

Key and Synopsis of the American Species of the Genus *Chenopodium* L

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# Key and Synopsis of the American Species of the Genus *Chenopodium* L.\*

Paul Aellen and Theodor Just

Despite its great practical and theoretical interest, our knowledge of the genus *Chenopodium* L. is far from being complete. Many of its species are highly variable and have often been misunderstood. While the senior author's earlier contribution (Aellen 1929) was mainly concerned with a critical study of the nomenclature and distribution of all American forms, the present paper is designed to serve primarily as a means for identification.

As more material comes to light and all available collections can be studied, many forms may have to be added or reassigned, a desirable procedure should it simplify the present disposition of difficult groups. The distribution data are mostly those assembled by the senior author in the process of his revision of the whole genus in its world wide occurrence. Obviously many American records will have to be added in the future.

Since a complete list of chromosome numbers as found in the genus *Chenopodium* does not seem to be available in the literature, the following table was compiled as a basis for future studies, both taxonomic and cytological. Species not known to occur in America are also included. For details see Cooper 1935, Kjellmark 1934, Lorz 1937, Maude 1939-1940, Winge 1917, Woroshilov 1942, Wulff 1936.

TABLE 1. Chromosome numbers in the genus *Chenopodium* L.

Species	n	Author	n	Author
<i>album</i> .....	9	Winge	18	Cooper
<i>album</i> .....	9	Maude		
var. <i>Borbasii</i> f. <i>Bernburgense</i> .....	27	Kjellmark		
f. <i>pseudo-Borbasii</i> .....	27	Kjellmark		
f. ad ssp. <i>diversifoliam</i> .....	27	Kjellmark		
var. (exot.) .....	27	Kjellmark		
<i>amaranticolor</i> .....	18	Wulff		
<i>ambrosioides</i> .....	18	Kjellmark		
<i>ambrosioides</i> .....	16	Lorz	16	Woroshilov
<i>anthelminticum</i> .....	32	Woroshilov		
<i>Bonus Henricus</i> .....	18	Winge	18	Wulff
<i>capitatum</i> .....	9	Kjellmark		
<i>chilense</i> .....	16	Woroshilov		
<i>ficifolium</i> .....	9	Kjellmark		
<i>foetidum</i> .....	9	Kjellmark		
<i>glaucum</i> .....	9	Wulff		
<i>hybridum</i> .....	9	Winge	18	Cooper
<i>integrifolium</i> .....	16	Woroshilov		
<i>missouriense</i> var. <i>Bushianum</i> .....	27	Kjellmark		

\* Contribution from the Botanical Institute, University of Basel, Basel, Switzerland and the Greene and Nieuwland Herbaria, University of Notre Dame, Notre Dame, Ind.

<i>murale</i> .....	9	Winge		
<i>nitariaceum</i> .....	18	Wulff		
<i>opulifolium</i> .....	18	Wulff		
<i>polyspermum</i> .....	9	Kjellmark		
<i>pratericola</i> .....	9	Kjellmark		
<i>Probstii</i> .....	27	Kjellmark		
<i>Quinoa</i> .....	18	Kjellmark	18	Wulff
<i>rubrum</i> .....	18	Kjellmark		
<i>suffruticosum</i> .....	16	Woroshilov		
<i>virgatum</i> .....	27	Kjellmark	9	Wulff
<i>viride</i> .....	9	Kjellmark		
<i>Vulvaria</i> .....	9	Winge		

No attempt has been made to correlate these numbers with the respective entities treated in the synopsis. The counts are apparently incomplete and show some discrepancies which may be the result of polysomaty, the existence of different chromosomal races, or the use of different taxonomic groups confused under the same name. At any rate, more exceptions to the euploid series of the Chenopodiaceae based by Lorz (1937) on  $x=9$  (or 3?) are now on record than were known to him. It seems, therefore, that much more cytological information is needed, before taxonomic conclusions can be drawn from it.

Acknowledgment for reading the entire manuscript and for valuable suggestions is due Dr. Paul C. Standley, Herbarium, Field Museum, Chicago, Ill., and Mr. C. A. Weatherby, Gray Herbarium, Harvard University, Cambridge, Mass. Mr. V. C. Asmous, Arnold Arboretum, Harvard University, Jamaica Plain, Mass., kindly furnished an excellent translation from the Russian original of W. N. Woroshilov's "Revision des espèces de *Chenopodium* de la section *Ambrina* (Spach) Hook. fil.," parts of which are quoted in this paper.

### Key to the Sections of the Genus *Chenopodium* L.

1. Plants lanuginose or glandular (rarely glabrous or subglabrous like *Ch. aristatum* L.), mostly aromatic.
  2. Seeds vertical; flowers in axillary glomerules, rarely in ebracteate panicles.
    3. Perianth reticulately veined, fused, 4-5-tipped.....Sect. I. *Roubieva*, p. 49.
    3. Perianth smooth, free almost to the base in the single American species.....  
.....Sect. II. *Orthosporum*, p. 50.
  2. Seeds mostly horizontal, occasionally vertical.
    3. Flowers in irregular glomerules. Inflorescence mostly spicate-paniculate.....  
.....Sect. III. *Ambrina*, p. 50.
    3. Flowers in loose, dichotomous cymes .....Sect. IV. *Botryoides*, p. 56.
      4. Plants with numerous glandular hairs .....Subsect. 1. *Botrys*, p. 56.
      4. Plants glabrous or subglabrous, with short glandular and vesiculose hairs  
.....Subsect. 2. *Teloxys*, p. 57.
1. Plants glabrous or bullate or (less commonly) glandular, but never lanuginose (pubescent).
  2. Seeds all vertical or partly vertical and horizontal.
    3. Perianth of terminal glomerulate flowers free almost to the base, 4-5-tipped, seeds horizontal; perianth of lateral glomerulate flowers partly fused, 3-tipped, seeds vertical ..... Sect. V. *Degenia*, p. 57.

