FLORA OF INDIA

VOLUME 12

ASTERACEAE
(Anthemideae - Heliantheae)

BOTANICAL SURVEY OF INDIA
Editors
P.K. Hajra
R.R. Rao
D.K. Singh
and
B.P. Uniyal
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BOTANICAL SURVEY OF INDIA
CALCUTTA
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PREFACE

Continuing with the present series on Flora of India, the editors now take pleasure in presenting the volume on Asteraceae, one of the largest flowering plant families in India, comprising about 1052 taxa in 161 genera (excluding the cultivated ones). In view of its large size the treatment is being presented in two volumes, i.e. Volumes 12 and 13. The entire family is treated under 12 tribes, viz. Anthemideae, Astereae, Calenduleae, Cardueae, Cichorieae, Eupatorieae, Heliantheae, Inuleae, Mutisieae, Senecioneae, Tageteae and Vernonieae. Some of the tribes, such as Cichorieae and Senecioneae, have been further segregated into a number of subtribes. While the delimitation of the tribes has been based on phylogenetic considerations, they are arranged in alphabetical sequence in conformity with the format adopted in the preceding volumes. Similarly, the subtribes, genera, sections, species and infraspecific categories have been arranged alphabetically under respective tribe, subtribe, genus, section or species. The Volume 12 deals with 525 species in 105 genera and 7 tribes, whereas the remaining taxa would constitute the Volume 13.

The editors express their gratitude and appreciation to Dr. T.N. Khoshoo, Emeritus Scientist, and Ex-Secretary, Ministry of Environment & Forests, Govt. of India, who had been the guiding force behind the preparation of Flora of India in its present pattern and gave constant encouragement and facilities during the formative period. They are also thankful to Mr. N.R. Krishnan, I.A.S., Secretary, and Mr. R. Rajamani, I.A.S., Ex-Secretary, Ministry of Environment & Forests, Govt. of India, for the encouragement and facilities received for the continuation of this work. The editors are also thankful to Dr. S.K. Jain, F.N.A., Scientist Emeritus, and Ex Director, Botanical Survey of India, who, by initiating the series ‘Fascicle of Flora of India’, provided a nucleus for the present work; and to Dr. M.P. Nayar, and Dr. B.D. Sharma, Ex-Directors, Botanical Survey of India, for initiation and continuation of the project, formulation of guidelines and the encouragement and facilities provided to us and the contributors.

The editors also express their thanks to Mr. A.R.K. Sastry, Scientist-SF, Publication Division, Botanical Survey of India, Calcutta for his valuable help in various ways during the entire work, from formulation of guidelines to the publication.

The editors record their appreciation for the hard work put in by various contributors. They also express their thanks to Mrs. R. Mathur, Senior Scientific Assistant, Mr Bhola Ram, Ex-Chief Artist, Botanical Survey of India, and Mr Dev Raj Agarwal, Photographer, Botanical Survey of India, Northern Circle, Dehra Dun, for their help in various ways.
The editors acknowledge the efficient work done by Mr. Sanjay Uniyal, Data Entry Operator at the Computer Unit of Botanical Survey of India at Northern Circle, Dehra Dun in computer typesetting of the manuscript, and the help rendered by Mr. A.K. Pathak, System Analyst, Botanical Survey of India, Southern Circle, Coimbatore, in formatting the data in the initial stage. The editors also record their deep appreciation and gratitude to all the present and retired staff members of Botanical Survey of India in general, and those of Northern Circle, Dehra Dun in particular for their hardwork and wholehearted cooperation which greatly helped us in achieving the objective.

Finally we acknowledge the quick printing of this volume in final form by Deep Printers, New Delhi.

Calcutta
23.03.1995

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ASTERACEAE nom. cons.

(Compositae nom. alt.)

