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Enumeration And Systematic Survey of Plant Species of Family Asteraceae From Sabarmati River of Gujarat State , India.

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ABSTRACT

The present research paper deals with enumeration and systematic survey of plant species of family Asteraceae which are observed in the area of Sabarmati river of Gujarat state ,India. Plant exploration was conducted to determine plant species of family Asteraceae .Taxonomic position of these plant species is described in various available Floras .Plant species of family Asteraceae from Sabarmati riverbed –riverside area, have been listed systematically which counts 23 species of 21 genera ,These plant species grown mostly as wild, and known as weed plants.

KEYWORDS : Asteraceae, Sabarmati

INTRODUCTION

The Asteraceae family is nested high in the Angiosperm. The family contains the largest number of species of any other plant family of Angiosperms.The family is characterized by florets arranged on a receptacle in centripetally developing heads and surrounded by bracts, and by the presence of achenes (cypselas) with a pappus . Although the family is well-defined, there is a great deal of variation among the members: the habit varies from annual and perennial herbs to shrubs; Most groups in the family contain some useful and some noxious species as well as common and rare. However, the general perception of this family as "weedy". the world contains members of this family that are an important part of the flora.From the beginning, those who studied this family thought that presence of both ray and disk florets represented the basic head pattern.

The present work reported enumaration and systematic survey of Asteraceae family from mentioned area. Earlier ,The Plants of Northern Gujarat published by Saxton, W. T. and Sedgwick L. J. (1918) ,Shah, C. K. (1963) enumerate the sedges of Sabarmati ,Bhatt, R. P. et.al (1969) reported A study of the vegetation and flora of Khedbrahma region. Sabnis,S.D.et.al(1975)reported forest vegetation and phytogeography of Khedbrahma region. Shah,G. L. (1978) published the flora of Gujarat State. Yogi, D. V. (1970) submit thesis of the flora of North Gujarat .Earlier many research workers explore the North Gujarat region but not much explore the river Sabarmati.

STUDY AREA:

The geographical situation of the Sabarmati river is between 22° 30′ to 24° 30′ North latitude and 72° 30′ to 73° 30′ East longitude. It originates from Arvalli hills, near Vekaria in Rajasthan State and enters in the Gujarat state at the border of the Sabarkantha district .It passing through seven districts of the Gujarat, Banaskantha, Sabarkantha, Mehsana, Gandhinagar, Ahmedabad , Kheda and Anand. Finally enters into the Gulf of Khambhat (Cambay).Sabarmati river is one of the longest river in the state and its length is about 418 km.It has total 5475 sq.km catchments area.

MATERIAL AND METHODS

The study of family Caesalpiniaceae of angiosperms from the Sabarmati river is based on the extensive and intensive field survey of the vegetation of an area. Field survey was carried out for observation and collection of plants in various seasons. Collected plants Identified by compiling different available floras and authenticated by experts from university department and research institutes. The photographs were taken of all the plant species during field trip. Field study visit made for Six (2000-2005) years during Ph.D. research work and after that visit occasionally up to 2013 to recollect the flowering plants.The enumerated plants were categorized according to their systematic positions on the levels of family, genera and species, followed by Bentham & Hookers classification system. The list of plant species with their Scientific name, Vernacular name and Habit present in description.

RESULT: The list of collected plants is given in Table-1. Identification keys for Genera and Species described. The keys to the genera and species were made mainly on the basis of morphological characters. With nomenclature and enumeration, brief descriptions of each species, flowering and fruiting period, local names and short information on economic uses wherever available are mentioned. Simple dichotomous keys to species under each genus are provided for identification. Descriptions of the genera are not given separately.

Table,1. LIST OF SURVEYED PLANT SPECIES
[T-Tree , S-Shrub , Us-Undershrub , H-Herb , Cl-Climber , Tw-Twiner , W- wild , C- cultivated,]

Sr.No	BOTANICAL NAME	LOCAL NAME (In Gujarati)	HABIT	CULTIVATED or WILD	REMARKS
01	***Acanthospermum hispidum* Dc.**	zinaku Gadariyu	H	Wild	Common
02	*Ageratum conyzoides* L.	Ajgandha	H	Wild	Very common
03	***Blainvillea acmella* (L) Philip**	Dholu Fuldu	H	Wild	Common
04	*Blumea eriantha* Dc.	Kapurio	H	Wild	Very common
05	***Caesulia axillaris* Roxb.**		H	Wild	Common
06	***Cichorium intybus* L.**	Chikory	H	Wild	Common
07	***Cyathocline purpurea* (D.Don) O.Ktze**	Okharad	H	Wild	Common
08	***Echinops echinatus* Roxb.**	Kanta Suliyo	H	Wild	Very common
09	*Eclipta prostrata* (L.) L.Mant.	Bhangro	H	Wild	Very common

