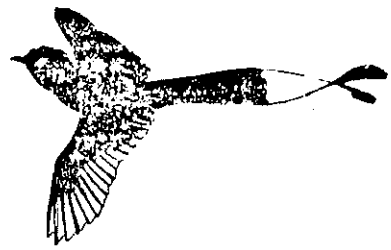
INDIAN INSTITUTE OF SCIENCE
Centre for Ecological Sciences
BANGALORE-560 012, INDIA



GEOGRAPHICAL DISTRIBUTION OF PLANT SPECIES IN KARNATAKA

MADHAV GADGIL, C. J. SALDANHA, SURESH H. S.
MALATI HEGDE AND VENKAT RAO

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INTRODUCTION

This is a report of our attempt to build up a computerised data base on geographical distribution of flowering plants in Karnataka. It constitutes part of a larger programme which in addition to Karnataka would eventually include Nilgiri biosphere reserve and Peninsular India. The information for this data base has been taken from "Flora of Karnataka" Vol. 1 by Prof. C. J. Saldanha (appendix-1)

Information has been coded to cover 6 fields which are as follows:

1) Zone
2) Altitude
3) Habitat
4) Life form
5) Abundance
6) Phytogeographic affinity

To each of these variables as far as they apply to Karnataka have been identified and coded as far as phytogeography of the plants concerned. Total number of tax a coded in 64 families is 1100.

Methodology

To prepare a complete account of geographical distribution of plants in Karnataka work was taken up in 2 steps.

1. Preparation of check list of plants
2. Collecting various information available for each plant species, organizing them in systematic way.

1. Preparation of check list:- Firstly check list of the Indian families was prepared and arranged in alphabetical order. Each family was assigned a code number, for easy retrieval. Out of this first 63 families of cronquest system of classification were taken for the analysis, the list is given in appendix. Check list of all the recorded species of plants of peninsular India was prepared then assigned a code number for every genus and species. Model sheet is inclued in appendix-1.

2. Information :- Various information collected for 63 families are explained below:-

This is the crucial part of work. Information about the plant was collected under 6 different heads which are important and obvious.

Zone: Zones were made for the Geographical region of Karnataka. Karnataka was divided into 6 broad ecological zones and assigned code. They are

01 Coastal littoral

02 Coastal low lands

03 Up Ghats

04 Western plateau

05 Northern plateau

06 Southern plateau

07 All regions

Coastal littoral: (01) This region represents coastal belt of 320 kms with a average width of 20 kms. The coast is often sandy and occasionally with rocky shore average rainfall 250 cms supports sand dune and mangrove vegetation.

Coastal low lands: (02) This zone is not extensive in Karnataka. It extends from 5 km north (Uttara Kannada) to 65 km in south (south kanara) receives rainfall on an average of 250 cm. The soil is fertile alluvial with latentic on exposed surfaces. This zone has agriculture belt as well as patches of evergreen forest/evergreen scrub.

Up Ghats: (03) This is a chain of mountains called Sahyadris with an average elivation of 900 m and deep valleys of 200 M with peak raised to 1827M (Kudremukh). This range has two faeles wind ward and leeward.

Wind ward had which appears plunging into sea near Karwar receives good rain fall from south west monsoon and supports luxuriant vegetation.

Leeward side which is undulating hills receives lesser rainfall supports moist deciduous forest. We have included Bababudan range in this category. They represent seperate chain of mountains with an average altitude of 1400M, highest 1923 M SL(Mullainagiri) very close to Western Ghats Vegetation pattern similar.

Soil is lateritic. Along with the forest belt this region harbours rich Areca plantations and paddy fields.

Western plateau: (04) This is a strip at eastern foot of the ghats and a part of Deccan plateau includes parts of Belgaum, Dharwar, Shimoga, Chikmagalur, Hassan and Mysore. We have included Biligirirangana hills in this region, which is at the southern tip of this region, join western ghats in Nilgiris and supports luxurient vegetation from dry scub to shola-grass land.

Northern plateau: (05) It is undulating plateau of elevation 300 450M, a vast stretch of Monotonous lands with isolated hills

leeping with low elevation. Soil mainly deep black and medium black. It is a prominant irrigation belt of the state natural vegetation very less except for dry scrub forest.