3. Perianth of flowers with vertical seeds 3-5-tipped, free to the middle.
  4. Perianth fleshy at maturity .....Sect. VI. *Eublittum*, p. 59.
  4. Perianth not fleshy.
    5. Plants annual .....Sect. VII. *Pseudoblittum*, p. 59.
    5. Plants perennial.
      6. Leaves pinnatifid or pinnately lobed. Glomerules bracteate.....  
.....Sect. VIII. *Thellungia*, p. 61.
      6. Leaves triangular to spatulate, entire or dentate. Glomerules mostly ebracteate..... Sect. IX. *Agathophyton*, p. 61.
2. Seeds nearly always horizontal. Perianth 5-tipped, (rarely for lack of space) in dense glomerules with fewer tips and oblique or vertical seeds.....  
.....Sect. X. *Chenopodia*, p. 61.
  3. Seeds smooth or nearly so.....Subsect. 1. *Lejosperma*, p. 61.
  3. Seeds marked with grooves, ridges etc.
    4. Seeds with regular surface markings in form of alveolar cells .....  
.....Subsect. 2. *Cellulata*, p. 69.
    4. Seeds with irregular surface markings.
      5. Seeds with undulate ridges .....Subsect. 3. *Undata*, p. 74.
      5. Seeds with rough, suborbicular or elongate grooves and lacerated edges..... Subsect. 4. *Grossefoveata*, p. 75.

Synopsis of the Sections, Species and Subspecific Entities  
of the Genus *Chenopodium* L.

Sect. I. ROUBIEVA Rouy in Rouy et Foucauld, Fl. France 12, 2:53. 1910. Moquin in Ann. sci. nat., 2e sér., 1:292. 1834—as genus.

Perianth fused, saccate, 4-5-tipped, reticulate. Seeds vertical. Flowers in axillary glomerules.

KEY TO SECTION ROUBIEVA

1. Perianth ovoid-globose, 1-2.5 (-3) mm. long, sessile (or nearly so).  
Seed 0.75 (-1) mm. in diam. Most leaves narrowly pinnatifid .....*Ch. multifidum*
2. Leaf segments narrow. Perianth sessile.
  3. Perianth 1-2 mm. long. Seed 0.75 mm. in diam. ....f. *typicum*
  3. Perianth 2.5-3 mm. long; oblong-ovate (as in *Ch. Haumani* but sessile).  
Seed 0.75-1 mm. in diam. ....f. *intermedium*
2. Leaf segments broader or leaves undivided. Perianth pedicellate.
  3. Leaf segments broader .....f. *latisectum*
  3. Uppermost leaves spatulate, entire, 6-7 mm. long .....f. *spathulatum*
1. Perianth oblong-ovate, 2.5-4 mm. long, pedicel 1-2 mm. long. Seed 1 mm. in diam. Leaves mostly broader, pinnately lobed or at best sinuate-dentate .....  
..... *Ch. Haumani*

1. CHENOPODIUM MULTIFIDUM L. Spec. Pl. 220. 1753.—*Roubieva multifida* (L.) Moq. in Ann. sci. nat., 2e sér., 1:292. 1834.

South America, Juan Fernandez. Introduced from New York to Alabama, California.

f. *typicum* Aellen, f. nov.—Segmenta foliorum angusta.

f. LATISECTUM Bonte et Aellen in Verh. Naturf. Ges. Basel 41:94. 1930.

f. *spathulatum* Aellen, f. nov.—Folia suprema spatuliformia, integerrima, 6-7 mm. longa.

f. *intermedium* Aellen, f. nov.—Segmenta foliorum angusta. Perianthium 2.5-3 mm. longum, oblongo-ovale. Semen 0.75-1 mm. in diam. latum.

2. *CHENOPODIUM HAUMANI* Ulbrich in Engl. u. Prantl, Natürl. Pfl.-Fam., ed. 2, 16c:491. 1934.—*Chenopodium bonariense* (Hook. f.) Hauman et Irigoyen—not Tenore.

Uruguay, Argentina.

Sect. II. *ORTHOSPORUM* R. Br., Prodr. Fl. Nov. Holl. 1:407. 1810.

Perianth tips five, partly separated, smooth or with appendages. Seeds vertical. Flowers in axillary glomerules. Only one species in America.

3. *CHENOPODIUM PUMILIO* R. Br., Prodr. 1:407. 1810.—*Ch. carinatum* of authors, not R. Br.; see Aellen, Verh. Naturf. Ges. Basel 44(1):308-318. 1933.

Plants glandular. Leaves pinnatifid or dentate. Perianth tips oblong, narrow, arched, without appendages and keel, fused only at the base.

Australia. Introduced in Massachusetts, New Jersey, District of Columbia, Missouri, Texas, northern California.

Sect. III. *AMBRINA* (Spach) Hook. f. in Benth. et Hook., Gen. Pl. 3:51. 1880.—Spach Hist. Nat. 5:295. 1836—as genus. Beck in Rchb. Icon. xxiv: 118, 1908—for a section of the genus *Blitum*.

