

Floristic Diversity Assessment of Parner Tahsil, Maharashtra (India)

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Abstract

The present paper provides the first and comprehensive account of the flora of Parner tahsil (Dist. Ahmednagar) of Maharashtra (India). The floristic study of this region demonstrates a wide range of species diversity and growth forms. Vegetation of the tahsil mainly represents tropical dry deciduous forests, thorny open scrub and vast grasslands. During the present investigation, a total of 410 taxa belonging to 295 genera and 91 families of flowering plants were recorded. Out of 91 families, monocotyledons share 19.78% (18 families) and dicotyledons share 80.21% (73 families). The ratio of monocotyledons to dicotyledons families is 1: 4.06. Fabaceae is the dominant family with 61 species followed by Solanaceae and Poaceae (19 species each). The endemic, medicinal and plants of economic and ecological importance have been reported in the present communication.

Key words: Floristic diversity, Parner tahsil, Ahmednagar, drought prone area.

Across the world, 25 hotspots have been identified on the basis of species endemism and degree of threat through habitat loss.⁵ India has two major biodiversity hotspots—the Western Ghats and the Himalayas having variety of flora and fauna and ranks 10th in the global diversity of flowering plants. The Western Ghats of India is ranked fifth in the world in terms of potential products. However the Western Ghats today is one of the most significance repositories of biodiversity of

India. The components of these resources constitute the basic raw material, which was used by peoples from ancients. About 33 per cent of Angiosperm occurring in India or about 28 per cent of total Indian flora is endemic to the country.²² India is the homeland of 167 important cultivated plant species. 320 species of wild relatives of domesticated crops originated in the Indian Subcontinent.³

Ahmednagar is one of the socially,

economically, historically and geographically important districts of western Maharashtra. Topographically area of the district is divided in the plains and hills. Regional taxonomical studies are very significant for getting information about vegetation diversity. The hilly regions of the study area are a treasure of vegetation with diversity of life. This region covers basins of the Ghod and Mula rivers. These are considered as a home for threatened and endemic species that have immense ecological, commercial and medicinal values. As regards the botanical explorations of Ahmednagar District of Maharashtra, several people have made notable contributions.^{1,4,6,8,9,11,12,15-17,19,24} Vegetation from the study area is semi arid and deciduous mainly with herbaceous species. However there is not even a single concrete report about Angiospermic diversity. Keeping this in view, the present study was conducted as the first ever attempt from the region to explore and identify the plant diversity.

Study Area :

Parner is one of the Tahsil in Ahmednagar district of Maharashtra. Total area of the Tahsil is 1976.76 Sq.km. On the North side it is bordered by Mula river while at West-South by Kukadi river. Except 14 villages, rest of the Tahsil totally depends on rain water for irrigation. The tahsil is drought prone with very less rainfall. As there are extremities in temperature, humidity and less average rainfall, it has very characteristic floral diversity. The study area lies between 18° 49' 40" to 19° 21' 13" N latitude and 74° 10' 22" E to 74° 38' 34" E longitude at an elevation of about 750-800 m above mean sea level.

Out of the total area (1976.76sq.km.)

about 235 hecters (*i.e.* 12.58%) area is under forest, 9.96% area is under Kukadi irrigation canal and rest of the area depends upon rain water. The weather, in general, can be said to be hot and dry. The average day temperature ranges from 25°C to 36°C. Relative humidity is extremely low for major part of the year (between 35 to 51%) while it is highest (83%) during monsoon.

The study area is rich with different kinds of Angiosperms. The investigation was carried out in order to explore the existing floristic composition in Parner tahsil of Maharashtra during 2010-2013. Some plant species are endemic and rare, at the same time some are abundant in numbers.