Southern plateau: (06) Undulating much higher area of mean elevation 800M with isolated low elevation ranges, major one Shivana Samudram to Bellary. Soil type is red soil with isolated patches of deep red and deep red and black soil. Natural vegetation scanty except for dry deciduous and scrub. For each region seperate code number is given last code number 07. All region represents entire state.

Altitude Karnataka has charactistic altitudinal range. It ranges from 0 to M to 1923M. this is divided into 4 class.

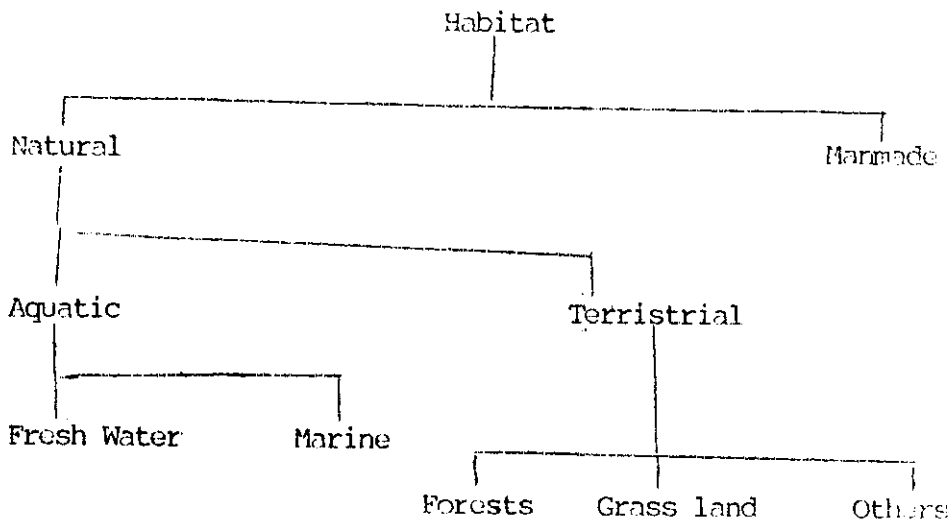
Type	Code No.
0.300	01
250-800	02
800-1400	03
1200 and above	04

This system is a standarised system used by French Institute, Pondicherry also.

0-300,250-850,850-1200- range represent tropical vegetation belt and 1200 and above range represents tropical mountane vegetation type(shola-grass land vegetation type).

Habitat: This is dwelling place of plant. This can be natural or

artificial(Man-made). We have under this 22 categories. For convenience they can be arranged



Forests: Broad classification of Indian forests is based on climatic consideration by H.G. Champion 1936.

Another approach to classification by Legris & Pascal(1964) and more detailed mapping of the region in 1982.

Both the approaches agree that two basic types exists.

1. Moist forest type
2. Dry forest type

Moist forest type includes evergreen, semievergreen and moist deciduous.

Evergreen and semievergreen

Lower slopes and valleys of western ghats are good examples. They are close canopy forests and nurtured by south west monsoon. Main associations are Dipterocarpus - Kingiodendron - Vateria.

Dipterocarpus - Mesua - Palaquium., Etc.

Ecological importance in considerable and disturbance would result in semievergreen forests.

Moist deciduous type

Decreasing rain fall on the leeward side results in moist deciduous forests. Canopy will be dense while in leaf. Rain fall during dry season. This belt runs from Belgaum to Kodagu.

Main association - Tectona-Dillenia-Lagerstroemia-Terminalia.

Dry evergreen type not represented in Karnataka.

Dry Type

Dry Deciduous: Bioclimate of eastern part of Maidan permits climax vegetation Dry Deciduous. Canopy is open and leafless during dry months. Major associations include

Anogeissus- Terminalia-Tectona ,

Anogeissus-Hardwickia,

Anogeissus-Chloroxylon Albizia and

Albizia - Acacia

Scrub: They are dry forests in several parts of Karnataka. Trees with tiny leaflets and spines. Dominent tree is Acacia.