Perianth (4-)5-tipped, fused to about the middle, glabrous or puberulent. Seed normally horizontal, occasionally vertical. Inflorescence usually spicate-paniculate. Represented by a single but highly polymorphic species.

#### KEY TO SECTION AMBRINA

(Key to the subspecific entities of *Chenopodium ambrosioides* L.)

1. Perianth often rugose, carinate when mature (if strongly carinate, the perianth is stellate). Inflorescence almost ebracteate. Leaves irregularly lacinate-dentate or pinnatifid.
  2. Leaves irregularly lacinate-dentate. Perianth distinctly rugose .....ssp. *Venturii*
  2. Leaves pinnatifid, the segments mostly entire, acuminate. Perianth carinate (smooth, when young?) .....ssp. *Burkartii*
1. Keel of perianth segments small, rounded or absent. Inflorescence bracteate or, when ebracteate, leaves small, regularly and symmetrically dentate.
  2. Leaves ovate-spatulate, regularly sinuate-dentate. Inflorescence a terminal and ebracteate panicle. Glomerules ebracteate .....ssp. *retusum*
  2. Leaves acute (rarely obtuse), mostly acute-dentate or irregularly repand-dentate or sinuately lobed. Inflorescence and glomerules mostly bracteate.
  3. Leaves mostly narrow and lacinate-serrate or rarely ovate-elliptical and then sinuately lobed. Inflorescence ebracteate or nearly so. Seed with shallow depressions (rarely also with undulate lines) .....ssp. *chilense*
  4. Leaves oblong-ovate to lanceolate, acute .....var. *eu-chilense*

- 5. Bracts definitely longer than glomerules.
- 6. Leaves ovate-lanceolate to broadly lanceolate; teeth usually dentate .....f. *normale*
- 6. Leaves narrower, lanceolate to linear, dentate .....f. *angustatum*
- 5. Bracts small or absent .....f. *denudatum*
- 4. Leaves rounded-ovate, with broad, lobe-like, dentate teeth, acute ..... var. *andicola*
- 3. Leaves mostly oblong-elliptical to broadly lanceolate, irregularly repand-dentate to entire, the larger ones sinuately lobed. Inflorescence bracteate. Seed almost smooth, with undulate lines .....ssp. *eu-ambrosioides*
- 4. Glomerules ebracteate throughout inflorescence .....var. *anthelminticum*
- 4. Glomerules bracteate.
- 5. Whole plant more or less lanuginose .....var. *suffruticosum*
- 5. Plant almost glabrous (except glandular hairs) or sparsely lanuginose .....var. *typicum* (with seven forms)

4. CHENOPODIUM AMBROSIOIDES L., Spec. Pl. 219. 1753.

ssp. *Venturii* Aellen, ssp. nov.

Folia (media) ad 6 cm. longa, ad 2 cm. lata, magnopere irregularia et profunde laciniato-dentata aut sinuato-dentata. Inflorescentia paene terminalis, breviramosa, aphylla. Glomeruli aphylli, catenulati. Perianthium  $\pm$  carinatum, maturate saepe stellatum, albescens, spongiosum, venoso-rugosum. Carina gibbosa. Pericarpium  $\pm$  liberum. Semen horizontale vel verticale. Corium seminis  $\pm$  leve, paucis lineis anguineis praeditum.

Argentina: Tucuman, 2 Cuestas, 2400 m., 1926, S. Venturi no. 4435.

ssp. *BURKARTII* Aellen in Fedde Rep. spec. nov. 26:37. 1929.

Argentina, Brazil?

ssp. *RETUSUM* Aellen in Fedde Rep. spec. nov. 26:38. 1929.—*Ambrina retusa* Juss. ex Moq. Chenop. enum. 38. 1840.—*Chenopodium ovatum* Moq. in DC. Prodr. 13 (2):73. 1849.

Argentina, Brazil, Uruguay.

ssp. *CHILENSE* Aellen in Fedde Rep. spec. nov. 26:36. 1929.—*Ch. chilense* Schrader, Ind. Sem. Hort. Gott. 1832:2. 1832, not of Pers. 1805.—*Ch. vagans* Standley in N. Am. Fl. 21:26. 1916.

var. *EU-CHILENSE* Aellen in Fedde Rep. spec. nov. 26:36. 1929.

f. *normale* Aellen, f. nov.—Folia ovato-lanceolata ad late lanceolata, dentibus serratis.

Chile, Bolivia. Introduced in northern California.

f. *ANGUSTATUM* (Moq.) Aellen in Fedde Rep. spec. nov. 26:36. 1929.—*Ch. chilense* var. *angustifolium* Moq. in DC. Prodr. 13 (2):74. 1849.

Chile, Argentina.

f. *DENUDATUM* (Phil.) Aellen in Fedde Rep. spec. nov. 26:36. 1929.—*Ambrina denudata* Phil. in Linnaea 29:37. 1856.

Chile, Brazil. Introduced in northern California.

var. *ANDICOLA* (Phil.) Aellen in Fedde Rep. spec. nov. 26:37. 1929.—*Ambrina andicola* Phil. in Anal. Univ. Sant. 91:442. 1895.—*Chenopodium querciforme* Murr in Mag. Bot. Lap. 3:37. 1904.

Chile, Peru, Bolivia.

ssp. *EU-AMBROSIOIDES* Aellen in Fedde Rep. spec. nov. 26:34. 1929.

var. *ANTHELMINTICUM* (L.) Aellen in Fedde Rep. spec. nov. 26:35. 1929.—*Ch. anthelminticum* L. Spec. Pl. 320. 1753.