10	***Gnaphalium indicum* .L**	Phulvo	H	Wild	Common
11	***Grangea maderaspatana*(L.)Poir.**	Zinki Mundi	H	Wild	Common
12	***Launaea procumbens* (Roxb.)** Ramayya & Rajagopal	Moti Bhonpatr	H	Wild	Common
13	***Parthenium hysterophorus* L.**	Congress ghaas	Us	Wild	Very common
14	***Pulicaria angustifolia* DC.**	Sisolia jevi	H	Wild	Very common
15	***Pulicaria wightiana* DC.**	Sonfulki	H	Wild	Common
16	*Sonchus oleraceus* L.	Dudhali sonki	H	Wild	Common
17	***Sclerocarpus africanus* Jacq.**		H	Wild	Common
18	***Sphaeranthus indicus* L.**	Gorakh Mundi	H	Wild	Common
19	***Tridax procumbens* L.**	Pardesi Bhangro	H	Wild	Very common
20	***Vernonia anthelmintica* (L.) Willd.**	Kalijiri	H	Wild	Very common
21	***Vernonia cinerea* (L.) Less.**	Sahdevi	H	Wild	Very common
22	***Vicoa indica* (L.) DC.**	Sonasali	Us	Wild	Common
23	***Xanthium strumarium* L.**	Gadariyu	H	Wild	Common

ASTERACEAE (Key to Genera)

1. Florets all ligulate, flowers yellow, head cylindric… ***Launaea***

1. Florets all ligulate,flowers yellow, heads ovoid, campanulate or cylindric .... ***Sonchus***

1. Florest all-tubular or at least disc florests tubular

2. Fruits spinous

3. Achenes stellately Arranged …***Acanthospermum***

3. Achenes not as above… …***Xanthium***

2. Fruits not spinous

3. Head spinous, leaves also spinous, florets pale blue.....…***Echinops***

3. Head not as above

4. Head of two colour, anther sagittate…***Tridax***

4. Florets of one colour

5. Floret white, greenish white, pale blue

6. Heads compound,axillary…***Caesulia***

6. Heads simple, note as above

7. Leaves alternate ,

8. Head solitary, purple but florets.....white…***Sphaeranthus***

8. Head not solitary, white… …***Parthenium***

7. Leaves opposite

8. Head heterogamous

9. Pappus 0… .. ***Eclipta***

9. Pappus of 2-5 ***Blainvillea***

8. Head homogamous ***Ageratum***

5. Floret blue, bluish purple,purple violet or brownish red

6. Head homogamous, head in paniculate cymes, pappus long… ***Vernonia***

6. Head heterogamous

7.Leavespinnatifid,pappus 0…… ***Cythocline***

7. Leaves entire, pappus copious…***Blumea***

6. Head yellow, orang yellow

7. Leaves lower or all opposite… ***Blainvillea***

7. Leaves alternate

8. Pappus 0, if present minute, copular

8. Pappus 0… ***Sclerocarpus***

8. Pappus copular, head stalked …***Grangea***

8. Pappus of ray florest 0, disc florets many..***Vicoa***

DESCRIPTION OF SPECIES:

01. *Acanthospermum hispidum* DC.

Prodr.5:522,1836;FGS1:366;FOS 2:6;BBM 163

Annual dichotomously branched 30-60 cm tall herbs. Leaves sessile or subsessile, obovate, hairy. Flowers, in heads pale-yellow, axillary solitary. Fruits glabrous, with hooked spines.

Fls. & Frs. : Aug. - Dec. Common in the moist places as a weed.

02. *Ageratum conyzoides* L. (Ajagandha)
Sp. Pl. 839. 1753; FBI 3 :243; FBP 2 : 70 ; FGS 1: 367 ; FOS 2 : 6 ; BBM 366

Annual, glandular pubescent herbs.Leaves broadly ovate, appressed-hairy. Heads 0.3- 0.6 cm across, pedunculate, white or seldom pale-violet, in terminal, paniculate cymes. Achenes 0.4-0.5 cm long, cuneate, black, sharply trigonous, glabrous or hairy on angles only.

