |

## Continuing Decline in Habitat

| Continuing decline in area, extent and/or quality of habitat? | Qualifier | Justification |
|---|---|---|
| Yes | Inferred | Because of tourism. |

## Life History

| Generation Length | Justification | Data Quality |
|---|---|---|
| 1 | - | good |

| Age at maturity: female or unspecified | Longevity | Maximum Size (in cms) |
|---|---|---|
| 3 Months | 4 Months | 300 |

## Systems

**System:** Terrestrial

## Plant Specific

**Wild relative of a crop?** No

| Plant Growth Forms |
|---|
| Geophyte |

# Use and Trade

## General Use and Trade Information

It is traded at local, regional and national levels. Tribal people use the tubers to cure child fever and opacity of the eyes, leaves as vegetables (Jagtap *et. al.*, 2008). Tubers possess medicinal value (Kambale, 2015).

| Subsistence: | Rationale: | Local Commercial: | Further detail including information on economic value if available: |
|---|---|---|---|
| - | - | Yes | - |

**National Commercial Value:** Yes

**International Commercial Value:** Yes

**Is there harvest from captive/cultivated sources of this species?** No

## Threats

Singh *et al.*, (2014) reported that the main threats facing this species were loss of individuals due to collection of the plants tubers by local peoples for their medicinal properties, and degradation of its habitat caused by people coming to admire, the attractive flowers. In addition to these anthropogenic threats, as the flowers structure is highly complicated which drives off the pollinators, coupling their scanty flower density in small population size, additionally seed germinability is negligible as among the entire populations only few flowers produced follicles and even the majority of their seeds failed to germinate *in-situ* as well as under *ex-situ* conditions. Finally, any crossing which does occurs also amounts to inbreeding due to the narrow restricted population size.

### Threats Classification Scheme

| Threat | Timing | Scope | Severity | Impact Score |
|---|---|---|---|---|
| 1.3. Residential & commercial development -> Tourism & recreation areas | Ongoing | Majority (50-90%) | Rapid Declines | Medium Impact: 7 |
| 2.3.1. Agriculture & aquaculture -> Livestock farming & ranching -> Nomadic grazing | Ongoing | Majority (50-90%) | Very Rapid Declines | High Impact: 8 |
| 5.2.1. Biological resource use -> Gathering terrestrial plants -> Intentional use (species is the target) | Ongoing | Whole (>90%) | Very Rapid Declines | High Impact: 9 |
| 8.1.1. Invasive and other problematic species, genes & diseases -> Invasive non-native/alien species/diseases -> Unspecified species | Ongoing | Majority (50-90%) | Very Rapid Declines | High Impact: 8 |

## Conservation

Measures for conservation (Singh *et al.*, 2014):

1. The anthropogenic disturbances may be avoided as the first step to safeguard the extant miniature population, simply by fencing and strictly restricting encroachment.
2. Digging out of tubers by local dwellers needs to be banned completely and general awareness created in this direction on the botanical significance of these species.
3. Species' multiplication through culture techniques may be acquired as this method relies on regeneration of plants through other vegetative parts using minimal plant material.

Thus damage to the population is avoided because uprooting of even a single tuber shall further decimate the population and is not advisable for experiments. The juvenile plantlets after acclimatization can be reintroduced in their natural habitat and then monitored for successful establishment in wild.

### Conservation Actions In- Place

| Action Recovery Plan | Note |
|---|---|
| No | - |

| Systematic monitoring scheme | Note |
|---|---|
| No | - |

| Conservation sites identified | Note |
|---|---|
| No | - |

| Occur in at least one PA | Note |
|---|---|
| No | - |

| Percentage of population protected by PAs (0-100) | Note |
|---|---|
| 0 | - |

| Area based regional management plan | Note |
|---|---|
| No | - |

| Invasive species control or prevention | Note |
|---|---|
| No | - |

| Harvest management plan | Note |
|---|---|
| No | - |

| Successfully reintroduced or introduced benignly | Note |
|---|---|
| No | - |

| Subject to ex-situ conservation | Note |
|---|---|
| Yes | A step towards the conservation of species by using biotechnological tools has been taken by the Department of Botany, Shivaji University, Kolhapur in collaboration with Agharkar Research Institute (ARI), Pune, and Forest Department, Maharashtra, (MS) India. |

| Subject to recent education and awareness programmes | Note |
|---|---|
| Yes | - |

| Included in international legislation | Note |
|---|---|
| No | - |

| Subject to any international management/trade controls | Note |
|---|---|
| No | - |

**Important Conservation Actions Needed**

| Conservation Actions | Note |
|---|---|
| 3.2. Species management -> Species recovery | - |
| 3.3.1. Species management -> Species re-introduction -> Reintroduction | - |
| 4.3. Education & awareness -> Awareness & communications | - |
| 6.4. Livelihood, economic & other incentives -> Conservation payments | - |

**Research Needed**

| Research | Note |
|---|---|
| 1.5. Research -> Threats | - |
| 2.1. Conservation Planning -> Species Action/Recovery Plan | - |
| 3.1. Monitoring -> Population trends | - |

**Ecosystem Services**

**Ecosystem Services Provided by the Species**

| | Importance: | Geographic range of benefit: |
|---|---|---|
| 9. Provision of Critical Habitat | 1 - Very Important | Regional |

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**Sarcostemma intermedium** Decne.

Habit: Shrub

Fl. – Fr.: July – September

DSTR: Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala

DSTR Gujarat: Listed by Singh *et al.* (2015), Raghavan *et al*. (1981) and GEC (1996) without any precise localities.

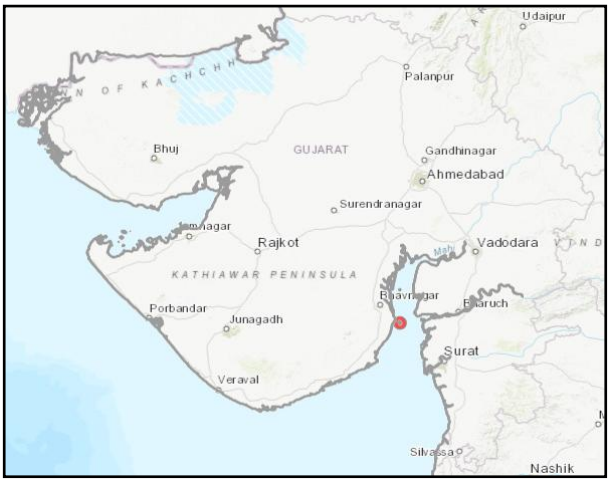


Figure 167: Distribution of *Sarcostemma intermedium*

Bhavnagar Dist.: Cooke (1901-1908) in Flora of Bombay Presidency reported it from "island of Perim at the mouth of the Narmada river"

Jamnagar Dist.: *T. Rao* 436 (CAL)

Kachchh Dist.: Dhara hillocks and recently collected by Patel (2013) from Tapakeshwari forest

Surendranagar Dist.: Sara

Specimen examined: *SLP* 2100 (SPU), *RPP* 14729, 19566 (BSJO)

EOO = 2923 km$^2$

AOO = 20 km$^2$

No. of locations: 5

AOO density: 0

**Vulnerable D2**

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**Hemidesmus indicus** var. **pubescens** (Wight and Arn.) Hook.f. [= *Hemidesmus pubescens* Wight and Arn.]

Habit: Climber

Fl. – Fr.: September – October

DSTR: Andhra Pradesh, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal (Singhadiya *et al.* 2011; Nayar *et al.* 2014; Singh *et al.* 2015)

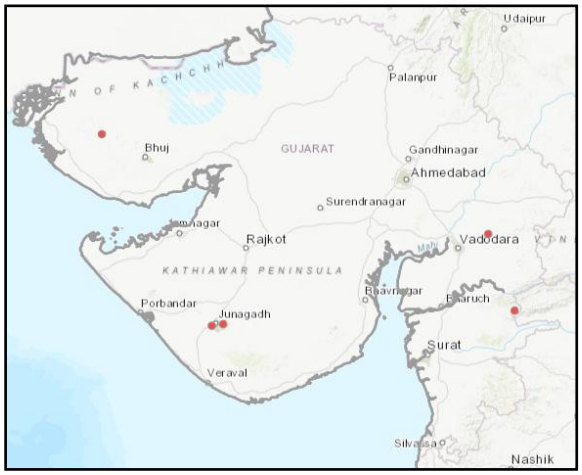


Figure 168: Distribution of *Hemidesmus indicus* var. *pubescens*

DSTR Gujarat:

Junagadh Dist.: Patel (2013) in his PhD work on climbing species of Gujarat, has reported this taxon from Girnar and Chobari

Kachchh Dist.: Singhadiya *et al.* (2011) have collected it from Muru village along Hajipir road, and reported it as an addition to the Flora of Gujarat

Narmada Dist.: In the present work, it was collected from Ninai

Panchmahal Dist.

Habitat: Rocky habitats, particularly low hillocks

Specimen examined: *R.P. Pandey* 20294 (BSJO)


Figure 169: *Hemidesmus indicus* var. *pubescens*

EOO = 58,199 km²

AOO = 20 km²

No. of locations: 05

AOO density: 0

This pubescent variety of the most commonly occurring climber *Hemidesmus indicus*, is very uncommon. It is reported from Kachchh, Saurashtra, central and southern Gujarat, and due to such sporadic points of occurrences it makes the convex polygon analysis (EOO) to be more and the species status to be **Endangered B2ab(i,ii,iii,iv)**.

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**Heterostemma dalzellii** Hook.f.

Habit: Shrub

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Meena and HariKrishna (2015) reported it as an addition to the Flora of Gujarat, collected from Ghichad in Narmada Dist.

Specimen examined: *Bedi* 2839 (BARO)

EOO = NA

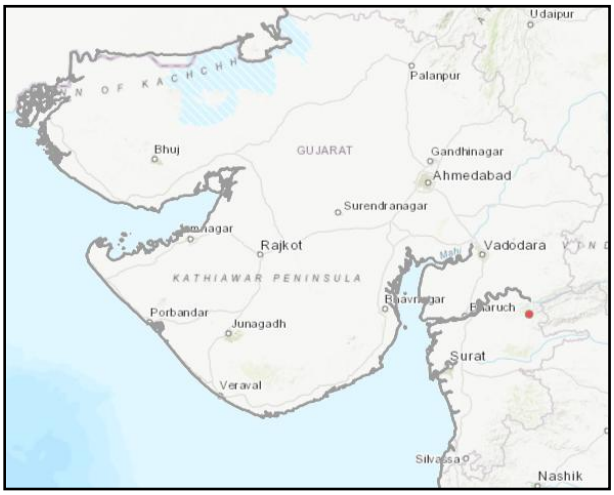


Figure 170: Distribution of *Heterostemma dalzellii*

AOO = 4 km²

No. of locations: 1

AOO density: 0

This twining shrub is restricted only to the northern Western Ghats (Maharashtra and Goa). Its regional status is assessed to be **Critically Endangered B2ab(iii,iv)**.

---

**Tylophora dalzellii** Hook.f.

Local name: *Radarudi*

Habit: Climber

Fl. – Fr.: April – December

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

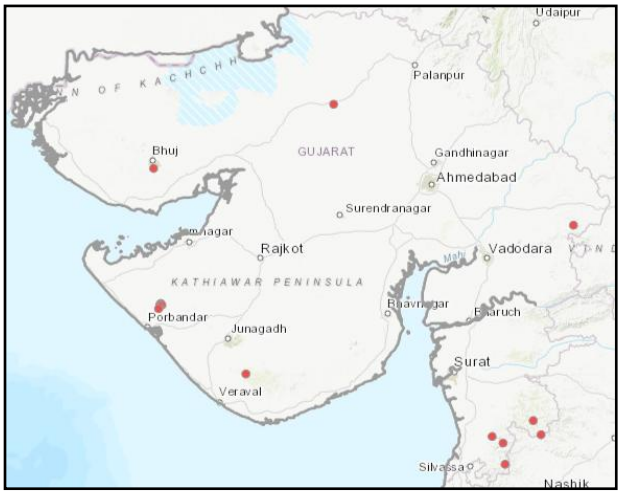


Figure 171: Distribution of *Tylophora dalzellii*

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015): Bole and Pathak (1988) have mentioned in the Flora of Saurashtra

Dahod Dist.: Dhanpur

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) reported it to be "rare, in the undergrowth of reserve forest at Malegaon-Kotumbdar", Ahwa (Joshi, 1970)

Devbhumi dwarka Dist.: The specimens collected by Nagar (2005) from Abhapar, Kileshwar, Venu and Ghumli, were later correctly identified to be *Telosma* sp.

Junagadh Dist.: Sasan

Kachchh Dist. (Thakar, 1926)

Patan Dist.: Satun

Porbandar Dist.: Barda (Thakar, 1910)

Valsad Dist.: Pangarbari, Sutharpada (Patel, 2013), Dharampur

Habitat: Rocky places in pasture lands and forest undergrowth

Specimen examined: *BS* 1252 (SPU), *MCJ* 500 (BARO)

EOO = 120,103.7 km²

AOO = 56 km²

No. of locations: 10

AOO density: 0.29

**Vulnerable B2ab(iii,iv)**.

Figure 172: *Tylophora dalzellii*

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**Wrightia dolichocarpa** Bahadur and Bennet

Local name: *Dudhkudi*

Habit: Tree

Fl. – Fr.: December – April

DSTR: Goa (Nayar *et al.* 2014; Singh *et al.* 2015)

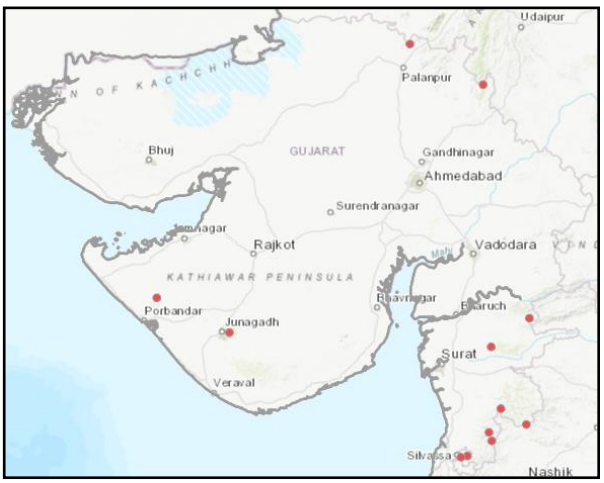


Figure 173: Distribution of *Wrightia dolichocarpa*

This species was first discovered and described by Bahadur and Bennet (1978) based on collections made from Nagarhaveli, adjacent to Valsad district in the South Gujarat. The length of follicles reach up to 95 cm (Fig. 175 c).

DSTR Dadra and Nagar Haveli (Reddy, 1987): Bonta, Saily (Bahadur and Bennet, 1978)

DSTR Gujarat (Singh *et al.* 2015):

Banaskantha Dt: Jessore (Rao, 2002), Manpuriya, Chori

Dang Dist. (Tadvi, 2013): Kilad, Kotamdar

Devbhumi dwarka Dist.: Ghumli

Junagadh Dist.: Girnar, Datar

Narmada Dist.: Sagai

Sabarkantha Dist.: Vijaynagar, Polo

Surat Dist.: Amli

Valsad Dist.: Reddy (1987) collected it from Kapurnya near Motikorval in Dharampur forest and reported as an addition to the flora of Gujarat. In the present study, it was collected from Ambatalat, Kaprada, Nanapodha, Pangarbari and Wilson hill

Habitat: Hill slopes

Specimen examined: *KRN* 33466 (BSJO)

EOO = 109,507.7 $km^2$

AOO = 48 $km^2$

No. of locations: 12

AOO density: 0

This tree is endemic only to Goa and Gujarat. In the later state, it shows sporadic distribution throughout, except Kachchh and central Gujarat, **Least Concern**.


Figure 174: *Wrightia dolichocarpa*: A. Habit, B. Flowering, C. Follicle (95 cm long)

**Gentianaceae Juss.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 80 | 1200 |
| India | 22 | 188 |
| Gujarat | 6 | 14 |
| Indian endemics | 12 | 49 |
| Indian endemics found in Gujarat | 3 | 3 |

**Exacum pumilum** Griseb.

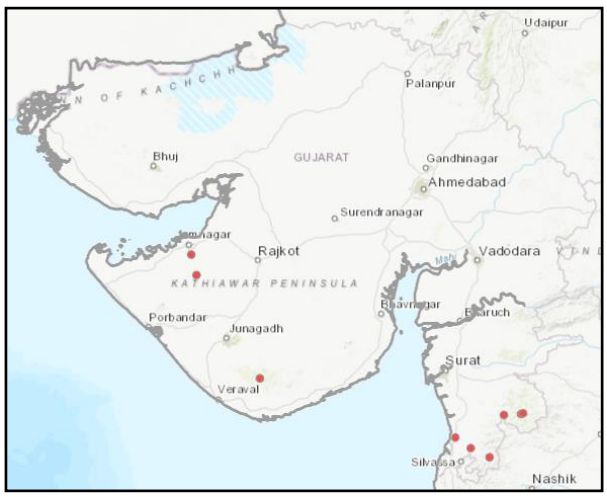

Figure 175: Distribution of *Exacum pumilum*

Habit: Herb

Fl. – Fr.: August – November

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014)

DSTR Gujarat (Nayar *et al.* 2014): Shah (1978) mentioned it from Valsad, Dangs and Saurashtra, among grasses

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noticed it to be rare, scattered among low grasses at Ahwa

Jamnagar Dist.: Khatiya, Ranjit Sagar

Junagadh Dist.: Sisodia (2007) analysed its frequency (7.66), density (0.47) and abundance (0.82) at Gir National Park

Navsari Dist.: Desai (1976) noted it to be common in grasslands and moist cultivated fields at Bansda

Valsad Dist. (Patel RM, 1971): Vora (1980) noted as common in moist places at Kaprada and Nana Pondha; further More (1972) found near moist places at the end of rainy season at Pardi

Habitat: Scattered among grasses

Specimen examined: *BS* 292, 303, *MJD* 841, 905, 1952, 2422, *PGM* 242, 1269, 1305, *HMV* 637, 1841 (SPU)

EOO = 27,844 km$^2$

AOO = 36 km²

No. of locations: 08

AOO density: 0.11

This herbaceous species is reported by different workers from Saurashtra and southern Gujarat. Though, it shows sporadic distribution, still occurs commonly scattered among grasses, and is assessed to be**Vulnerable B2ab(ii,iii,iv)**.