Missouri, Texas, Bermuda, Argentina, Brazil.

var. *SUFFRUTICOSUM* (Willd.) Aellen in Fedde Rep. spec. nov. 26:35. 1929.—*Ch. suffruticosum* Willd. Enum. pl. hort. berol. 1:290. 1809.

var. *TYPICUM* (Speg.) Aellen in Fedde Rep. spec. nov. 26:34. 1929.—*Ch. ambrosioides* a) *typica* Speg. in Anal. Mus. Nac. B. Aires, 2. ser., 4:137. 1902.

Central and southern N. America, Central and South America.

f. *SPATHULATUM* (Sieber) Aellen in Fedde Rep. spec. nov. 26:35. 1929.—*Ch. spathulatum* Sieber, Fl. Martin. 92. 1825.—Bracts large and spatulate.

f. *GENUINUM* (Willk.) Aellen in Fedde Rep. spec. nov. 26:34. 1929.—*Ch. ambrosioides* L. var. *genuinum* Willk. in Willk. et Lange, Prodr. Fl. Hisp. 1:271. 1861.—Bracts little, lanceolate or linear, leaf-blades oblong-elliptical to broadly lanceolate.

f. *ANGUSTIFOLIUM* (Moq.) Aellen in Verh. Naturf. Ges. Basel 41:96. 1930.—*Ch. ambrosioides* L. var. *angustifolium* Moq. in DC. Prodr. 13 (2):73. 1849.—Leaf-blades narrow, lanceolate, and denticulate.

f. *DENTATUM* (Fenzl) Aellen in Verh. Naturf. Ges. Basel 41:96. 1930.—*Ch. ambrosioides* L. var. *dentata* Fenzl in Mart. Fl. Bras. 5 (1):145. 1864.—Leaf-blades almost serrate-denticulate.

f. *INTEGRIFOLIUM* (Fenzl) Aellen, comb. nov.—*Ch. ambrosioides* L. var. *integrifolium* Fenzl in Mart. Fl. Bras. 5 (1):146. 1864.—Leaf-blades slightly dentate or entire.

f. *ROTUNDATUM* Aellen, f. nov.—Folia orbiculato-ovata.

f. *PINNATIFIDUM* (Willk.) Aellen, comb. nov.—*Ch. ambrosioides* L. var. *pinnatifidum* Willk. in Willk. et Lange, Prodr. Fl. Hisp. 1:271. 1861.—Leaf-blades almost pinnatifid.

The treatment of all forms belonging to Section *Ambrina* adopted in this synopsis differs widely from that proposed by Woroshilov (1942). *Chenopodium ambrosioides* L. is here regarded as a highly polymorphic species but is broken up by Woroshilov into twelve species with several subspecies and varie-

ties. One of these species (*Ch. integrifolium* Worosh.) and two subspecies (*Ch. integrifolium* ssp. *ramosissimum* and *Ch. suffruticosum* ssp. *remotum*) are described as new.

Woroshilov bases his disposition of these species and subspecific entities on the customary study of herbarium material, published information and, as far as possible, on data obtained from transplants, cytological analysis, chemical behavior, and geographical distribution. The following enumeration includes the entities known to occur in North and South America, nearly all of which appear in synonymy in the synopsis, and one species from Tristan da Cunha.

1. *Ch. spathulatum* Sieber.
2. *Ch. integrifolium* Worosh. with ssp. *ramosissimum* Worosh.
3. *Ch. ambrosioides* L. with var. *pinnatifida* Willk.
4. *Ch. suffruticosum* Willd. with ssp. *remotum* Worosh.
5. *Ch. tomentosum* Pet.— Thou.
6. *Ch. chilense* Schrad. with var. *angustifolium* Moq., var. *denudata* (Phil.) Reiche, and var. *incisa* (Phil.) Reiche.
7. *Ch. andicola* (Phil.) Reiche.
8. *Ch. Venturii* Aellen. See synopsis for diagnosis of *Ch. ambrosioides* L. ssp. *Venturii* Aellen, ssp. nov. Woroshilov based the transfer of this unpublished name to stat. nov. on herbarium material from the Herbarium P. Aellen.
9. *Ch. querciforme* Murr with var. *minus* Murr.
10. *Ch. anthelminticum* L.
11. *Ch. retusum* Juss.
12. *Ch. Burkartii* (Aellen) Worosh.

In addition to having the highest chromosome number ( $2n=64$ ) *Ch. anthelminticum* L. is remarkable also, because it takes 145 days until the first flowers appear, whereas other species (*Ch. chilense* Schrad., *Ch. suffruticosum* Willd., *Ch. ambrosioides* L. and *Ch. integrifolium* Worosh.) require only 65-75 days. *Ch. suffruticosum* Willd. ssp. *remotum* Worosh. requires as many as 180 days to flower, although the typical species reaches that stage in 70 days. Differences in the time required for fruiting were also studied as were the yield of dry fruits with perianths in various parts of USSR (see Table 1 in Woroshilov 1942). *Ch. suffruticosum* Willd. gives the best yield (3.5 tons per ha).

Chemical analysis of all species investigated disclosed interesting and taxonomically valuable information. Although *Ch. ambrosioides* L. and *Ch. integrifolium* Worosh. look very much alike, they differ definitely in their volatile oil content. The former species contains at least 70 per cent ascaridol in its volatile oil, whereas the latter has only about 35 per cent (see Table 2 in Woroshilov 1942 for additional data).