Fls.&Frs.: Nearly throughout the year.moist ground, common.

03. *Blainvillea acmella* (L.) (Dholu fuldu)

Philip.in Blumea FBI 3 : 305 ; FBP 2 : 97 ; FGS 1: 370 ; PNG 272 ; FOS 2:8 ; BBM 285

Annual 30-90cm tall plants, Leaves ovate-rhomboid or ovate-lanceolate, hairy, Flowers 0.6-0.8cm across in heads, white or yellow, in axillary and terminal cymes. Achenes two types, those of ray florets 0.2-0.35cm long, obconical, disc floret ones 0.3-0.4cm long, compressed, glabrescent.

Fls. & Frs. : Aug. - Dec. common, along the road sides; in the waste lands.

04. *Blumea eriantha* Dc. (KAPURIO)

in Wt. Contrib. 15. 1834 ; FBP 2:78 ;; PNG 271 ; FBI 3 : 266 ; FGS 1: 372 ; BBM 044

Strongly aromatic herbs, viscidly pubescent, atleast in younger parts. Leaves radical and cauline, elliptic- oblong, obovate-oblong or lyrately pinnatifid, sessile or petiolate, silky-pubescent, irregularly toothed, teeth spinous-tipped. Heads yellow, in axillary and terminal, paniculate cymes. Fruit achenes minute, angled, sparsely hairy on angles.

Fls. & Frs. : Oct. - Apr. throughout , common.

05. *Caesulia axillaris* Roxb.
Pl.. Cor. 1:64. t. 93. 1795; FBP 2: 92 ; FGS 1:375 ; FBI 3 : 291 ; BBM 225

Diffuse, glabrous herbs. Leaves sessile, lanceolate. Heads greyish-white or ash-coloured, axillary, solitary, sessile. Fruit achenes blackish-brown, obovoid, notched at apex, sparsely toothed on either side of notch, faintly ribbed.

Fls. & Frs. : Aug. – May. found in damp places and drying moist ground,.

06. *Cichorium intybus* L.
Sp **.** Pl.. *813*. 1753; FBI 3 : 391 ;FBP 2: 127 ; FGS 1:376; BBM 304

Erect hairy herbs. Leaves sessile, ovate-lanceolate. Heads blueish purple, axillary. Fruit achenes blackish-brown, obovoid,

Fls. & Frs. : Oct. – Mar. found in damp places.

07. *Cyathocline purpurea* (D. Don) O. Ktze.
Rev.Gen.Pl.338.1891;FBI 3 : 246 ,1881; FGS. 1:375,1978.Shah 378; S.& S. 271;Yogi 381. Tenacetum purpureum D. Don, Prodr. Fl. Nep. 181. 1825. [OKHARAD].

Annual, 30-60 cm tall herbs. Leaves 1.6-6.5 cm long, radical and cauline, pinnatifid, sessile, segments toothed, pubescent. Flowers rose-purple to bright purple, heads 0.4-0.6 cm, across in terminal, corymbose panicles. Involucral bracts, linear, acute, ciliate. Corollas of flowers, 5teethed. Pappus 0. Achenes minute, oblong, smooth, pale brown, faintly ribbed, glabrous.

Fls&Frs : Sep. - Mar.Field notes : In moist places like river beds, not common.

08. *Echinops echinatus* Roxb. (Kanta shulio)

Fl. Ind. 3:447. 1832; PNG : 273 ; FBI 3 : 358 ; FBP 2: 212;FGS1: 378; FOS2 : 14 ; BBM 161

Annual 30-60cm tall, armed, stout, rigid, cottony-white-pubescent. Leaves sessile, white-cobwebby-wooly beneath. Flowers white or pale blue in 3.4-5.5cm, solitary, terminal heads. Achenes 0.4-0.7cm across obconical.

Fls. & Frs. : Oct. - Feb. Common in plains, waste places near the river.

09. *Eclipta prostrata* (L.) (Bhangro)
L. Mant. 2:286.1771;FBI 3 : 304 ; FBP 2 : 95 ; FGS 1: 379; FOS 2 : 14 ; BBM 367

Annual hairy, erect or diffuse herbs. Leaves petiolate, entire, acute, elliptic, elliptic-lanceolate, lanceolate-oblong, hairy. Flower in heads, white, 0.5-1.3cm across, axillary, terminal, solitary or 2-3-fascicled. Achenes 0.2cm across obconical, compressed, winged, deep-brown to almost black, glabrous.