Grass Land: In Karnataka grass lands are in high altitudes of Ghats, Bababudan hills and Biligirirangana hills.

Lithophytes: Lithophytes are those which grow on rocks and rocky formations.

Non-cultivated Lands: They constitute waste places which is usually occupied by exotics and weeds.

Sandy Beach: This is made up of characteristic vegetation - sand dune vegetation which is psamaphytic has direct sun, salt laiden winds and shifting sand. There are about 99 species of plants are

recorded (A.G. Untawale and Sayeda Wafar, 1986). Main species includes Ipomeapescapre, Spinifix littoreus.

Fresh water habitats include rivers, streams, rivulets, etc in the flowing fresh water category. Ponds, Tanks and ditches are included in standing fresh water category. Marshy area surrounding this, is Fresh water marsh.

Marine habitats include mangrove and related vegetation.

Man made: This includes the manipulated habitats which is created by man. They include :

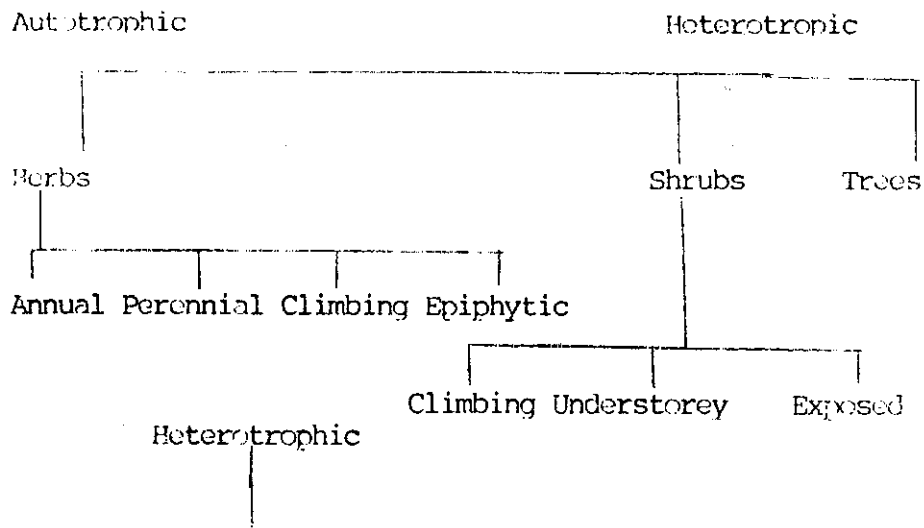
Agriculture includes irrigated, nonirrigated and fallows.

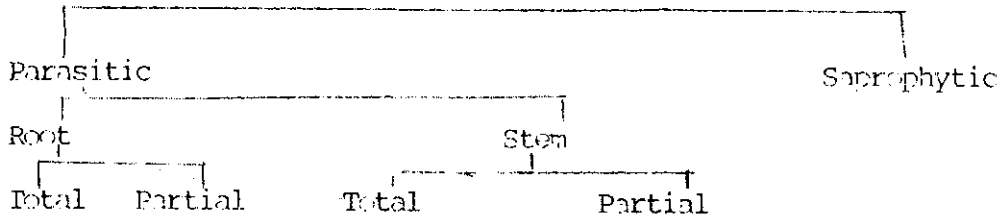
Plantations includes forestry and domestic.

Parks and gardens, road sides/hedges, railway tracks.

So all the habitat categories can be listed with their codes.(appendix-2).

Life form: Life form of a plant is defined by stature, structure, amount of biomass they put in and their life cycles This class has 13 categories. They can be arranged for convenience.





They can be listed with their respective codes. (appendix-2).

Abundance: Abundance is number of representatives of that species. It is the qualitative quantification. discussed under 7 different headings as given below.

Code	Heading
01	Absent
02	Rare
03	Frequent
04	Common
05	Locally abundant
06	Distribution in patches
07	Distribution scattered

01 Absent This does not fit into present analysis but when analysis includes peninsular India then it will be useful.

Rare In which species restricts itself to an area or distributes scantly around an area.

Common and locally abundant- distinction is made by the fact that common stands for commoness of species all along the state and locally abundant - abundant in that particular area where species are collected.