In view of the general inaccessibility of Woroshilov's revision, the Latin descriptions of his new species and subspecies are here reprinted together with his Russian ones as translated by Mr. V. C. Asmous. The illustration of *Ch. integrifolium* Worosh. is reproduced from the original one.





*Chenopodium integrifolium* Worosh. sp. nov.

**Chenopodium integrifolium** Worosh. sp. nov. 'Mar' tsel'nolistnaia'. Caulis erectus, subglaber, ramosus, 30-80 cm. altus. Rami erecti. Folia tenuia, lanceolata vel obovato-lanceolata, integerrima vel subdentata, 4-8 cm. longa; floraria 1-2 cm. longa, acuta. Ramuli floriferi dense foliati, abrupte glomerulati. Perianthium fructiferum suborbiculatum, apicem obtusum; lobis non carinatis. Semina .5 mm diametro.

Differt ab *Ch. spathulato* Sieber foliis floralibus acutis, non spathulatis; ab *Ch. ambrosioides* L. ramis erectis, foliis caulinis integerrimis vel subdentatis; foliis floralibus majoribus.

**Area geogr.** Europa australis, America media et borealis, Africa, Australia.

**Typus.** Hungaria. Kalocsa in pago Fokto, 17 ix 1875, leg. S. I. Menyharth, in Herb. Inst. Bot. Acad. Sci. URSS.

Stems 30-80 cm. high, subglabrous with erect branches. Leaves lanceolate or obovate-lanceolate, 4-8 cm. long, tapering towards both ends, acute at the apex, thin, mostly entire, rarely subdentate. At maturity most leaves fallen. Glomerules on the main stem almost to its base. Glomerules on the ultimate branchlets of the inflorescence interrupted, moniliform, subtending bracts large (1-2 cm. long), acute, broadly linear or lanceolate, 3-5 times longer than glomerules. Sometimes short (.5-3 cm. long) branchlets replace the glomerules. Perianth in fruit suborbicular, small, .75-1.0 mm. diam. subglobose, rounded on the apex, lobes not keeled. Seeds small, .5 mm. in diam.

**Geogr. range.** This species is widely distributed in southern Europe (Spain, Portugal, Italy, France, Greece, Austria, Hungary), Central America (Mexico, Guatemala); disjunct areas in North America (Missouri, New York, California), Africa, Australia. Described from Hungary. Type in Leningrad.

**Subsp. ramosissimum** Worosh. subsp. nov.—*Chenopodium ambrosioides* L.  $\beta$  *angustifolium* et *Ch. spathulatum* Sieber  $\gamma$  *angustifolium* Moq. in DC. Prodr. Syst. Nat. xiii, pt. 2 (1849) 73; ? *Ch. ambrosioides* L.  $\gamma$  *comosa* et  $\epsilon$  *angustifolium* Willk. in Willk. et Lange, Prodr. Fl. Hisp. i (1861) 271.

Ramis adscendentibus; caulibus apicem et ramulis longis flexuosis; foliis tenuibus, integerrimis lanceolatis vel sublinearibus (var. *angustifolium* Moq.), floraribus longis, acutis.

**Area geogr.** Africa, Asia australis, America australis.

**Typus.** Central Madagascar, Maroharona pr. Tananarivo, 14 vi 1880, leg. I. M. Hildebrand; in Herb. Inst. Bot. Acad. Sci. URSS.

Differs from the species in the ascendent lower branches of the stem and in thin, flexuose ends of the stems and branches.

**Geogr. range.** Africa (Madagascar, Madeira, Capland), southern Asia (eastern India, French Indochina, Java, Philippines), South America (Brazil). Described from Madagascar. Type in Leningrad.

**Chenopodium suffruticosum** Willd.

**Subsp. remotum** Worosh. subsp. nov.

Serotinum. Caulis ad 150 cm. altus, apicem dense tomentosus. Ramuli floriferi abbreviati, tenui, valde abrupti (glomerulis remotis), foliacei. Folia floralia magna, ad 2 cm. longa.

**Area geogr.** America australis, Australia.

**Typus.** Uruguay, departamento Montevideo, Atahualpa, Casavalle vi 1926, leg. Herter; in Herb. Inst. Bot. Acad. Sci. URSS.

Very late flowering, tall plant with dense tomentose pubescence on the ends of stems and branches. Distinguished by abbreviated, slender, interrupted, foliaceous branchlets of the inflorescence. Bracts large, up to 2 cm. long.

**Geogr. range.** South America (Uruguay, Chile, Brazil), Australia. Described from Uruguay. Type in Leningrad.

Sect. IV. BOTRYOIDES C. A. Meyer in Ledebour, Fl. Alt. 1:410. 1829 in part.—*Botrydium* Spach, Hist. Nat. 5:298. 1836 as genus, in part.—*Botryois* Moq. in DC. Prodr. 13 (2):72. 1849 as section, in part.

Flowers in loose, dichotomous cymes.

Subsect. 1. BOTRYS (Koch) Aellen et Iljin in Fl. USSR. 6:46. 1936.—*Botrys* Koch, Syn. Fl. Germ. Helv. ed. 1:607. 1837.

Plants (densely) glandular-pubescent.

