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A synopsis of the Family Chenopodiaceae in India

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Abstract

The present paper presents a concise account of Chenopodiaceae in India. In all 19 genera with 50 species, 1 subspecies, 3 varieties have been recognized and another 2 genera and 14 species are cultivated or introduced. The genera and species are arranged in alphabetical order. Within the enumeration Key to genera and species, correct nomenclature, reference to type materials wherever available, phenology and distribution also have been added.

Key words: India, Chenopodiaceae, Synopsis, *comb. et stat. nov*.

INTRODUCTION

The plants of Chenopodiaceae Ventenat, commonly known as 'Goosefoot' family, are mostly grow as weed and some are food plants like spinach, chard, beets, sugar beet and quinoa. The family is placed in the order Caryophyllales by Cronquist (1981), Takhtajan (1969) and Dahlgren (1975). Hutchinson (1959) and Thorne (1968, 1992) included the family in the order Chenopodiales, Ulbrich in Engler & Prantl (1934) in the order Centrospermae and Bentham & Hooker (1880) in the series Curvembryeae. Bentham & Hooker (1880) divided the family into two series, cyclobeae and spirolobeae. Cyclobeae is characterized by annular embryo, albumen copious whereas in spirolobeae the embryo is spiral and albumen scanty or absent. Williams & Ford-Lloyd (1974) recognised three subfamilies: Chenopodieae (embryo cyclical, operculum absent, endosperm absent, ovary superior), Salsoleae (embryo spiral, operculum absent, endosperm absent, ovary superior), Beteae (embryo cyclical, operculum present in fruit, endosperm present, ovary semi-inferior). Takhtajan (1997) divided the family into four subfamilies: Chenopodioideae (Embryo annular or less often curved. Leaves well developed, mostly broad, sometimes narrow and fleshy or scale like. Fruits surrounded by the persistent perianth or by bracteoles. Perisperm usually present), Salicornioideae (Embryo annular or curved, rarely straight. Perisperm present. Stems succulent, articulated, with leaves reduced to tubercules or scales. Flowers usually in groups of 3 sunken into cavities in the axis of spiciform inflorescences), Salsoloideae (Embryo spirally coiled. Perisperm usually lacking. Leaves mostly linear to filiform, terete, sometimes scale like. Flowers 1-3, in the axils of the bracts, usually bracteolate), Polycnemoideae (Embryo annular. Stem with normal secondary growth. Flowers bisexual, solitary, with bracteoles) and subsequently he again (2009) divided the family into Chenopodioideae (embryo annular or less often curved), Microteoideae (embryo annular), Salicornioideae (embryo annular or curved, rarely straight) and Salsoloideae (embryo spirally coiled).

The Chenopodiaceae and its allied family Amaranthaceae represent the core of the order Centrospermales having curved embryo surrounding the endosperm, presence of betalain pigments, basal or free-central placentation and anomalous secondary thickening. Chenopodiaceae differs from the Amaranthaceae by the presence of nonscarious perianth and mostly free filaments; whereas in Amaranthaceae the perianth is scarious and the filaments are mostly connate below.

The APG (Angiosperm phylogeny group) system (1998), the APG II system (2003) and APG III (2009) have included the chenopods in the family Amaranthaceae on the basis of evidence from molecular phylogenies.

Sir J.D. Hooker in his *Flora of British India* (1886) first gave an account of Chenopodiaceae of the then British India. In his treatment there were 20 genera viz. *Acroglochin* (1 sp.), *Chenopodium* (8 spp.), *Beta* (1 sp.), *Spinacia* (1 sp.), *Atriplex* (5 spp.), *Eurotia* (1 sp.), *Axyris* (1 sp.), *Microgynoecium* (1 sp.), *Corispermum* (1 sp.), *Chenolia* (2 spp.), *Kochia* (4 spp.), *Arthrocnemum* (2 spp.), *Salicornia* (1 sp.), *Suaeda* (6 spp.), *Haloxylon* (4 spp.), *Salsola* (4 spp.), *Anabasis* (2 spp.), *Halocharis* (2 spp.), *Halogeton* (1 sp.) and *Basella* (1 sp.). Within the present political boundary of India and recent taxonomic treatments by different authors a number of additions and deletions of several species in the family have been taken place. The genus *Basella* is now treated under a separate family Basellaceae. So a systematic study of the family in India is very much essential.

In the present paper the generic delimitation of the family is followed according to Takhtajan (1997).

In the following enumeration all the recorded genera, species and varieties are arranged alphabetically. Plants those are still in human care in India are recorded under a separate section 'Cultivated and Introduced Species'.

CHENOPODIACEAE Ventenat

Cosmopolitan, chiefly in xeric environment and halophytic areas; *ca.*103 genera and 1600 species (Takhtajan 2009); 19 genera and 50 species, 1 subspecies and 3 varieties in India, another 2 genera and 14 species are cultivated or introduced.

The plants of the family commonly grow in saline and semiarid habitats. Some species, those occur in desert, are mostly used as animal forage. Some species are of valued as food and as a source of dyes, alkaloids, drugs etc., while others like Beet, Spinach are cultivated for excellent vegetables, some are also cultivated for their ornamental foliage.

Key to the Genera

1a. Embryo curved to annular, perisperm abundant ……... 2
1b. Embryo spiral, perisperm scanty or absent …… 15
2a. Fruit a pyxis with circumscissile dehiscence ……..... ***Acroglochin***
2b. Fruit a utricle, not dehiscent 3
3a. Perianth basally adnate to ovary, enlarged …… ***Beta*** (cultivated)
3b. Perianth free from ovary, not enlarged ……..…… 4
4a. Flowers born in axill of succulent bracts; leaves reduced scaly or insignificant .. 5
4b. Flowers free from rachis; leaves usually well developed …… 7
5a. Annual herbs, all branches terminated by inflorescences ……..….. ***Salicornia***
5b. Perennial subshrubs or shrubs, many branches non flowering …… 6
6a.Opposite pairs of bracts connate or free; stamens abaxially placed …..… ***Halosarcia***
6b. Opposite pairs of bracts connate toform a segment; stamens adaxially placed ….
..... ***Arthrocnemum***
7a. Flowers unisexual (plant monoecious or dioecious) ……... 8
7b. Flowers bisexual or plant sometimes polygamous …… 12
8a. Plants covered with stellate hairs …… 9
8b. Plant glabrous or furfuraceous …… 10
9a. Female flowers with perianth, bracts in fruit without silky hairs …….. ***Axyris***
9b. Female flowers perianthless, bracts in fruit densely long silky hairy ….....
..... ***Kraschenninnikovia***

10a. Female flowers several, borne at base of foliaceous bract …..... ***Microgynoecium***
10b. Female flowers born in axil of a foliaceous bract in a cup formed by 2 connate bracts .....…. 11
11a. Plant glabrous; stigmas 4 or 5 …… ***Spinacia*** **(**cultivated)
11b. Plant covered with furfuraceous indumentum, stigmas 2 ……..…….... ***Atriplex***
12a. Plant covered with stellate hairs; perianth segment 1 – 3 or absent; utricles with 2-fid beak at apex ……..... ***Corispermum***
12b. Plant covered with vesicular or glandular hairs, villous or pubescent; perianth segments (3) 5 parted, utricles flattened without beak ……....……...…..… 13
13a. Plants usually furfuraceous, glabrous or glandular, aromatic; seeds horizontal or erect 14
13b. Plants pubescent, not aromatic; seeds horizontal ……....…… 16
14a. Plant covered with glandular hairs ……..…….. ***Dysphania***
14b. Plant covered with vesicular hairs …….. ***Chenopodium***
15a. Fruiting perianth with prickly or hooked appendage ……....…… ***Bassia***
15b. Fruiting perianth with wing like appendage ……....…… ***Kochia***
16a. Perianth fleshy or membranous; bracteoles rudimentary, scale like…….. ***Suaeda***
16b. Perianth glumaceous; bracteoles developed, often rigid and spinescent … 17
17a. Branches jointed; leaves opposite ……..…… 18
17b. Branches not jointed, leaves alternate …….. 19
18a. Flowering branches borne on the branches of previous year; flowers in lower nodes of these branches ……..……. ***Haloxylon***
18b. Flowering branches borne on shoots of same year; flowers in the upper nodes of the shoots ……..……. ***Arthrophytum***
19a. Perianth winged; anther appenducilate or not …….……....…… 20
19b. Perianth not winged, segments connate at base; anther appendiculate …..... ***Halocharis***
20a. Winged appendage of perianth segments attached sub apically; stamens 2 or 5, anther apex without an appendage ……..……..... ***Halogeton***
20b. Winged appendage of perianth segments attached at middle; stamens 5, anther apex appendaged ….....…… ***Salsola***

Acroglochin

Schrader *ex* Schult*es f.*, Mant. 1: 69. 227. 1822.

Type species: *A. chenopodioides* Schrader *ex* Schultes *f.*

Etymology: From the Greek *akros* (highest, terminal) and *glochin* (point).

2 species in Central & Eastern Asia, Himalaya (Mabberley 2008); 1 in India.

Acroglochin persicarioides (Poiret) Moquin in DC., Prodr. 13(2): 254.1849. R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 216. 1972; Gelun Zhu *et al*. in Fl. China 5: 353. 2003. *Amaranthus persicarioides* Poiret in Lamarck, Encycl. Meth. Bot. Suppl.1: 311. 1810. *Acroglochin chenopodioides* Schrader *ex* Schult. *f*., Mant. 1(2): 227.1822; Hooker *f*., Fl. Brit. India 5: 2. 1886.

Holotype: Described from the Himalayas (Nepal/Kashmir) (P).

Flowering & Fruiting: September – November

Distribution: INDIA - growing in hill slopes, roadsides, waste places and forest margins, in the Himalayas between 1520 – 2600 m. Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Meghalaya; PAKISTAN, NEPAL, BHUTAN and CHINA.