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**Swertia minor** (Griseb.) Knobl.

Habit: Herb

Fl. – Fr.: August

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

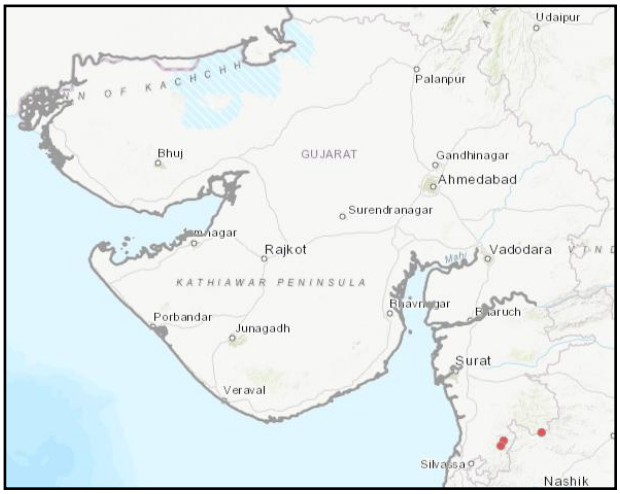


Figure 176: Distribution of *Swertia minor*

DSTR Gujarat:

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it as common, scattered among low grasses in the forest rest house compound at Malegaon

Valsad Dist.: Pangarbari, Pindval

Habitat: Scattered among grasses

Specimen examined: *BS* 1384 (SPU)

EOO = 34.3 km²

AOO = 12 km²

No. of locations: 02

AOO density: 0.33

This species is restricted to the Western Ghats showing its continuity in northern limit of ranges in Dangs and Valsad districts of southern Gujarat. **Vulnerable D2**.

**Rubiaceae Juss.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 630 | 10400 |
| India | 113 | 616 |
| Gujarat | 26 | 37 |
| Indian endemics | 45 | 235 |
| Indian endemics found in Gujarat | 2 | 2 |

Followed by Asteraceae, this is the second family with highest number of endemic taxa in India, among dicotyledons. Though two species which were earlier considered endemic show an extended distribution now *Kohautia nagporensis* (Brace ex Haines) Santapau & Merchant in Tropical Africa, and *Neanotis rheedei* (Wight and Arn.) W.H.Lewis in Sri Lanka.

**Ixora brachiata** Roxb.

Local name: *Garbale, Lokhind, Navri*

Habit: Tree

Fl. – Fr.: February – June

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

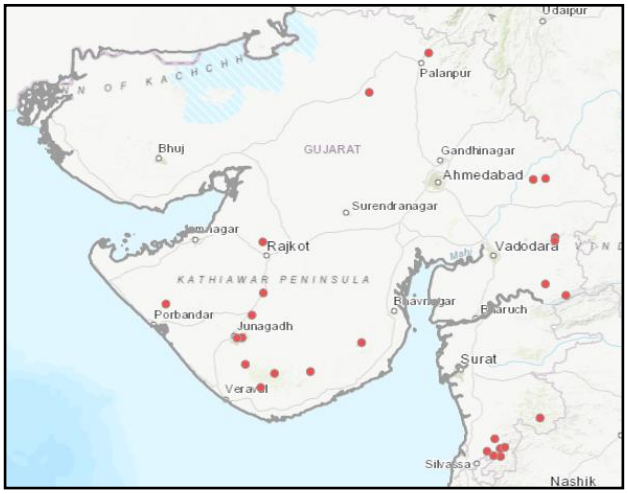


Figure 177: Distribution of *Ixora brachiata*

DSTR Gujarat (Nayar *et al.* 2014): Shah (1978) stated it as 'not common' and reported from Dangs, Panchmahal and Saurashtra

Banaskantha Dist.: Meena (2012) collected it from Balaram-Ambaji wildlife sanctuary

Bhavnagar Dist.: Oza (1991) mentioned it from Bhavnagar without stating precise locality or further details

Chhota udepur Dist.: Desai (2002) collected it from Naswadi and Jetpur Pavi ranges at Koraj, Ganiyar Bari, Satun and Vasangadh

Dang Dist. (Tadvi, 2013)

Gir somnath Dist.: Sisodia (2007) studied its frequency (8.57), abundance (0.46) and density (0.13) at Gir National Park

Junagadh Dist.: Santapau (1962) collected it from Sasan and Willingdon dam; further Menon (1979) noted occasionally at forests in Girnar, Mithyala and Sapnes

Mahisagar Dist.: Bhatt (1975) observed it to be rare, found in Dezar and Shingnali

Mehsana Dist.: Shah and Yogi (1974) have enlisted this species in their work on additions to the flora of North Gujarat

Porbandar Dist.: Santapau (1962) found it from Kileshwar

Rajkot Dist.: Santapau (1962) collected it from Gondal Lake, while Menon (1979) noted it from at Hadala

Valsad Dist.: Yadav (1979) observed it as rare in dense forests, along river banks at Dhamni and Pendha; Vora (1980) stated it as "common, but not abundant" noted on hilly slopes at Bilpudi, Mandva and Nana Pondha, and Gopal (1983) collected it from Kaprada

Specimen examined: *ARM* 455, 1681, 1743, 1699, 1885 (BARO), *GVG* 253, *HMV* 1655, 3237 (SPU)

EOO = 114,632.9 $km^2$

AOO = 104 $km^2$

No. of locations: 24

AOO density: 0.08

Its wood is hard and close grained, used for making walking sticks by the local Maldhari community in Saurashtra (Shah*et al*., 1981). This endemic tree is reported by several workers and distributed sporadically throughout Gujarat except Kachchh, thus it becomes a **Least Concern** species.

**Pavetta crassicaulis** Bremek.

Habit: Shrub

Fl. – Fr.: July – October

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

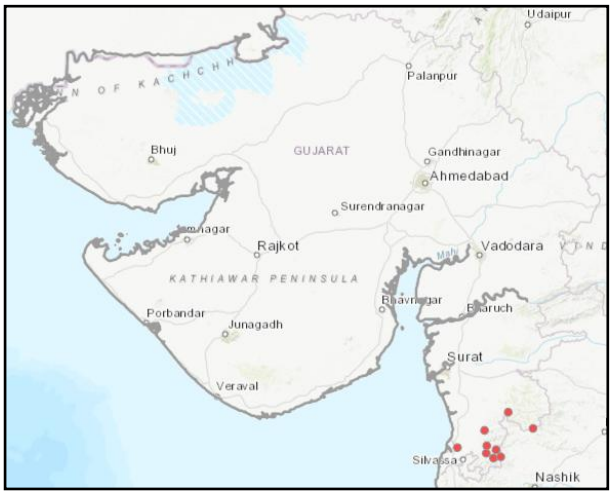


Figure 178: Distribution of *Pavetta crassicaulis*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) found it occasionally on hilly slopes at Malegaon and Saputara; Yadav (1979) collected it from Waghai

Valsad Dist.: Kaprada (Yadav, 1979), River Par, River Kolak (Vora, 1980), Dharampur, Dixal, Huda

Habitat: Hill slopes

Specimen examined: *BS* 790, 809, 1208, 2418 (SPU), *MCJ* 79 (BARO)

EOO = 2091.4 km$^2$

AOO = 36 km$^2$

No. of locations: 09

AOO density: 0

Figure 179: *Pavetta crassicaulis* (in flowering)

Bremekamp differs this species from *P. indica* by the following characters "flowering shoots peduncle-like either consisting of a single internode or the lowest internode much longer than all others together". This endemic shrub is restricted to Andhra Pradesh along with the Western Ghats, and shows continuity in southern Gujarat districts of the northern Sahyadris. Based on its limited distribution, the status assessed is **Vulnerable B1ab(iii,iv)+2ab(iii,iv)**.

**Acanthaceae Juss.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 364 | 4300 |
| India | 92 | 500 |
| Gujarat | 36 | 95 |
| Indian endemics | 30 | 234 |
| Indian endemics found in Gujarat | 11 | 18 |

**Barleria cuspidata** F.Heyne ex Nees

Habit: Shrub

Fl. – Fr.: December – March

DSTR: Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dang Dist.

Gandhinagar Dist.: Norda nala

Gir somnath Dist.: Sisodia (2007) studied the frequency (26.66), abundance (1.58) and density (0.94)

Kachchh Dist.

Mehsana Dist.: Shah and Yogi (1974) have mentioned this species in their work on additions to the flora of North Gujarat

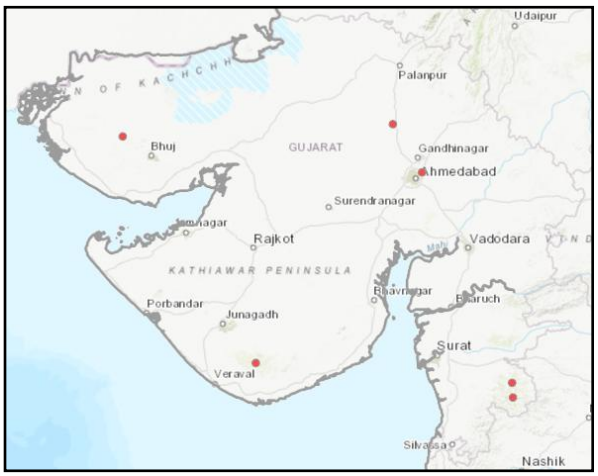


Figure 180: Distribution of *Barleria cuspidata*

EOO = 86,503.9 km$^2$

AOO = 24 km$^2$

No. of locations: 06

AOO density: 0

This shrub is endemic to the Western Ghats and occurs sporadically in all five zones of Gujarat, thus it is assessed to be **Least Concern**.

**Barleria gibsonii** Dalzell

Habit: Undershrub

Fl. – Fr.: September – November

DSTR: Maharashtra, Karnataka, Tamil Nadu (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

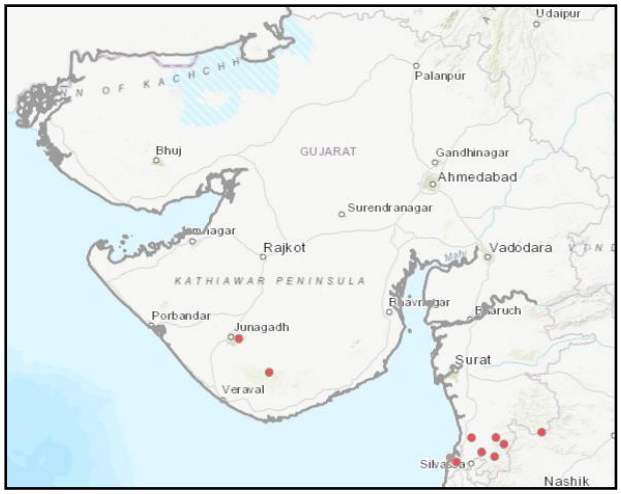


Figure 181: Distribution of *Barleria gibsonii*

Dang Dist.: Suryanarayana (1968) noticed it **rare** among grasses on slopes of Taula, Gira and Giri hills at Saputara, in pure or mixed patches with *Tricholepis*

Gir somnath Dist.: Sisodia (2007) studied the frequency (2.0), abundance (0.19) and density (0.10)

Junagadh Dist.: Menon (1979) observed it to be **very rare** in forest undergrowth at Girnar

Valsad Dist.: Dharampur, Kaprada, Nana Pondha (Vora, 1980), Rabda (More, 1972), Fansa, Pangarbari, Sarigam

Habitat: Among dried grasses, on hill slopes

Specimen examined: *ARM* 6, *BS* 2248 (SPU)

EOO = 13,059 km$^2$

AOO = 40 km$^2$

No. of locations: 10

AOO density: 0

This plant occurs in southern Gujarat and Saurashtra, based on its EOO is **Vulnerable B1ab(iii,iv)+2ab(iii,iv)**.

---

**Barleria lawii** T.Anderson

[= *Barleria sepalosa* C.B.Clarke]

Habit: Shrub

Fl. – Fr.: October – December

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

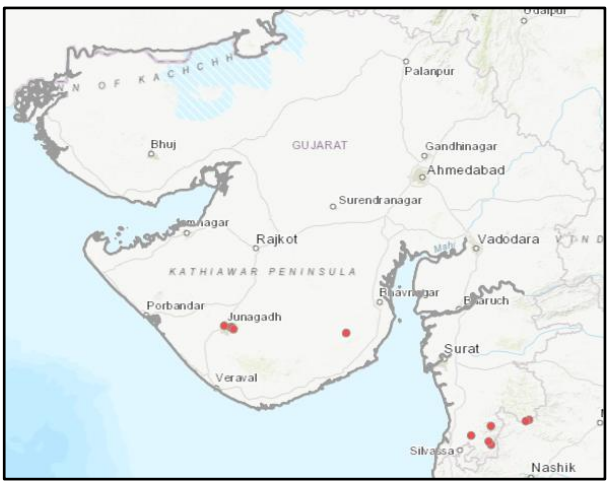


Figure 182: Distribution of *Barleria lawii*

Bhavnagar Dist.: Menon (1979) noted it occasional in the forest undergrowth

Dang Dist.: Suryanarayana (1968) observed it as common and abundant on the hilly slopes around Saputara only, which stands out distinct among other vegetation by the masses of white flowers

Junagadh Dist.: Cremation ground (Bole and Pathak, 1988), Girnar

Valsad Dist.: Dharampur, Kaprada, Nana Pondha (Vora, 1980)

Habitat: Among dense vegetation on hill slopes

Specimen examined: *KRN* 33476 (BSJO), *ARM* 2347, *BS* 831, 876, 2262 (SPU)

EOO = 12,796 km$^2$

AOO = 44 km$^2$

No. of locations: 07

AOO density: 0.37

Figure 183: *Barleria lawii* in flowering

This is a beautiful shrub with white flowers. It was reported for the first time in Gujarat from the Dangs, after which it was reported from Bhavnagar, then again from Valsad in south, and its last record was documented in the Flora of Saurashtra. So, after three decades we could rediscover the species occurrence for the state from the peak of Girnar hill. Due to the limited habitation, this shrub is evaluated to be regionally **Endangered B1ab(ii,iii,iv)+2ab(ii,iii,iv)**.

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**Barleria prattensis** Santapau

Habit: Undershrub

Fl. – Fr.: September – December

DSTR: Rajasthan, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Banaskantha Dist.: Meena (2012) collected it from Koteshwar near Ambaji

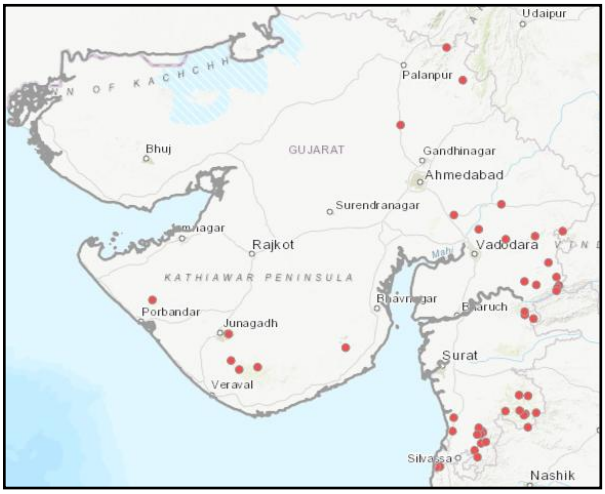


Figure 184: Distribution of *Barleria prattensis*

Bhavnagar Dist.: Meena (2014b) noted it commonly growing as forest undergrowth in moist places at Kadambagiri

Chhota udepur Dist.: Vagasthal, Rajmahal, Kadipani, Ambadungar, Satun, Jamli, Naswadi, Turkheda (Desai, 2002), Kavant (Thaker, 1974)

Dahod Dist.: Bedi (1968) observed it to be fairly common on higher altitudes, near Banvaro, Alindra, Pepargota and Ratanmahal. It becomes less common as we go towards north and is very rare on the plains.

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) observed it common in the undergrowth on hilly slopes along ghat roads at Ahwa, Malegaon and Subir; Borkhal, Mahal, Waghai (Yadav, 1979), Don

Gir somnath Dist. (Santapau and Raizada, 1954)

Jamnagar Dist.: Bole and Pathak (1988) in the Flora of Saurashtra noted it from Kileshwar

Junagadh Dist.: Menon (1979) found it frequent in forest undergrowth often gregarious at Sasan; Bole and Pathak (1988) stated its occurrence in Girnar and Junvaniya, in the Flora of Saurashtra

Mehsana Dist.: Shah and Yogi (1974) state its occurrence in "additions to the flora of North Gujarat"

Narmada Dist.: Pradeepkumar (1993) stated as "not so common" at Mohbi, Namgir and Waghumar

Panchmahal Dist.: Oza (1961) noted as fairly common and abundant in the lower slopes of the forest along sides of the path at Pavagadh, while Deshpande (1968) observed few plants in shaded spots along roadsides at Tuwa

Sabarkantha Dist. (Parmar, 2012): Bhatt (1971) observed as an undergrowth of forests ar Khedbrahma

Vadodara Dist.: Noted as rare, on the slopes of ravines and shaded localities at Savli (Padate, 1969; Padate, 1973)

Valsad Dist.: Avdha, Dhamni, Pendha, Sidhumbar, Sanjan, Palgam (Yadav, 1979), Amba, Bilpudi, Mandva (Vora, 1980), Parnera (More, 1972), Dungri hill (Patel RM, 1971), Khadakval (Rao, 2012)

Habitat: Undergrowth on hilly slopes, roadsides on ghat

Specimen examined: *Deshpande* 383, 1139, *ARM* 5, *BS* 2114 (SPU), *Gpk* 1533, *Bhatt* 1070, 1356, *Bedi* 462, 650, 700, *Oza* 110, 173, 1161, *Padate* 768, 1396, 3251 (BARO)

EOO = 119,729.84 km$^2$

AOO = 204 km$^2$

No. of locations: 39

AOO density: 0.24

This is another aesthetic member of the Barlerias, it is very showy, especially the flowers. This pretty looking plant is often conspicuous by its masses of violet-purple flowers. It is widely spread throughout in the state, except Kachchh. Due to the sporadic occurrence records of the species, it shows to be **Least Concern**.