#### KEY TO SUBSECTION BOTRYS

1. Keel of perianth tips smooth, inconspicuous, and glandular-pubescent.
  2. Leaves deeply 1-2-pinnatifid, with linear segments .....5. *Ch. dissectum*
  2. Leaves sinuate-pinnatifid, with broad segments .....6. *Ch. Botrys*
1. Keel of perianth tips tuberculate.
  2. Keel usually with several tubercles and a strong ridge .....7. *Ch. foetidum*
  2. Keel with one tubercle in distal part .....8. *Ch. graveolens*

5. CHENOPODIUM DISSECTUM (Moq.) Standley in N. Am. Fl. 21:26. 1916.—*Ch. bipinnatifidum* Moric. ex Moq. in DC. Prodr. 13 (2):76. 1849.—*Ambrina dissecta* Moq. Chenop. enum. 38. 1840.

Mexico.

6. CHENOPODIUM BOTRYS L. Spec. Pl. 219. 1753.

Distributed throughout the United States and Canada.

7. CHENOPODIUM FOETIDUM Schrad. in Magaz. Ges. Naturf. Freunde Berlin: 79. 1808.—*Ch. Schraderianum* Schult. Syst. veg. 6:260. 1820.

American records uncertain.

8. CHENOPODIUM GRAVEOLENS Willd. Enum. pl. hort. berol. 1:290. 1809. Aellen in Verh. Naturf. Ges. Basel 41:105. 1930.—*Ch. incisum* Poir. in Lam. Encycl. méth. Suppl. 1:392. 1810.—*Ch. effusum* Martens et Galeotti in Bull. Acad. Brux. 10 (1):346. 1843.—*Ambrina incisa* Moq. Chenop. enum. 36.1840.—*Teloxys cornuta* Torrey Pac. R.R. Rep. 4:129. 1857.—*Chenopodium cornutum* Benth. et Hook. Gen. Pl. 3:51. 1880; S. Wats. Bot. Calif. 2:482. 1880.—*Teloxys aristata* Moq. in DC. Prodr. 13 (2)59. 1849, in part, not *Ch. aristatum* L.

var. BANGII (Murr) Aellen in Verh. Naturf. Ges. Basel 41:107. 1930.—*Ch. incisum* Poir. var. *Bangii* Murr in Bull. Herb. Boiss., 2e sér., 4:991. 1904.—*Ch. rigidum* Lingelsheim in Fedde Rep. spec. nov. 7:241. 1909.—*Ch. foetidum* and *Ch. Botrys* in part of South American authors, neither Schrad. nor L.—*Teloxys Mandoni* S. Wats. in Proc. Am. Acad. 9:91. 1874.—*Chenopodium Mandoni* Aellen in Fedde Rep. spec. nov. 26:160. 1929.—Plant mostly erect, stiff, with few branches. Leaves elliptic, sinuate-dentate, tip not aristate.

Bolivia, Peru, Argentina.

f. ROTUNDFOLIUM Aellen in Verh. Naturf. Ges. Basel 41:108. 1930.—*Ch. incisum* var. *Bangii* f. *rotundifolium* Aellen in Fedde Rep. spec.

nov. 26:40. 1929.—Leaves rotund, slightly sinuate-dentate, the upper ones entire.

f. *PUMILUM* (Kurtz) Aellen in Verh. Naturf. Ges. Basel 41: 108. 1930.—*Ch. foetidum* f. *pumilum* Kurtz in Fries, Flora nördl. Argent. 156. 1905.—*Ch. incisum* var. *Bangii* f. *pumilum* Aellen in Fedde Rep. spec. nov. 26:40. 1929.—Plant small, delicate.

var. *MEXICANUM* Aellen in Verh. Naturf. Ges. Basel 41:108. 1930.—*Ch. incisum* var. *mexicanum* Aellen in Fedde Rep. spec. nov. 26:40. 1929.—*Ch. graveolens* Willd. in the narrower sense.—Leaves ovate, pinnately lobed, with long aristate tip.

Mexico.

var. *NEOMEXICANUM* Aellen in Verh. Naturf. Ges. Basel 41:108. 1930.—*Ch. incisum* var. *neomexicanum* Aellen in Fedde Rep. spec. nov. 26: 40. 1929.—Plants profusely branched. Leaves pinnate with narrow segments, not noticeably aristate.

Mexico, New Mexico, Arizona.

f. *RUBELLUM* Aellen in Verh. Naturf. Ges. Basel 41:108. 1930. *Ch. incisum* var. *neomexicanum* f. *rubellum* Aellen in Fedde Rep. spec. nov. 26:40. 1929.—Plant turning red.

Subsect. 2. *TELOXYS* (Moq.) Aellen et Iljin in Fl. URSS. 6:47. 1936.—*Teloxys* Moq. in Ann. sci. nat., 2e sér., 1:286. 1834.

Plants almost glabrous with short vesiculose or glandular hairs.

9. *CHENOPODIUM ARISTATUM* L. Spec. Pl. 221. 1753.

American records of this northern and northeastern Asiatic species uncertain.

Sect. V. *DEGENIA* Aellen in Magyar Bot. Lap. 25:56. 1926 (1927).

Terminal flowers of glomerules with free, 3-5-lobate perianth and horizontal seeds. Lateral flowers with fused, 3-tipped perianth and vertical seeds.

