



Angiospermic diversity of Ahmedabad City, Gujarat, India

KEYWORDS

Angiospermic diversity, Plant species, Ahmedabad city, Gujarat state.

Dr. Nailesh A. Patel

Assistant Professor in Botany, Department of Biology, Gujarat Arts & Science College, Ellis-Bridge, Ahmedabad-15, Gujarat, India

ABSTRACT Ahmedabad is situated in Central Gujarat, it is a largest city of Gujarat state located on Sabarmati river. The angiosperm diversity is highly diversified in vegetation and has rich number of floristic composition due to topography, climate and edaphic factors which are favourable for such luxurious vegetation. Present paper deals with the synoptical analysis of the angiospermic diversity. 1015 plants species belonging to 580 genera spread over 135 families

Introduction:

Angiospermic diversity has acquired increasing importance in recent years in response to need of developing and under developing countries to assess their plant wealth. Here prepared with a view to incorporate data on the synoptic analysis and comparison of the flora.

Ahmedabad is situated in Central Gujarat; it is a largest city of Gujarat state. It lies between 22°55' 35°36' and 23°07' 51°44' North latitude and 72°28' 41°95' and 72°41' 19°59' East longitudes. The North side of the city is bounded by Kalol and Gandhinagar talukas of Gandhinagar district. North-East by Dahegam taluka of Gandhinagar district and South of City taluka of Ahmedabad district and the West side by Sanand taluka of Ahmedabad district. Ahmedabad the district headquarters was also the state's capital from May 1960 to May 1970.

The Ahmedabad municipal corporation declared the city as megacity and built up Sardar Patel ring road on periphery of the city. Except the peripheral agricultural land, rest part is the city area. It covers 10,000 square kilometer and circumference of the Sardar Patel ring road is 70 kilometer. As per census of 2001 approximate population of the city is 61, 67,589.

Cooke (1903), Saxton and Sedgwick (1918 and 1922) studied the plants of North Gujarat. Sutaria (1958), Gandhi (1958), Vaidya and Vora (1964), Vaidya (1967), Pandya (1972), Shah (1978), Patel (2010), , carried out Floristic study in Ahmedabad. There has been almost a gap of four decades. The area has been eroded which might be owing to the proliferation of human activities in these areas. The present paper is there for based on fresh field work carried out during the 2006 to 2012 with a view to incorporate data on the synoptic analysis and comparison of the flora.

Synoptic analysis

(A) Status of flora

A total number of angiosperm species reported from Ahmedabad city is 1015 belonging to 580 genera spread over 135 families (Table 1).

Table 1: Showing the number and percentage of Dicotyledon and Monocotyledon Families, Genera and Species.

Class	No. of families	No. of genera	No. of species
Dicotyledons			
(i) Polypetalae	61	204	372
(ii) Gamopetalae	31	199	326
(iii) Monochlamydae	16	48	97
Total	108	451	795
Percentage	80	77.75	78.32
Monocotyledons	27	129	220
Percentage	20	22.24	21.67
Total of Dicotyledons and Monocotyledons	135	580	1015

(B) Monocot – Dicot ratio and percentage

Dicot dominate over Monocot in all levels and the ratio of Monocot and Dicots are 1:4, 1:3.49, 1:3.61 at family, genus and species level respectively (as shown below).

Ratio and percentage of monocots and dicots

Rank			Total Number	Ratio	Percentage	
	Mono-cots	Di-cots		(Mono-cots : Dicots)	(Mono-cots)	(Di-cots)
Families	27	108	135	1:4	20	80
Genera	129	451	580	1:3.49	22.2	77.8
Species	220	795	1015	1:3.61	21.6	78.4

(C) Number of percentage of dicot, monocot family, genera and species

A synoptic data on the flora of Ahmedabad with respect to total number of family, genera and species is given in tabular mode (Table 1).

It shows that dicot families, genera and species dominate

over monocot family genera and species. With reference to families, dicot families (80%) were higher in number compared to monocot families (20%). With reference to genera, dicot genera (77.8%) were also higher in number as compared to monocot genera (22.2%). Similarly, dicot species (78.4%) were also higher in number as compared to monocot species (21.6%). Hence, it suggests that dicots are dominant over the monocots with reference to their numerical strength. Among the dicots, Polypetalae was the largest group as compared to gamopetalae and monochlamydeae within dicot.

The next dominant group is gamopetalae. It consists of families 22.96%, genera 34.31% and species 32.11%. Polypetalae and gamopetalae are almost equal in floral composition and together constitute more than 80%. Monocots are poorly represented, constituting 20%.