Herbs, annual or perennial, sometimes shrubs or climbers, rarely arborescent, often with stolons, rhizomes, tubers or fleshy roots, variously pubescent or glandular, rarely laticiferous. Leaves alternate or opposite, sometimes radical, simple or sometimes 2 to many foliate, entire to variously dissected; stipules absent. Flowers actinomorphic or zygomorphic, hermaphrodite, unisexual or neuter, 1 to numerous, aggregated on a common receptacle, enclosed by a common involucre of bracts (phyllaries) forming the heads or capitula. Phyllaries in one or more series, free or connate, valvate or imbricate, green or coloured, herbaceous or scarious. Capitula sessile or peduncled, variously arranged spikes, corymbs, panicles or rarely in glomerules; homogamous or heterogamous or sometimes monoecious, discoid (all florets alike, perfect and have tubular corolla) or ligulate (all florets perfect but with ligulate corolla: ligules conspicuous) or disciform (outer florets filiform, pistillate; ligules inconspicuous) or radiate (ray florets on the periphery, either neutral or pistillate and disc florets on the rest of the receptacle). Receptacle flat, convex, concave or conical, paleaceous or naked. Calyx absent or reduced to pappus of bristles, awns or scales. Corolla sympetalous, of 4-5 petals, tubular, ligulate or bilabiate. Stamens 5 or rarely 4, epipetalous, alternating with corolla lobes; anthers 2-loculed, connate (syngenesious) forming a tube around the style, oblong, intorse with sterile tips, obtuse or sagittate or caudate and tailed at base, dehiscing lengthwise. Style branches 2, filiform or broader, appended or not. Ovary inferior, unilocular, terete or compressed; ovule solitary. Fruit an achene (Cypsela), variously ridged and grooved or striate, smooth or with ornamentations, often crowned by the persistent pappus. Pappus in one or more series, simple or feathery, often replaced by bristles, awns or scales. Seeds exalbuminous.

The family constitutes the largest vascular plant family with ca 30,000 species and over 1100 genera. Although the family is well represented in temperate or subtropical regions, the species have adopted to varied ecological conditions. In lowland areas, a large number of species have become adventive. In India, the family is represented by ca 900 species under 167 genera. The species are distributed widely along sea coasts, cultivated fields, alpine areas in Himalayas and in cold deserts of Ladakh and Lahul-Spiti. A vast majority of them are recent introductions and some obnoxious weeds in the agriculture fields are Eupatorium spp., Mikania micrantha, Parthenium hysterophorus, Ageratum conyzoides, A. houstonianum, Tagetes minuta, Acalypospermum hispidum, Xanthium indicum and a few others.

Economically the family is important as the source of Sunflower and Safflower oil. Many are useful in native medicines. Several ornamental taxa belonging to Chrysanthemum, Dahlia, Cosmos, Tagetes, Calendula, Zinnia and a few others are popular throughout the world.
Asteraceae form a distinct group whose phylogenetic relationship within the family as well as with other families are not clearly established. Many consider that Asteraceae are allied to both Campanulales and Calycerales (Takhtajan, 1980). Based on palynological evidences (Skvarla et al. 1977) the family is said to be closely related to Calycerales. According to Cronquist (1981) the Calycerales can be no more than 'Collateral allies' of Asteraceae. The family differs from Campanulales in having flowers aggregated into capitulum surrounded by involucral bracts, connate anthers, the 2-lobed or 2-fid style, definite number of carpels and ovules and nonendospermous seeds. Therefore, derivation of Asteraceae from Campanulaceae stock is also ruled out.

Rubiales have also been considered as a possible ancestral group by Cronquist (1981). But Asteraceae are quite distinct chemically as well as morphologically. According to Cronquist (1981) the ancestry of Asteraceae probably lies in or near the Rubiaceae, along a line parallel in some respects to the line leading to the Dipsacales and Calycerales.

Within the family, the phylogenetic relationship among the various tribes is also not clear. Some authors consider Heliantheae as the most primitive tribe (Cronquist, 1958). Yet others consider Vernoniae, Mutisieae, Senecioneae as the primitive tribes. In the present treatment of the family Bentham & Hooker’s (1873) arrangement of tribes is broadly followed, except for tribe Tageteae which has been treated as a distinct tribe.