KEY TO SECTION DEGENIA

1. Plant delicate, with long branches. Leaves with long petioles, triangular to deltoid-ovate, entire to slightly three-lobed. Flowers in small, bracteate glomerules ..... 10. *Ch. frigidum*
1. Plants robust. Leaves large, up to 10 cm. long and wide, broadly triangular to deltoid, sharply sinuate-dentate or with one obtuse lateral tooth and then almost entire. Flowers in axillary (more or less cymose) or subterminal (paniculate) inflorescences.
  2. Plant glabrous or glabrescent ..... 11. *Ch. chenopodioides*
  3. Plant prostrate. Leaves usually entire or with a single obtuse lateral tooth, rounded-triangular ..... var. *Degenianum*
  3. Plant erect. Leaves more or less triangular, deeply sinuate-dentate, often lobed ..... var. *Lengyelianum*
2. Plant copiously farinose, especially on the lower sides of leaves. Leaves petio- late, triangular-rhombic, sharply sinuate-dentate ..... 12. *Ch. macrospermum*
3. Leaves and stem thick. Plant compact, prostrate. Glomerules axillary, not terminal in a panicle. Seed large, 1.25-1.5 mm. .... ssp. *crassicaule*

3. Plant erect, up to 50 cm. high. Glomerules terminal in bracteate panicles.  
Seed 0.75-1 mm. in diam. .... ssp. *halophilum*
10. *CHENOPODIUM FRIGIDUM* Phil. Flor. atac. no. 332. 1860; Reiche Fl. Chil. 6(1):154. 1911.—*Ch. hypophilum* Hauman in Anal. Soc. Cient. Arg. 86:250. 1918.  
Chile, Argentina.
11. *CHENOPODIUM CHENOPODIODES* (L.) Aellen in Ostenia :98. 1933.—*Blitum chenopodioides* L. Mant. pl. 2:170. 1771.—*Ch. crassifolium* Hornem. Hort. Hafn. 254. 1813; Aellen in Magyar Bot. Lap. 25:55. 1926 (1927).—*Ch. rubrum* and *humile* of North American authors, not of L. or Hook.
- var. *Degenianum* Aellen, comb. nov.—*Ch. crassifolium* Hornem. var. *Degenianum* Aellen in Magyar Bot. Lap. 25:58. 1926 (1927).  
Washington, Nevada, California.
- var. *Lengyelianum* Aellen comb. nov.—*Ch. crassifolium* Hornem. var. *Lengyelianum* Aellen l.c. :57.  
Washington, Oregon, Utah, Nebraska.
12. *CHENOPODIUM MACROSPERMUM* Hook. f. Fl. Antarct. 2:341. 1847.  
ssp. *CRASSICAULE* (Moq.) Aellen in Fedde Rep. spec. nov. 26:42. 1929.  
*Blitum rubrum* (L.) Rchb. var. *crassicaule* Moq. in DC. Prodr. 13(2):84. 1849.—*Blitum rubrum* (L.) Rchb. var. *macrosperma* Speg. in Anal. Mus. Nac. B. Aires, 2. ser., 4:141. 1902.—*Ch. macrospermum* Hook. f., s. str.  
Falkland Islands, Tierra del Fuego.
- ssp. *HALOPHILUM* (Phil.) Aellen in Fedde Rep. spec. nov. 26:42. 1929.  
—*Ch. halophilum* Phil. in Anal. Univ. Sant. 18:67. 1861.—*Ch. murale* var. *farinosum* S. Wats. in Proc. Amer. Acad. 9:97. 1874.—*Ch. farinosum* Standley in N. Am. Fl. 21:28. 1916.—*Chenopodium macrospermum* var. *halophilum* (Phil.) Standley in Field Mus. Nat. Hist. Bot. 11:118. 1931.—*Chenopodium* and *Blitum rubrum* of South American authors, not of L.—Variable.  
North Carolina, California, Mexico, Bolivia, Chile, Paraguay, Uruguay, Argentina.
- f. *SUBVIRIDE* Thellung et Aellen in Fedde Rep. spec. nov. 26:43. 1929.—*Blitum rubrum* var. *vulgaris* Speg. in Anal. Mus. Nac. B. Aires, 2e sér., 4:141. 1902, not Moquin.—*Ch. rubrum* var. *vulgaris* Hauman et Irigoyen in Anal. Mus. Nac. Hist. Nat. B. Aires 32:88. 1923, not Wallr.—Lower side of leaves glabrescent.
- f. *FARINOSUM* (S. Wats.) Aellen, l.c. 43.—*Ch. murale* var. *farinosum* S. Wats. in Proc. Am. Acad. 9:97. 1874.—*Blitum rubrum* var. *hypoleuca* Speg. in Anal. Mus. Nac. B. Aires, 2e sér., 4:141. 1902.—*Ch. rubrum* var. *hypoleuca* Hauman et Irigoyen in Anal. Mus. Nac. Hist. Nat. B. Aires 32:88. 1923.—Lower side of leaves copiously farinose.
- f. *LATIFOLIUM* Thellung et Aellen l.c. :43.—Leaves as broad as long, with hastate base.

f. *ANGUSTIUS* Thellung et Aellen l.c. :44.—Here belongs f. *nanum* Aellen, l.c. 44.—Plant small, branches 2.3 cm. long; leaves small, less than 1 cm. long, entire.

Bolivia, Lake Titicaca.

Sect. VI. *EUBLITUM* (Moq.) Aellen in Verh. Naturf. Ges. Basel 41:103. 1930.—*Eublitem* Moq. Chenop. enum. 47. 1840, as a section of *Blitum*.

Perianth when attached to fruit mostly fleshy, red, with 3 (-5) attenuated tips. Seeds vertical or horizontal in terminal flowers. Leaves becoming glabrous. Stigma short.