(D) Family-genus-species ratio

Ratio between monocot and dicot in terms of family: genus, genus: species and family:species for the Ahmedabad city were reported 1:4.30, 1:1.75, 1:7.52 respectively however this ratio were larger in monocotyledon than those of dicots (Table 2).

Table 2 : Ratio of family-genus-species

Group/ Rank	Family : Genus		Genus : Species		Family : Species	
	Number	Ratio	Number	Ratio	Number	Ratio
Monocots	27:129	1:4.77	129:220	1:1.70	27:220	1:8.15
Dicots	108:451	1:4.17	451:795	1:1.76	108:795	1:7.36
Total	135:580	1:4.30	580:1015	1:1.75	135:1015	1:7.52

(E) Floristic composition at family level

A critical analysis of floristic composition of the area (Table 3) shows that monogeneric families dominate with the largest number, i.e. 62 families (45.92%) then in the order of dominance Penta-multigeneric families occupy 2nd position with 32 families (23.72%), followed by trigeneric 18 (13.33%) , bigeneric 17(12.59%), and tetrageneric 06 (4.44%).

(F) Floristic composition at generic level

At generic level the monospecific genera constitute (69.82%) followed by Bispecific genera (14.14%) Trispecific (6.89%), Penta-Multispecific (6.04%) and Tetraspecific (3.11%).

The Tetraspecific constitute comparatively less number (Table 5.8). This analysis clearly reveals the specific diversity in the flora of the present area.

Table No. 3: Number and percentage of families with reference to the number of genera and species.

Sr. No.	Families	Number	Percentage (%)
1.	Monogeneric	62	45.92
2.	Bigeneric	17	12.59
3.	Trigeneric	18	13.33
4.	Tetrageneric	6	04.44
5.	Pentageneric or Multigeneric	32	23.72

	Total	135	100
1.	Monospecific	43	69.40
2.	Bispecific	08	12.91
3.	Trispecific	08	12.91
4.	Tetraspecific	02	3.40
5.	Pentaspecific	01	1.38
	Total	62	100

Number and percentage of genera with reference to the number of species.

Families	Number	Percentage (%)
Monospecific	405	69.82
Bispecific	82	14.14
Trispecific	40	6.89
Tetraspecific	18	3.11
Penta-Multispecific	35	6.04
Total	580	100

Ten largest families with maximum number of genera and species.

Family	No. of Genera	Family	No. of Species
Poaceae	47	Poaceae	77
Asteraceae	43	Fabaceae	67
Fabaceae	36	Asteraceae	51
Acanthaceae	23	Acanthaceae	38
Euphorbiaceae	16	Euphorbiaceae	38
Rubiaceae	15	Caesalpinaceae	34
Apocynaceae	15	Convolvulaceae	31
Scrophulariaceae	15	Malvaceae	28
Mimosaceae	12	Cypreaceae	26
Bignoniaceae	12	Cucurbitaceae	24

Poaceae is the largest family in respect to genera and species while Bignoniaceae is on 10th position in respect to genera while Cucurbitaceae is on 10th position in respect to species.

Floristic analysis of habit

Out of the total 1015 angiosperms species, 9.65% medium to tall trees, 10.15% small size trees, 14.87% shrubs, 8.08% under shrubs and 57.24% are herbs. This study shows that herbaceous plants are dominating the forest and their surroundings. This is probably owing to the semi-arid conditions and erratic rainfall. Further, the scrubby plant species can be observed as dominant perennial vegetation of the area.

Synoptic analysis and comparison with other flora

The total number of species so far recorded from Ahmedabad city is 1015 belonging to 580 genera, spread over 135 families. The genus species ration confirms the general rule that within the same floral region, smaller the flora, smaller will be species genus ratio.

The monocot dicot ratio at family, genus and species ranked are 1:4, 1:3.49 and 1:3.61 respectively. The family genus species ratio is 1:4.3, 1:1.75 and 1.7.52 (Table 2)

Members of Poaceae dominate the flora followed by Fabaceae. The first 10 dominant families in the present area as well as adjacent areas are almost similar except some slight variation which may be due to size, topography and biotic interference. Monogeneric families and monospecific genera are dominating the floral elements at family and generic ranks, respectively.

Most of the dominant families in this area in the order of Poaceae, Fabaceae, Asteraceae, Acanthaceae, Euphorbiaceae, Caesalpinaceae, Convolvulaceae, Malvaceae, Cyperaceae, Cucurbitaceae.

Acknowledgement:

Author highly thankful to Dr. B. L. Punjani, Head Botany Department, S. M. Panchal Science College, Talod and Dr. S. K. Patel, Head, Biology Dept., Govt. Science College, Gandhinagar for their critical suggestions, field work and identification of plants, lending of literature, valuable remarks, co-operation and moral support during the period of research study.

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