Figure 185: *Barleria prattensis* in flowering

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**Cynarospermum asperrimum** (Nees) Vollesen [= *Blepharis asperrima* Nees]

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dang Dist.: Malegaon

Sabarkantha Dist. (Parmar, 2012): Bhatt (1971) stated as "not very common"

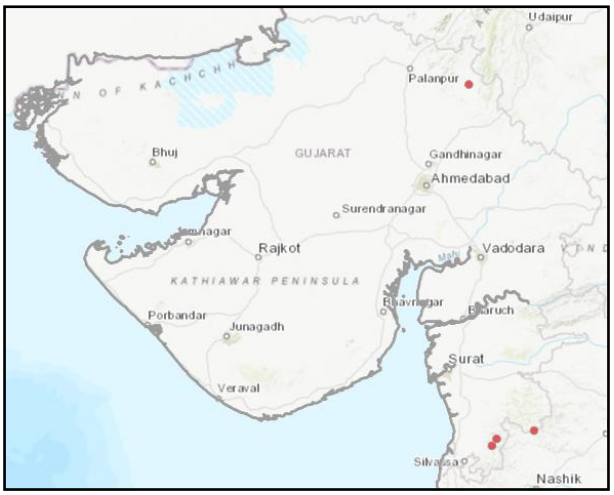


Figure 186: Distribution of *Cynarospermum asperrimum*

and collected from lower slopes of hillocks at Khedbrahma

Valsad Dist.: Yadav (1979) observed it as rare in shaded areas and in forest undergrowth at Pendha and Pangarbari

Specimen examined: *Bhatt* 260 (BARO), *Dharampur* 241, 242 (SPU)

EOO = 8535 km$^2$

AOO = 16 km$^2$

No. of locations: 03

AOO density: 0.25

This herbaceous species is endemic to the Western Ghats and is distributed infrequently in southern and northern Gujarat. And based on its extent of occurrence it is **Vulnerable D2**.

---

**Dyschoriste vagans** (Wight) Kuntze [=*Calophanes vagans* Wight]

Habit: Herb

Fl. – Fr.: November – February

DSTR: Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist.: Bheskatri, Mahal, Malegaon, Saputara

Narmada Dist.

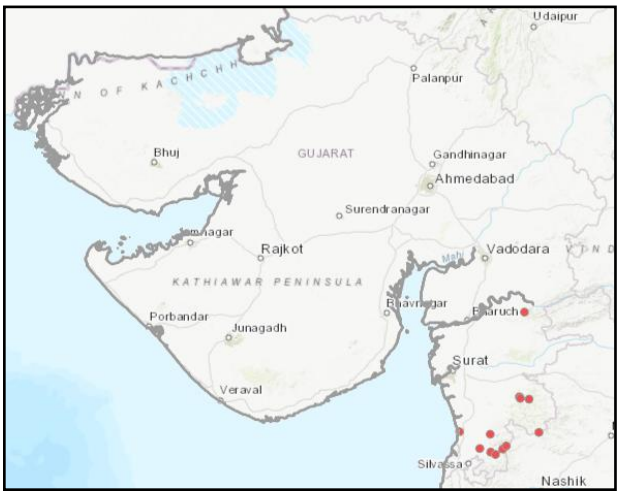


Figure 187: Distribution of *Dyschoriste vagans*

Valsad Dist.: Patel RM (1971) noted it occasional in field hedges from Nanakwada; Vora (1980) noted as "not so common" in waste places and cultivated fields at Dharampur, Kaprada and Nana Pondha; Rao (2012) noted as rare, on the edges of fields at Veri Bhavada; Moti Korval and Tuterkhed

Specimen examined: *HMV* 675, 2245, *RMP* 3787, 3788, 3789 (SPU)

EOO = 7021.6 km$^2$

AOO = 48 km$^2$

No. of locations: 09

AOO density: 0.25

This herbaceous plant is endemic to the Sahyadris, and shows continuity in the northern most ranges of the Western Ghats *i.e.*, southern districts of Gujarat. As the occurrence records are in close proximity the species is evaluated to be **Vulnerable B1ab(iii,iv)+2ab(iii,iv)**.

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**Eranthemum roseum** (Vahl) R.Br. [= *Justicia rosea* Vahl]

Local name: *Dashmuli*

Habit: Undershrub

Fl. – Fr.: October – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Ahmedabad Dist.

Anand Dist. (Anjaria, 2002)

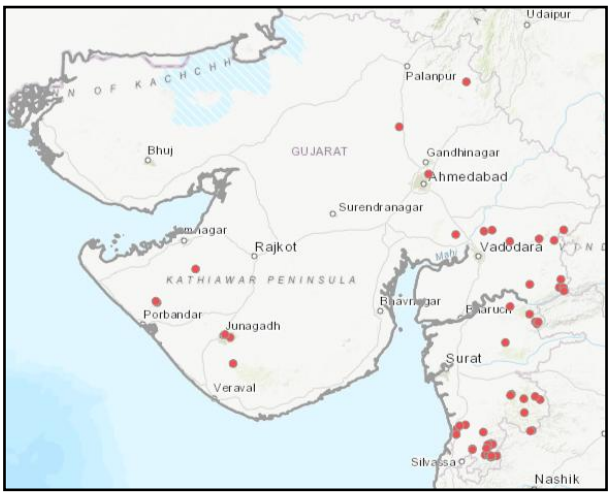


Figure 188: Distribution of *Eranthemum roseum*

Chhota udepur Dist.: Mogra, Kadipani, Hampeshwar road, Koraj, Satun, Raipur-kundal, Naswadi, Lagami (Desai, 2002), Kavant (Thaker, 1974)

Dahod Dist.: Bedi (1968) observed it common and subgregarious on hilly slopes of Ratanmahal, especially to the south of Panam river

Dang Dist. (Tadvi, 2013): Ahwa, Mahal, Malegaon, Pipaldahad, Saputara, Subir (Suryanarayana, 1968), Bheskatri (Yadav, 1979)

Figure 189: *Eranthemum roseum* in flowering

Devbhumi dwarka Dist.: Bole and Pathak (1988) in the Flora of Saurashtra, mentioned its occurrence from Abhapara and Ghumli Jamnagar Dist.

Junagadh Dist.: Girnar (Bole and Pathak, 1988), Sasan (Menon, 1979)

Mehsana Dist.: Shah and Yogi (1974) have documented its occurrence in the Additions to the flora of North Gujarat

Narmada Dist.: Pradeepkumar (1993) has seen commonly in forest areas at Ninaighat, Sagai, Vav and Waghumar; Shah (1967) mentioned from Rajpipla, in the Flora of Gujarat; Yadav (1979) observed it common in moist places at Chandrapada

Navsari Dist.: Abrama

Panchmahal Dist.: Oza (1961) observed it fairly abundant in forest undergrowth, halfway up the hill, and sides of the paths at Pavagadh

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972)

Vadodara Dist.: Padate (1969) observed it rare at Kamalpura

Valsad Dist. (Inamdar and Patel, 1971): Vavar (Rao, 2012), Dharampur, Kaprada, Nana Pondha (Vora, 1980), Abrama, Atgam, Palan (Patel RM, 1971), Hedri, Parnera, Pendha (Yadav, 1979)

Habitat: Forest undergrowth and wastelands

Specimen examined: *Oza* 269, 271, *Gpk* 160, 1652, *Padate* 2131, 2132, *Bedi* 699 (BARO), *BS* 2429 (SPU)

EOO = 105,489.2 km$^2$

AOO = 236 km$^2$

No. of locations: 38

AOO density: 0.36

This endemic medicinal plant is found to occur very commonly in forests undergrowth and wastelands, distributed throughout the state except Kachchh. And thus its status is **Least Concern**.

---

**Haplanthodes neilgherrensis** (Wight) R.B.Majumdar

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Banaskantha Dist.: Meena (2012) collected it from Balaram-Ambaji wildlife sanctuary

Dahod Dist.: Bedi (1968) observed it less common than *Haplanthodes verticillatus* and more common on the upper heights *i.e.* near Banvaro and Panam

Narmada Dist.: Namgir, Shisha, Waghumar (Pradeepkumar, 1993), Rajpipla (Shah, 1967)

Panchmahal Dist.: Bedi *et al*. (1972) noticed it to ocassionally on the lower part of the Pavagadh hill

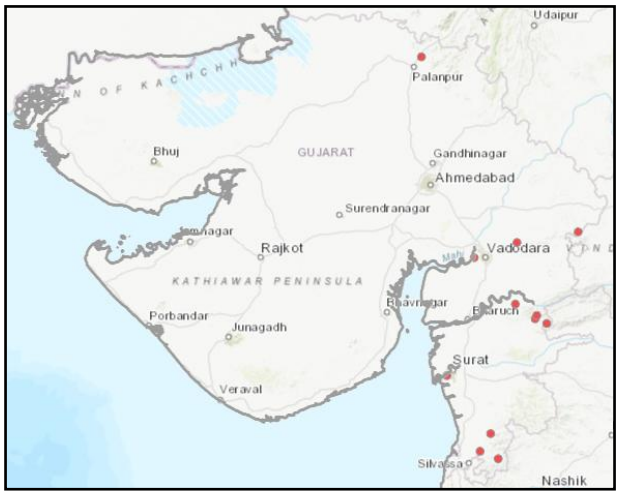

Figure 190: Distribution of *Haplanthodes neilgherrensis*

Surat Dist.: Joshi (1980) noticed it ocassionally as an undergrowth of hedges

Vadodara Dist.: Sabnis (1967) noted in waste places, stony pathways and even lawns especially in the dry season and in the shade of tall trees

Valsad Dist. (Inamdar and Patel, 1971): Dharampur, Kaprada, Nanapondha (Vora, 1980)

Habitat: Undergrowth of hedges

Specimen examined: *Sabnis* 905, 2455, *JVJ* 1853, 1963, *Bedi* 387, 1490, 6633, *JVJ* 1963 (BARO)

EOO = 38,943.7 km$^2$

AOO = 48 km$^2$

No. of locations: 11

AOO density: 0.08

This endemic herb can be easily differentiated from it by its slender cladodes and slightly pubescent capsule. During summer, the leaves fall off and leafless horizontally spreading branches with erect spikes at the end are observed. It is mostly occurring in southern and central Gujarat, with one recent record from northern Gujarat. **Near Threatened**.

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**Haplanthodes tentaculatus** (L.) R.B.Majumdar [= *Ruellia tentaculata* L.]

Habit: Herb

Fl. – Fr.: October – January

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Ahmedabad Dist.

Chhota udepur Dist.: Thaker (1974) noted along with grasses near streams at Kavant

Dang Dist. (Tadvi, 2013): Bheskatri, Pipaldahad (Yadav, 1979), Ahwa, Mahal, Malegaon, Subir (Suryanarayana, 1968)

Gir somnath Dist. (Santapau and Raizada, 1954)

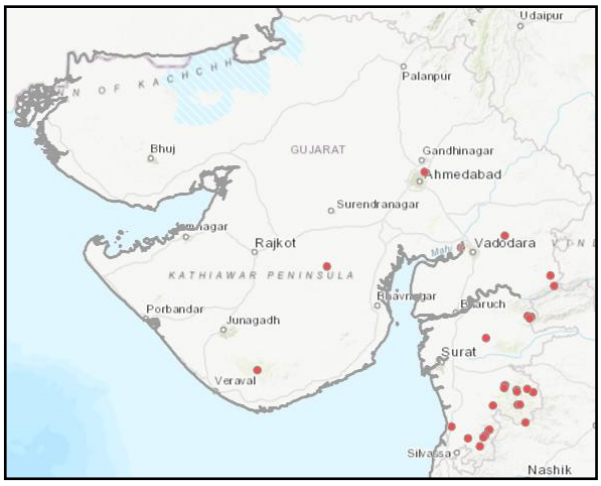


Figure 191: Distribution of *Haplanthodes tentaculatus*

Junagadh Dist.: Bole and Pathak (1988) in the Flora of Saurahtra stated its occurrence at Shirvaniya

Mahisagar Dist.

Narmada Dist.: Sagai

Navsari Dist.: Bansda (Desai, 1976)

Panchmahal Dist.: Chavan and Sabnis (1960) reported it from the Vishwamitri riverbank

Surat Dist.: Zankhvav (Yadav, 1979)

Valsad Dist. (Patel RM, 1971): Kaprada (Rao, 2012), Dharampur, Nanapondha (Vora, 1980), Parnera (More, 1972), Hedri, Pendha (Yadav, 1979)

EOO = 61,388.3 km$^2$

AOO = 116 km$^2$

No. of locations: 21

AOO density: 0.28

Habitat: Common in forest and moist places

Specimen examined: *BS* 807 (SPU), *DNT* 1867, *KRN* 119, *Dipa* 742 (BARO)

This endemic herb is commonly occurring in Gujarat except Kachchh and northern Gujarat. Due to extensive distribution it becomes **Least Concern**.

**Haplanthodes verticillatus** (Roxb.) R.B.Majumdar

Local name: *Kalun Kariyatun*

Habit: Herb

Fl. – Fr.: October – January

DSTR: Maharashtra, Karnataka, Tamil Nadu (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

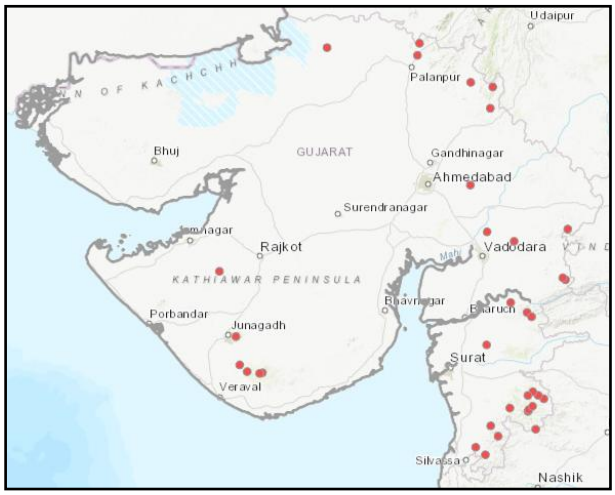


Figure 192: Distribution of *Haplanthodes verticillatus*

Banaskantha Dist.: Meena (2012) collected it from Balaram-Ambaji road, Jessore wildlife sanctuary

Chhota udepur Dist.: Thaker (1974) observed as an undergrowth of forests on the slopes of hillocks at Kavant

Figure 193: *Haplanthodes verticillatus*

Dahod Dist.: Bedi (1968) noted as common in rocky places, along the banks of streams, but rare on the plains at Ratanmahal

Dang Dist. (Tadvi, 2013): Ahwa, Nilsakiya (Yadav, 1979), Malegaon, Pipaldahad, Saputara, Subir (Suryanarayana, 1968)

Gir somnath Dist. (Santapau and Raizada, 1954)

Junagadh Dist.: In the Flora of Saurashtra (Bole and Pathak, 1988), it has been reported from various localities at Girnar, Junvaniya, Kankai, Sasan and Shirvaniya

Kheda Dist.: Kapadvanj

Narmada Dist.: Chopadi, Namgir, Vav (Pradeepkumar, 1993), Rajpipla (Shah, 1967)

Navsari Dist.: Anklachh, Vati (Desai, 1976)

Panchmahal Dist.: Machi (Oza, 1961), Kavant

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972), Dholwani, Vanaj (Parmar, 2012)

Surat Dist.: Vankal

Vadodara Dist.: Savli (Padate, 1969; Padate, 1973)

Valsad Dist.: Kaprada (Rao, 2012), Dharampur, Nana Pondha (Vora, 1980)

EOO = 125,455.4 km$^2$

AOO = 140 km$^2$

No. of locations: 30

AOO density: 0.14

Habitat: Forest undergrowth

Specimen examined: *DNT* 1509, *Bedi* 676, 938 (BARO), *BS* 759 (SPU)

This endemic herbaceous species is spread across the state except Kachchh, and due to this extensive occurrence it is **Least Concern**.

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**Hygrophila serpyllum** (Nees) T.Anderson [= *Physichilus serpyllum* Nees]

Local name: *Sarapat*

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra, Goa (Nayar *et al.* 2014; Singh *et al.* 2015)

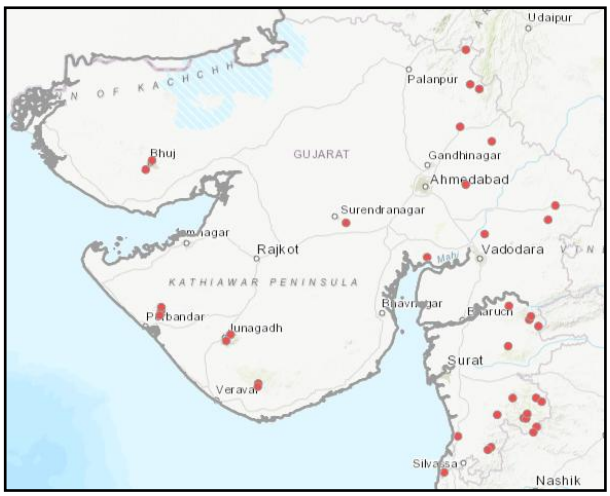


Figure 194: Distribution of *Hygrophila serpyllum*

DSTR Gujarat (Nayar *et al.* 2014):

Anand Dist.: Bhagwanani, 1980) noticed it forming mats near the margin of drying ponds and puddles at Khambhat

Arvalli Dist.: Saxton and Sedgwick (1918) collected it from Modasa and Vatrak

Banaskantha Dist.: Meena (2012) collected it from Hathidhara forest

Dahod Dist.: Devgadh Baria

Dang Dist. (Tadvi, 2013): Bheskatri, Galkund, Sunda (Yadav, 1979), Ahwa, Malegaon, Pipaldahad, Subir (Suryanarayana, 1968)

Gir somnath Dist.

Junagadh Dist.