Arthrocnemum

Moquin, Chenop. Monogr. Enum. 111. 1840.

Lectotype: *A. fruticosum* (Linnaeus) Moquin (*Salicornia fruticosa* Linnaeus) (P. C. Standley, N. Amer. Fl. 21: 81. 27 November, 1916).

5 species in Mediterranean region, Asia, South Africa and South, West and North America (Mabberley 2008); 1 in India.

Arthrocnemum macrostachyum (Moricand) K. Koch, Hort. Dendrol.96. 1853; Ball in Tutin *et al*., Fl. Europea 1: 121. 1993. *Salicornia macrostachya* Moricand, Fl. Veneta 1: 2. 1820. *S. glauca* Delile, Fl. Aegypt. Illustr. 69.1813. *Arthrocnemum glaucum* (Delile) Ungern–Sternberg, Atti Congr. Bot. Firenze 283.1876; Hooker *f*., Fl. Brit. India 5: 12. 1886. *A. fruticosum* Moquin var. *glaucum* (Delile) Moquin in DC., Prodr. 13(2): 151. 1849; Gamble, Fl. Pres. Madras 2: 828. 1957 (repr. ed.).

Type: Italy: Venice, "secus viam quae ad portum Malamocco ducit."

Flowering & Fruiting: October – December

Distribution: INDIA – Seacoasts of peninsular India; Tamil Nadu; IRAN, PAKISTAN, SRI LANKA, Mediterranean region, W. ASIA, Coasts of S. EUROPE and N. AFRICA.

Arthrophytum

A.G. Schrenk, Bull. Phys.Math. Acad. Imp. Sci. Saint-Pétersbourg 3: 211. 1845.

Type species: *A. subulifolium* A. G. Schrenk

9 species in Western and Central Asia (Mabberley 2008); 1 in India.

Arthrophytum thomsonii (Bunge *ex* Boissier) Iljin in Mat. Hist. Fl. & Veg. USSR, Fasc. 2: 222. 1946; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 217.1972. *Haloxylon thomsonii* Bunge *ex* Boissier, Fl. Orient. 4(2): 950. 1879; Hooker *f*., Fl. Brit. India 5: 16. 1886.

Flowering & Fruiting: June – December

Distribution: INDIA – North-West Himalayas, in open rocky slopes, between 2128 – 3600 m. Jammu & Kashmir (Ladakh); PAKISTAN.

Atriplex

Linnaeus, Sp. Pl. 2:1052. 1753 (*nom. cons*.)

Type species: A. hortensis Linnaeus (typ. cons.)

Etymology: From the Latin atriplexum, an orache, a plant sometimes used as a substitute for spinach.

250 species in temperate and warmer regions (Mabberley 2008); 6 species and 1 variety in India.

Key to the Species

1a. Annual herbs …… 2
1b. Perennial shrubs ……... 6
2a. Pistillate flowers of two kinds, with as well as without perianth …..... 3
2b. Pistillate flowers without perianth …… 4
3a. Leaves almost glabrous or farinose above ……..... ***A. hortensis***
3b. Leaves grey to white farinose, at least beneath ……. ***A. nitens***

4a.Inflorescence blackish brown hairy; plant 5-25 cm high ….. ***A. tatarica*** var ***pamirica***

4b. Inflorescence without such hairs; plant 10-90 cm high …… 5

5a. Leaves hastate triangular or ovoid-oblong, upper leaves linear-lanceolate; fruiting bracts serrate at apex; ovary ovate-globose ……..…… ***A. crassifolia***

5b. Leaves rhombic-ovate; fruiting bracts 3-lobed at apex; ovary globose ..... ***A. rosea***

6a. Stamens connate at base ……..……..…… ***A. repens***

6b. Stamens free ……..…..…… ***A. Stocksii***

Atriplex crassifolia Ledebour, Icon. Pl. (Ledebour) 1: 11, t. 42. 1829; Hooker *f*., Fl. Brit. India 5: 6. 1886; Iljin in Komarov, Fl. USSR 6: 88. 1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 217. 1972. *A. laciniata* Aitchison, Cat. Pl. Punjab 125. 1869.

Type: Described from the area south of the Irtysh river, evidently from the Semipalatinsk District (LE).

Flowering & Fruiting: July – January

Distribution: INDIA – Growing in dry rocky slopes in Northwest Himalayas and western part between 150 – 3648 m. Jammu & Kashmir, Himachal Pradesh, Punjab, Rajasthan and Delhi; PAKISTAN, AFGHANISTAN, IRAQ and C. ASIA.

Note: The plant is used as fodder.

Atriplex hortensis Linnaeus, Sp. Pl. 2: 1053.1753; Hooker *f*., Fl. Brit. India 5: 6.1886; Iljin in Komarov, Fl. USSR 6: 85. 1936; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 218. 1972; Gelun Zhu *et al*. in Fl. China 5:362.2003. *A. virgata* Roth, Nov. Pl. Sp. 377. 1821. *A. heterantha* Wight, Icon. Pl. Ind. Orient. t. 1787. 1852. *Chenopodium benghalense* Spielm. *ex* Steudel, Nomencl. Bot. [Steudel], ed. 2. 1: 348. 1840.

Bengali: *Paharipalang*; Marathi: *Suraka*, *Chandanbatva*, Engish: Mountain spinach.

Type: Tataria, Orenburg steppe, Hortus Sicc. Cliff. (BM). [McNeill et al. in Taxon 32: 552. 1983.]

Flowering & Fruiting: July – January

Distribution: INDIA – Western Himalayas, up to 3650 m, also cultivated throughout mainly in Jammu & Kashmir, Gujarat, Punjab, West Bengal, Assam, Meghalaya and Maharashtra. Native to SW ASIA and EUROPE; introduced and cultivated in many countries.

Note: Leaves used as vegetable. The flour of seeds is reported to be valuable against vitamin A deficiency.

Atriplex nitens Schkuhr, Handb. 3: 541. 1803; Iljin in Komarov, Fl. USSR 6: 85. 1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 218. 1972. *A. hortensis* Linnaeus ssp. *nitens* Pons, Nuov. Giorn. Bot. Ital. N. S. 9: 409. 1902.

Type: Described from Germany (Wittenberg).

Flowering & Fruiting: July – September

Distribution: INDIA – Northwestern Himalaya in temperate zone. Jammu & Kashmir (Ladakh); PAKISTAN, S. W. & C. ASIA, RUSSIA and C. EUROPE.

Atriplex tatarica Linnaeus var. ***pamirica*** (Iljin) G.L. Chuin, *Fl. Reipubl. Popul. Sin. 25(2): 46. 1979. A. pamirica* Iljin in Acta Inst. Bot. Acad. Sc. URSS., Ser. 1, 2: 124. 1936 & in Komarov, Fl. USSR 6: 98. 1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 218. 1972.

Type: Described from the vicinity of Lake Kara-kul in the Pamir (LE).

Flowering & Fruiting: July – August

Distribution: INDIA – Northwestern Himalaya: Jammu & Kashmir and Himachal Pradesh; PAKISTAN and CENTRAL ASIA (Pamir mountains).

Atriplex repens Roth, Nov. Pl. Sp. 377. 1821; Hooker *f*., Fl. Brit. India 5: 7. 1886. R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 218. 1972; Gelun Zhu *et al*. in Fl. China 5:361.2003. *A. koenigii* Wall.Cat. n. 6951. 1832. *A. belangeri* Boissier, Fl. Orient. 4: 913. 1879. *Obione koenigii* Moquin in DC., Prodr. 13(2): 169. 1849; Wight, Icon. Pl. Ind. Orient. t. 1790. 1852.

Type: Described from India Orient

Flowering & Fruiting: July – November

Distribution: INDIA – Grows in coastal areas in Peninsular India. Andhra Pradesh, Karnataka and Tamil Nadu; AFGHANISTAN, IRAQ, PAKISTAN, SRI LANKA, CHINA and S.E. ASIA.

Note: Sometimes cultivated for leafy vegetable.

Atriplex rosea Linnaeus, Sp. Pl. ed. 2. 2: 1493.1763; Hooker *f*., Fl. Brit. India 5: 7. 1886; Iljin in Komarov, Fl. USSR 6: 94.1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 218. 1972.

Type: Described from S. Europe.

Flowering & Fruiting: July – September

Distribution: INDIA – Northwestern Himalaya in temperate zone: Jammu & Kashmir (Ladakh); PAKISTAN, RUSSIA and EUROPE.

Atriplex stocksii Boissier, Diagn. Pl. Or. Nov. Ser. 2, 4: 73. 1859; Hooker *f*., Fl. Brit. India 5: 7. 1886. *A. grifffithii* Moquin var. *stocksii* Boissier, Fl. Orient 4: 916. 1879; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 218. 1972. *A. repens* Aitchison, Cat. Pl. Punjab Pl. 125. 1869. *Obione stocksii* Wight, Icon. Pl. Ind. Orient. t. 1789. 1852 (as '*obeone*')

Gujrati: *Adban-palakh*, *Adbau-tanko*.

Type: Scinde, *Stocks* 542 (K).

Flowering & Fruiting: August –November

Distribution: INDIA – Growing in coastal areas in saline soil, in rock crevices, abundant. Gujarat and Tamil Nadu; PAKISTAN.

Axyris

Linnaeus, Sp. Pl. 2: 979. 1753

Lectotype species: *A. amaranthoides* Linnaeus (Green, Prop. Brit.Bot. 187.1929).

Etymology: From the Greek *a-* (without) and *xyris* (razor), referring to the bland flavor.

6 species in India, Pakistan, China, the Himalayas, Central Asia East Europe to Korea (Sukhorukov *l.c.*); 4 in India.