**KEY TO THE TRIBES**

1a. Capitula homogamous; florets all ligulate or tubular or tubuliform 2
b. Capitula heterogamous; florets both ray and Disk 10

2a. Florets all ligulate (florets all ligulate in Calamitis but achenes silky, villous.) 5. Cichorieae
b. Florets all tubular 3
3a. Anther cells tailed or auricled or mucronate at the base
b. Anther cells cleft at base or subentire
4a. Styles subentire or arms short, hairy or thickened towards the base; leaves mostly spinous margined
b. Style branches of hermaphrodite florets truncate or appendaged; leaves never spinous margined

5a. Leaves opposite
b. Leaves alternate
6a. Florets all tubular; style branches subulate, hairy
b. Florets all tubuliform; style branches linear, obtuse, truncate or appendiculate
7a. Anther cells tailed or auricled
b. Anther cells not tailed
8a. Styles linear, obtuse or styles of sterile florets undivided
b. Styles of hermaphrodite florets truncate or appendaged
9a. Involucral bracts 2-many-seriate, dry or with scariosus tips
b. Involucral bracts uniseriate, herbaceous or foliaceous
10a. Achene large, thick and curved, often deformed; pappus absent
b. Achene not as above; pappus various or absent
11a. Anthers distinctly tailed
b. Anthers not tailed, sometimes mucronate at the base
12a. Anther tips without distinct hyaline appendage
b. Anther tips with distinct hyaline appendage
13a. Style branches linear, obtuse, non appendiculate
b. Style branches of hermaphrodite florets, truncate or appendiculate
14a. Involucral bracts with scariosus or hyaline margins and tips
b. Involucral bracts not as above
15a. Receptacle epauleaceous. Pappus hairs capillary
b. Receptacle paleaceous. Pappus of scales and paleas or absent
16a. Involucral bracts uniseriate, valvate, connate nearly to apex
b. Involucral bracts 1-many seriate, not connate as above
17a. Pappus of white, copious, capillary hairs (paleaceous in *Senecio* *grahamii* and *S. belgomensis*), but leaves white tomentose beneath with prominent venation
b. Pappus of paleas, bristles or awns, rarely absent

Tribe 1. **ANTHEMIDEEAE** Cass.

(B.D. Naithani)

Herbs or undershrubs, mostly aromatic, glabrous to hoary pubescent or woolly. Leaves alternate, often finely pinnate, pinnatifid, dissected or entire. Heads white, yellow or purplish green, heterogamous, radiate or homogamous, discoid, all bisexual or outer female or neuter. Involucral bracts imbricate, few to many seriate, often dry and scariosus or at least the inner ones with scariosus margins or tips. Receptacle naked or pubescent or hairy or with deciduous paleas. Ray florets present or absent, the ligules 3-toothed or entire. Disc florets yellow, limb usually tubular. Anthers not tailed, usually obtuse at the base, and with a terminal appendage. Style branches truncate or rounded. Achenes small, often angular and truncate, compressed, sometimes winged, unbeaked. Pappus mostly absent or reduced to corona.
Mostly in the old world, principally Mediterranean and S. African; ca 50 genera and ca 1252 species, 12 genera and 66 in India.


**Notes.** The tribe is fairly uniform and difficult to separate into well marked subtribes. The strongly scented, usually finely dissected, pinnately parted or at least pinnatisect leaves, the dry and scarious involucral bracts and the truncate nature of the style branches of the disc florets which are more constant in their shape than in the majority of the tribes of Compositae, are the characteristic features.

Anthemideae are largely insect pollinated but some notably *Artemisia* is wind pollinated. Great deal of variation in the number and size of the pollen grains exists between wind and insect pollinated species.

### KEY TO THE GENERA

1a. Receptacle paleaceous; heads usually rayed

1b. Receptacle naked or with fimbriate pits, heads rayed or disciform

2a. Heads corymbose; achenes margined.

2b. Heads solitary peduncled: achenes 4-5 angled or many ribbed

3a. Heads rayed

3b. Heads disciform

4a. Diffuse or tufted herbs; peduncles short; achenes 5-angled

4b. Usually erect herbs; peduncles long: achenes angled or ribbed

5a. Annual herbs; achenes ventrally 3-5-ribbed, dorsally many ribbed or smooth

5b. Perennial herbs; achenes ribbed or angled

6a. Achenes 3-many ribbed; vallecular secretory canals or epicarpy mucilaginous cells absent

6b. Achenes usually with 10-prominent ribs; vallecular secretory canals or epicarpy mucilaginous cells present

7a. Heads many, racemose, panicked or corymbose

7b. Heads single

8a. Heads racemose or panicked; involucral bracts few seriate

8b. Heads in corymbs, involucral bracts many seriate

9a. Involutural bracts many seriate, incurred in fruits

9b. Involutural bracts sub 2-seriate, not incurred in fruits

10a. Stoloniferous; heads sessile; corolla of outer florets wanting;