Phyto Geographic Affinity It is the distribution of species along the global scale or otherwise the limit of the species. Plants have

evolved through ages. Our continent "Gondwana" has also undergone several geological and climatical changes. Plants have also correspondingly responded to the changes.

Affinities are discussed under 7 heads.

Code	Head
01	Endemic
02	Indo arabic
03	Indo malayan
04	Himalayan
05	Introduced
06	Neotropical
07	Pantropical

Endemic:(01) Having one restricted area of distribution.

Indoarabic:(02) Which is related to the parts of Africa and dry areas of Pakistan etc. include Arabia also.

Indo malayan:(03) It is a continuous belt of relating areas such as Srilanka, Peninsular India, Burma, South East Asia, Malaya, etc.

Introduced:(05) Introduction by man, sometimes grow as escape but not yet naturalised.

Neotropical:(06) From central American countries which have become naturalised.

Pantropical:(07) Which has distribution of entire tropics.

This would give a brief account of parameters chosen for the organisation of the information.

Analysis: Central computational facility Dec-10 system is used for

analysis. Typical coded information for a species namely Achyranthus [illegible]

008 0101, 07, 010203, 2022, 02, 04, 07, ACHYRANTHUS ASPERA

We will just try to analyse with our codes

008 0101 - stands for the name of the plant species

Achyranthus aspera of Amaranthaceae

07 - stands for zones - All regions

010203 - Altitude - 0-1400M

2022- Habitat - Roadsides/hedges and non culltivated lands

02 - life form - Perrenial herb

04 - Abundance - Common

07 - Phytogeographic affinity - Pantropical

Information Retrieval

From the information gathered on various parameters following kind of information can be retrieved.

Following are the few that can be answered.

1. How many families are represented in each geographical zone?

Zones	01	02	03	04	05	06
No. of families	36	38	55	57	42	53
% of families exists stud	57.1	60.3	87.3	90.5	66.7	84.1

2. What is the species density of each geographic zone?

Zone	01	02	03	04	05	06
No of species	143	163	547	497	281	387
% of species	13.9	15.9	53.2	48.3	27.3	37.6
Density logS/ logA	.5979	.6757	.7058	.6380	.4927	.4547

S = No. of species

A = Geographical area in sq Km

3. Which is the zone having highest species density level?

"Unghats"

4. What is the percentage of species distribution for a given family in each geographical zones? For example if one wants to know % of species occurance for the families Amaranthaceae and Lauraceae.

Families	01	02	03	04	05	06
Amaranthaceae	50%	43.8%	65.6%	50%	71.9%	75%
Lauraceae	1.8%	9.5%	92.9%	11.9%	2.4%	9.5%

5. What is the composition of a particular zones in terms of life forms For example, if we want to know composition of coastal littoral and upper ghats.

	Coastal Littoral		Upper Ghats	
	No.	%	No	%
Annual herb	35	25.5	75	14.1
Perrenial herb	33	24.1	73	13.7
Climbing herb	9	6.6	40	7.5
Climbing shrub	5	3.6	50	9.4
Understorey shrub	0	0	16	3.0
Exposed shrub	22	16.1	68	12.8
Tree	31	22.6	203	38.1
Epiphytes	0	0	6	1.1
H.T.S.P.	0	0	0	0
H.T.R.P.	1	.7	1	.2
H.P.S.P.	0	0	0	0
H.P.R.P.	1	.7	1	0.2
Saprophyte	0	0	0	0

6. What is the percentage of species in each zone at a particular altitude class?

Altitude Zones	01	02	03	04
01	43.2	8.6	9.0	3.4
02	46.8	10.0	10.0	5.2
03	49.2	36.1	35.9	72.4
04	37.9	34.2	35.2	22.4
05	31.6	19.5	19.9	6.9
06	35.1	25.9	29.8	6.9