Key to the Species

1a. Stem prostrate; lamina broadly ovate to sub orbicular; staminate flowers in capitates inflorescence; utricles with apical appendages, small or obscure ……. ***A. prostrata***

1b. Stem erect; leaves lanceolate to oblong-ovate; staminate flowers in spike like inflorescence; utricles with apical appendages forming a crest ……....…. 2

2a. Stem covered with both short and long rayed stellate hairs; perianth densely pubescent; pericarp of brown fruits sometimes with sclereids making the fruit surface brownish red, pericarp surface of black fruits rugose, without radially semiconcentric sculpturing ……..…… ***A. mira***

2b. Stem covered with short-rayed hairs only or basally, sometimes also with long-rayed hairs; perianth slightly pubescent; pericarp of brown fruits without sclereids, pericarp surface smooth or with semi-concentric sculpturing …….....…….. 3

3a. Leaves acute or acuminate, mostly glabrous above; staminate inflorescences unbranched; utricles not encircled by wrinkles, sometimes marked with lines, with 2 approximate teeth at top, larger, forming an emarginated crest …..... ***A. amaranthoides***

3b. Leaf-tip obtuse or rounded, hairy; staminate inflorescences branched below; utricles encircled by wrinkles, with 2 distant teeth at top, small, triangular …..... ***A. hybrida***

Axyris amaranthoides Linnaeus, Sp. Pl. 2: 979. 1753; Hooker *f*., Fl. Brit. India 5: 8. 1886; Iljin in Komarov, Fl. USSR 6: 113. 1936; Gelun Zhu *et al*. in Fl. China 5: 358. 2003.

Lectotype: Herb. Linn. No. 1101.4 (LINN) [Jonsell & Jarvis in Jarvis & al., Regnum Veg. 127: 23. 1993].

Flowering & Fruiting: June – October

Distribution: INDIA – Northwestern Himalayas between 2400 – 4560 m. Jammu & Kashmir, Himachal Pradesh and Uttarakhand; CHINA, KAZAKHSTAN, S. RUSSIA and C. ASIA. Introduced in Europe and N. America.

Axyris hybrida Linnaeus, Sp. Pl. 2: 980. 1753; Iljin in Komarov, Fl. USSR 6: 114.1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 219. 1972; Gelun Zhu *et al*. in Fl. China 5: 358. 2003.

Type: Siberia, Herb. Linn. no. 1101.5 (LINN).

Flowering & Fruiting: June – September

Distribution: India, Western Himalayas between 3040 – 4256 m. Jammu & Kashmir and Himachal Pradesh; NEPAL, PAKISTAN, CHINA, S.E. RUSSIA, CENTRAL and S.W. ASIA.

Axyris mira Sukhorukov in Willdenowia 41(1): 76. 2011**.**

Holotype: INDIA – Uttarakhand, Kumaon, Milam glacier, 12500 feet above the sea, 28.8. 1848, *R. Strachey & J.E. Winterbottom* 2 (LE).

Flowering & Fruiting: August – October

Distribution: INDIA – Jammu & Kashmir, Himachal Pradesh, Uttrakhand; PAKIATAN, NEPAL, CHINA.

Axyris prostrata Linnaeus, Sp. Pl. 2: 980. 1753; Iljin in Komarov, Fl. USSR 36: 114. 1936; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 219. 1972; Gelun Zhu *et al*. in Fl. China 5:358.2003. *A. amaranthoides* Linnaeus var. *humifusa* Moquin in DC., Prodr. 13(2): 116. 1849; Hooker *f*., Fl. Brit. India 5: 9. 1886.

Lectotype: Herb. Linn. no. 1101.6 (LINN). [Suchorukov in Feddes Repert.116:175. 2005].

Flowering & Fruiting: July – September

Distribution: INDIA – Himalayas: Jammu & Kashmir and Sikkim; PAKISTAN, NEPAL, BHUTAN, CHINA, MONGOLIA, RUSSIA (S. SIBERIA) and TAJIKISTAN.

Bassia

Allioni, Melanges Philos. Math. Soc. Roy. Turin 3:177 t. 4 f. 2. 1766.

Lectotype species: *B. muricata* (Linnaeus) Ascherson (Schweinfurth, Beitr. Fl. Aethiop. 187. 1867) (*Salsola muricata* Linnaeus)

Etymology: Named after Ferdinando Bassi (1710 – 1774), Italian naturalist and curator of the Botanical garden at Bologna.

10 species in warm region (Mabberley 2008); 3 in India.

Key to the species

1a. Subshrubs ……..... ***B. prostrata***
1b. Annual herbs ……...… 2
2a. Leaves semiterete or terete,hairy,fleshy, fruiting perianth with acute, dorsal, straight, wide based spines about as broad as disk ……..... ***B. dasyphylla***
2b. Leaves lanceolate or linear-lanceolate, glabrous or slightly hairy, fruiting tepals with short semicircular wings, sometimes reduced to a tubercle .....… ***B. scoparia***

Bassia dasyphylla (Fischer & C. A. Meyer) O. Kuntze, Revis. Gen. 2: 546. 1891; Kachroo *et al*., Fl. Ladakh 133. 1977; Gelun Zhu *et al*. in Fl. China 5:386.2003. *Kochia dasyphylla* Fischer & C. A. Meyer in Schrenk, Enum. Pl. Nov. 1: 12. 1841. *Chenolea divaricata* (G.S. Karelin & I.P. Kirilov) Hooker *f*., Fl. Brit. India 5: 10. 1886. *Echinopsilon divaricatum* G.S. Karelin & I.P. Kirilov in Bull. Soc. Nat. Moscc. 15: 736. 1841. *Bassia divaricata* (G.S. Karelin & I.P. Kirilov) O. Kuntze, Revis. Gen. 546.1891; R. R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 219. 1972.

Type: Habitat ad lacum Saisang-Nor (LE).

Flowering & Fruiting: July – September

Distribution: INDIA – Northwestern Himalayas between 3040 – 4560 m. Jammu & Kashmir (Ladakh); PAKISTAN, CHINA, MONGOLIA, RUSSIA (S. SIBERIA) and C. & S.W. ASIA.

Bassia prostrata (Linnaeus) Beck in Icon. Fl. Germ. Helv. 24:155.1909. *Salsola prostrata* Linnaeus, Sp. Pl. 1: 222. 1753. *Kochia prostrata* (Linnaeus) Schrader in Neues Journ. Bot.3: 85.1809; Hooker *f*., Fl. Brit. India 5: 10.1886; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 224. 1972; Zhu Gelin *et al* in Fl. China 5: 384. 2003.

Lectotype: Herb. Linn. no. 315.15 (LINN).

Flowering: July – August; *Fruiting:* August – October

Distribution: INDIA – Grows in sandy places, stony slopes, valleys in Northwestern Himalayas up to 2900 m. Jammu & Kashmir (Ladakh) and Himachal Pradesh; IRAN, PAKISTAN, CHINA; C. & SW ASIA, RUSSIA and S. EUROPE.

Bassia scoparia (Linnaeus) A.J. Scott in Feddes Repert. 89 (2-3): 108. 1978. *Chenopodium scoparia* Sp. Pl. 1: 221. 1753. *Kochia scoparia* (Linnaeus) Schrader in Neues Journ. Bot. 3: 85.1809; Hooker *f*., Fl. Brit. India 5: 11. 1886; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 224.1972; Zhu Gelin *et al* in Fl. China 5: 385. 2003. *Kochia trichophylla* Hort. *ex* Tribune, Hortic 2: 445. 1907. *Salsola scoparia* (Linnaeus) M. Bieberstein in Mem. Soc. Nat. Mosc. 1: 144. 1811.

Lectotype: Herb. Linn. no. 313.20 (LINN).

Flowering & Fruiting: June – October

Distribution: INDIA – Jammu & Kashmir; Nepal, Pakistan, Iran, China, Japan; RUSSIA, EUROPE, widely naturalized in AFRICA, AUSTRALIA and N. and S. AMERICA.

Note: Cultivated for ornamental foliage and also used as fodder. Sometimes escape from cultivation. It is a variable species. Two specimens identified as *K. scoparia* var. *littorea* Moquin and *K. scoparia* var. *tattaria* Mullino are deposited at BSD.

Chenopodium

Linnaeus, Sp. Pl. 1: 218. 1753.

Lectotype species: C. album Linnaeus (Hitchcock, Prop. Brit. Bot. 137. August 1929).

Etymology: From the Greek Chen (goose) and podos (little foot) referring to the shape of the leaves of some species.

ca. 100 species (Mabberley 2008); mainly in subtropical and temperate regions; 14 in India.