Fls. & Frs. : Throughout the year, , common in the moist ground .

10. *Gnaphalium indicum* L. (Phulvo) Sp.Pl. 852 .1753. FBI 3 : 289 ; FBP 2: 87; GLS 1: 382 ; FOS 2 : 19 ; BBM : 368 .
Annual hairy, erect or diffuse herbs. Leaves petiolate, entire, linear -lanceolate,grayish white. Flower in heads, creamy yellow, terminal .fruit achenes oblong , brown, hairy.

Fls. & Frs. : Oct.-Apr. Common in the moist ground .

11. *Grangea maderaspatana* (L.) (Zinki mundi) **Poir.** Eacycl. Meth. Suppl. 2:825. 1811; FBI 3 :247 ; FBP 2 : 72 ; FGS 1: 384 ; PNG 271 ; FOS 2 : 21 ; BBM 421
Prostrate or procumbent, glandular-pubescent herbs. Leaves oblanceolate, pinnatifid. Heads yellow, solitary, terminal or leaf-opposed, sessile or subsessile. Fruit achenes glandular-pubescent.

Fls. & Frs. : Dec. – May. Common in drying pond or in moist ground near water.

12. *Launaea procumbens* (Roxb.) (Moti Bhopatri)

Ramayya & Rajagopal in Kew Bull. 23:465. 1969; FBI 3 : 416; FBP 2 : 122 ;FGS 1: 387 ; FOS 2 : 28 ; BBM 162

Prostrate or suberect, perennial herbs. Leaves sessile, glabrous, radical ones lyrate while cauline ones linear-lanceolate. Flower creamy-yellow in heads ; fruit achenes minute, smooth, brown.

Fls. & Frs. : Almost throughout the year,Very common

13. *Parthenium hysterophorus* L. (Congress ghaas)Sp. Pl.988.1753; FGS 1: 388 ;BBM 046 Erect, stout, undershrubs; leaves pinnatifid, appressed-hairy. Inflorescence heads white in terminal, paniculate cymes. Flower achenes minute.

Fls. & Frs. : Oct. - Mar. Common in the waste places .

14. *Pulicaria angustifolia* DC. (Sisoliya ni jat)

Prodr. 5 : 479 ; FBI 3: 299; FBP 2 : 90 ; FGS 1: 391; FOS 2 : 30 ; BBM 118

Erect, glaucous herbs ; leaves sessile , pubescent , linear- oblong. Inflorescence head , yellow , in terminal. Fruit achenes , minute.

Fls. & Frs. : Aug. - Nov. Common in the waste places .

15. *Pulicaria wightiana* DC (Sisoria)

CL. comp.Ind. 128 .1786 **;** FBI 3 : 298 ; FBP 2 : 90 ; FGS 1: 392 ; FOS 2 : 31 ;BBM 224

Erect, herbs ; leaves sessile , pubescent , runcinate-pinnatifid ,linear- oblong. Inflorescence head , bright -yellow , in solitary , terminal. Fruit achenes , minute.

Fls. & Frs. : Aug. - Jan. Common in the waste places among grasses.

16 . *Sonchus oleraceus* L. (Dudhali sonki)

Sp.Pl. 794 , 1753. FBI 3 : 414 ; FBP 2 : 119 ; FGS 1: 394 ; FOS 2 : 33 ; BBM 288

Erect,herbs with milky juice; leaves sessile,pubescent,ovate-lanceolate.Inflorescence head , bright -yellow , in terminal umbellate cymes.. Fruit achenes minute , pale brown.

Fls. & Frs. : Sep. - Jan. Common weed in the waste places among grasses .

17. *Sclerocarpus africanus* Jacq. Icon.

Pl. Rar. 1:17. t. 176. 1782; FBI 3 : 305 ; FBP 2 : 96 ; FGS1: 392 ; FOS 2 : 31 ; BBM 165

Annual herbs. Leaves ovate, ovate-oblong, hairy. Flower yellow, solitary in terminal or leaf-opposed in head. Fruit achenes obovoid, smooth.

Fls. & Frs. : Aug.- Dec. Common in waste places also found near hedges.

18. *Sphaeranthus indicus* L. (Gorakh mundi)

Sp. Pl. 927. 1753; FBI 3 : 275 ; FBP 2 : 84 ; FGS 1: 395 ; FOS 2 : 34 ; BBM 047

Annual prostrate or procumbent herbs with winged stem. Leaves elliptic-oblong or obovate oblong , glandular-pubescent. Flower pale coloured heads, globose or obovoid, solitary, terminal. Fruits achenes oblong, glabrous.