Kachchh Dist. (Patel *et al.*, 2011)

Narmada Dist.: Kelda, Namgir, Sankali, Waghumar (Pradeepkumar, 1993), Rajpipla (Shah, 1967)

Navsari Dist.: Bansda (Desai, 1976)

Panchmahal Dist.: Sankali

Porbandar Dist.: Barda (Bole and Pathak, 1988, Nagar, 2005)

Sabarkantha Dist.: Khedbrahma (Yogi, 1970; Bhatt, 1971; Bhatt and Sabnis, 1972; Parmar, 2012), Himmatnagar, Moti Posina, Vireshwar

Surat Dist.: Umarpada

Vadodara Dist.: Padate (1973) observed as forming mats near the edges of drying ponds and puddles at Savli

Valsad Dist. (Inamdar and Patel, 1971): Pendha (Yadav, 1979), Parnera (More, 1972), Umbergaon (Bhagwanani, 1980)

EOO = 145,953.8 km$^2$

AOO = 152 km$^2$

No. of locations: 33

AOO density: 0.13

Habitat: Forming mats on edges of drying ponds, puddles

Specimen examined: *Padate* 756, 3342, *PPB* 228, 495 (BARO), *BS* 2773 (SPU)

This species is very commonly found in moist pockets, near the edges of drying ponds, puddles. It is reported by several workers and widely distributed in the state, giving the status **Least Concern**.

---

**Justicia neesii** Ramamoorthy [= *Rostellularia neesii* (Ramamoorthy) A.K.Mukh.]

Habit: Herb

Fl. – Fr.: September – November

DSTR: Maharashtra, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Anand Dist.: Dhuvaran

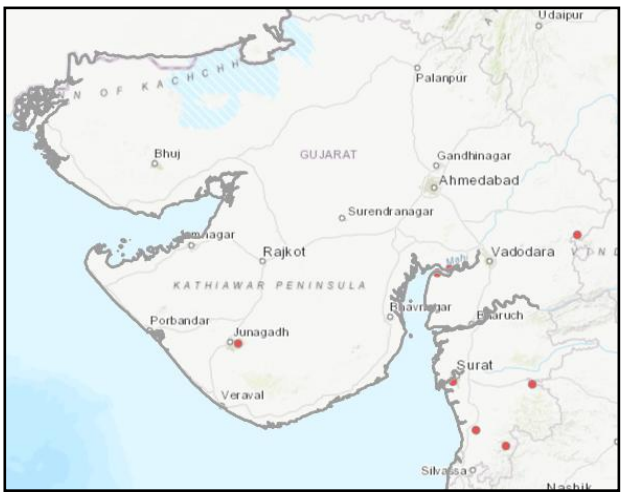


Figure 195: Distribution of *Justicia neesii*

Bharuch Dist.: Kavi

Dahod Dist.: Kanjeta

Junagadh Dist.: Bole and Pathak (1988) stated its occurrence at Girnar

Navsari Dist.: Chari

Surat Dist.

Tapi Dist.: Gaumukh

Valsad Dist.: Reddy (1987) declared to be an extremely rare species, but once exposed among grasses at Pangarbari

EOO = 39,596.7 km$^2$

AOO = 32 km$^2$

No. of locations: 08

AOO density: 0

Specimen examined: *ASR* 2431 (SPU)

It shows a very discontinuous distribution in Saurashtra, central and southern Gujarat, thus based on the above criteria it is assessed to be **Vulnerable B2ab(iii,iv)**

---

**Justicia orbiculata** Wall. ex T.Anderson

Figure 196: Distribution of *Justicia orbiculata*

Habit: Herb

Fl. – Fr.: August – November

DSTR: Tamil Nadu (Nayar *et al.* 2014)

DSTR Gujarat:

Ahmedabad Dist.: Yogi (1970) noted it as abundant

Sabarkantha Dist.: Prantij (Saxton and Sedgwick, 1918; Parmar, 2012)

EOO = NA

AOO = 8 km$^2$

No. of locations: 2

AOO density: 0

Specimen examined: *Saxton* 324

Based on the above findings it is evaluated to be **Endangered B2ab(iii,iv)**

**Neuracanthus sphaerostachys** Dalzell

Local name: *Ganther*

Habit: Shrub

Fl. – Fr.: August – October

DSTR: Rajasthan, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

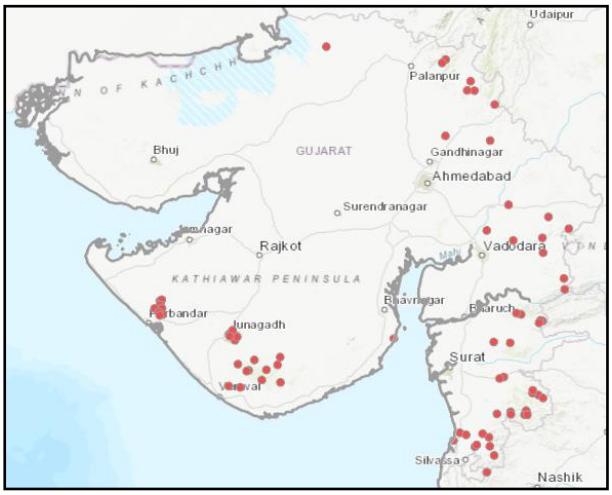


Figure 197: Distribution of *Neuracanthus sphaerostachys*

Arvalli Dist.: Modasa (Yogi, 1970)

Banaskantha Dist.: Danta on way to Hadad, Kangura-Umbrapani village near Ambaji (Meena, 2012), Vav

Bhavnagar Dist.: Meena (2014b) collected it from Mithi Viradi

Chhota udepur Dist.: Ambadungar, Pavi-jetpur, Satun (Desai, 2002), Kavant (Thaker, 1974)

Dahod Dist.: Bedi (1968) stated as 'not very common', occasionally noted as an undergrowth of forests on the hilly forest slopes, or sometimes associated with tall grasses in open places at Ratanmahal, also collected from Devgadh Baria

Dang Dist. (Tadvi, 2013): Ghoghli, Subir (Yadav, 1979), Ahwa, Pipaldahad (Suryanarayana, 1968), Waghai

Devbhumi dwarka Dist.: Abhapar, Kileswar, Venu, Ghumli (Nagar, 2005)

Gir somnath Dist. (Santapau and Raizada, 1954; Sisodia, 2007)

Junagadh Dist.: Bole and Pathak (1988) in the Flora of Saurashtra have reported it from Girnar, Jasadhar, Junvaniya and Tulsishyam; Menon (1979) observed it frequent in forest undergrowth at Ramnath, Sapnes and Sasan

Narmada Dist.: Kalvat, Shisha, Vav (Pradeepkumar, 1993), Rajpipla (Shah, 1967)

Navsari Dist.: Bansda (Desai, 1976)

Panchmahal Dist.: Pavagadh (Oza, 1961), Tuwa (Deshpande, 1968)

Porbandar Dist.: Godhana, Satvirda, Adityana, Ranavav (Nagar, 2005)

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971), Mahudi, Pahada (Yogi, 1970), Dharod, Vadali (Parmar, 2012)

Surat Dist.: Umarpada, Zankhvav (Yadav, 1979)

Tapi Dist.: Vyara (Yadav, 1979)

Vadodara Dist.: Padate (1973) observed along roadsides and also on the slopes of ravines, and stated as 'not common'

Valsad Dist. (Inamdar and Patel, 1971): Dighi (Rao, 2012), Dhamni, Sidhumbar (Yadav, 1979), Dharampur, Kaprada, Nana Pondha (Vora, 1980), Chival, Dhari, Parnera, Rabda, Udwada (More, 1972)

EOO = 141,415.9 km$^2$

AOO = 312 km$^2$

No. of locations: 54

AOO density: 0.31

Habitat: Riverbeds, moist shady regions

Specimen examined: *Padate* 533, 3704, *Bedi* 3023 (BARO), *ARM* 1031, 2007, 1574, 1272, *BS* 1012, 2183, 1455, 1647 (SPU)

The shrub is reported by several experts and is distributed throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

---

**Neuracanthus tetragonostachyus** subsp. **trinervius** (Wight) Bidgood [= *Neuracanthus trinervius* Wight]

Habit: Herb

Fl. – Fr.: November – March

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015): According to Shah (1978) in Flora of Gujarat it is fairly common at Malegaon (Dangs).

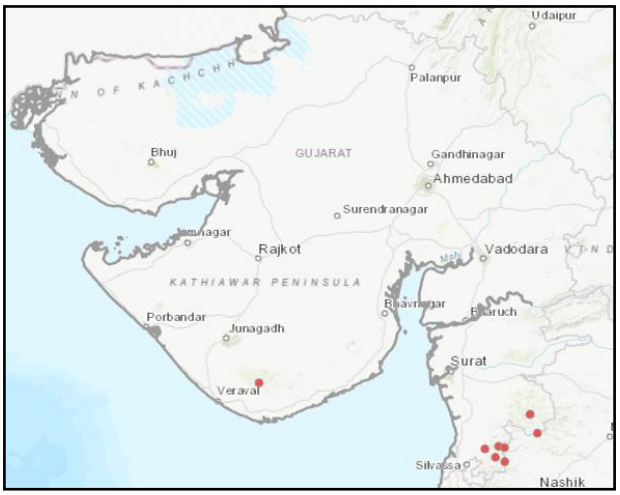


Figure 198: Distribution of *Neuracanthus tetragonostachyus* subsp. *trinervius*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) observed as fairly common in the dense forest undergrowth,

in the vicinity of Malegaon only, while Yadav (1979) collected it from Nilsakiya and Saputara

Gir somnath Dist.: Sisodia (2007) estimated its frequency (17.83), abundance (4.43) and density (2.52) at the Gir National Park

Valsad Dist.: Vora (1980) noted as common and abundant, forming distinct patches at Dharampur, Kaprada and Nanapondha; also collected from Huda and Tuterkhed in the present explorations

Habitat: Dense forest undergrowth

Specimen examined: *BS* 757, 2392, 2410, 2811, *HMV* 1198, 1200, 1199 (SPU)

EOO = 8841.5 km$^2$

AOO = 36 km$^2$

No. of locations: 07

AOO density: 0.22

**Vulnerable B1ab(iii,iv)+2ab(iii,iv)**

Figure 199: *Neuracanthus tetragonostachyus* subsp. *trinervius*

---

**Rungia elegans** Dalzell and A.Gibson

Local name: *Dungari-Khadsaliyo*

Habit: Herb

Fl. – Fr.: September – January

DSTR: Rajasthan, Uttarakhand, Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Arvalli Dist.: Modasa

Bhavnagar Dist.: Meena (2014b) collected it from Palitana and Shatrunjaya

Dang Dist.: The only record of its occurrence from southern Gujarat is by Tadvi (2013) without mentioning any locality or further details

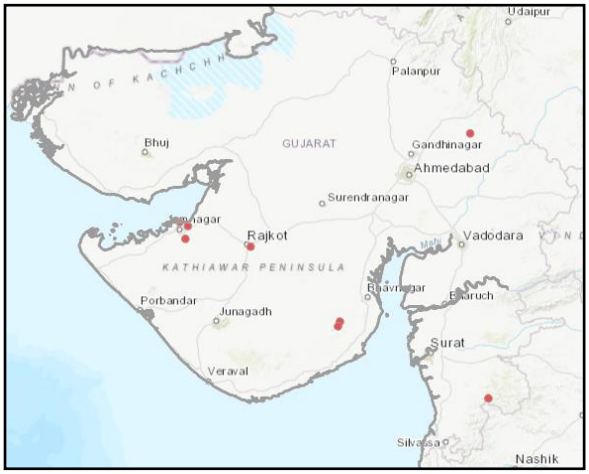


Figure 200: Distribution of *Rungia elegans*

In the flora of Saurashtra by Bole and Pathak (1988), it has been reported from the following three districts:

Devbhumi dwarka Dist.: Beyt

Jamnagar Dist.: Dhunvav, Ranjit Sagar, Rozi

Rajkot Dist.: Pradhyuman park

Habitat: Forest undergrowth

Specimen examined: *57769* (BLATT), *PSN* 596 (BARO)

EOO = 66,053.5 km$^2$

AOO = 36 km$^2$

No. of locations: 08

AOO density: 0.11

Based on the above results it is evaluated as **Vulnerable B2ab(iii,iv)**

---

**Strobilanthes callosa** Nees

[= *Carvia callosa* (Nees) Bremek.]

Local name: *Karavi, Karev*

Habit: Shrub

Fl. – Fr.: October – November

DSTR: Rajasthan, Madhya Pradesh, Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

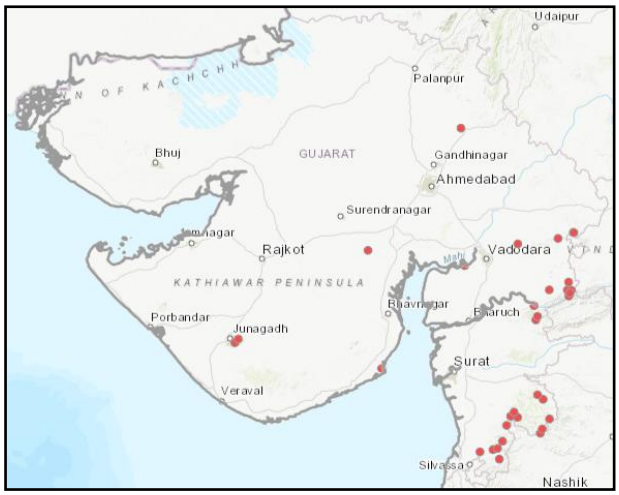


Figure 201: Distribution of *Strobilanthes callosa*

DSTR Gujarat (Nayar *et al.* 2014; Singh *et al.* 2015):

Saurashtra (Santapau, 1953; Bole and Pathak, 1988)

Chhota udepur Dist.: Mogra, Kadipani, Turkheda, Kevdi, Jamlidam, Rangpur (Desai, 2002), Ambadungar (Thaker, 1974), Handev dungar, Kavant

Dahod Dist.: Bedi (1968) noted as most common shrub in the region, fairly abundant on almost all the hilly forest regions of Ratanmahal

Dang Dist. (Tadvi, 2013): Malegaon, Saputara, Subir (Suryanarayana, 1968), Don, Galkund, Waghai

Narmada Dist.: Dabka, Phulsar, Namgir, Vaghumar (Pradeepkumar, 1993), Rajpipla (Shah, 1967), Gora

Navsari Dist.: Desai (1976) collected from Ambabari, Anklach, Mankunia and Vati

Figure 202: *Strobilanthes callosa* in flowering

Panchmahal Dist.: Oza (1961) observed it very abundant on the slopes of Pavagadh hill in pure patches

Sabarkantha Dist.: Himmatnagar

Valsad Dist.: Chavshala (Rao, 2012), Dharampur, Nana Pondha (Vora, 1980), Dhamni, Pendha

Habitat: Forest hill slopes

Specimen examined: *Oza* 103, 262, *Bedi* 926, 1747, 1961, 2978, 3250 (BARO), *BS* 802 (SPU), *Joshi* 326

EOO = 76,241.6 km$^2$

AOO = 132 km$^2$

No. of locations: 26

AOO density: 0.21

The growth is so dense and at times in pure formation, that it becomes very difficult problem to locate forest paths during monsoon. **Least Concern**

---

**Thelepaepale ixiocephala** (Benth.) Bremek. [= *Strobilanthes ixiocephala* Benth.]

Habit: Shrub

Fl. – Fr.: November – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

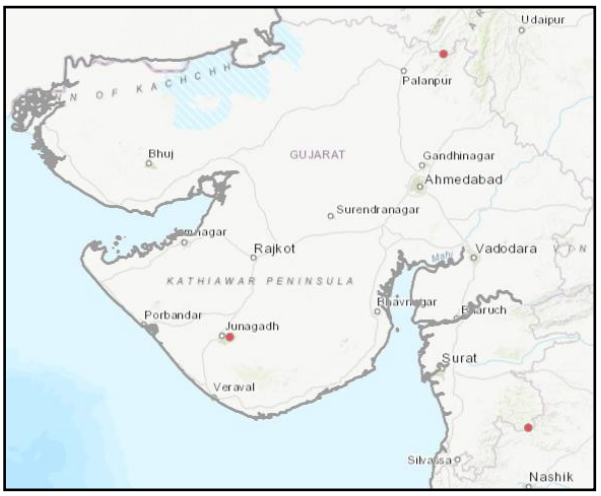


Figure 203: Distribution of *Thelepaepale ixiocephala*

DSTR Gujarat (Nayar *et al.* 2014): Shah (1963) has stated its occurrence in 'further contribution to the vegetation of Baroda'. The distribution of plant as given in the Cooke's Flora of Bombay presidency reveals that it is a forest species confined to Kanara and Konkan. Sabnis (1967) has mentioned it on the authority of Shah (*loc. cit.*) and stated with a doubtful occurrence

Banaskantha Dist.: Meena (2012) collected it from Ambaji

Dang Dist. (Tadvi, 2013)

Junagadh Dist.: Menon (1979) observed it rare in the forest undergrowth at Girnar

EOO = 64,730.4 km$^2$

AOO = 12 km$^2$

No. of locations: 03

AOO density: 0

Specimen examined: *ARM* 46, 47 (SPU)

This shrub is restricted to less than five locations, hence it is evaluated to be **Vulnerable D2**

### 4.2.2.32 Bignoniaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 86 | 852 |
| India | 15 | 40 |
| Gujarat | 10 | 28 |
| Indian endemics | 3 | 5 |
| Indian endemics found in Gujarat | 3 | 4 |

**Dolichandrone atrovirens** (Roth) K.Schum. [= *Bignonia atrovirens* Roth; *Dolichandrone crispa* (Buch.-Ham. ex Roxb.) Seem.]