10b. Non stoloniferous; heads sessile or peduncled; corolla of outer florets usually present

11a. Heads sessile or sub sessile; involucral bracts 2-seriate; leaves toothed or lobed

11b. Heads peduncled, involucral bracts sub-2-seriate; leaves pinnatifid or pinnatisect

2. Achillea

3. Anthemis

4. Waldheimia

5. Matricaria

6. Chrysanthemum

7. Leucanthemum

8. Artemisia

9. Tanacetum

10. Sphaeromorphae

11. Soliva

4. Centipeda

5. Cotula
1. Achillea L.

Herbs or undershrubs, perennial, pilose or pubescent, often with thick woody rootstock. Leaves alternate, serrulate, pinnatisect or pinnatifid. Heads heterogamous, radiate, peduncled or subsessile, small or medium sized, usually arranged in terminal coryms, rarely solitary, terminal. Involucral bracts few seriate, more or less scarious margined. Receptacle flat or convex, paleaceous; paleae lanceolate or oblanceolate. Ray florets female; lingule white pink or yellow, short, more or less 3-dentate. Disc florets hermaphrodite, fertile, tubular, compressed and 2-winged; limbus 5-toothed. Anther bases obtuse. Style arms of disc florets with truncate and penicillate tips. Achenes glabrous, smooth, compressed, not winged, oblanceolate or obovate, tips rather broad. Pappus absent.

Temperate regions; ca 200 species, 2 in India.


**KEY TO THE SPECIES**

1a. Herbs; leaves 3-pinnatisect; heads 6 mm in diam.  
2. *A. millefolium*  
1. *A. alpina*

b. Undershrubs; leaves pectinately -pinnatifid; heads 9-12 mm in diam.


Undershrubs, erect; stems 20-80 cm high, woody. Leaves linear-oblanceolate, 2-10 x 0.5-1.5 cm, pectinately pinnatifid, segments oblong-lanceolate, mucronate, acutely dentate, 1-2 mm wide, more or less 1 mm apart, appressed-pilose. Heads pale purple to white, in dense coryms, 9-12 mm in diameter; peduncles 4-10 mm long. Involucral bracts 4-seriate, 4-5 mm long. Achenes 2 x 1 mm. Pappus absent.


*Distrib.* India: E. Himalayas, between 1200-1900 m. Meghalaya.

N. & C. Asia, China, Indochina and Japan.

*Notes.* This species so far known to occur in China and Siberia is probably introduced as a garden plant and now runs wild.

*Fig. 1*.

Herbs, perennial, erect, pubescent, stoloniferous; stems 15-60(-90) cm, leafy. Radical leaves ca 25 cm, 3-pinnatisect, pетioled; cauline leaves alternate, oblong-lanceolate, 5-15 cm, 3-pinnatisect; segments linear-subulate, acute to acuminate. Heads simple, crowded in compound corymbs, 6 mm in diam. Involucral bracts few-seriate, glabrous to sparsely pubescent; outer bracts 3-5 x 1 mm, margins brown scarious. Receptacle flat, paeaceous; scales thin, membranous, more or less as long as the florets. Ray florets ca 8 mm long, female; ligule white or pale pink, rounded, reflexed. Disc florets yellow, tubular, 6 mm long; limb 5-lobed. Achenes oblong, flattened, 3 mm long, shining. Pappus absent.

Fl. & Fr. May Oct.

Distrib. India: W. Himalayas, in moist and dry grassy slopes, between 1500-3500 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh and Tamil Nadu.

Asia, Europe and N. America.

Notes. Achillea millefolium L. is a polymorphic species and exhibits a great deal of variation, in the size of the leaves, nature of the leaf segments, colour of the flowers and the indumentum. An ingredient of the Unani drug BRINJASE which is said to be used as derivative and demulcent of pus. It is diuretic, expels kidney stones and is useful in fever, nasal congestion and stomach diseases.