Key to the Species

1a. Perianth 3- or 4- parted …… 2
1b. Perianth segments mostly 5- parted ……. 3
2a. Flowers in dense axillary globose inflorescens; perianth becoming red and succulent in fruit …… ***C. foliosum***
2b. Flowers in spicate or paniculate inflorescens; perianth light green, slightly succulent ……..….***C. glaucum***
3a. Leaves palmately lobed; seeds usually 2-3 mm in diameter …… ***C. hybridum***
3b. Leaves serrate or irregularly lobed; seeds less than 2 mm in diameter …. 4
4a. Plants usually 2-3.5 m tall; lower leaves up to 20 cm long …… 5
4b. Plants usually 0.15-1 m tall; lower leaves to 12 cm long ……,,,, 7
5a. Stems reddish green or with reddish purple striate; inflorescence terminal panicles, pendulous …… ……..… ***C. giganteum***
5b. Stems uniformly purple or scarlet; inflorescence terminal and axillary spikes, not pendulous …… 6
6a. Leaves ovate, margin bluntly toothed, lamina grayish-bluish-green; stigma 2 or 3 fid . …… ***C. cyanifolium***
6b. Leaves hastate, 3- lobed, margin few dentate, lamina reddish green on dorsal side, green with blue tinge ventrally; stigma 2, 3 or 4 fid …….....…… ***C. santoshei***
7a. Decumbent herbs; leaves unlobed or shallowly lobed near base, otherwise entire ...…..…… ***C. karoi***
7b. Erect herbs; leaves lobed or dentate ……..…… 8
8a. Leaves distinctly 3- lobed ……..…..…….. 9
8b. Leaves variously toothed or lobed …… 10
9a. Leaf margin hastate, middle lobe with dentations …..……..... ***C. hastatifolium***
9b. Leaf margins not hastate, middle and lateral lobes serrate ……. ***C. ficifolium***
10a. Seeds sharply keeled, surface finely pitted; pericarp persistent ……..… ***C. murale***
10b. Seeds bluntly keeled, surface smooth to striate or weakly furrowed; pericarp readily detached ……..... 11
11a. Leaves very large, 17-20 x 10-12 cm, sagittate …… ***C. sagittatum***
11b. Leaves smaller, 2-8x1-3.5 cm, variable in shape …… 12
12a.Leaves with photonastic movement, veins reddish brown …..... ***C. adpressifolium***
12b. Leaves not like this, leaf veins green ……..… 13

13a. Leaves much longer than broad, usually over 3 cm long, seeds smooth ..... ***C. album***
13b. Leaves about as long as broad, 2–3 cm long, seeds punctate ..... ***C. atripliciforme***

Chenopodium adpressifolium Pandeya & A. Pandeya in J. Bombay Nat. Hist. Soc. 100(1): 87. 2003.

Holotype: India, Agra, 26.2.1999, *S.C. Pandeya* & *A. Pandeya* 910 (R.B.S. College, Agra).

Flowering: January – April

Distribution:.Plains of Northern India. Grows naturally as weed in winter crop fields in moist places.

Note: Tender shoots are edible.

Chenopodium album Linnaeus, Sp. Pl. 1: 219.1753; Boissier, Fl. Orient. 4: 901.1879; Hooker *f*., Fl. Brit. India 5: 3. 1886, *p.p*.; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 220. 1972; Long in Grierson & Long, Fl. Bhutan 1(2): 217. 1984; Gelun Zhu *et al*. in Fl. China 5:386.2003.

Bengali: *Chandan bethu*; Gujrati: *Cheel, tanko*; Hindi: *Bathua sag*; Kashmiri: *Bothur*; Kanada: *Huchuchakkotha*; Marathi: *Chakvar*; Sanskrit: *Bhatua arak*; Tamil: *Parappukeerai*; Telegu: *Pappukoora*.

Lectotype: Herb. Linn. no. 313.8 (LINN).

Flowering & Fruiting: January – August

Distribution: Throughout India. Commonly cultivated in winter months, also growing as weeds in cultivated fields, gardens, among debris, roadsides and other moist places. Native of Europe.

Note: Tender shoots are eaten raw in salad or with curd, also cooked as vegetable. The seeds are consumed after cooking like rice or oatmeal and considered nutritious. The herb is reported to be laxative, anthelmintic and cardiac-tonic.

Chenopodium atripliciforme Murr, Magyar Bot. Lapok. 1:360. 1902; Uotila in Rech. *f*., Fl. Iran.172: 53, fig. 3A. 1997. *Chenopodium opulifolium sensu* Hooker *f*., Fl. Brit. India 5: 3. 1886 *auct. non* Schrader *ex* Koch & Ziz; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 221.1972; Mullin in Hara *et al*., Enum. Fl. Pl. Nepal 3: 170. 1982.

Lectotype: Pakistan, Kurram, Kurrum Valley, Shálozán, Aug. 1879, *J.E.T. Aitchison* 980 (G), Isolectotypes (C, FI, G-BOIS, K, S) (Uotila in Ann. Bot. Fennici 30: 191, 1993).

Flowering & Fruiting: May – October

Distribution: INDIA - Northwestern Himalayas. Jammu & Kashmir, Himachal Pradesh and Uttarakhand; IRAN, AFGHANISTAN, NEPAL, PAKISTAN and N.W. ASIA.

Chenopodium cyanifolium Pandeya, G. Sighal & A.K. Bhatnagar in J. Bombay Nat. Hist. Soc. 95(3): 480. 1998. *C. album* Linnaeus *sensu* Hooker *f*. in Fl. Brit. India 5: 3. 1886, *p.p.*

Holotype: INDIA - Uttar Pradesh, Agra, Dayalbagh, *Pandey* 102 (Botany Dept. Dayalbagh Educational Inst.).

Flowering: February – April

Distribution: Throughout India. Commonly occurs in winter months as weed along with *Chenopodium album* Linnaeus

Note: Commonly used as leaf vegetable.

Chenopodium ficifolium J.E. Smith, Fl. Brit. 1: 276. 1800; Hara in Fl. E. Himal. 2: 25. 1971; H. Hara *et al*., Enum. Fl. Pl. Nepal 3: 170. 1980; Long in Grierson & Long, Fl. Bhutan 1(2): 218. 1984; Gelun Zhu *et al*. in Fl. China 5:383.2003.*C. album* Linnaeus *sensu* Hooker *f*., Fl. Brit. India 5: 3. 1886, *p.p*.

Type: "About London, Curtis"

Flowering & Fruiting: January – June

Distribution: INDIA – Eastern Himalaya in subtropical to temperate zone, in waste places and fallow fields. West Bengal, N. E. India; NEPAL, BHUTAN, CHINA and JAPAN; Most of ASIA, naturalized in N. AFRICA and EUROPE.

Chenopodium foliosum Ascherson, Prodr. Fl. Brandenb. 1: 572. 1864; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 221. 1972; Gelun Zhu *et al*. in Fl. China 5: 379. 2003. *Monocarpus foliosum* Moench, Meth. 342. 1794 *nom. illeg*. Superfl., based on *Blitum virgatum* Linnaeus, Sp. Pl. 1: 4. 1753. *Chenopodium blitum* F. Mueller, Select Pl., Additions : 11.1874; Hooker *f*., Fl. Brit. India 5: 5. 1886.

Type: 'Süddeutschland einheimisch'.

Flowering & Fruiting: May – September

Distribution: INDIA – Grows in sandy, stony places and hill slopes in North and Northwestern Himalayas between 1550 – 3600 m; Jammu & Kashmir, Himachal Pradesh and Uttarakhand; IRAN, AFGHANISTAN, PAKISTAN, NEPAL, CHINA; C & SW ASIA, EUROPE and N. AFRICA, occasionally naturalized in other regions.

Note: Plant is used as vegetable.

Chenopodium giganteum D. Don, Prodr. Fl. Nepal. 75. 1825; Iljin in Komarov, Fl. USSR 6: 65. 1936; Long in Grierson & Long, Fl. Bhutan 1(2): 217. 1984; Gelun Zhu *et al*. in Fl. China 5: 382. 2003. *C. amaranticolor* Coste *et* Reynier in Bull. Soc. Bot. France 54: 178. 1907.

Type: Nepal, *Wallich*

Flowering & Fruiting: May – November

Distribution: INDIA – Jammu & Kashmir, Himachal Pradesh, Uttarakhand, West Bengal and Northeastern states. Cultivated and becoming naturalized in subtropical and temperate regions.

Note: Leaves used as vegetable.

Chenopodium glaucum Linnaeus, Sp. Pl. 1: 220. 1753; Boissier, Fl. Orient. 4: 903. 1879; Hooker *f*., Fl. Brit. India 5: 4. 1886; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 221. 1972; Gelun Zhu *et al*. in Fl. China 5:379. 2003. *C. ambigua* R. Brown, Prodr. 407. 1810.

Lectotype: Herb. Linn. no. 313.17 (LINN).

Flowering & Fruiting: July – August

Distribution: INDIA – Grows in hill slopes, river banks, in fields, between 3648 – 5400 m. Jammu & Kashmir (Ladakh, Rupsu); IRAN, PAKISTAN, CHINA, RUSSIA; C. ASIA, EUROPE, AFRICA, AUSTRALIA and N. AMERICA.

Note: The plant is reported to be toxic to animals. It is a variable species represented by various forms with little taxonomic significance.

Chenopodium hastatifolium Pandeya & A. Pandeya in J. Bombay Nat. Hist. Soc. 100(1): 91. 2003.

Holotype: INDIA – Agra, 15.3.1999, *S.C. Pandeya* & *A. Pandeya* 911 (R.B.S. College, Agra).

*Flowering***:** January – April

Distribution: Plains of Northern India. Grows naturally as weed in winter crop fields in moist places.

Note: Tender shoots are edible.

Chenopodium hybridum Linnaeus, Sp. Pl. 1: 219. 1753; Hooker *f*., Fl. Brit. India 5: 3. 1886; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 221.1972; Zhu Gelin *et al* in Fl. China 5: 382. 2003.

Type: Described from Europe

Flowering & Fruiting: July – september

Distribution: INDIA – Himalayas, between 2500 – 3646 m; Jammu & Kashmir (Ladakh, Kistawar), Himachal Pradesh and Uttarakhand; PAKISTAN, CHINA, JAPAN, KOREA, MONGOLIA, RUSSIA, CENTRAL ASIA, EUROPE, N. AFRICA and N. AMERICA.

Chenopodium karoi (Murr) Allen in Fedde, Repert. 26: 149.1929; Zhu Gelin *et al* in Fl. China 5: 381. 2003. *C. album* Linnaeus ssp. *karoi* Murr, Neue Ubers. Farn-ubl. Pfl. Voralberg 97. 1923. *C. prostratum* Bunge *ex* Herder in Acta Hort. Petrop. 10: 594.1889 *non* Schultes 1820; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 221. 1972; Long in Grierson & Long, Fl. Bhutan 1(2): 218. 1984.

Type: Described from Siberia.

Flowering & Fruiting: May – August

Distribution: India: Himalayas between 4260 – 4570 m. Jammu & Kashmir (Ladakh) and Sikkim; PAKISTAN, BHUTAN, CHINA, C. ASIA and RUSSIA.