Entire study area was periodically visited and an extensive floristic survey was carried out. Plant species belonging to various life forms were collected and identified taxonomically with the help of available literature.^{7,15,20,21} The collected plant specimens were properly processed and preserved using prescribed techniques¹⁰. Photographs were also taken. The collected specimens were preserved in the Department of Botany, New Arts, Commerce and Science College Parner, Dist. Ahmednagar. The lists of endangered, threatened and endemic plants found in study area were prepared with the help of published works.^{2,13,14,23}

Present study revealed that, the flora of Parner tahsil is composed of 91 families, 295 genera and 410 species. It also shows that about 42 families are represented by solitary genus (Table 1). Out of 295 genera, 228 genera are represented by only one species. The genus *Acacia*, *Euphorbia* and *Solanum* exhibits

maximum diversity with eight species each, followed by *Amaranthus* with seven species on second position and *Cassia*, *Citrus* and *Vigna* with eight species each are at third position. Table 2 summarizes the number and percentage of the families, genera and species of dicotyledons and monocotyledons as found within the study area. Out of the 91 families monocotyledons share 19.78% (18 families) and dicotyledons share 80.20% (73 families). Out of 295 genera, monocotyledons share 14.91% (44 genera) and dicotyledonous share 85.08% (251 genera). Out of total 410 species, monocotyledonous share 12.68% (52 species) and dicotyledonous share 87.31% (358 species). The ratio of monocotyledonous to dicotyledonous families is 1:4.06, for genera it is 1: 5.70 and for species it is 1: 6.88. Total genus species ratio of the Parner tahsil is 1:1.18 (Table 4). The most diverse families are Fabaceae (61 species), Poaceae (19 species) and Solanaceae (18 species) followed by Asteraceae and Cucurbitaceae (16 families each), Apocynaceae and Amaranthaceae (15 families each). About 200 species diversity is restricted to above 10 dominant families (Table 3).

The tree species of the study area include *Tamarindus indica*, *Azadirachta indica*, *Ficus bengalensis*, *Acacia arabica*, *Ficus amplissima*, *Mangifera indica*, *Syzygium cumini*, *Ficus glomerata*, *Terminalia bellirica*, *Ficus religiosa*. The shrubs comprise *Tecoma stans*, *Caesalpinia pulcherrima*, *Aegle marmelos*, *Vitex negundo*, *Caesalpinia decapetala*, *Jatropha gossypifolia*, *Lantana camara*, *Sesbania grandiflora*, *Carissa congesta*. In spite of dry, semi arid climate of the tahsil, the notable amount of climbers/ twiners occur are *Jasminum grandiflorum*, *Coccinia grandis*, *Dioscorea bulbifera*,

Momordica dioca, *Lactuca runcinata*. Herbaceous taxa of the tehsil is notable. Family Fabaceae and Poaceae are dominant in herbaceous in terms of number of species indicating favourable climatic and edaphic factors for agriculture in the tehsil. The wild flora is mostly represented by shrubs and weeds. The dominant weeds observed are *Lantana camara*, *Datura metel*, *Parthenium hysterophorus*, *Tephrosia purpurea*, *Xanthium strumarium*, *Commelina basskerlil*, *Lactuca runcinata*, *Commelina fasciculata*, *Argemone mexicana*, *Tridax procumbens*, *Cynodon dactylon*, *Cymbopogon martini*, etc.

Table 1. List of families with number of genera and species

Sr. No	Family	Genus	Species
Dicot Families			
1.	Acanthaceae	6	6
2.	Amaranthaceae	7	15
3.	Anacardiaceae	3	3
4.	Annonaceae	3	4
5.	Apiaceae	7	8
6.	Apocynaceae	13	15
7.	Asclepiadaceae	7	8
8.	Asteraceae	16	16
9.	Azollaceae	1	1
10.	Bignoniaceae	4	4
11.	Bombacaceae	2	2
12.	Boraginaceae	2	3
13.	Brassicaceae	2	4
14.	Burseraceae	1	1
15.	Cactaceae	1	1
16.	Caesalpinaceae	3	7
17.	Cannabaceae	1	1
18.	Capparidaceae	1	2
19.	Caricaceae	1	1