2. Anthemis L.

Herbs, annual, biennial, perennial; stems simple or branched, pubescent. Leaves alternate, usually 1-3 pinnatisect, rarely simple; primary segments usually 3, sometimes finely pinnately or palmately divided into lobes. Heads solitary on more or less naked peduncles, radiate or discoid, hemispheric or turbinate or shortly cylindrical. Involucral bracts 3-or many seriate, inner at least generally narrowly or broadly scarious margined, outer shorter. Receptacle convex or conical, palaee linear-lanceolate, subulate or oblanceolate, scarious or cartilaginous, acute, mucronate or acuminate at apex, generally as long as disc florets, sometimes longer. Ray florets female, fertile or neuter, 1-seriate; ligule white or yellow, rarely purplish, base of corolla sometimes persistent on achenes. Disc florets hermaphrodite, fertile, tubular; limbs yellow, rarely purplish, 5-dentate, sometimes inflated at base but not saccate. Achenes usually obconical, terete, sometimes dorsiventrally compressed, smooth, ribbed or tuberculate. Pappus absent or very short, palaeeaceous or of a membranous large or small auricle.

N. & W. Asia and N. Africa; ca 200 species, 1 in India.
Fig. 1. Achillea millefolium L.: a. Habit; b. Involucral bract; c. Outer floret; d. Palea; e. Inner floret.


Herbs, annual, erect, glabrous to sparsely hairy, much branched, foetid, 12-45 cm high. Leaves alternate, 2-4 cm long, bipinnate; segments oblong-linear, acuminate. Heads many in loose corymbs, 15-20 mm in diam., long peduncled, Involutrical bracts 3-4 mm long, narrowly ovate-lanceolate to elliptic-lanceolate, obtuse with brown scarious tips. Receptacle conic, paleaceous; scales, oblong, linear, hyaline. Ray florets 6 mm lon, female, sterile; ligule white, narrowly obovate, nerved, abruptly 3-lobed. Disc florets yellow, tubular, 2 mm long, winged; limb 5-fid with acute lobes, slightly dialated at base. Achenes grey, turbinate, truncate, tubercled, apically collared, 2 x 0.6 mm. Pappus absent or very short, paleaceous or of a membranous large or small auricle.

Fl. & Fr. May Oct.

Distrib. India: W. Himalayas, sometimes as an undergrowth in Cedrus forest otherwise on shady slopes, between 800-3000 m. Jammu & Kashmir, Himachal Pradesh and Uttar Pradesh.

Pakistan, N. Asia, China, N. America, Britain and Canary Islands.

Notes. Highly variable with regard to the hight, and nature of the head.

3. Artemisia L.

Herbs or undershrubs, usually strongly aromatic. Leaves alternate, entire, incised or 1-3-pinnatisect. Heads homogamous or heterogamous, solitary or fascicled, racemose or panicked, never corymbose, ovoid or broadly campanulate, small. Involucral bracts few-seriate with scarious margins; the outer shorter. Receptacle flat, convex or hemispheric, naked or pubescent to long hairy. Outer florets female, fertile, 1-seriate; corolla slender, tubular, shortly 2-3-fid. Disc florets hermaphrodite, fertile or sterile; corolla regular, tubular; the limb slightly enlarged or campanulate, 5-fid. Anther bases oblong, entire. Style arms of hermaphrodite florets truncate, usually penicillate tips often connate in the sterile florets. Achenes ellipsoid, oblong, subobovoid, very small, faintly striate, glabrous or pilose. Pappus absent.

North Temperate regions, S. Africa and S. America; most common on arid soils of W. United States and Russian Steppes; ca 400 species, ca 32 in India.

Fig. 2. *Anthemis cotula* L.: a. Habit; b. & c. Involucral bracts; d. Outer floret; e. Inner floret with scale.

**KEY TO THE SPECIES**

1a. Heads homogamous; receptacle naked; florets all fertile  
18. *A. maritima*

b. Heads heterogamous; receptacle various; florets all fertile or only the outer female fertile and the disc with sterile florets  
2

2a. Receptacle naked  
3

b. Receptacle hairy or obscurely pubescent  
28

3a. Outer florets female, fertile; disc florets sterile  
4

b. Outer female florets and disc florets all fertile  
9

4a. Perennial herbs  
5

b. Annual herbs  
8

5a. Heads secund; cauline leaves with stipule like appendages at the base  
16. *A. japonica*

b. Heads not secund; cauline leaves without the appendages at the base  
6

6a. Leaves entire, weakly toothed; radical leaves 3-fid or absent  
8. *A. dracunculus*

b. Leaves 2-3-pinnatisect or pinnatifid, only upper ones entire  
7

7a. Stems pale white; heads in simple or panicked racemes  
24. *A. salsoloides*

b. Stems pale green, sometimes purple; heads solitary and distant or in cluster of 2-3-short forming panicked racemes  
9. *A. dubia*