Chenopodium murale Linnaeus, Sp. Pl. 1: 219. 1753; Boissier, Fl. Orient. 4: 902. 1879; Hooker *f*., Fl. Brit. India 5: 4. 1886; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 221. 1972; Mullin in Hara et al., Fl. Pl. Nepal 3: 170. 1982. *C. gandhium* Buchanon-Hamilton in Wall. Cat. n. 6953D. 1832. *C. congestum* Hooker *f*. in London J. Bot. 6: 280. 1847. *C. hookerianum* Moquin in DC., Prodr. 13(2): 68. 1849. *C. ilicifolium* Griffith, Not. Pl. Asit.4: 337.1854 & Icon. Pl. Asiat. 4: plate 521. 1854.

Gujati: *Barello*; Hindi: *Khartua*; Punjabi: *Bahu, Kurunal, Khartua*; Rajasthani: *Goyalo, Khad-bathod*.

Lectotype: Herb. Linn.No. 313.6 (LINN).

Flowering & Fruiting: August – March

Distribution: INDIA – Throughout, up to 2000 m. A common weed in gardens and cultivated fields.Almost cosmopolitan, native of Southern Europe and Asia.

Note: The plant is used as vegetable. Seeds are used as cereal. Whole plant is used as vermifuge. The pollen grains of the plant cause allergy.

Chenopodium sagittatum Pandeya & A. Pandeya in J. Bombay Nat. Hist. Soc. 100(1): 89. 2003.

Holotype: India, Agra, 12.3.1999, *S.C. Pandeya* & *A. Pandeya* 911 (R.B.S. College, Agra).

Flowering: January – April

Distribution: Plains of Northern India. Grows naturally as weed in winter crop fields in moist places.

Note: Tender shoots are edible.

Chenopodium santoshei Pandeya, G. Singhal & A. Bhatnagar in J. Bombay Nat. Hist. Soc. 95(3): 484. 1998. *C. album* Linnaeus *sensu* Hooker *f.* in Fl. Brit. India 5: 3. 1886, *p.p.*

Holotype: INDIA – Uttar Pradesh, Agra, Dayalbagh, *Pandey* 103 (Botany Dept. Dayalbagh Educational Inst.).

Flowering: February – April

Distribution: Throughout India. Commonly occurs in winter months as weed along with

Chenopodium album Linnaeus

Note: Leaves used as vegetable.

EXCLUDED SPECIES:

Chenopodium vulvaria Linnaeus, Sp. Pl. 1: 220.1753; R.R. Stewart, Ann.Cat.Vasc. Pl.W. Pakistan & Kashmir 221. 1972.

According to R.R. Stewart (*l .c.)* this species occurs in Ladakh (based on the collection of *Koelz* 6461). However there is no further record or collection of it from India.

Corispermum

Linnaeus, Sp. Pl. 1: 4. 1753.

Lectotype species: C. hyssopifolium Linnaeus (N.L. Britton *et* A. Brown, Ill. Fl. N.U.S. ed. 2.2:20. 1913; Hitchcock, Prop. Brit. Bot. 115. August 1929).

65 species in north temperate region (Mabberley 2008); 1 in India.

Corispermum tibeticum Iljin in Bull. Jard. Bot. Princ. 28: 644. 1929; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 222. 1972; Zhu Gelin *et al*. in Fl. China 5: 371. 2003. *C. hyssopifolium sensu* Hooker *f.*, Fl. Brit. India 5: 9. 1886 *non* Linnaeus 1753. *C. ladakhianum* Grey-Wilson & Wadhwa in Kew Bull. 42(2): 471. fig. 1 (a-h). 1987.

Type: Described from Karakorum (LE).

Flowering & Fruiting: August – September

Distribution: INDIA – Northwestern Himalayas between 3040 – 4175 m; Jammu & Kashmir (Ladakh); PAKISTAN, CHINA, C. ASIA.

EXCLUDED SPECIES

Corispermum korovinii Iljin, Bull.Jard. Bot. Princ. URSS 28: 641. 1929. *C. ikramii*

Aellen in Candollea 19: 207. 1964; R. R. Stewart, Ann.Cat.Vasc.Pl.W.Pakistan & Kashmir 222. 1972.

According to R.R. Stewart (*l. c*.) this species occurs in Kashmir, may be in Pakistan. There is no further record or collection of it from India.

Dysphania

R. Brown, Prodr. Florae Novae Hollandiae 411. 1810.

*Type species: Dysphania littoralis R. Br*own

Etymology: From the Greek *dysphanes* (obscure), apparently in reference to the small flowers.

Ca. 32 species, cosmopolitan especially in warmer region (Mabberley 2008); 2 in India.

Key to the Species

1a.Lamina oblong or elliptic-lanceolate; flower clusters in panicled leafy spikes .... ***D. ambrosioides***

1b. Lamina ovate or oblong; flower clusters cymosely arranged on leafless spikes ... ***D. botrys***

Dysphania ambrosioides (Linnaeus) Mosyakin & Clemants, Ukrayins'k. Bot. Zhurn.59: 382. 2002; Zhu Gelin *et al* in Fl.China 5: 377. 2003. *Chenopodium ambrosioides* Linnaeus, Sp. Pl. 1: 219. 1753; Hooker *f*., Fl. Brit. India 5: 4. 1886; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 220. 1972; Long in Grierson & Long, Fl. Bhutan 1(2): 218. 1984. *C. anthelminticum* Linnaeus, Sp. Pl. 1: 220. 1753. *C. suffruticosum* Willdenow, Enum. Pl. Hort. Berol. 290. 1809.

Hindi: *Kathna*; Kanada: *Kaaduvoma* ; Malayalam: *Kattayamodagum*.

Type: Herb. Linn. No. 313/13 (LINN) [Brenan in Turrill & Milne-Redhead, Fl. Trop. E. Africa, Chenopodiaceae: 10. 1954].

Flowering & Fruiting: Throughout the year.

Distribution: Throughout India. Grows as weed. Native of tropical America.

Note: It's a very polymorphic species. Sometimes it is cultivated for an essential oil used in perfumery. Leaves and tender shoots are used as vegetable. The herb is considered as tonic, pectoral, emmenagogue and antispasmodic. It is also employed in treating nervous affections.

Dysphania botrys (Linnaeus) Mosyakin & Clemants, Ukrayins'k. Bot. Zhurn.59: 383. 2002; Zhu-Gelin *et al* in Fl. China 5: 377. 2003. *Chenopodium botrys* Linnaeus, Sp. Pl. 1: 219. 1753; Hooker *f*., Fl. Brit. India 5: 4. 1886; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 220. 1972; Long in Grierson & Long, Fl. Bhutan 1(2): 218. 1984. *C. ilicifolium* Griffith, Notul. 4: 337 *et* in Icon. Pl. Asiat. t. 521. 1854. *Ambrina bortys* Moquin, Chenop. Monogr. Enum. 37. 1840.

Ladaki: *Sahanik, Vastuk*.

Lectotype: Herb. Linn. No. 313/12 (LINN).

Flowering & Fruiting: May – October

Distribution: INDIA – Grows in sandy soil, dry river belt, cultivated fields and waste places. Throughout Northwestern part and Himalayas up to 4200 m. Punjab, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and Sikkim; PAKISTAN, NEPAL, BHUTAN, IRAN, CHINA, RUSSIA, C & S.W. ASIA, EUROPE and N. AFRICA.

Note: (i) A native of tropical America. Naturalised in other subtropical to warm-temperate regions.

(ii) The species is used as a popular medicine of Asthma, catarrhal or spasmodic condition, migraine etc. Dried and powered leaves are used for flavouring food in Ladakh.

Halocharis

Moquin in DC., Prodr. 13(2): 201.1849.

Lectotype species: H. sulphura Moquin (Ulbrich in Engler *et* Prantl, Nat. Pflanzenfam. ed. 2. 16C: 580. 1934).

13 species in Southwest and Central Asia (Mabberley 2008); 1 in India.

Halocharis violacea Bunge, Anabas. Rev. 63 t. 1-3. 1862; Hooker *f.*, Fl. Brit. India 5: 19. 1886; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 222. 1972.

Syntypes: SE Persia (Kerman), E and SW Afghanistan (Ghazni, Kandahar) and Pakistan (Baluchistan).

Flowering & *Fruiting*: March – August

Distribution: INDIA – Northwestern India. Himachal Pradesh; PAKISTAN, AFGHANISTAN and IRAN.

Note: (i) Hooker (*l. c.*) recorded its occurrence in Western Punjab plains, Peshawar valley, now in Pakistan. However R.R. Stewart (*l. c.*) recorded its occurrence in India from Spitug near Leh in Himachal Pradesh.

(ii) A single collection from Ladakh identified as *Halocharis sulphurea* (Moquin) Moquin is deposited at BSD**,** however the identity could not be confirmed due to incomplete specimen.

Halogeton

C.A. Meyer, Icon. Pl. Nov. 1: 10. 1829.

Type species: H. glomeratus (M. Bieberstein) C.A. Meyer

Etymology: From the Greek *hals* (sea, salty) and *geiton* (neighbor), meaning near the sea.

5 species in Mediterian to central Asia (Mabberley 2008); 1 species and 1 variety in India.

Halogeton glomeratus (M. Bieberstein) C.A. Meyer in Ledebour, Fl. Alt. 1: 378.1829; Hooker *f.*, Fl. Brit. India 5: 20. 1886; Iljin in Komarov, Fl. USSR 6: 352. 1936; Zhu Gelin *et al* in Fl. China 5: 400. 2003.*Anabasis glomeratus* M. Bieberstein in Mem. Soc. Imp. Nat. Mosc. 1: 110. 1806.