Fls. & Frs. : Nov.-May. Found abundantly in the drying moist ground

19 .*Tridax procumbens* L. (Pardesi bhangro)

Sp. Pl. 900. 1753; FBI 3 : 311 ; FBP 2 : 102 ; FGS 1: 397;PNG 271;FOS 2 : 37 ; BBM 049

An annual , glabrous, hairy, erect or procumbent herbs. Leaves ovate-lanceolate, hairy. Flower in yellow coloured heads , solitary, terminal. Fruits achenes ribbed, dark-brown.

Fls. & Frs. : Throught the year . common, it was growing among hedge plant.

20. *Vernonia anthelmintica* (L.) Willd.. (Kalijiri)
Sp. Pl. 3:1634. 1800; FBI 3 : 236 ; FBP 2 : 66 ; FGS 1: 398 ; FOS 1 : 38 ; BBM 119

Stout, glabrous or appressed-hairy herbs, Leaves elliptic-lanceolate or lanceolate, pubescent. Heads bright-purple, in terminal corymbs. Achenes 0.4-0.5 cm long, obconical, blackish-brown, ribbed.

Fls. & Frs. : Aug. - Dec. Not common in the plains, occasionally in the area.

21. *Vernonia cinerea* (L.) (Sahadevi)
Less. in Linnaea 4:291.1829;FBI 3 : 233 ; FBP 2 : 65 ; FGS 1: 398 ; PNG 271 ; FOS 1 : 39 ; BBM 120

An annual tall erect herbs. Leaves ovate, elliptic or lanceolate, smooth above, densely hairy beneath. Flower in heads pale-to bright-purple, in terminal, paniculate cymes. Fruits achenes minute, brown , hairy.

Fls. & Frs. : Throught the year . commonly found in the hedges.

22. *Vicoa indica* (L.) DC. (Sonasali)
in Wt. Contrib. 10. 1834; FBI 3 : 297 ; FBP 2 : 88 ; FGS 1: 399 ; FOS 2 :41 ; BBM 371

An annual herbs. Leaves petiolate, acute, sessile, linear or linear-lanceolate, hairy. Flower bright-yellow in heads axillary, solitary in terminal or leaf-opposed paniculate cymes. Achenes minute, brown, sparsely hairy.

Fls. & Frs. : Oct.- May . Common, weed in the cultivated field, occasional in area .

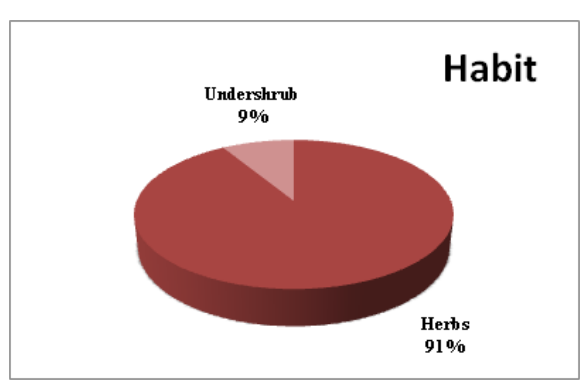
23. *Xanthium strumarium* L. (Gadariyu)
Sp. Pl. 987. 1753; FBI 3 : 303 ; FBP 2 : 94 ; FGS 1: 400 ; FOS 1 : 40 ; BBM 478

An annual herbs. Leaves broadly ovate-triangular, petiolate, hairy. Flower greenish-yellow in heads in terminal and axillary in spikes. Fruit ellipsoid or oblong, pale to dark brown. Fruits achenes smooth, glabrous, oblong, compressed.

Fls. & Frs. : Aug.- Mar. Common, in the waste places along near water ditches.

STATISTICAL DATA **OF FAMILY**: Table: 2 : Family: Asteraceae

Genera	Species	Herb Species	Undershrub species	Wild Species
21	23	21	02	23



DISCUSSION & CONCLUSION:
The analysis of the plant species in the area give the result that the total 23 species belong to 21 genera of the family Asteraceae including naturalized and indigenous plants. The dominance of the plant species especially of semi-arid zone type and presence of dif-

ferent habit like 91% herbs, 09% Undershrub.No any Tree or Climber from the Family . There are 100 % wild plant species found in the area.The most of the species found on riverbank and nearby field. Most of the species as weeds in this study area.There are herb 21 species, undershrub 02 species.

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