Local name: *Padari*

Habit: Tree

Fl. – Fr.: May – June

DSTR: Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dahod Dist.: Bedi (1968) observed it very rare, noted only two trees growing on the border of Dumka and Garabdi

Dang Dist.: Borkhal, Subir (Yadav, 1979)

Valsad Dist.: Vora (1980) observed it common in Kaprada and Nana Pondha ranges, and rare in Dharampur range

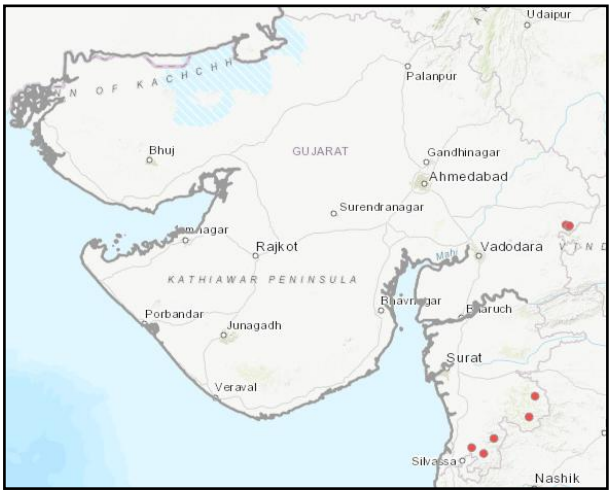


Figure 204: Distribution of *Dolichandrone atrovirens*

EOO = 7134.6 km$^2$

AOO = 32 km$^2$

No. of locations: 06

AOO density: 0.25

Specimen examined: *Bedi* 3030 (BARO), *HMV* 1188, 2697 (SPU)

**Vulnerable B1ab(ii,iii,iv)+2ab(ii,iii,iv)**

Figure 205: *Dolichandrone atrovirens* in flowering

**Dolichandrone falcata** (Wall. ex DC.) Seem. [= *Dolichandrone lawii* Seem.; *Spathodea falcata* Wall. ex DC.]

Local name: *Matarsing, Medsingh*

Habit: Tree

Fl. – Fr.: April – June

DSTR: Andhra Pradesh, Odisha, Rajasthan, West Bengal, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

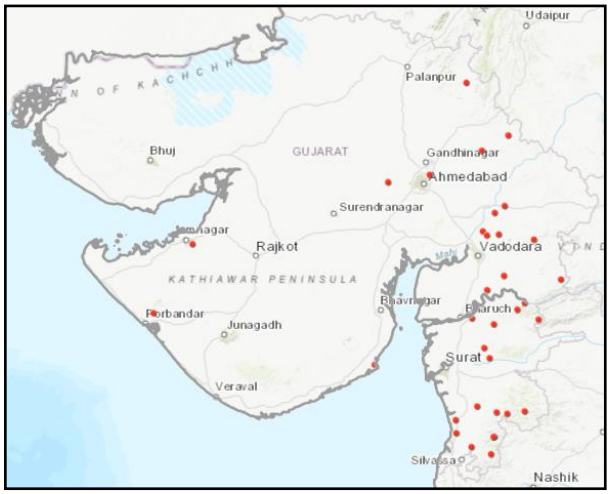


Figure 206: Distribution of *Dolichandrone falcata*

DSTR Gujarat:

Ahmedabad Dist.

Chhota udepur Dist.: Desai (2002) frequently noticed at Bhadurpur, Boriyad, Ghantoli-songir, Koraj, Pani-mines, Sadhli and Vagasthal, while Thaker (1974) observed it restricted along the riverbanks of Narmada and adjoining hilly areas

Dang Dist. (Tadvi, 2013): Ahwa (Suryanarayana, 1968), Ambapada, Surkhai

Jamnagar Dist. (Nagar, 2005)

Kheda Dist.: Yogi (1970) noted it occasional in Savannah east of Majham river

Narmada Dist.: Gora, Gumandev, Netrang, (Patel, 1971), Fulsar, Junaraj, Pankhala (Pradeepkumar, 1993), Vankal (Yadav, 1979), Rajpipla (Shah, 1967)

Navsari Dist.: Desai (1976) noticed it commonly found on hills and along roadsides at Bansda

Panchmahal Dist.: Tuwa (Deshpande, 1968), Shivarajpur

Porbandar Dist. (Nagar, 2005)

Sabarkantha Dist.: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972), Meghraj (Parmar, 2012), Dhansura road based on the collection of *Sedgwick* 347

Vadodara Dist.: Padate (1969) observed as 'not common', noted along railway line from Vejpur to Timba, and at Khakharia, Samlaya and Boriyad

Valsad Dist. (Inamdar and Patel, 1971): Vora (1980) observed it common in Nana Pondha range, and rare in Dharampur and Kaprada ranges; Parnera (More, 1972), Dungri (Patel RM, 1971), Kaprada (Rao, 2012)

Figure 207: *Dolichandrone falcata*

Specimen examined: *DNT* 863, 1728, *Padate* 1047, 2582, *Gpk* 211, 394, *Bhatt* 1892, *SNP* 1047, 2582, *MCJ* 259 (BARO), *MJD* 705, 1966, 2512, 2520, *HMV* 383, 384, 2009, 2010 (SPU)

EOO = 104,607.6 km$^2$

AOO = 136 km$^2$

No. of locations: 33

AOO density: 0.03

*Dolichandrone falcata* is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

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**Heterophragma quadriloculare** (Roxb.) K.Schum. [= *Bignonia quadrilocularis* Roxb.; *Heterophragma roxburghii* (Spreng.) DC.; *Spathodea roxburghii* Spreng.]

Local name: *Padar Vadvachh, Waras, Kharsing*

Habit: Tree

Fl. – Fr.: February – June

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Ahmedabad Dist.

Dang Dist. (Tadvi, 2013): Bheskatri, Borkhal, Galkund, Mahal, Sagbara, Subir (Yadav, 1979), Ahwa, Malegaon, Pipaldahad (Suryanarayana, 1968), Kalibel

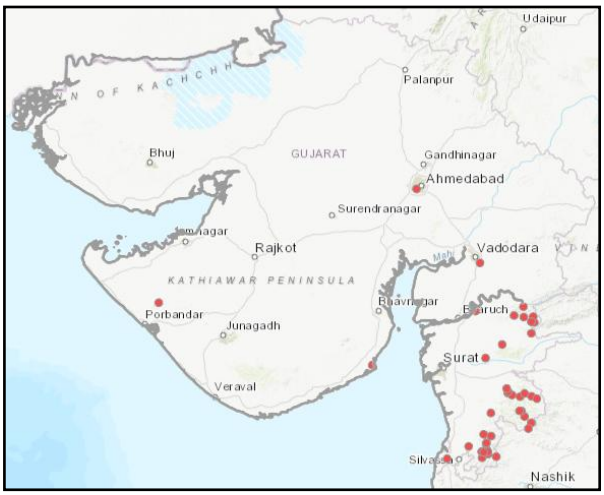

Figure 208: Distribution of *Heterophragma quadriloculare*

Devbhumi dwarka Dist.: Abhapara (Bole and Pathak, 1988)

Narmada Dist.: Pradeepkumar (1993) observed mostly near water sources at Kalvat, Ninaighat and Thavadia; Ghantoli (Yadav, 1979), Laldarwaja, Rajpardi (Patel, 1971); Sharma (2010) studied its density to be 2 individuals $ha^{-1}$ in Fulsar and Sagai ranges, also collected from Kokam and Namgir

Navsari Dist.: Desai (1976) observed it as common tree on hills and along roadsides at Bansda

Surat Dist.: Yadav (1979) found it frequent in dense forests at Umarpada

Tapi Dist.: Kelvan, Rani Amba

Vadodara Dist.: One tree conserved at the M.S. University campus, near General Education centre (Sabnis, 1967)

Valsad Dist.: Lavkar (Rao, 2012), Chavshala, Avdha, Pendha (Yadav, 1979), Nana Pondha, Kaprada (Vora, 1980), Bhilad, Huda, Pangarbari

Specimen examined: *Gpk* 1684, 1888, *MCJ* 236, 387 (BARO), *MJD* 2211, 2486, 2501 (SPU)

EOO = 69,812.3 $km^2$

AOO = 168 $km^2$

No. of locations: 29

AOO density: 0.31

*Heterophragma quadriloculare* is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

---

**Radermachera xylocarpa** (Roxb.) K.Schum. [= *Bignonia xylocarpa* Roxb.]

Habit: Tree

Fl. – Fr.: April – September

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Bharuch Dist.: Netrang

Chhota udepur Dist.: Kavant, Jamlidam (Desai, 2002), Ambadungar (Thaker, 1974), Hampheshwar, Kadipani, Turkheda

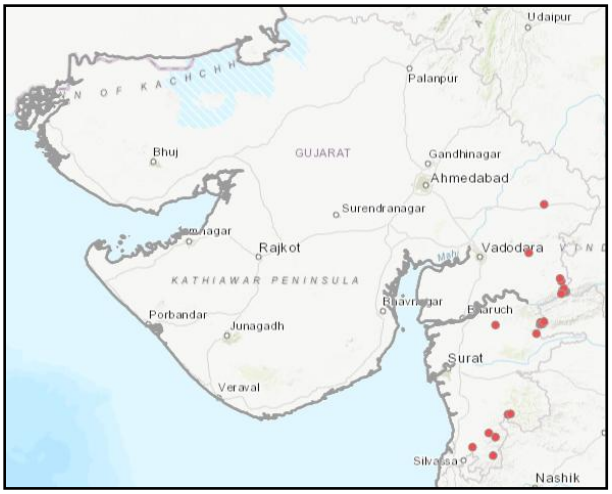


Figure 209: Distribution of *Radermachera xylocarpa*

Dang Dist. (Tadvi, 2013): Yadav (1979) observed it rare in the forests and also planted along road sides at Waghai

Narmada Dist.: Joshi (1983) reported it from Mal-Samot, but Pradeepkumar (1993) could not collect even a single tree from Mal-Samot; however, a few plants were observed at Kokati and Shisha; Sharma (2010) could locate only one individual from compartment no. 233 of Piplod range; Sagbara

Panchmahal Dist.: Jambughoda

Valsad Dist.: Vora (1980) stated it to be 'common, but not abundant' at Dharampur, Kaprada and Nanapondha ranges; while Reddy (1987) observed it **rare** in Pangarbari

Specimen examined: *Gpk* 1430, 1431, *MCJ* 241, 521 (BARO), *Dangs* 333, *ASR* 2604, 3544 (SPU)

EOO = 11,607.3 km$^2$

AOO = 84 km$^2$

No. of locations: 12

AOO density: 0.43

**Near Threatened**

### 4.2.2.33 Lamiaceae Martinov

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 221 | 5600 |
| India | 72 | 435 |
| Gujarat | 26 | 68 |
| Indian endemics | 18 | 100 |
| Indian endemics found in Gujarat | 3 | 3 |

**Anisomeles heyneana** Benth.

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Singh *et al.* 2015)

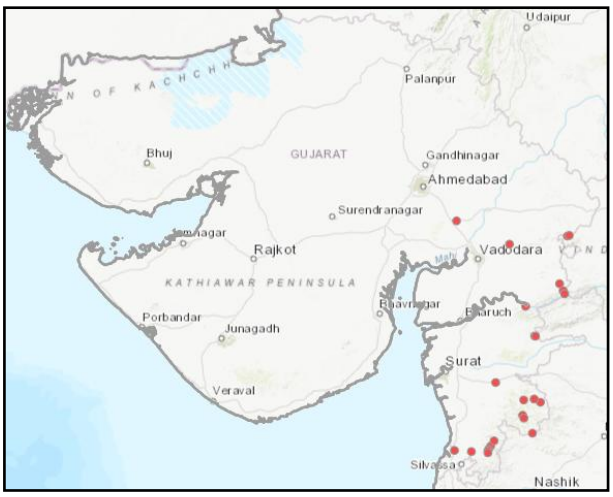


Figure 210: Distribution of *Anisomeles heyneana*

DSTR Gujarat (Nayar *et al.* 2014): Shah (1978) in Flora of Gujarat stated as a rare plant in the forests of Dangs, Vyara, Rajpipla, Pavagadh and Chhota udepur. Chhota udepur Dist.: Desai, 2002) stated it **rare**, noted only three individuals on the way from Kadipani to Hampheshwar; Thaker (1974) observed as an undergrowth of forests at Kavant range

Dahod Dist.: Bedi (1968) observed as fairly common in forest undergrowth at Alindra, Banvaro and Pipargota

Dang Dist. (Tadvi, 2013): Ahwa, Malegaon, Pipaldahad, Subir (Suryanarayana, 1968), Mahal

Narmada Dist.: Sagbara, Ghatoli, Rajpipla

Panchmahal Dist.: Oza (1961) noted it occasional at the edge of forest, or near the path on the Pavagadh hill

Tapi Dist.: Vyara

Valsad Dist.: Vora (1980) noted it fairly common in the undergrowth of forests at Nana Pondha and Pangarbari; Tukwada (Rao, 2012), Hedri (Yadav, 1979); Tamachhadi

Specimen examined: *DNT* 1410, *Bedi* 670, 1757, 3681 (BARO), *HMV* 495, 2316, 2317 (SPU)

EOO = 25,915.3 km$^2$

AOO = 96 km$^2$

No. of locations: 17

AOO density: 0.29

**Near Threatened**

---

**Lavandula bipinnata** (Roth) Kuntze [= *Bystropogon bipinnatus* Roth]

Local name: *Asmani galgota*

Habit: Undershrub

Fl. – Fr.: October – January

DSTR: Bihar, Odisha, Rajasthan, Madhya Pradesh, Maharashtra, Karnataka, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

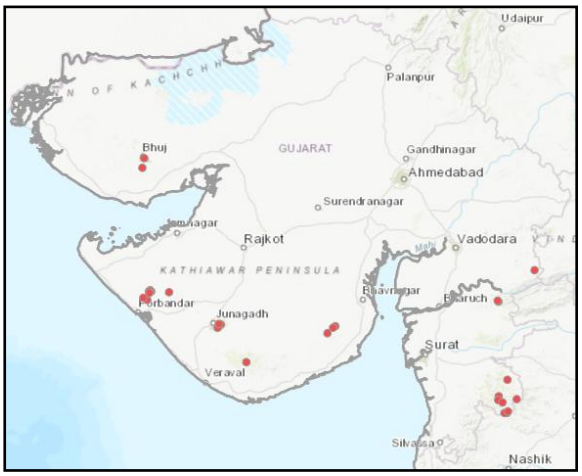


Figure 211: Distribution of *Lavandula bipinnata*

DSTR Gujarat:

Bhavnagar Dist.: Menon (1979) collected it from Palitana; further Meena (2014b) noted it as common among the grasses, in rocky habitats at Hastagiri

Chhota udepur Dist.: Thaker (1974) observed it **common** at the foot and slopes of hillocks at Kavant forest range

Dang Dist. (Tadvi, 2013): Saputara (Yadav, 1979), Ahwa, Malegaon, Subir (Suryanarayana, 1968), Don

Devbhumi dwarka Dist.: Abhapara, Ghumli (Bole and Pathak, 1988), Kileswar, Venu (Nagar, 2005)

Gir somnath Dist. (Santapau and Raizada, 1954)

Jamnagar Dist. (Nagar, 2005)

Junagadh Dist.: Girnar (Menon, 1979)

Kachchh Dist. (Patel *et al.*, 2011): Bhuj (Bhatt, 1993)

Narmada Dist.: Pradeepkumar (1993) observed in open areas at Chopadi, and stated to be **'not common'**

Porbandar Dist.: Godhana, Satvirda (Thakar, 1910; Nagar, 2005)

Habitat: Rocky habitats, among the grasses

Specimen examined: *DNT* 462, 1485, *Gpk* 1793, 1794 (BARO), *ARM* 2260 (SPU), *Meena* 24538 (BSJO)

EOO = 82,952.69 km$^2$

AOO = 108 km$^2$

No. of locations: 14

AOO density: 0.48

The undershrub is reported by several experts and is distributed sporadically throughout Gujarat and thus assessed to be **Least Concern**.

Figure 212: *Lavandula bipinnata*

**Nepeta bombaiensis** Dalzell

Habit: Herb

Fl. – Fr.: July – August

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Chhota udepur Dist.: Thaker (1974) observed it commonly on steep banks of streams at the foot of hillocks at Kavant

Junagadh Dist.: Bole and Pathak (1988)

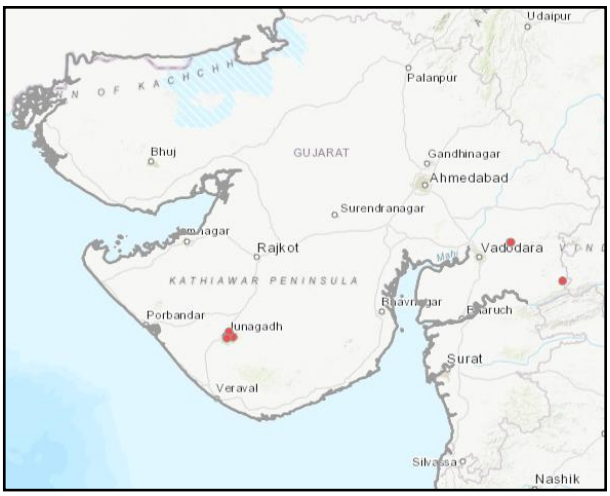


Figure 213: Distribution of *Nepeta bombaiensis*

in Flora of Saurashtra stated it from Girnar

Panchmahal Dist.: Pavagadh (Oza, 1961)

Specimen examined: *DNT* 1411, 1476, 1854, 1857 (BARO)

EOO = 10,613.76 km$^2$

AOO = 24 km$^2$

No. of locations: 03

AOO density: 0.5

**Vulnerable B1ab(i,iii,iv)+2ab(iii,iv)**

---

**Oleaceae Hoffmanns. and Link**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 25 | 688 |
| India | 12 | 48 |
| Gujarat | 3 | 12 |
| Indian endemics | 4 | 17 |
| Indian endemics found in Gujarat | 1 | 1 |

**Jasminum malabaricum** Wight

Local name: *Mogra, Jui*

Habit: Climbing shrub

Fl. – Fr.: March – May

DSTR: Andhra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

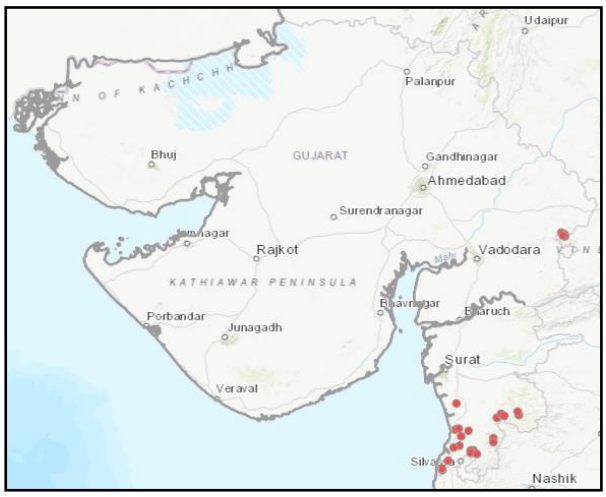


Figure 214: Distribution of *Jasminum malabaricum*

DSTR Gujarat:

Dahod Dist.: Bedi (1968) noted a big patch in the interior of the forest near Kanjeta, but it never bears flower and fruits though resembling with the vegetative structure. In absence of the reproductive parts, it remains of **doubtful occurrence**. A similar patch was noticed along the bank of a stream near Pipargota in the forest interior

Dang Dist. (Tadvi, 2013)

Navsari Dist.: Desai (1976) spotted it **rare**, could collect only single individual at Bansda; Vedchha

Valsad Dist.: Patel RM (1971) observed as 'not so common', and noted in hedges at Abrama, Ghadoi and Marla, while Vora (1980) witnessed it common at Dharampur, Jogvel, Mandva and Nana Pondha; Patel (2013) noticed it occasional in deciduous forest of Malegam, Rohina and Sanjan; Rao (2012) spotted it from Sarigam and Tukwada; More (1972) collected it from Rabda

Specimen examined: *MJD* 2300, 2342, 2578, *HMV* 1727, 1728, 3317, 3318, *RMP* 3410, *SLP* 669, 813, 3081 (SPU), *Bedi* 2548 (BARO)

EOO = 11,272 km$^2$

AOO = 100 km$^2$

No. of locations: 14

AOO density: 0.44

**Near Threatened**

---

**Convolvulaceae Juss.**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 58 | 1650 |
| India | 28 | 184 |
| Gujarat | 14 | 79 |
| Indian endemics | 10 | 27 |
| Indian endemics found in Gujarat | 2 | 4 |

**Argyreia boseana** Santapau and V.Patel

Habit: Climber

Fl. – Fr.: July – December

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: The only authority of this plant is by Lancelot b. D'cruz (2002) reported this species from Dediapada in

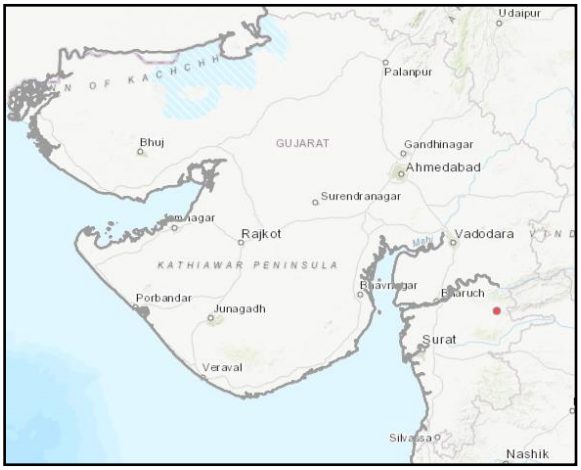


Figure 215: Distribution of *Argyreia boseana*

Narmada Dist. (Patel, 2013)

EOO = NA

AOO = 4.0 km$^2$

No. of locations: 01

AOO density: 0

This species is endemic to Satara and Sindhudurg in Maharashtra. It can be distinguished by its cordate, minutely pilose leaves becoming glabrescent beneath and flowers in elongate cymes. It needs intensive field explorations to confirm its occurrence and further assessment. Hence, it is presently reported as **Data Deficient.**

---

**Argyreia sericea** Dalzell

Local name: *Goda vel, Shankhavali*

Habit: Climber

Fl. – Fr.: August – October

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014)

DSTR Gujarat:

Bhavnagar Dist.: Meena (2014b) spotted it from Memon boarding

Chhota udepur Dist.: Kavant (Patel, 2013), Ambadungar (Thaker, 1974)

Dahod Dist.: Bedi (1968) noted as 'not common' in shrubs and dense bamboo clumps on Pipargota and Banvaro plateaus; Patel (2013) spotted from Devgadh Baria

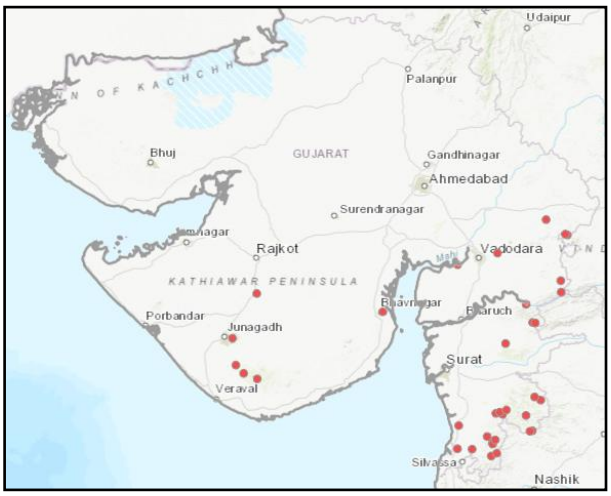


Figure 216: Distribution of *Argyreia sericea*

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) spotted occasionally at Ahwa, Malegaon, Pipaldahad, Saputara and Subir; Yadav (1979) also collected from Ahwa

Gir somnath Dist.: Sisodia (2007) studied its frequency (15.92), abundance (5.14) and density (4.05) at the Gir National Park

Junagadh Dist.: In the Flora of Saurashtra, Bole and Pathak (1988) reported from Girnar, Junvaniya and Sasan

Narmada Dist.: Dabka, Mathavali, Sagai (Pradeepkumar, 1993), Chanderpada (Yadav, 1979), Gora (Patel, 1971)

Navsari Dist.: Bansda (Patel, 2013), Ambabari, Mahuvas, Manpur, Sara, Vati (Desai, 1976)

Rajkot Dist.: Gondal (Bole and Pathak, 1988)

Vadodara Dist.: Ajwa

Valsad Dist.: Malegam, Pindval (Patel, 2013), Avdha (Yadav, 1979), Dharampur, Kaprada, Nana Pondha (Vora, 1980), Paria (More, 1972), Saron (Patel RM, 1971), Tokarpada (Rao, 2012)

Specimen examined: *Bedi* 2991, *DNT* 1059, 1067 (BARO), *BS* 261, 546, 1204, 1398, 1786, 1742, 1769 (SPU)

EOO = 62,881 km$^2$

AOO = 140 km$^2$

No. of locations: 26

AOO density: 0.26

It is one of the conspicuous climbers distinguished by its large bright rosy-purple flowers. According to Dalzell it is similar to *A. argentea* Choisy, but can be distinguished by the large, foliaceous bracts which are sericeo-pubescent beneath. It is a **Least Concern** species.

---

**Merremia rajasthanensis** Bhandari

Habit: Climber

Fl. – Fr.: September – October

DSTR: Rajasthan

DSTR Gujarat:

Kachchh Dist.: Joshi (1994) reported it for the first time from Gujarat. Later, Parmar and Singh (2003) stated it to be 'rare' and collected it from Narayan

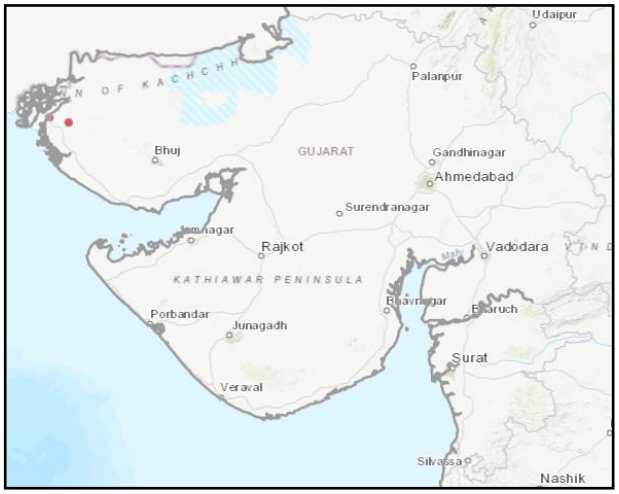


Figure 217: Distribution of *Merremia rajasthanensis*

sarovar during their work on 'interesting plant records from Gujarat'. Further, Pandey *et al.* (2009) collected it from Mindhiyari, and Patel (2013) in his work on Climbers of Gujarat, mentioned the plant from Narayan sarovar

Habitat: Dry sandy moist places climbing on hedges and trees in loamy soil

Specimen examined: *V. Singh* 15748 (BSJO)

EOO = NA

AOO = 8 km$^2$

No. of locations: 02

AOO density: 0

Owing to its restricted distribution and the above findings, it is assessed as **Endangered B2ab(iii,iv).**

---

**Merremia rhynchorrhiza** (Dalzell) Hallier f. [= *Ipomoea rhynchorrhiza* Dalzell]

Habit: Climber

Fl. – Fr.: July – August

DSTR: Maharashtra, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

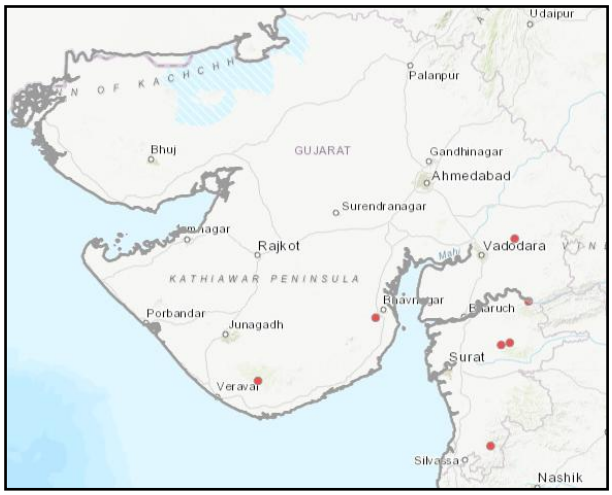

Figure 218: Distribution of *Merremia rhynchorrhiza*

Bhavnagar Dist.: Menon (1979) noticed it **very rare** in the forest undergrowth, and enumerated by Meena (2014b) in the checklist of Bhavnagar, based on the collection of A.R. Menon

Gir somnath Dist.: On the authority of Bole and Pathak (1988) in the Flora of Saurashtra

Narmada Dist.: Shah (1978) in Flora of Gujarat

Panchmahal Dist.: Shah (1978)

Valsad Dist.: Yadav (1979) noticed it rare on hedges and low shrubs at Pendha; Patel (2013) also noted it as rare from Khatradevi-Umarpada

Specimen examined: *ARM* 2412, *Dharampur* 499, *SLP* 527, 528 (SPU)

EOO = 33,105.9 km$^2$

AOO = 28 km²

No. of locations: 07

AOO density: 0

This species can be identified by its tuberous roots, 5-7 lobes leaves and solitary flowers. The tubers of this species are edible, and preferred by the villagers which may be one of the threat. It is assessed as **Vulnerable B2ab(iii,iv).**

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### 4.2.2.36 Solanaceae Juss.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 115 | 2678 |
| India | 24 | 108 |
| Gujarat | 12 | 47 |
| Indian endemics | 2 | 5 |
| Indian endemics found in Gujarat | 1 | 2 |

**Solanum hovei** Dunal

Habit: Shrub

Fl. – Fr.: December – January

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Singh *et al.* 2015):

Ahmedabad Dist.: On the sole authority of Dholka, near Sabarmati river, A. Hovei s.n. in 1788 (BM).

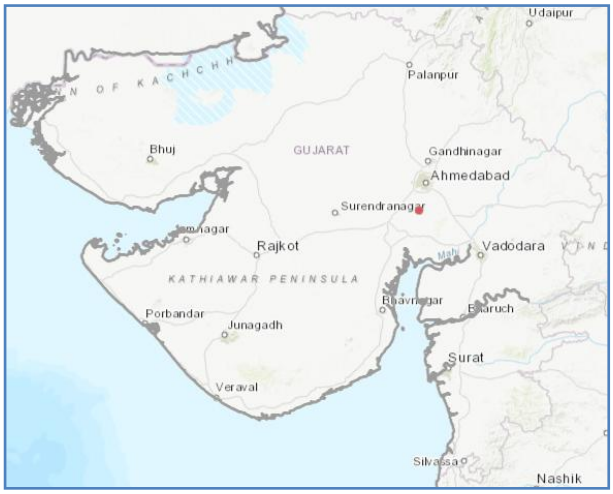


Figure 219: Distribution of *Solanum hovei*

EOO = 0.0 km²

AOO = 4 km²

No. of locations: 01

AOO density: 0

It needs intensive field explorations to confirm its occurrence and further assessment. Hence, it is presently reported as **Data Deficient.**

**Solanum purpureilineatum** Sabnis and Bhatt

Habit: Herb

Flowering – Fruiting: October – March

DSTR: Orissa, Uttar Pradesh, Uttarakhand (Singh and Garg, 2018)

DSTR Gujarat (Sabnis and Bhatt, 1972):

Anand Dist.: Bhagwanani (1980) noted as a weed in Khambhat, '**rare'**

Banaskantha Dist.: Tharad

Chhota udepur Dist.: Thaker (1974) observed it rare, growing as a weed along roadsides and cultivated fields at Hampheswar; Kadipani

Kachchh Dist.: Bhuj (Rao, 1977; Bhatt, 1993)

Sabarkantha Dist.: Khedbrahma (Bhatt and Sabnis, 1972), Dan Mahudi, Padhara (Bhatt, 1971; Parmar, 2012)

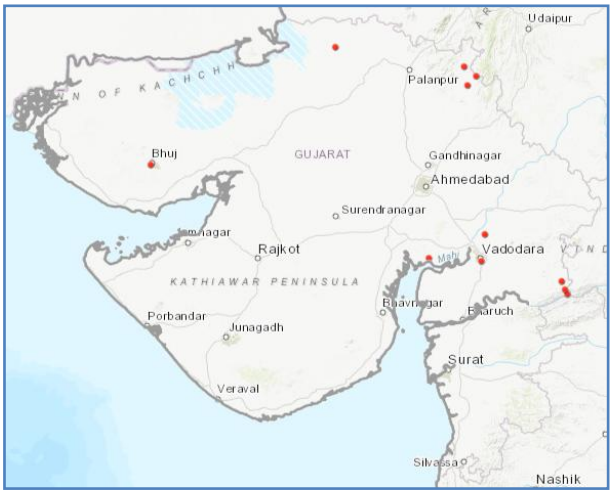


Figure 220: Distribution map of *Solanum purpureilineatum*

Vadodara Dist. (Sabnis, 1967): Padate (1973) noted as weed along roadsides at Savli

Specimen examined: *Padate* 974, 2988, *DNT* 1811, 1849, *KSR* 44, *PPB* 1240 (BARO)

EOO = 59,109.0 km$^2$

AOO = 44 km$^2$

No. of locations: 10

AOO density: 0.09

The herbaceous species is sporadically distributed throughout Gujarat, and based on the above obtained information regarding its distribution, it is evaluated as **Vulnerable B2ab(i,ii,iii)**

### 4.2.2.37 Apiaceae Lindl.

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 418 | 3225 |
| India | 72 | 288 |
| Gujarat | 12 | 17 |
| Indian endemics | 30 | 72 |
| Indian endemics found in Gujarat | 2 | 4 |

**Pimpinella adscendens** Dalzell

Habit: Herb

Fl. – Fr.: December – April

DSTR: Maharashtra, Goa, Karnataka (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Shah (1978) in Flora of Gujarat recorded this species on the authority of RM Patel's collection from Valsad and environs.

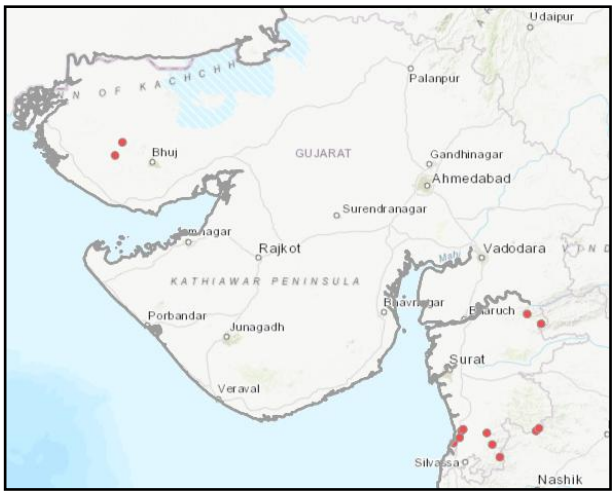


Figure 221: Distribution of *Pimpinella adscendens*

Dang Dist.: Saputara

Kachchh Dist.: Bhatt (1993) stated as 'not common', observed on gravelly soils at Dhinodhar and Nakhatrana

Narmada Dist.: Pradeepkumar (1993) observed occasionally at Chopadi and Ninaighat

Valsad Dist. (Inamdar and Patel, 1971): Patel RM (1971) reported from Atak, Ghadoi and Pardi; More (1972) collected it from river Par; Vora (1980) noted on the bank of river Par, Kolak, Tan, Man and Vanki; Rao (2012) spotted it as rare, along river banks of Vavar

Specimen examined: *Gpk* 1227, 1720, *JB* 69, *SKJ* 1996 (BARO), *HMV* 1082, 2734 (SPU)

EOO = 51,764.79 km$^2$

AOO = 52 km$^2$

No. of locations: 11

AOO density: 0.15

*Pimpinella adscendens* is reported by several experts and is distributed sporadically throughout Gujarat and thus it becomes **Least Concern**.