Key to the varieties

1a. Leaves in clusters, ellipsoid or ovoid with a tuft of long white hairs in axils, leaf arista *ca* 5 mm long; appendage of perianth segments sub-orbicular, utricles rounded or rounded-oval ……..……....…….....……. var. ***glomeratus***

1b. Leaves not clustered, linear-oblong, leaf arista 1.5 – 2 mm long; appendage of perianth segment somewhat triangular, utricles depressed subglobose …..... var. ***tibeticus***

var. ***glomeratus***

Type: Described from Siberia (apparently from N.E. Kazakhstan) (LE).

Flowering &Fruiting: July – September

Distribution: INDIA – Northwestern Himalayas between 3648 – 4560 m; Jammu & Kashmir (Ladakh); PAKISTAN, AFGHANISTAN, CHINA, C. ASIA and RUSSIA (S. SIBERIA).

var. ***tibeticus*** (Bunge) Grubov in *Rast. Centr. Azii, Mater. Bot. Inst. Komarov 2: 117. 1966. H. tibeticus Bunge in Mem. Acad. Imp. Sc. Petersb. 7, ser. 4. 11: 94. 1862. H. kashmirianus* Grey-Wilson & Wadhwa in Kew Bull. 42(2): 473. fig.2 (a-h) 1987.

Type: INDIA – Kashmir, *Wadhwa* 59345 (*Holotype*: K; *Isotype*: BSD).

Flowering & Fruiting: July – November

Distribution: INDIA – Northwestern Himalayas in temperate zone, Jammu & Kashmir; PAKISTAN and CHINA (TIBET).

Halosarcia

Paul G.Wilson, Nuytsia 3: 28.1980.

Type: H. halocnemoides (C.G.D. Nees) Paul G. Wilson (*Arthrocnemum halocnemoides* C.G. D. Nees)

Etymology: From the Greek *halos* (salt) and *sarx* (flesh), in reference to the succulent stems.

Ca. 23 species, 1 extended to Malesian region (Mabberley 2008); 1 in India.

Halosarcia indica (Willdenow) Paul G. Wilson in Nuytsia 3(1): 63.1980. *Salicornia indica* Willdenow in Ges. Naturf. Fr. Neue Schr. 2:111 t. 4, f. 2.1799; Wight, Icon. Pl. Ind. Orient.t.737.1844. *Arthrocnemum indicum* (Willdenow) Moquin,Chenop. Monogr. Enum. 113. 1840; Hooker *f*., Fl. Brit. India 5:12.1886; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 217. 1972. *Salicornia brachiata* Miquel, *Fl. Ned. Ind. 1: 1019. 1858.*

Bengali: *Jadu palong*; Hindi: *Machola*; Gujrati.:*Bholado*; Marathi: *Machur*; Sanskrit: *Subhar*, *Suvar*; Tamil: *Umari*; Telegu: *Koyya-pippili*.

Type: India – Madras, Tranquebar, *Klein* (B-WILLD).

Flowering: August – February

Distribution: INDIA – Tamil Nadu; PAKISTAN, SRI LANKA, MALAYSIA; AUSTRALIA and TROPICAL E. AFRICA.

Note: The species can absorb salt from soil and used as salad and pickles.

Haloxylon

Bunge *ex* E. Fenzl in Ledebour, Fl. Ross.3: 819. Dec 1851.

Lectotype: H. ammodendron (C. A. Meyer) E. Fenzl [*Anabasis ammodendron* C.A. Meyer] L.K.G. Pfeiffer, Nom. 1: 1552. 27 Nov 1874.

Ca 25 species in W. Mediterranean to Iran, Mongolia, Myanmar to South-West China (Mabberley 2008); 2 in India.

Key to the Species

1a. Leaves distinct; plants blackish grey on drying …….. ***H. stocksii***
1b. Leaves reduced to the dilated tips of the joints; plants pale yellowish on drying .... ***H. salicornicum***

Haloxylon stocksii (Boissier) Bentham & Hooker *f*., Gen. Pl. 3:70.1883. *Salsola stocksii* Boissier, Diagn. Pl. Or. Nov. Ser. 2, 2(4): 75. 1879. *H. recurvum* Bunge *sensu* Hooker *f*., Fl. Brit. India 5: 15. 1886, *p.p.*

Hindi: *Khar*

Key to the varieties

1a. Stems and branches robust, fleshy, branches straight or irregular…….var. ***stocksii***
1b. Stems and branches slender, hardy, branches recurved…… var. ***indicum***

var. ***stocksii***

Type: Pakistan: "in ditionibus Beloutschistan et Scinde Indiae finitimis", J.E. Stocks (G).

Flowering & Fruiting: December – March

Distribution: INDIA – Punjab, Rajasthan, Gujarat, Andhra Pradesh and Tamil Nadu; PAKISTAN and AFGHANISTAN.

Note: The plant is a source of crude sodium carbonate, which is used for making soap. It is also used as camel-fodder.

var. ***indicum*** (Wight) T.K. Paul ***comb. et stat. nov.*** - *Caroxylon indicum* Wight, Icon. Pl. Ind. Orient. 5(2): 6, t.1794. 1852. *H. recurvum* (Wallich *ex* Moquin) Bunge *ex* Boissier, Fl. Orient.4: 949. 1879; Hooker *f.*, Fl. Brit. India 5: 15. 1886, *p.p. Salsola recurva* Wallich Cat.no. 6943. 1832. *Caroxylon recurvum* Wallich *ex* Moquin in DC., Prodr. 13(2): 175. 1849. *Haloxylon indicum* (Wight) Noltie, Regnum Veg. 145 (Botany of Robert Wight): 214. 2005.

Flowering & Fruiting: September – February

Distribution: INDIA – Gujarat, Rajasthan and Tamil Nadu; SRI LANKA and MYANMAR.

Notes: (i) J.D. Hooker. (1886) recognized both the robust and slender forms of this species as one species – *Haloxylon recurvum* Bunge, though he earlier (1883) named the robust form as *Salsola stocksii*. Hedge (Fl. Iranica 172: 322. 1997) suggested that the slender forms of Burmese and South Indian plants mentioned by J.D. Hooker (*l.c.*) are different and stated that *Caroxylum indicum* Wight should be the earliest name of this form. Noltie (*l.c.*) validly published the combination as *Haloxylon indicum* (Wight) Noltie.

(ii) It is found that both the forms are growing in the same localities of Gujarat, Rajasthan and Tamil Nadu and the slender forms with recurved branches are recognized here as variety of *H. stocksii*. Noltie (*l.c.*) mentioned 3 syntype specimens of *Caroxylon indicum* deposited at K of which one with field ticket " Coimbatore, Jan. 1846" and two sheets with field no. 2477 (*ex* herb. Hooker) with same details. But there are another two Wight's original specimens seems to be syntypes are at CAL: one with Kew distribution (Wight) no. 2477 without any details and another with Wight's signature with type locality as 'coimbatore'.

Haloxylon salicornicum (Moquin) Bunge *ex* Boissier, Fl. Orient.4: 949.1879; Hooker *f.*, Fl. Brit. India 5: 16.1886; R.R. Stewart, Ann.Cat.Vasc. Pl. W. Pakistan & Kashmir 224. 1872. *Caroxylon salicornicum* Moquin in DC., Prodr. 13(2): 174. 1849.

Hindi: *Lana*

Holotype: Afghanistan, *Griffith* 1796 (K).

Flowering & Fruiting: August – December

Distribution: INDIA – Grows in saline habitat in Northwestern region. Rajasthan and Punjab; IRAN, PAKISTAN, AFGHANISTAN and W. ASIA.

Note: Plant is used as fodder.

EXCLUDED SPECIES

Haloxylon multiflorum Bunge *ex* Boissier, Fl. Orient.4: 949.1879; Hooker *f.*, Fl. Brit. India 5: 16. 1886.

The occurrence of this species in Rajasthan is doubtful due to wrong identification (Bhandari, Fl. Ind. Desert 330. 1978), so it is excluded.

Kochia

Roth in J. Bot. 1800 (1): 307. 1801.

Type: *K. arenaria* Roth

Etymology: Named after Wilhelm Daniel Josef Koch, 19th century German doctor and professor of Botany.

5 species throughout World (Mabberley 2008); 2 in India.

Key to the Species

1a. Wings of fruiting perianth segment oblong, narrow towards base with unequal toothed margin, strongly nerved; leaves linear ……..…….... ***K. stellaris***

1b. Wings of fruiting perianth segment broadly triangular ovate, obtuse, nerves inconspicuous; leaves elliptic or linear-oblong ....…….....…… ***K. indica***

Kochia indica Wight, Icon. Pl. Ind. Orient. 5(2): 5, t.1791.1852; Hook. f., Fl. Brit. India 5: 11.1886; R. R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 224. 1872. *K. griffithii* Bunge *ex* Boissier, Fl. Orient.4: 924. 1879.

Type : Described from Coimbatore in Salt soil, Wt., Ic. 1791. 1852.

Flowering & Fruiting: June – October

Distribution: INDIA – Northwestern and peninsular India up to 4000 m; Jammu & Kashmir, Himachal Pradesh, Punjab, Delhi and Tamil Nadu. PAKISTAN, AFGHANISTAN, NORTH AFRICA and S.W. ASIA. A variable species.

Notes: (i) The plant is an excellent fodder. Dried plant is used as fuel. It is also reported to use as a cardiac stimulant.

(ii) Noltie (Regnum Veg. 145: 215. 2005) mentioned the probable Holotype of this species (Coimbatore, Oct. 1845, Herb Wight) is at K and a remounted sheet with HRWP label (Herb Robert Wight proper) with no annotation is possible an Isotype is also at K.

(iii) There are also two sheets of this species at CAL: one with HRWP labelled with field no.2479 and another without any label but with field no. *Wight* 2479. These two sheets are also probable Isotypes. There are also two another Wight's collections of this species deposited at CAL from the type locality: one sheet with "Coimbatore, Nov. 1847, R W" and another sheet with "near Coimbatore 1847, R. Wight" though identified by him as 'Salsola'.