8a. Heads secund; involucral bracts glabrous; achenes narrowly obovate  
6. *A. capillaris*

b. Heads not secund; involucral bracts hairy; achenes narrowly obconic  
27. *A. stricta*

9a. Annual or biennial herbs  
10

b. Perennial herbs  
12

10a. Small herbs, ca 15-30 cm high; involucral bracts pubescent; heads rather large  
4. *A. biennis*

b. Tall herbs, up to 1.2 m high; involucral bracts glabrous; heads small  
11

11a. Heads hemispheric, pedicelled, secund, drooping in axillary leafy racemes  
7. *A. caruiifolia*

b. Heads ovoid, erect in very dense axillary erect sessile, compound thyrsoid panicles  
30. *A. tournefortiana*

12a. Heads usually small, 1.25-4 mm in diam., often in spreading panicked spikes or racemes  
13

b. Heads rather large 4-8 mm in diam. in simple, sparingly branched, erect axillary and terminal racemes  
27

13a. Leaves simple, lobed or serrate  
14

b. Leaves pinnatifid, pinnatisect of pinnati-partite  
15

14a. Hoary pubescent or tomentose herbs; leaves ovate-elliptic, lobed; heads ovoid  
21. *A. nilagirica*

b. Glabrous herbs; leaves lanceolate, acuminate, serrate; heads globose-campanulate  
2. *A. amygdalina*

15a. Glandular hairy herbs  
20. *A. myriantha*

b. Pubescent or tomentose or glabrescent herbs  
16

16a. Rhizomatous perennial herbs  
17

b. Rhizomatous perennial herbs  
17

17a. Brown purple or purple herbs  
18

b. Herbs more or less green  
20

18a. Cauline leaves with auricled lobes; heads often clustered at the terminal ends embedded in brown ferruginous wool  
5. *A. campbellii*

b. Cauline leaves without auricled bases; heads panicked, not embedded in wool  
19

19a. Leaves grey white to woolly tomentose beneath; heads subglobose or campanulate; corolla tube of hermaphrodite florets broadly attenuate  
23. *A. roxburghiana*

b. Leaves tomentose beneath; heads hemispheric; Corolla tube of hermaphrodite florets narrowly attenuate  
28. *A. strongylocephala*
20a. Heads oblong; involucral bracts glandular hairy
   b. Heads campanulate or subglobose; involucral bracts glabrous or tomentose at maturity
      21a. Leaf segments pectinately pinnatifid; rachis often pectinately winged; heads hemispheric, subsecund
         b. Leaf segments not pectinately pinnatifid; rachis simple winged; heads often subglose or campanulate, not sub secund
   22a. Herbs with glabrous stems; leaves pinnate-partite.
      b. Herbs with puberulous to pubescent stems; leaves 2-pinnatisect or 2-pinnatifid or 2-pinnatipartite
      23a. Stems slender; leaves 2-pinnatifipartite, segments incised
         b. Stems stout; leaves 3-2-1-pinnatisect; segments not incised
      24a. Leaves 3-2-pinnatisect, white punctate above
         b. Leaves 2-1-pinnatisect, not white punctate above
      25a. Panicles almost entirely leafless; heads campanulate
         b. Panicles sparsely to densely leafy; heads globose or ovoid-campanulate or ovoid
      26a. Outer involucral bracts densely tomentose
         b. Outer involucral bracts arachnoid-puberulous
      27a. Leaves white tomentose beneath, segments spreading; corolla not densely villous
         b. Leaves subsilky villous on both surfaces, segments close-set, short; corolla densely villous
       28a. Receptacle obscurely pubescent; heads ca 4 mm in diam., subglobose; corolla of hermaphrodite florets almost cupular
          b. Receptacle covered with long hairs; heads 6-12 mm in diam., hemispheric; corolla of hermaphrodite florets not cupular
      29a. Silky hoary or tomentose perennial herbs, heads 6-8 mm in diam.
         b. Hoary pubescent or tomentose annual or biennial herbs; heads 6-12 mm in diam.
      30a. Tall herbs; heads numerous, somewhat crowded; achenes elliptic-oblong or somewhat obovoid
         1. Artemisia absinthium
            b. Dwarf herbs; heads few, solitary or spicate; achenes cylindric, obscurely ribbed, somewhat auricled at the tips
               19. A. minor
            31a. Usually tall herbs, simple or paniculately branched above; anthers aristate
               b. Dwarf herbs; branches many ascending from the root, spreading in a circular way; anthers acuminate
                  17. A. macrocephala