20.	Casuarinaceae	1	1
21.	Cleomaceae	1	2
22.	Combretaceae	2	5
23.	Convolvulaceae	4	9
24.	Crassulaceae	1	1
25.	Cucurbitaceae	10	16
26.	Cuscutaceae	2	2
27.	Euphorbiaceae	10	16
28.	Fabaceae	41	61
29.	Lamiaceae	4	8
30.	Lawsoniaceae	1	1
31.	Linaceae	1	1
32.	Loranthaceae	2	2
33.	Lythraceae	1	1
34.	Magnoliaceae	2	2
35.	Malvaceae	9	14
36.	Martyniaceae	1	1
37.	Meliaceae	2	2
38.	Menispermaceae	2	2
39.	Mimosaceae	6	13
40.	Moraceae	3	8
41.	Moringaceae	1	1
42.	Myristicaceae	1	1
43.	Myrtaceae	5	5
44.	Nelumbonaceae	1	1
45.	Nyctaginaceae	3	4
46.	Nymphaeaceae	1	1
47.	Oleaceae	2	7
48.	Oxalidaceae	1	1
49.	Papaveraceae	1	1
50.	Passifloraceae	1	1
51.	Pedaliaceae	1	1
52.	Piperaceae	1	1
53.	Plumbaginaceae	1	1
54.	Portulacaceae	1	1
55.	Punicaceae	1	1
56.	Ranunculaceae	2	2
57.	Rhamnaceae	1	1

58.	Rosaceae	2	3
59.	Rubiaceae	2	2
60.	Rutaceae	5	10
61.	Salvadoraceae	2	2
62.	Santalaceae	1	1
63.	Sapindaceae	3	3
64.	Sapotaceae	3	3
65.	Scrophulariaceae	1	1
66.	Simaroubaceae	1	1
67.	Solanaceae	8	19
68.	Tiliaceae	2	2
69.	Umbelliferae	1	1
70.	Urticaceae	1	2
71.	Verbenaceae	5	5
72.	Vitaceae	1	1
73.	Zygophyllaceae	1	1
Monocot Families			
74.	Agavaceae	1	1
75.	Amaryllidaceae	2	3
76.	Araceae	2	3
77.	Arecaceae	3	3
78.	Asparagaceae	1	1
79.	Cannaceae	1	1
80.	Commelinaceae	1	3
81.	Cyperaceae	1	1
82.	Dioscoreaceae	2	3
83.	Hydrocharitaceae	1	1
84.	Lemnaceae	2	2
85.	Liliaceae	2	2
86.	Musaceae	2	2
87.	Pandanaceae	1	1
88.	Poaceae	17	19
89.	Pontederiaceae	1	1
90.	Typhaceae	1	2
91.	Zingiberaceae	3	3

Table 2. Showing comparative account of taxa reported in different taxonomic works on Maharashtra State and Parner tahsil (*Note: The figure in the parenthesis indicates the account of the Bombay State including Maharashtra, Karnataka and Gujarat, Baluchistan and some part of Rajasthan*).

Name of the Flora	Families	Genera	Species
Flora of The Presidency of Bombay (1958 Repr.)	139 (147)	849 (999)	1938 (2513)
Flora of Maharashtra(1996 – 2002)	187	1081	3025
The Previous Literature	---	---	578
Flora of the ParnerTahsil	91	295	410

Table 3. Ten dominant families observed in the Parner tehsil.

Sr. No.	Family	Number of Genera	Number of Species
1.	Fabaceae	41	61
2.	Poaceae	17	19
3.	Solanaceae	8	19
4.	Asteraceae	16	16
5.	Cucurbitaceae	10	16
6.	Apocynaceae	13	15
7.	Amaranthaceae	7	15
8.	Euphorbiaceae	10	15
9.	Malvaceae	9	12
10.	Mimosaceae	6	12
	Total	137	200

The study area is explored with medico botanical view point. *Eucalyptus globulus*, *Justicia adhatoda*, *Syzygium cumini*, *Santalum album*, *Cyperus rotundus*, *Catharanthus roseus*, *Celosia argentea*, *Aloe vera*, *Adhatoda vesica*, *Aegle marmelos* are commonly found medicinal plants of the region. *Cuscuta reflexa*, *Dendrophthoe coccinea*,