Kochia stellaris Moquin, Chenop. Monogr. Enum. 93. 1840; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 225. 1972; Zhu Gelin *et al* in Fl. China 5: 385. 2003. *K. odontoptera* Schrenk in Bull. Acad. Sc. Petersb. 1: 361.1843; Hooker *f*., Fl. Brit. India 5: 11. 1886; Burtt in Kew Bull 3: 43. 1948.

Type: Persia, *C.P. Bélanger* 436 (G)

Flowering & Fruiting: June – August

Distrib. India: Northwestern Himalayas between 2432-3648 m. Jammu & Kashmir and Himachal Pradesh; Iran, Afghanistan, Pakistan and China.

Kraschenninikovia

Gueldenstaedt, Novi Comment. Acad. Sci. Imp. Petrop.16: 551. 1772.

Type: *K. ceratoides* (Linnaeus) Gueldenstaedt (*Axyris ceratoides* Linnaeus)

Etymology: For the 18th century Russian botanist Stephan Petrovich Krascheninnikov.

3 species in Mediterranean region, temperate Asia, West North America (Mabberley 2008); 1 in India.

Krascheninnikovia ceratoides (Linnaeus) Gueldenstaedt in Nov. Comm. Acad. Petrop. 16: 548, 555. 1772; R.R. Stewart, Ann. Cat.Vasc. Pl. W. Pakistan & Kashmir 225. 1972; Zhu Gelin *et al* in Fl. China 5: 359. 2003. *Axyris ceratoides* Linnaeus, Sp. Pl. 2: 979. 1753. *Eurotia ceratoides* (Linnaeus) C.A. Meyer in Ledebour, Fl. Ait. 4: 239. 1833; Hooker *f*., Fl. Brit. India 5: 8. 1886; Iljin in Komarov, Fl. USSR 6: 108. 1936.

Type: "Tataria, Moravia," Herb. Linn.No. 1101/1 & 2 (LINN).

Flowering & Fruiting: June – September

Distribution: INDIA – Himalayas between 2400 – 4700 m; Jammu & Kashmir and Himachal Pradesh; PAKISTAN, AFGHANISTAN, NEPAL, CHINA, MONGOLIA; S.E. EUROPE, E. SIBERIA, N. AFRICA and N.W. AMERICA.

Microgynoecium

Hooker *f*. in Bentham & Hooker *f*., Gen. Pl. 3:56.1880.

Type species: *M. tibeticum* Hooker *f*.

Temperate and alpine regions of the Himalayas. Monotypic.

Microgynoecium tibeticum Hooker *f*. in Bentham & Hooker *f*., Gen. Pl. 3: 56. 1880 & in Fl. Brit. India 5: 9. 1886; Long in Grierson & Long, Fl. Bhutan 1(2): 219. 1984; Zhu Gelin *et al* in Fl. China 5: 357. 2003.

Syntypes: Western Tibet: Topedunga, north of Kumaon, *Strachey* & *Winterbottom* (E).

Flowering & Fruiting: August – November

Distribution: India: Throughout the Himalayas between 4200-5400 m. Jammu & Kashmir, Himachal Pradesh, Uttarakhand and Sikkim; NEPAL, BHUTAN and CHINA.

Salicornia

Linnaeus, Sp. Pl. 1: 3. 1753.

Lectotype: *S. europaea* Linnaeus (N. L. Britton *et* A. Brown, Ill. Fl. N.U.S. ed. 2. 2: 21. 1913; Hitchcock, Prop. Brit. Bot. 115. August 1929).

Etymology: From the Greek *Sal* (salt) and *cornus* (horn), referring to the hornlike branches of the saline plants.

25 species, cosmopolitan, sea coasts and salt habitat (Mabberley, 2008); 1in India.

Salicornia brachiata Roxburgh, Hort. Beng. 79. 1814 *nom. nud. et* Fl. Ind. 1:82.1820 (ed. Carey & Wallich); Roxburgh, Fl. Ind. 1:84. 1832 (ed. Carey); Hooker *f*., Fl. Brit. India 5:12.1886. *Arthrocnemum indicum* Thwaites, Enum. Pl. Zeyl. 246. 1858.

Gujrati: *Muchul*; Telegu: *Koyalu*; Tamil: *Umari Kerrai, Pavalappundu, Sittumari, Umarikeerdi*.

Type: Bengal in salt marshes, *Roxb*.

Flowering & Fruiting: April – October

Distribution: INDIA – Throughout the seacoast and salt marshes: Tamil Nadu and West Bengal; SRI LANKA.

Note: The young shoots are eaten after pickling. Seeds yield high quality edible oil. The plant is used as fodder.

Salsola

Linnaeus, Sp. Pl.1: 222. 1753.

Lectotype species: *S. kali* Linnaeus (Hitchcock, Prop. Brit. Bot. 137.1929).

Etymology: From the Latin *salsa* (salty; plants with this name usually have a high salt tolerance)

130 species, cosmopolitan, in seacoasts and other salt habitats (Mabberley 2008); 2 species and 1 subspecies in India.

Key to the Species

1a. Perennial shrub branches not spinescent; leaves subglobose, fleshy..... ***S. imbricata***
1b. Annual herb, spinescent; leaves ovate – subulate or linear …… 2
2a. Plants robust, densely hispidulous, scabrid or glabrous; leaves slightly clasping stem; Perianth segments stiff, cuspidate or short acuminate, bracts patent .....… ***S. kali ssp. tragus***
2b. Plants herbaceous, glabrous or minutely hispidulous; leaves semi-amplexicaule; perianth segments membranous, long acuminate, bracts appressed ……..…..… ***S. collina***

Salsola collina Pallas, Ill. Pl. 34, t. 28.1803; Moquin in DC., Prod.13, 2:188.1849; Hook. f., Fl. Brit. India 5: 17. 1886; Zhu Gelin *et al* in Fl. China 5: 409. 2003.

Type: [SE Europ. Russia], Inter Rhymnum et Samaram fl. A jugo Uralensi descendentium" Pallas; Icono- Pl. 26 *l.c.*

Flowering & Fruiting: June – September

Distribution: INDIA – Jammu & Kashmir (Ladakh) and Himachal Pradesh; PAKISTAN, CHINA, MONGOLIA, KOREA, RUSSIA, C. ASIA, C. & W. EUROPE and N. AMERICA.

Salsola imbricata Forsskål, Fl. Aegypt.- Arab. 57. 1775; Boulos in Kew Bull. 46: 138.1991; Freitag in Rech. f., Fl. Iran. 172:193. 1997. *Chenopodium baryosma* Schultes in Roemer & Schult., Syst. Veg. 6: 269. 1820. *Salsola baryosma* (Schultes) Dandy in Andrews, Fl. Pl. Anglo-Egypt. Sudan 1: 111. 1950. *Salsola foetida* Delile *ex* Moquin, Chenop. Monogr. Enum.143.1840; Hooker *f*., Fl. Brit. India 5: 18. 1886; Parker, Forest Fl. Punjab ed. 2: 418. 1924. *S. spinescens* Wight, Icon. Pl. Ind. Orient. t. 1795. 1852.

Punjabi: *Gora lane, lana, shora*; Rajasasthani: *Lani*; Telegu: *Ellakura*

Neotype: Yemen, Hodeida, 09.09.1976, *J.R.J. Wood* 1184 (K). (Boulos in Kew Bull. 46: 138. 1991).

Flowering & Fruiting: August – October

Distribution: INDIA – North and north western region in sandy, gravelly soil. Gujarat, Haryana, Rajasthan, Punjab, Delhi and Uttar Pradesh; IRAN, IRAQ, AFGHANISTAN, PAKISTAN, W. ASIA and N. AFRICA.

Note: The plant is used as camel food. It is a source of 'Sajji', a crude form of sodium carbonate.

Salsola kali Linnaeus ssp. ***tragus*** (Linnaeus) Celakovsky, *Cent.Pl. II 13. 1756*. *Salsola tragus* Linnaeus, Cent. Pl. 2: 13. 1756; Iljin in Komarov, Fl. USSR 36: 213. 1936; Zhu Gelin *et al* in Fl. China 5: 411. 2003. *S. kali* Linnaeus, *sensu* Hooker *f*., Fl. Brit. India 5: 17. 1886; Blatter *et al*. in Journ. Ind. Bot. Soc. 1: 276. 1920. *S. kali* Linnaeus *ssp. ruthenica* Iljin in Weeds USSR. 2: 137. 1934; Dhar & Kachroo, Alp. Fl. Kashmir Himal. 166. 1983.

Punjabi: *Sajjibuti*.

Holotype: Linn. 315.3 (LINN)

Flowering & Fruiting: June – August

Distribution: INDIA – Jammu & Kashmir (Ladakh); PAKISTAN, CHINA, RUSSIA, SW & C. ASIA; AUSTRALIA, AFRICA, EUROPE and N. AMERICA.

Note: This species is highly polymorphic. It contains a large amount of sodium, calcium as well as oxalic acid. Young shoots are edible after boiling.

EXCLUDED SPECIES

Salsola paulsenii Litvinov in Izv. Turkestansk..Otd. Russk. Georg. Obsch. 4(5): 28. 1905; R.R. Stewart, Ann. Cat. Vasc. Pl. W. Pakistan & Kashmir 226. 1872.

According to R.R. Stewart (*l.c*.) this species occurs in Kashmir, but no specimen is available for study.

Salsola drummondii Ulbrich in Engl. & Prantl., Pflanzenfam. ed.16c: 565. 1934; Parker, For. Fl. Punjab, Hazara & Delhi 417. 1934.

Parker (*l.c*.) erroneously recorded it from Kashmir, but no specimen is available for study.