   Eng.: Absinth, Madderwort; Hindi: Vilayati afsanth; Mal.: Shula bandha.

Herbs, perennial, erect, hoary pubescent, 30-90 cm high; stems few or many from the rootstock, angled, densely hoary pubescent, roughly sulcate, slender, terminating in inflorescences. Radical leaves ca 10 cm long, 2-3-pinnatisect, hoary pubescent to dull ferruginous petioled; petioles narrowly winged; segments linear or oblong-linear, obtuse. Heads yellow, compact, arising from the axils of the leaf-like bracts, shortly pedicelled in dense secund racemes, terminating the branches hemispheric, 3 cm in diam. Outer involucral bracts herbaceous, oblong with narrowly scarious margins; 2 x 0.5 mm; inner involucral bracts obovate-orbicular, with scarious margins 3 x 1 mm. Receptacle slightly convex, dull brown hairy. Outer florets 1 x 0.3 mm, female, fertile; corolla red, glandular, slightly obliquely dilated below. Disc florets hermaphrodite fertile,
Fig. 3. *Artemisia absinthium* L.: a. Habit; b., c., & d. Involucral bracts; e. Outer floret; f. Anther; g. Achene.
2 x 0.5 mm, tube widened at the top; limbs 5-fid. Anthers acuminate. Achenes dull-brown, elliptic-oblong to obovoid, 1 x 0.5 mm, slightly concave in the centre rough.

Fl. & Fr. July Sept.

Distrib. India: W. Himalayas, common on slopes, between 1500-2500 m. Jammu & Kashmir (Srinagar, Banihal, Tangmarg).

Afghanistan, N. Asia and Westwards to Atlantic.

Notes. Critical study of the specimens revealed that Artemisia absinthium L. is a very distinct species but sometimes confused with Artemisia sieversiana in general habit. However, the characteristic perennial habit, hoary pubescence of the stem and the leaves, small, short peduncled heads in small dense secund racemes, and acuminate anthers of the former are sufficient to distinguish it from the latter. Native of Europe, perhaps introduced for medicinal purposes. The whole herb is an aromatic tonic formerly used in debility of the digestive organs. It exercises a powerful influence over the nervous system and causes headache. This phenomenon was known to the travellers from the early times when marching through the extensive tracts of Kashmir and Ladakh.


Herbs, perennial, large, glabrous; stems stout erect, deeply grooved, many-ribbed, glabrous. Leaves simple, rather membranous, subsessile, lanceolate, cuneate, cuneate at the base, acuminate, serrate, 10-15 x 1.5-3 cm, more or less glabrous above, brown white pubescent beneath. Heads fewflowered, sub secund in dense short axillary racemes ovoid, ca 3 mm in diam. Involutral bracts oblong, obtuse, glabrous with scarious margins, 3 x 1 mm; outer with green midrib. Receptacle naked. Outer florets female, fertile, 0.5 mm long. Disc florets yellow; hermaphrodite, fertile, tubular, 2 mm long, limb 5-lobed. Achenes not seen.


Pakistan and Afghanistan.