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**Pimpinella tomentosa** (Dalzell & A.Gibson) C.B.Clarke [= *Heracleum tomentosum* Dalzell & A.Gibson]

Local name: *Jungli Jeeru*

Habit: Herb

Fl. – Fr.: November – December

DSTR: Maharashtra (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) spotted as rare, seen on one occasion only in open hilly areas in Gira-Giri Hills near Saputara

Valsad Dist.: Vora (1980) observed as 'not common', noted near damp places and also in hedges at Dharampur, Kaprada and Nanapondha

Specimen examined: *HMV* 656, 657, 2550, 2551, BS 2271 (SPU)

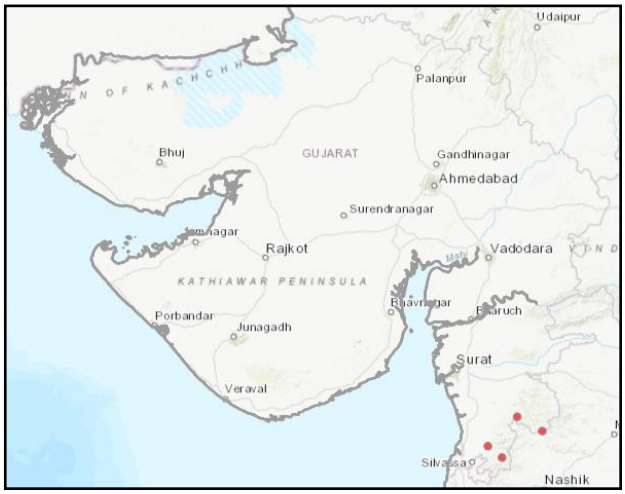


Figure 222: Distribution of *Pimpinella tomentosa*

EOO = 1232 km²

AOO = 20 km²

No. of locations: 05

AOO density: 0

*Pimpinella tomentosa* is confined to only two districts in southern Gujarat, thus due to its restricted distribution it is assessed to be**Vulnerable D2**

**Pimpinella wallichiana** (Miq.) Gandhi

Habit: Herb

Fl. – Fr.: September – December

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013)

Valsad Dist.: Rao (2012) noted it rare, collected from Rabda, River Auranga at Atak Pardi, Suliya

Specimen examined: *VHR* 112 (VNSGU)

EOO = 2244.9 km$^2$

AOO = 16 km$^2$

No. of locations: 04

AOO density: 0

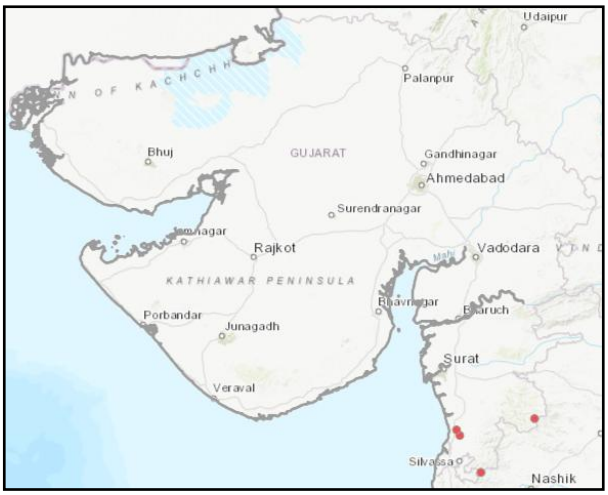


Figure 223: Distribution of *Pimpinella wallichiana*

*Pimpinella wallichiana* shows its confinement in only two districts in southern Gujarat, and hence assessed as**Vulnerable D2.**

**Asteraceae Bercht. and J. Presl**

| | Genera | Species + Infraspecific taxa |
|---|---|---|
| World | 1314 | 21000 |
| India | 166 | 803 |
| Gujarat | 67 | 123 |
| Indian endemics | 58 | 197 |
| Indian endemics found in Gujarat | 8 | 12 |

**Artemisia nilagirica** (C.B.Clarke) Pamp.

Local name: *Surpan, Surpin*

Habit: Herb

Fl. – Fr.: September – March

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Banaskantha Dist.: Meena (2012) reported it from Ambaji

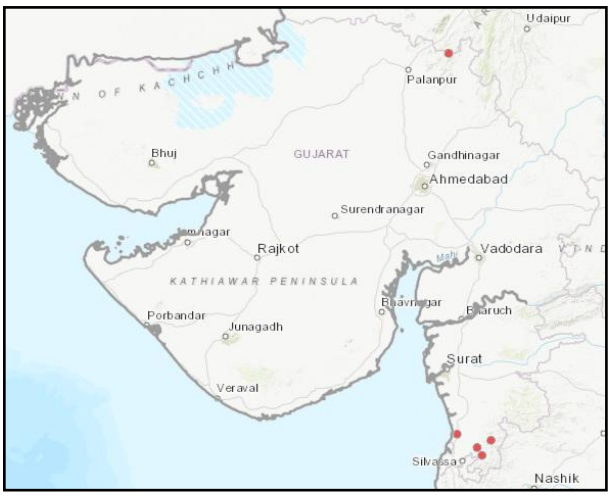


Figure 224: Distribution of *Artemisia nilagirica*

Valsad Dist.: More (1972) stated it as **rare**, spotted only once at Parnera hill; Vora (1980) observed it **common but scattered**, in moist open grounds at Dharampur, Kaprada and Nanapondha. Further, Reddy (1987) stated as **very rare**, in the forest undergrowth on hilly slopes at Pangarbari and Cheedpada.

Specimen examined: *PGM* 327, 2043, *HMV* 1167, 1168, 2882, 2883, *ASR* 2441, 2465 (SPU)

EOO = 8332 km²

AOO = 20 km²

No. of locations: 05

AOO density: 0

Based on the above observations, it is assessed to be **Endangered B2ab(iii,iv)**

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**Phyllocephalum scabridum** (DC.) K.Kirkman [= *Decaneurum scabridum* DC.; *Baccharoides scabrida* (DC.) M.R. Almeida; *Centratherum molle* (Wall. ex DC.) Benth. and Hook.f.; *Decaneurum molle* (Wall.) DC.]

Habit: Herb

Fl. – Fr.: September – October

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Chhota udepur Dist.: Thaker (1974) noticed it rare, observed as an undergrowth of forest at Ambadungar

Dang Dist. (Tadvi, 2013): Ahwa

Panchmahal Dist.: Oza (1961) noted fairly common near the lower talao at Pavagadh hill

Valsad Dist.: Reddy (1987) spotted as occasional to common in the forest undergrowths at Sidumbar, Audha and Dhamni

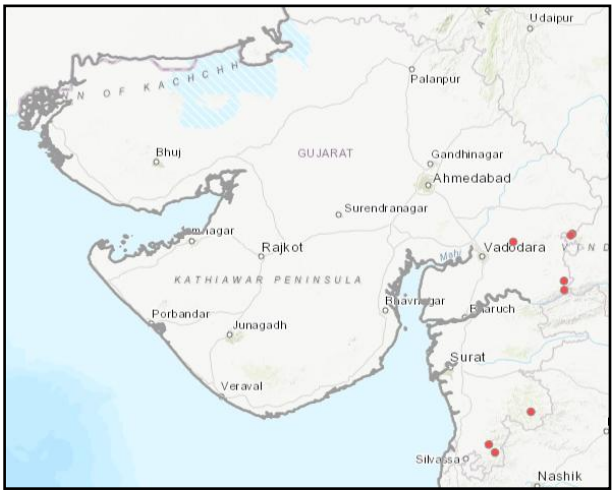

Figure 225: Distribution of *Phyllocephalum scabridum*

Specimen examined: *Oza* 108, *DNT* 523 (BARO), *ASR* 2114, 2189, *YSS* 1491, 1492 (SPU)

EOO = 12,090.9 km$^2$

AOO = 32 km$^2$

No. of locations: 07

AOO density: 0.125

Based on the above observations, it is assessed **Vulnerable B1ab(iii,iv)+2ab(iii,iv)**

---

**Blumea belangeriana** DC.

Habit: Herb

Fl. – Fr.: December – March

DSTR: Assam, Nagaland, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist.: Ahwa, Nilsakiya (Yadav, 1979), Malegaon, Saputara (Suryanarayana, 1968)

Junagadh Dist.: Menon (1979) spotted as **rare**, among grasses in forest undergrowth at Girnar

Narmada Dist.: Sagbara

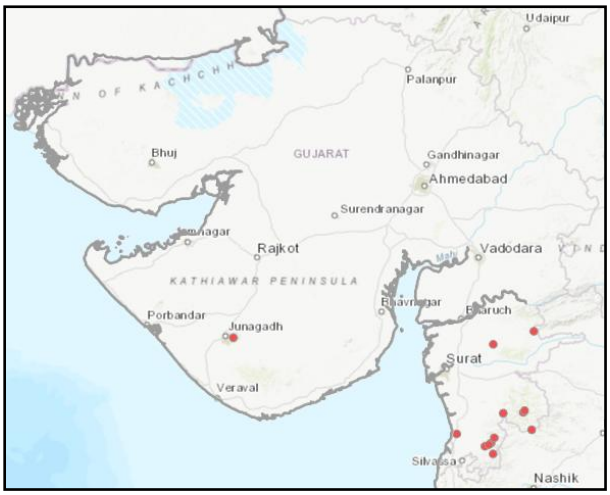

Figure 226: Distribution of *Blumea belangeriana*

Navsari: Desai (1976) noted as **common** in wastelands and on hills of Bansda forest

Surat Dist.: Zankhvav (Yadav, 1979)

Valsad Dist. (Patel RM, 1971): Kaprada (Rao, 2012), Dhamni, Hedri, Parnera, Pendha (Yadav, 1979); Reddy (1987) observed as **rare** among grasses in the forest undergrowth at Pangarbari, Dhamni and Pendha

Specimen examined: *ASR* 2605, MJD 420, 938, 2008, 2114, 2185, *YSS* 24, 1519, *ARM* 177, 183 (SPU)

EOO = 25,244.95 km$^2$

AOO = 52 km$^2$

No. of locations: 10

AOO density: 0.23

Based on the above observations, it is assessed to be **Vulnerable B2ab(iii,iv)**

---

**Blumea eriantha** DC.

Local name: *Bhurandi, Kalar, Kalhar, Kapurio*

Habit: Herb

Fl. – Fr.: October – December

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

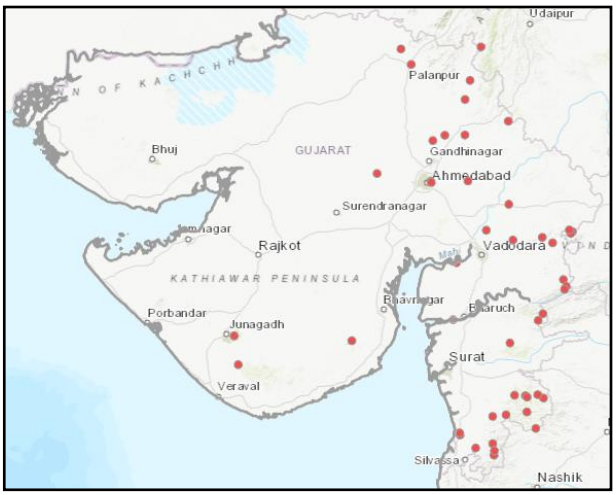


Figure 227: Distribution of *Blumea eriantha*

DSTR Gujarat (Nayar *et al.* 2014):

Ahmedabad Dist.: Raypur (Saxton and Sedgwick, 1918), Viramgam (Meena, 2014a), Kharicut canal

Arvalli Dist.: Vatrak (Saxton and Sedgwick, 1918)

Banaskantha Dist.: Mahudi (Yogi, 1970), Dantiwada, Palanpur (Patel, 2009)

Bharuch Dist.

Bhavnagar Dist.: Meena (2014b) found it growing near Shatrunjaya dam

Chhota udepur Dist.: Kawant (Thaker, 1974), Gabadia, Kadipani, Hampeshwar, Satun, Ucheda, Udhwania, Zoz (Desai, 2002)

Dahod Dist.: Bedi (1968) noted as **common** on higher altitudes at Bhuvera, Alindra and Ratanmahal

Dang Dist. (Tadvi, 2013): Bheskatri, Mahal (Yadav, 1979), Ahwa, Malegaon, Pipaldahad, Saputara, Subir (Suryanarayana, 1968)

Gandhinagar Dist.: Mansa (Yogi, 1970)

Junagadh Dist.: Menon (1979) spotted as frequently scattered throughout in Girnar and Sasan

Narmada Dist.: Dumkhal, Sagai, Vav (Pradeepkumar, 1993), Umarkui, Umarpada (Yadav, 1979)

Navsari Dist.: Desai (1976) noted **common** in waste places and as a weed on the borders of cultivated fields at Bansda

Panchmahal Dist.: Pavagadh (Oza, 1961), Tuwa (Deshpande, 1968)

Sabarkantha Dist.: Kotra, Khedbrahma, Isari, Fatepur, Idar (Parmar, 2012)

Vadodara Dist. (Sabnis, 1967): Savli (Padate, 1973), Chokari (Bhagwanani, 1980)

Valsad Dist. (Inamdar and Patel, 1971; Patel RM, 1971; Vora, 1980): Reddy (1987) noted as **common** along forest paths and cultivated fields at Chavshala, Nana Pondha, Pendha and Tutarkhed (Yadav, 1979), Pardi, Parnera (More, 1972), Kaprada (Rao, 2012)

Habitat: Moist shaded localities and along streams in the forests

Specimen examined: *Meena* 24502 (BSJO), *Bedi* 756, *Dipa* 1141 (BARO), *ARM* 1910, 1438, 178, *ASR* 2462, 3171, *YSS* 32, 38, *MJD* 222, 1689, 1883 (SPU)

EOO = 107,209.5 $km^2$

AOO = 188 $km^2$

No. of locations: 41

AOO density: 0.13

*Blumea eriantha*is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

**Blumea malcolmii** (C.B.Clarke) Hook.f. [= *Pluchea malcolmii* C.B.Clarke]

Habit: Herb

Fl. – Fr.: November – January

DSTR: Bihar, Madhya Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

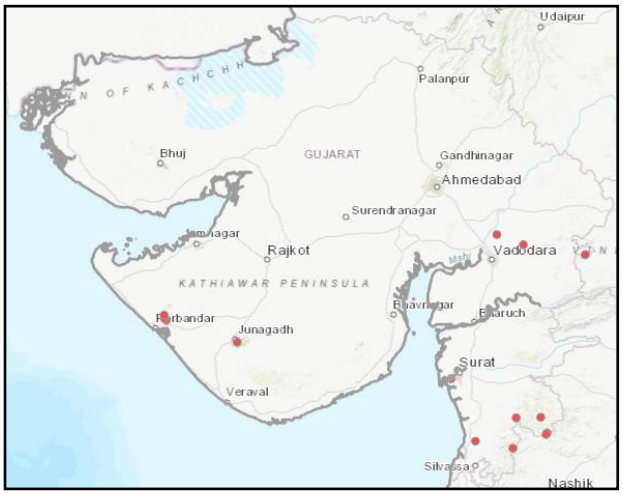

Figure 228: Distribution of *Blumea malcolmii*

DSTR Gujarat (Nayar *et al.* 2014):

Chhota udepur Dist.: Thaker (1974) noted it **rare** on wastelands and along roadsides at Rangpur

Dang Dist.: Ahwa, Malegaon (Yadav, 1979), Saputara (Suryanarayana, 1968)

Junagadh Dist. (Bole and Pathak, 1988)

Navsari Dist.: Desai (1976) noted as **common** on hills at Bansda

Panchmahal Dist.: Oza (1961) collected from the top of the Pavagadh hill

Porbandar Dist.: Satvirda, Adityana, Ranavav (Nagar, 2005)

Surat Dist.

Vadodara Dist.: Padate (1973) observed it **rare** in open places along roadsides and old walls at Savli

Valsad Dist.: Reddy (1987) spotted as **rare** in shade along paths in forest at Rabda and Tutarkhed

Specimen examined: *Padate* 1562, 2380, *Bedi* 953, *DNT* 1445 (BARO), *MJD* 151, 706, 1769, *ASR* 3170 (SPU)

EOO = 60,437.5 km$^2$

AOO = 56 km$^2$

No. of locations: 11

AOO density: 0.21

*Blumea malcolmii*is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and northern Gujarat, thus it assessed to be **Least Concern**.

**Goniocaulon indicum** (Klein ex Willd.) C.B.Clarke [= *Amberboa indica* (Klein ex Willd.) DC.; *Serratula indica* Klein ex Willd.; *Goniocaulon glabrum* Cass.]

Habit: Herb

Fl. – Fr.: December – February

DSTR: Andhra Pradesh, Uttar Pradesh, Bihar, Madhya Pradesh, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

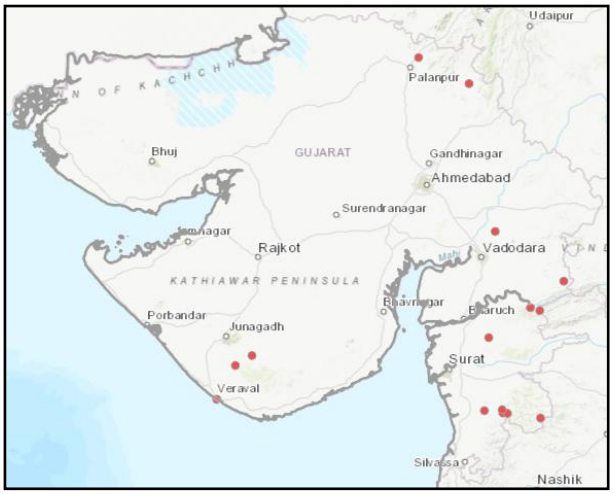


Figure 229: Distribution of *Goniocaulon indicum*

DSTR Gujarat (Nayar *et al.* 2014):

Banaskantha Dist.: Meena (2012) collected it from Balaram-Ambaji wildlife sanctuary

Chhota udepur Dist.: Thaker (1974) noted it **rare** in hedges and along roadsides at Kavant

Dang Dist.: Tadvi (2013) listed its occurrence without providing any locality/details

Gir somnath Dist.: Bole and Pathak (1988) reported from Veraval in the Flora of Saurashtra. Further, Sisodia (2007) has stated about the frequency (6.47), abundance (2.61) and density (1.31) in Gir National Park

Junagadh Dist.: In Flora of Saurashtra, Bole and Pathak (1988) stated its occurrence at Sasan and Visavadar

Narmada Dist.: Pradeepkumar (1993) rarely **observed** it at Mokhadi, Surpan and Thavadia

Navsari Dist.: Desai (1976) observed it occasional, noted on agricultural hedges at Pratapnagar,Lakawadi and Mahuvas-Sara

Sabarkantha Dist.: Bhatt (1971) collected only once from the base of hillocks at Khedbrahma. Further, Parmar (2012) re-collected it from Sabarkantha.

Vadodara Dist.: Padate (1973) observed it **rare**, could collect only once from Kamalpura

Specimen examined: *DNT* 1424, *Padate* 2106, 2107, *Gpk* 1555, *Bhatt* 565 (BARO), *MJD* 469, 604, 571, 1789 (SPU)

EOO = 89,246.39 km$^2$

AOO = 60 km$^2$

No. of locations: 13

AOO density: 0.13

*Goniocaulon indicum*is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

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**Pulicaria wightiana** (DC.) C.B.Clarke [= *Poloa wightiana* DC.]