Suaeda

Forsskål *ex* J. F. Gmelin, Onomat. Bot. Compl. 8: 797.1776 (*nom. cons*.).

Type: *S. vera* Forsskål *ex* J.F. Gmelin (*typ. Cons*.)

Etymology: From the Arabic vernacular name of this plant.

110 species, cosmopolitan, in seacoasts and salt steppe (Mabberley 2008); 5 in India.

Key to the Species

1a. Perennials; seeds usually vertical ……... 2
1b. Annuals; seeds vertical or horizontal …….....…..... 4
2a. Flowers bisexual; stigmas 3 ……..... 3
2b. Flowers unisexual, stigmas 2-5; branches with prominent leaf scars ..…. ***S. monoica***
3a. Bract and bracteoles with pectinate margins, forming a tuft in leaf axils after falling of fruiting perianth ……..... ***S. nudiflora***
3b. Bract and bracteoles entire or denticulate, not forming any tuft ..... ***S. fruticosa***
4a. Leaves linear, linear-oblong, younger leaves sickle shaped; seeds with no beak; in coastal areas ……..…… ***S. maritima***
4b. Leaves linear to oblong, floral leaves only oblong, younger leaves straight; seeds beaked,horizontal or vertical; Himalayas ……..…….. ***S. microsperma***

Suaeda fruticosa Forsskål *ex* J.F. Gmelin, Onomat. Bot. Compl. 8:789.1776 ; Forsskål, Fl. Aegypt.-Arab. 70. 1775; Hooker *f*., Fl. Brit. India 5: 13. 1886. *Chenopodium fruticosum* Linnaeus, Sp. Pl. 1: 221.1753.

Hindi: *Lunak, chhoti-la*ni; Gujrati: *Moras, ushuklani*; Punjabi: *Lunak, lana;* Rajasthani: *Lunaki*.

Lectotype: [Saudi Arabia] "Gomfodae" (Al Qumfidhah), Forssk. 162 I. Schweinf.1896; Freitag in Flora 183: 156, 1989.

Flowering & Fruiting: April – September

Distribution: INDIA – Jammu & Kashmir, Uttrakhand, Uttar Pradesh, Rajasthan, Delhi, Punjab, Gujarat, Maharashtra and Tamil Nadu; IRAN, IRAQ, PAKISTAN; W. ASIA and N. AFRICA.

Note: The plant is extremely polymorphic. Tender roots and succulent leaves are edible, also used as fodder.

Suaeda maritima (Linnaeus) Dumortier, Fl. Belg. 22.1827; Hooker *f*., Fl. Brit. India 5: 14. 1886. *Chenopodium maritimum* Linnaeus, Sp. Pl. 1: 221. 1753. *Chenopodina indica* Wight, Icon. Pl. Ind. Orient. 5(2): 5, t. 1793. 1852. *Suaeda indica* Moquin in Ann. Sci. Nat. (Paris) 23:316.1831; Wight, Icon. Pl. Ind. Orient. t. 1796.1852.

Bengali: *Gira sag*; Hindi: *Khari lani*; Marwari & Gujrati: *Moras, lano*; Telegu: *Ilakoora*; Tamil: *Vellakeerai, Nariumari, Uppukeerai*; Orya: *Geriasag*

Type: Described from W. Europe.

Flowering & Fruiting: April – October

Distribution: INDIA – Throughout the coastal regions; MYANMAR, SRI LANKA, JAPAN, MALAYSIAN ISLANDS; N. AFRICA, AUSTRALIA and N. AMERICA.

Note: (i) A common herb in the saline marshy area.

(ii) A much polymorphic species. Leaves used as vegetable. The plant is used as fodder. It acts as a sand binder.

Suaeda microsperma (C.A. Meyer) Fenzl, in Ledebour, Fl. Ross. 3(2): 785. 1851; Hooker *f*., Fl. Brit. India 5: 15. 1886. *Schoberia microsperma* C.A. Meyer in Eichw. Pl. Casp. Cauc.14, t.13.1831-33. *Chenopodina microsperma* Moquin in DC., Prodr. 13(2): 165. 1849. *C. parviflora* Moquin in DC., Prodr. 13(2): 165. 1849.

Type: Described from Turkmenia, from the eastern shore of the Caspian Sea (Krasnovodsk, Dagada island)

Flowering & Fruiting: July – September

Distribution: INDIA – Jammu & Kashmir (Ladakh) and Himachal Pradesh; C. ASIA.

Note: A rare plant.

Suaeda monoica Forsskål *ex* J.F. Gmelin in Linnaeus, Syst. Nat. ed. 13, 1: 503. 1791; Forsskål, Fl. Aegypt.-Arab. 70. 1775; Hooker *f*., Fl. Brit. India 5: 13. 1886.

Tamil: *Katravumari, umarinandi*; Telegu: *Koyyalakoord, Vellakoora*; Orya: *Nunia*.

Lectotype: [N. Yemen] "Lohaja" (=Luhaiya), Forssk. 180, XII 1762-I 1763 I. Freitag in Flora 183: 154, 1989.

Flowering & Fruiting: May –December

Distribution: INDIA – Common marine herb in marshy places. Orissa, Andhra Pradesh, Tamil Nadu and Diu; PAKISTAN, SRI LANKA and U.A.E.; TROP. AFRICA.

Note: The plant is a good fodder.

Suaeda nudiflora Moquin in Ann. Sci. Nat. (Paris) 23: 316. 1831 & in DC., Prodr. 13(2): 155. 1849; Hooker *f*., Fl. Brit. India 5: 14. 1886. *Salsola nudiflora* Willdenow, Sp. Pl. 1: 1313. 1798.

Flowering & Fruiting: November – April

Distribution: INDIA – Throughout coastal regions; SRI LANKA, MALAYSIA, AUSTRALIA, N. AFRICA and N. AMERICA.

Note: Growing along with mangrove plants.

Cultivated and Introduced Species

Atriplex halimus Linnaeus, Sp. Pl. 2 : 1052. 1753.

English: *Mediterranean salt bush* or *sea orache*.

The plant is used as a fodder. Introduced in India from Israel.

Atriplex lindleyi Moquin, in DC., Prodr. 13(2): 100. 1849.

The species is grown for reclaiming the saline tracts. Introduced in India from Australia.

Atriplex nummularia Lindley in J. Exped. Trop. Australia 64. 1848.

English: *Oldman salt bush*. Cultivated for fodder.Native of Australia.

Atriplex vasicaria Heward *ex* Bentham, Fl. Austral. 5: 172. 1870.

English: *Bladder salt bush.* Introduced to reclaim alkaline soil. Native of Australia.

Beta palonga R.K. Basu & K.K. Mukherjee in Canad. J. Bot. 53: 1166.1975.

Common name: Palak, Palong sak. Plant used as vegetable.

Beta vulgaris Linnaeus, Sp. Pl. 1: 222.1753; Hooker *f*., Fl. Brit. India 5: 5. 1886.

Common name: *Beet*.

It is widely cultivated in India for its edible leaves and red roots. Cultivated beet falls under two groups (i) the Cicla group [*Beta vulgaris* Linnaeus ssp. *cicla* (Linnaeus) Koch] includes the beets grown as leafy vegetable *viz*., leaf beet or spinach beet, and (ii) the crassa group [*Beta vulgaris* Linnaeus var. *crassa* (Alefeld) J. Helm] includes the types grown chiefly for their roots used as vegetable (garden beet or beet root) and as a source of sugar (sugar beet). (Anonymous 1988).

Chenopodium capitatum (Linnaeus) Ascherson, Fl. Brandenburgh 572. 1864. *Blitum capitatum* Linnaeus, Sp. Pl. 1: 4.1753.

Cultivated for leaf vegetable. Native of Australia.

Chenopodium carinatum R. Brown, Prodr. 407. 1810; Subba Rao & Kumari in J. Bombay Nat. Hist. Soc. 69: 683.1972.

Reported from Tamil Nadu (Nilgiri dist.). Rare. Native of Australia.

Chenopodium moquinianum Aellen in Ber.Schweiz. Bot. Ges. 38: 15, 19. 1929; Fischer in Gamble, Fl. Pres. Madras 3: 1303. 1936; Kumari in Fl. Tamil Nadu 2: 195. 1987.

According to Fischer (*l. c*.) this species "has been found near Madras and is reported to be spreading". There is no further record of occurrence of this species as well as no specimen is available for study. Kumari (*l. c*) referred only Gamble's observation.

Chenopodium pallidicaule Aellen in Fedde Rep. 26: 126. 1929.

Introduced from South America.

Chenopodium quinoa Willdenow, Sp. Pl. 1(2): 1301. 1797.

Introduced from Peru. It's a high protein crop.

Dysphania pumilio (R. Brown) Mosyakin & Clemants in Ukrayins'k. Bot. Zhurn. 59: 382. 2002. *C. pumilio* R. Brown, Prodr.1: 407. 1810; Ramayya & Rajagopal in Curr. Sci. 38: 173. 1969.

Reported once from Tamil Nadu (Ootakamund). Native of Australia.

Dysphania truncata (Paul G. Wilson) Mosyakin & Clemants in J. Bot. Res. Inst. Texas 2: 427. 2008. *Chenopodium truncatum* Paul G. Wilson in Nuytsia 4: 177. 1983 & in J. Econ. Taxon. Bot. 14(1): 109 – 110. 1990.

Reported once from Karnataka (Lalbagh garden, Bangalore).

Spinacia oleracea Linnaeus, Sp. Pl. 2: 1027. 1753; Hooker *f*., Fl. Brit. India 5: 6. 1886. *S. Tetranda* Roxburgh, Fl. Ind. 3: 771.1832 (ed. Carey); Wight, Icon. Pl. Ind. Or. t. 818. 1844 – 45.

Commonly cultivated as a leaf vegetable. It contains large amount of vitamin A, B, C, iron and phosphorus.

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