Herbs, perennial; stems pale yellow or purplish brown erect, striate, branches patently puberulous or glabrescent. Middle and upper cauline leaves 3.5-5.5 x 2-3.5 cm, 1-2-pinnatisect, membranous, papery, short petioled; petioles 0.5-1.5 cm long; basal
stipuliform, half amplexicaul, sparsely pubescent or glabrescent above or arachnoid-pubescent beneath, elliptic in outline; primary segments (3-)4-5-sect; secondary segments 1-2-sect, elliptic or lanceolate, mucronate at the apices 0.3-1 x 2-2.5 mm. Floral leaves 3-sect or entire. Heads sessile or sub sessile, slightly drooping in panicles or 3-5 heads crowded on the branch or solitary or laxly spiked, panicles many ovoid-campanulate or ovoid, 1.5-2.5 mm in diam. Involutural bracts in 3-4 series; outer bracts lanceolate, sparsely arachnoid-puberulous with membranous margins, midrib green; middle and inner long ovate, membranous or submembranous, glabrescent to glabrous. Receptacle minute, naked. Outer florets 7 11, female; corolla narrowly tubular, 2 dentate at the apex. Disc florets 8-12, hermaphrodite, tubular; limb 5-dentate, purple. Anther apices triangular, acute, bases acute. Style arms truncate, penicillate. Achenes long, ovoid or elliptic-ovoid minute.

Fl. & Fr. Sept.

Distrib. India: W. Himalayas, at 4000 m. Himachal Pradesh and Uttar Pradesh (Garhwal : Niti).


Herbs, annual, erect, glabrous to sparsely pilose, 25-60 cm high; stems pale green, rather succulent, sometimes many from base. Lower leaves 5-8 cm long, 2-pinnatifid or toothed; cauline leaves linear-oblong; 2-6 cm long subsessile. Heads yellow or purplish green, many flowered, suberect in short leafy panicked racemes broadly cupular, 4 mm in diam. Outer involuclral bracts dull green with narrow brown scarious margins, broadly ovate to obovate, 2.5-3.2 x 2 mm, more or less glabrous; inner involucral bracts obovate with narrow brown scarious apices, 3 x 2 mm. Receptacle broad, convex, naked. Outer florets female, fertile 1.5 mm long, corolla oblong, slightly glandular. Disc florets hermaphrodite, fertile, tubular, 3 mm long, slightly glandular, limb 5-fid. Achenes brown, oblong to oblanceolate, 1.2-1.5 x 1 mm, obscurely angled.

Fl. & Fr. July Sept.

Distrib. India: W. and E. Himalayas, along shady bank of streams, in waste lands and on grassy hill slopes, between 4000-5000 m. Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh and Sikkim.

Tibet and N. China.

Fig. 4. Artemisia biennis Willd. : a. Habit; b. Involucral bract; c. Achene.
Herbs, perennial, erect, strongly scented; branches clothed with brown tomentum, ca 20 cm high; rootstock creeping. Leaves pinnatisect, ovate in outline; segments 2-3-lobed; lobes lanceolate, acute; radical leaves 3-6 cm long; stout petioloed, sheathing at base; cauline leaves auricled at base with revolute margins, brown ferruginous above, white tomentose beneath. Heads brown, sessile, clustered in interrupted, simple or racemose spikes hemispheric, 4 mm in diam. Involucral bracts densely woolly, oblong; outer with narrow scarious margins; inner rather scarious. Receptacle very small. Outer florets, female, fertile. Disc florets, hermaphrodite, fertile, tubular. Achenes not seen.

Fl. & Fr. July Aug.

Distrib. India: W. & E. Himalayas, between 1500-6000 m.

Pakistan, Bhutan and Tibet.


Fig. 5.

Mah. (Bombay): Churisaraj, Danti; Punj.: Biur, Dona, Durunga, Jhan, Marua.

Herbs, annual, glabrous to sparsely villous, 20-60 cm high; branches dull purple to pale white, slender, grooved; rootstock woody. Radical leaves broadly ovate in outline, ca 6 cm long, 1-3-pinnatisect; segments setaceous; cauline leaves pinnatisect. Heads sessile, or on short capilllary peduncles, secund in densely or sparsely panicled racemes, 0.2-0.25 cm in diam. Involucral bracts oblong, obtuse with white scarious margins, 1-2 mm long glabrous, outer green with scarious margins. Receptacle small, slightly convex, naked. Outer florets female, fertile, 1 mm long, corolla filiform. Disc florets hermaphrodite, sterile, tubular; 1.8 mm long, limb 5-fid. Achenes brown narrowly obovate, 0.8 mm long, obscurely striate.

Fl. & Fr. July Dec.


Pakistan, W. Tibet, N. China, Mongolia, Japan and Afghanistan to C. Europe.

Notes. A highly variable species.