Viscum angulatum are the parasitic plants observed on *Mangifera indica*, *Terminalia bellirica*, *Euphorbia tirucalli* and *Medicago sativa*. Parner tahsil harbors great deals of wealth of vegetables, cereals, pulses, fruit crops and oil yielding crops due to its varied climatic and edaphic conditions. In the present floristic work, the commonly cultivated species

are also included in addition to indigenous ones. The high proportion of cultivated species cannot be neglected as it forms the major component of rural flora in particular. *Glycine max*, *Arachis hypogaea*, *Sesamum indicum*, *Linum usitatissimum*, *Guizotia abyssinica*, *Helianthus annuus*, *Carthamus tinctorius* etc. are commonly

grown oil yielding plants of the region. *Punica granatum*, *Mangifera indica*, *Carica papaya*, *Citrus aurantifolia*, *Zizyphus jujubo*, *Annona reticulata*, *Achras sapota*, *Musa paradisiaca*, *Annona squamosa* are common fruit plants of the area.

Table 4. Floristic analysis of the Parner tahsil

	Monocots		Dicots		Total	Ratio	
	Total No.	%	Total No.	%		Monocot	Dicot
Families	18	19.78	73	80.20	91	1:	4.06
Genera	44	14.91	251	85.08	295	1:	5.70
Species	52	12.68	358	87.31	410	1:	6.88
Genus-Species Ratio	1:1.18		1:1.43		1:1.39	1:	1.39

Vegetation of the area is decided by the complex of the ecological factors such as soil, rainfall, humidity, geology and forest biota. Most of the part of the study area depicts thorny scrub forest. The barren hills of the area should be afforested with deciduous elements, which are wild, indigenous and adaptable to dry climate. Xerophytic plants were mainly represented by *Aloe vera*, *Acacia sp.*, *Opuntia elatior*, *Nerium indicum*, *Euphorbia caducifolia*, *Agave americana*, *Bombax ceiba*, *Zizyphus jujubo* while representatives of hydrophytic plants were *Hydrilla verticillata*, *Eichhornia sp.*, *Typha angustifolia*, *Azolla pinnata*, *Nelumbo nucifera*, *Lemna perpusilla*, *Wolffia arrhiza*. In spite of migration of floristic elements from other contiguous or neighbouring regions and from some distant lands, India has large percentage of endemic flora. Such endemic

plants recorded from the study area are *Capparis grandis*, *Adansonia digitata*, *Oroxylum indicum*, *Salvadora persica*, *Ficus microcarpa*, *Gmelina arborea*, *Prosopis spicigera*, *Putranjiva roxburghii*, *Clematis heynei*, *Hardwickia binata*. This revealed that the area comprised a number of exotic species. Introduction to exotics in the region may be adventitious and intentional for purposes of food, medicine, ornamental, avenues, etc. They constitute most of the road side places, gardens, open places and waste patches. The commonly occurring exotic plants were mainly represented by *Allium cepa*, *Azadirachta indica*, *Beta vulgaris*, *Bougainvillea spectabilis*, *Capsicum annum*, *Euphorbia hirta*, *Polyanthus tuberosa*, *Mimosa pudica*, *Tagetes erecta*, *Ricinus communis*, *Hibiscus rosa-sinensis*, etc.

Floristic vegetation is very much affected by local activities and their natural regeneration prevented due to grazing, heavy cutting, mining activities etc. The influence of industrialization, over population, loss of potential habitat, climatic changes etc. have altered the vegetation pattern of the area. This has definitely affected the flora adversely. For controlling further loss and restoration of plant diversity in future, reorientation of the attitudes of the local community towards, restoration and maintaining biodiversity is of utmost importance. For immediate conservation of plant resources, effective environmental awareness programmes from Government and Non-Government organizations in collaboration with local people is desired.

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