7. Which are the families having representations in all zones of Karnataka?

1. Aizoaceae
2. Amaranthaceae
3. Annonaceae
4. Aristolochiaceae
5. Capparaceae
6. Ceratophyllaceae
7. Chenopodiaceae
8. Dilleniaceae
9. Dioscoreaceae
10. Ebenaceae
11. Elaeocarpaceae
12. Euphorbiaceae
13. Lauraceae
14. Lecythidaceae
15. Magnoliaceae
16. Malvaceae
17. Menispermaceae
18. Moraceae
19. Papaveraceae
20. Pittosporaceae
21. Plumbaginaceae
22. Polygonaceae

23. Portulacaceae

24. Ranunculaceae

25. Sapotaceae

26. Sterculiaceae

27. Tiliaceae

28. Urticaceae

29. Violaceae

APPENDIX-1:LIST OF FAMILIES

005	AIZOACEAE
008	AMARANTHACEAE
010	ANCISTROCLADACEAE
011	ANNONACEAE
019	ARISTOLOCHIACEAE
026	BEGONIACEAE
030	BIXACEAE
031	BOMBACACEAE
033	BRASSICACEAE
038	CACTACEAE
042	CAPPARACEAE
046	CARYOPHYLLACEAE
050	CERATOPHYLLACEAE
051	CHENOPODIACEAE
058	CLUSIACEAE
067	CRASSULACEAE
070	CUCURBITACEAE
074	DATISCACEAE
077	DILLENIACEAE
081	DIPTEROCARPACEAE
082	DROSERACEAE
083	EBENACEAE
085	ELAEOCARPACEAE
096	FABACEAE/CAESALPINIACEAE
097	FABACEAE/MIMOSOIDEAE
098	FABACEAE/PAPILIONACEAE
100	FLACOURTIACEAE
110	HERNANDIACEAE
126	LAURACEAE
127	LECYTHIDACEAE
137	MAGNOLIACEAE
139	MALVACEAE
144	MENISPERMACEAE
148	MORACEAE
149	MYRISTICACEAE
154	MYRSINACEAE
157	MELIOSMACEAE
160	NYCTAGINACEAE
161	NYMPHAEACEAE
163	OCHNACEAE
174	PAPAVERACEAE
175	PASSIFLORACEAE
177	PHYTOLACCACEAE
178	PIPERACEAE
179	PITTOSPORACEAE
182	PLUMBAGINACEAE
187	POLYGONACEAE
189	PORTULACACEAE
196	RANUNCULACEAE
200	ROSACEAE
204	SABIACEAE
205	SALICACEAE

209	SAPOTACEAE
211	SAXIFRAGACEAE
223▲	STERCULIACEAE
226	SYMPLOCACEAE
228	TAMARICACEAE
230	THEACEAE
233	TILIACEAE
237	TURNERACEAE
239	ULMACEAE
240	URTICACEAE
243	VIOLACEAE

APPENDIX-2 : HABITAT CATAGORIES

01	EVERGREEN/SEMIEVERGREEN
02	MOIST DECIDUOUS
03	DEGRADED EVERGREEN
04	DEGRADED DECIDUOUS
05	SCRUB
06	FLOWING FRESH WATER
07	STANDING FRESH WATER
08	FRESH WATER MARSH
09	BRACKISH WATER
10	BRACKISH MARSH
11	SANDY BEACHES
12	LITHOPHYTES
13	NATURAL GRASS LANDS
14	IRRIGATED
15	NON IRRIGATED
16	FALLOW
17	PARKS AND GARDENS
18	FORESTRY PLANTATION
19	NON FORESTRY PLANTATION
20	ROAD SIDES/HEDGES
21	RAILWAY TRACKS
22	NON CULTIVATED LAND

APPENDIX-3 : LIFE FORM CATAGORIES

01	ANNUAL HERB
02	PERENNIAL HERB
03	CLIMBING HERB
0d	CLIMBING SHRUB
05	UNDER STOREY SHRUB
06	EXPOSED SHRUB
07	TREE
08	EPIPHYTE
09	HETEROTROPHIC TOTAL STEM PARASITE
10	HETEROTROPHIC TOTAL ROOT PARASITE
11	HETEROTROPHIC PARTIAL STEM PARASITE
12	HETEROTROPHIC PARTIAL ROOT PARASITE
13	SAPROPHYTE