Local name: *Sisoria, Sonasalia, Sonfulki, Songali, Sonnofuli, Sisoria*

Habit: Herb

Fl. – Fr.: October – January

DSTR: Andhra Pradesh, Chhattisgarh, Maharashtra, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014)

Banaskantha Dist.: Mahudi (Yogi, 1970), Dantiwada, Palanpur (Patel, 2009)

Bhavnagar Dist.: Mahuva (Meena, 2014b)

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it **rare**, seen on one occasion only in the undergrowth at Subir

Devbhumi dwarka Dist.: Bhanvad, Kota (Bole and Pathak, 1988)

Gandhinagar Dist.: Mansa (Yogi, 1970)

Gir somnath Dist. (Santapau and Raizada, 1954): Somnath (Bole & Pathak, 1988)

Jamnagar Dist.: Rozibet (Bole and Pathak, 1988)

Junagadh Dist.: Menon (1979) noted as

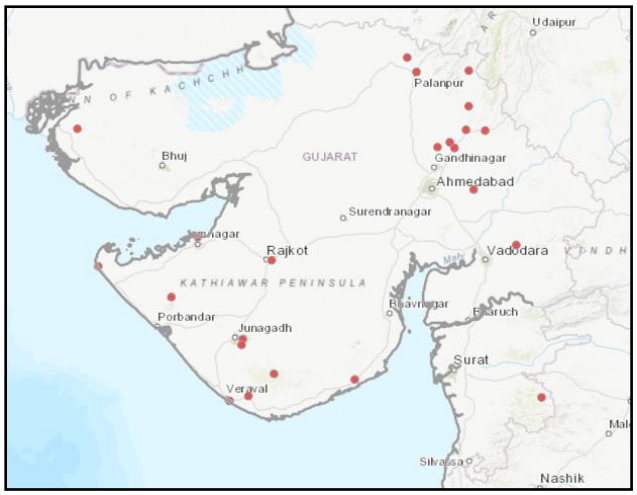


Figure 230: Distribution of *Pulicaria wightiana*

a common weed in cultivated fields, among grasses along roadsides and riverbeds at Girnar, Khamba, Ramnath and Sapnes; later Gopal (1983) discussed about its ethnobotanical uses

Kachchh Dist. (Patel *et al.*, 2011): Mindhiyari (Pandey *et al.*, 2009)

Kheda Dist.: Kapadvanj

Panchmahal Dist.: Oza (1961) noticed as **rare**, collected from the upper parts of the Pavagadh hill

Rajkot Dist. (Thakrar, 1987)

Sabarkantha Dist.: Danmahudi (Bhatt, 1971), Himmatnagar, Idar (Yogi, 1970), Raigarh (Parmar, 2012), Prantij

Habitat: Found in plains among grasses, dry open fields, rocky slopes, etc.

Specimen examined: *Oza* 229, 805, *Dipa* 756 (BARO), *BS* 1698, *ARM* 1173, 1360, 1052, 1472 (SPU)

EOO = 152,525.2 km$^2$

AOO = 92 km$^2$

No. of locations: 21

AOO density: 0.09

*Pulicaria wightiana*is reported by several experts and is distributed sporadically throughout Gujarat except Kachchh and thus it becomes **Least Concern**.

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**Senecio bombayensis** N.P.Balakr.

Habit: Herb

Fl. – Fr.: September – November

DSTR: Madhya Pradesh, Maharashtra, Karnataka, Goa, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat:

Dang Dist.: Malegaon, Saputara

Junagadh Dist.: Girnar

Panchmahal Dist.: Pavagadh

Specimen examined: K000852229

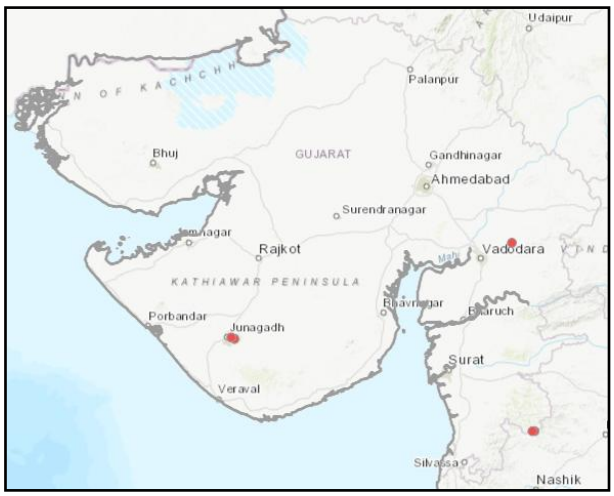


Figure 231: Distribution of *Senecio bombayensis*

EOO = 34,098 km²

AOO = 20 km²

No. of locations: 03

AOO density: 0.4

**Endangered B2ab(iii,iv)**

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**Senecio dalzellii** C.B.Clarke [= *Senecio lawii* C.B.Clarke]

Habit: Herb

Fl. – Fr.: December – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu (Nayar *et al.* 2014; Singh *et al.* 2015)

DSTR Gujarat: Shah (1978) cited in the Flora of Gujarat based on the authority of Oza's collection

Panchmahal Dist.: Oza (1961) spotted few individuals on the higher slopes of the Pavagadh hill

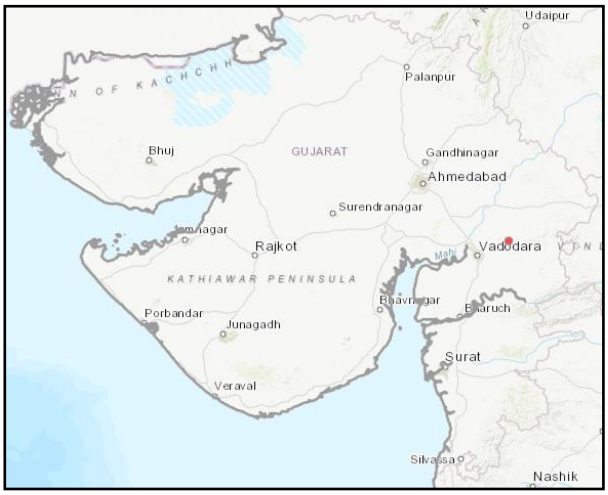


Figure 232: Distribution of *Senecio dalzellii*

Specimen examined: K000852227

EOO = NA

AOO = 4 km²

No. of locations: 01

AOO density: 0

*Senecio dalzellii* is endemic to the Western Ghats and was reported before a half-century from central Gujarat, after which it shows no record of occurrence, so it is considered to be possibly **Regionally Extinct**.

**Tricholepis amplexicaulis** C.B.Clarke

Local name: *Ubho-mulo*

Habit: Herb

Fl. – Fr.: October – January

DSTR: Maharashtra, Karnataka, Tamil Nadu, Kerala (Nayar *et al.* 2014; Singh *et al.* 2015)

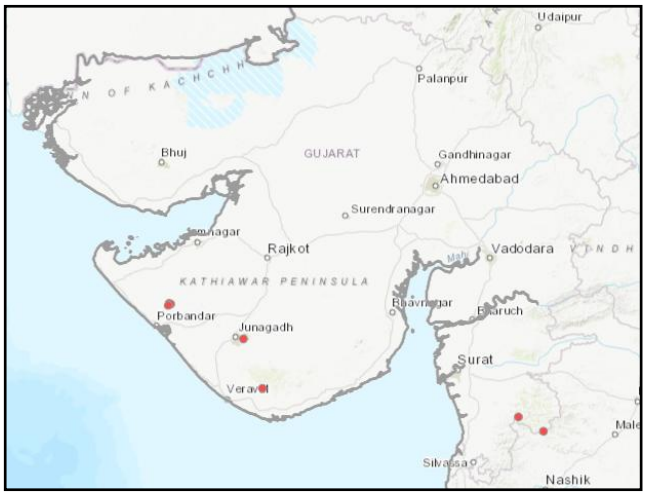


Figure 233: Distribution of *Tricholepis amplexicaulis*

DSTR Gujarat (Nayar *et al.* 2014):

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) found it ocassionally scattered on Gira-Giri hills at Saputara only

Devbhumi dwarka Dist.: Abhapara (Bole and Pathak, 1988), Kileswar, Venu (Nagar, 2005)

Gir somnath Dist.: Sisodia (2007) studied the frequency (7.45), abundance (0.90) and density (0.47) in Gir National Park

Junagadh Dist.: Girnar

Specimen examined: *BS* 2246 (SPU)

EOO = 13,937.3 km$^2$

AOO = 28 km$^2$

No. of locations: 05

AOO density: 0.29

**Vulnerable B1ab(iii,iv)+2ab(iii,iv)**

**Tricholepis glaberrima** DC.

Local name: *Brahm Dandi, Dahan, Fisshiaru, Fusiaru, Ichar, Pobay*

Habit: Herb

Fl. – Fr.: December – January

DSTR: Maharashtra, Goa, Karnataka, Tamil Nadu (Singh *et al.* 2015)

DSTR Gujarat (Nayar *et al.* 2014): According to Shah (1978) in the Flora of Gujarat, it is a rare plant in the forests of Dangs, Pavagadh, Chhota udepur, northern Gujarat and Saurashtra.

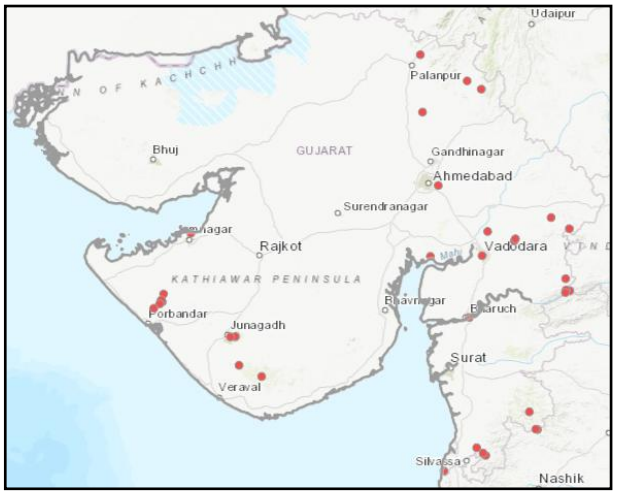


Figure 234: Distribution of *Tricholepis glaberrima*

Ahmedabad Dist.: Collected once by Meena (2014a)

Anand Dist.: Bhagwanani (1980) remarked as **not common**, growing as a weed in cultivated fields of Khambhat

Banaskantha Dist.: Meena (2012) spotted it from Balaram-Ambaji wildlife sanctuary

Bharuch Dist.: Gopal (1983) collected it from Bharuch and discussed about its ethnobotanical uses

Chhota udepur Dist.: Desai (2002) observed it **rare** on hilly slopes at Ambadungar, Bhadurpur, Hampeshwar and Turkheda; Thaker (1974) noticed it as a weed of waste places and cultivated fields at Kavant

Dahod Dist.: Bedi (1968) often noted as a weed in cultivated fields, among grasses, on dry fallow fields; **common** both in hilly regions as well as on plains at Ratanmahal and Devgadh Baria.

Dang Dist. (Tadvi, 2013): Suryanarayana (1968) noted it **rare** on hilly slopes and along road cuttings at Ahwa and Malegaon-Saputara

Devbhumi dwarka Dist.: Bhanvad (Bole and Pathak, 1988), Abhapar, Kileswar, Venu, Ghumli (Nagar, 2005)

Gir somnath Dist. (Santapau and Raizada, 1954)

Jamnagar Dist.: Rozibet (Bole and Pathak, 1988)

Junagadh Dist.: Girnar (Menon, 1979; Bole and Pathak, 1988), Sasan (Bole and Pathak, 1988)

Mehsana Dist.: Visnagar (Bharati, 1959)

Panchmahal Dist.: Chavan and Sabnis (1960) have enumerated in their work 'along the banks of the River Vishwamitri', further Oza (1961) noted in the higher parts of the Pavagadh hill, and in the plains

Porbandar Dist.: Godhana (Thakar, 1910; Nagar, 2005)

Sabarkantha: Khedbrahma (Bhatt, 1971; Bhatt and Sabnis, 1972), Vireshwar

Vadodara Dist. (Sabnis, 1967): Padate (1973) remarked as **'not common'** and noticed as a weed of waste places and fallow/cultivated fields at Savli; Pathak and Joshi (1955) have noticed as a weed on bare grounds of the Experimental school campus, near the M. S. University of Baroda.

Valsad Dist.: Vora (1980) noted as a weed and observed it **commonly** at Chavsari, Dhabhdi, Kaprada and Mandva; Umbergaon (Bhagwanani, 1980), Nana Pondha (Gopal, 1983)

Specimen examined: *BS* 2101, 2199, *GVG* 252, 224, *HMV* 991, 993, 2736 (SPU), *Bedi* 562, 577, *PPB* 1310, 1312, *DNT* 1795, *Oza* 1538, *SNP* 1493, *KJS* 10 (BARO)

EOO = 128,742 $km^2$

AOO = 140 $km^2$

No. of locations: 27

AOO density: 0.23

It is a distinct plant among tall grasses by its height, bright-green foliage and purple heads. **Least Concern**

Plant species that are endemic to Gujarat were assessed at a global scale, while species those are endemic to India, with extended distribution in Gujarat, 169 taxa, were assessed at regional scale. These, 169 taxa come under 106 genera and 37 families. Of which, Fabaceae was the dominant family represented by 27 taxa, followed by Poaceae (24), Acanthaceae (18), Asteraceae (11), Euphorbiaceae (10), and Orchidaceae (9). The IUCN assessments resulted in 6 species (*Ceropegia odorata, Achyranthes coynei, Euphorbia deccanensis, Flemingia tuberosa, Geissaspis tenella* and *Heterostemma dalzellii*) as critically endangered, 35 endangered, 61 vulnerable, 15 near threatened, 34 least concern and 7 data deficient (Appendix-I).

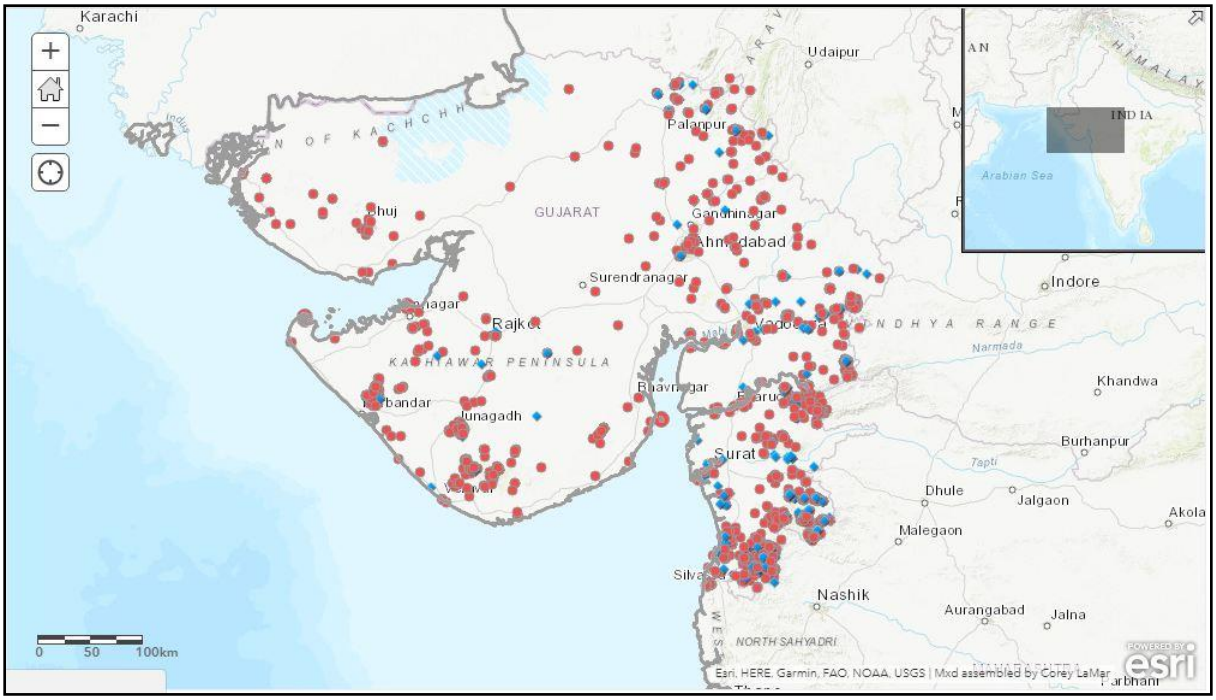


Figure 235: Distribution of Indian endemics in Gujarat (Monocots in blue; Dicots in red)

The present study demonstrates that endemics are mostly concentrated in southern Gujarat region, they are primarily herbaceous (108 members), followed by 22 trees, 21 shrubs, 13 climbers and 5 undershrubs. Many of the endemics are habitat specific, while some of them are known either only by type collections of just a few additional collections. Moreover, size of the family is directly proportional to the number of endemics.

| Number of taxa | | AOO density range |
|---|---|---|
| 77 | 44 Dicot | 0 |
| | 33 Monocot | |
| 15 | 11 Dicot | 0.01 – 0.09 |
| | 04 Monocot | |
| 19 | 16Dicot | 0.1 – 0.19 |
| | 03 Monocot | |
| 25 | 22 Dicot | 0.2 – 0.29 |
| | 03 Monocot | |
| 18 | 16 Dicot | 0.3 – 0.39 |
| | 02 Monocot | |
| 8 | 08 Dicot | 0.4 – 0.49 |
| | 0 Monocot | |
| 7 | 04 Dicot | 0.5 – 0.59 |
| | 03 Monocot | |

Based on the AOO density, 77 taxa showed the value 0 indicative of being sparsely occupied, 15 taxa showing values in the range of 0.03 to 0.09, 19 taxa showed the values from 0.1 to 0.17, 25 taxa show their values from 0.2 to 0.29, 18 taxa show their values from 0.3 to 0.39, 8 taxa show their values between 0.4 to 0.49 and 7 taxa show their values between 0.5 to 0.57.