KEY TO SECTION *EUBLITUM*

- 1. Leaves hastate, entire ..... 13. *Ch. Overi*
- 1. Leaves hastate, dentate.
  - 2. Inflorescence bracteate ..... 14. *Ch. foliosum*
  - 2. Inflorescence almost ebracteate ..... 15. *Ch. capitatum*

13. *CHENOPODIUM OVERI* Aellen in Fedde Rep. spec. nov. 26:159. 1929.—*Blitum hastatum* Rydb. in Bull. Torr. Bot. Club 28:273. 1901.

Wyoming to Oregon, Nevada and New Mexico.

14. *CHENOPODIUM FOLIOSUM* (Moensch) Aschers. Fl. Brand. 1:572. 1864.—*Morocarpus foliosus* Moench Meth. 342. 1794.—*Blitum virgatum* L. Spec. Pl. 4. 1753.—*Ch. virgatum* Jessen Deutsche Exc.-Fl. 300. 1879, not Thbg. 1815.

Adventive in Massachusetts, New York, Idaho, Oregon and Washington.

15. *CHENOPODIUM CAPITATUM* (L.) Asch. Fl. Brand. 1:572. 1864.—*Blitum capitatum* L. Spec. Pl. 4. 1753.

Presumably adventive or naturalized in southern Canada and extending to New Jersey, Minnesota, New Mexico, and Oregon.

Sect. VII. *PSEUDOBLITUM* Hook. f. in Benth. et Hook. Gen. Pl. 3:15. 1880 em. Aellen in Verh. Naturf. Ges. Basel 41:102. 1930.

Like section *Degenia*, but perianth of lateral flowers 4-5-tipped and free almost to base. Seeds horizontal or vertical (in this case perianth separated).

KEY TO SECTION *PSEUDOBLITUM*

- 1. Leaves large, up to 5 cm. long (including the petiole-like base), up to 3.5 cm. wide, usually deltoid-hastate, sinuately dentate. Inflorescence a terminal panicle, bracteate only in lower part. Seed usually horizontal ..... 16. *C. mexicanum*
- 1. Leaves usually smaller, narrower, not hastate. Inflorescences usually axillary, rarely terminal, spicate or paniculate or cymose, mostly bracteate.
  - 2. Lower side of leaves farinose ..... 17. *Ch. glaucum*
    - 3. Leaves with short, petiole-like base, elongate, ovate-rhombic, distantly undulate-dentate ..... ssp. *eu-glaucum*
    - 3. Leaves with long, petiole-like base.
      - 4. Leaves broadly deltoid to rhombic, irregularly sinuately lobed to dentate, more or less trilobed, with few sharp teeth. Inflorescences few, small, with few flowers ..... ssp. *ambiguum*

4. Leaves rhombic to trilobed, irregularly sharply sinuate-dentate, usually smaller (than in *ssp. ambiguum*).
5. Leaves as long as broad, slightly trilobed. Petiole longer than leaf....  
..... *ssp. Parodii*
5. Leaves longer than broad, hardly trilobed, sharply sinuate-dentate.  
Petiole as long or shorter than the leaf ..... *ssp. salinum*
2. Leaves on both sides glabrous or glabrescent, ovate-rhombic, irregularly sinuate-dentate to lobed, rarely entire. Glomerules in axillary or terminal spikes or panicles, rarely in ebracteate cymes ..... 18. *Ch. rubrum*

16. *CHENOPODIUM MEXICANUM* Moq. in DC. Prodr. 13 (2):70. 1849. Mexico.

17. *CHENOPODIUM GLAUCUM* L. Spec. Pl. 220. 1753.

*ssp. EU-GLAUCUM* Aellen in Fedde Rep. spec. nov. 26:45. 1929.

Probably adventive from Europe. Canada: Alberta, Quebec. United States: Wyoming, Colorado, New Mexico, N. and S. Dakota, Nebraska, Iowa, Missouri, Illinois, Indiana, Michigan, Ohio, Vermont, Massachusetts, New York, Pennsylvania, New Jersey, Maryland, D. of Columbia, and Virginia.

*ssp. AMBIGUUM* (R. Br.) Thellung et Aellen in Fedde Rep. spec. nov. 26:47. 1929.—*Ch. ambiguum* R. Br. Prodr. N. Holl. 1:407. 1810.—*Ch. glaucum* var. *paschale* Fuentes in Inst. Centr. Meteor. y Geofis. Chile no. 4. 1913.

Chile: Easter Island, Chonos Archipelago.

*ssp. Parodii* Aellen comb. nov.—*Ch. Parodii* Aellen in Fedde Rep. spec. nov. 26:49. 1929.

Argentina.

*ssp. SALINUM* (Standley) Aellen in Fedde Rep. spec. nov. 26:46. 1929.—*Ch. salinum* Standley in N. Am. Fl. 21:29. 1916; Rydberg Fl. Rocky Mts. 242. 1917.

Alaska, represented by var. *pulchrum* Aellen in Fedde Rep. spec. nov. 26:47. 1929; plant reddish, upper leaves entire, oval-elliptic to broad lanceolate; Montana, Oregon, Idaho, Wyoming, Nevada, Colorado, Arizona, New Mexico, N. and S. Dakota, Missouri.

18. *CHENOPODIUM RUBRUM* L. Spec. Pl. 218. 1753.

f. *HUMILE* (Hook.) Asch. et Graeb. Syn. 5 (1):99. 1913.—*Ch. humile* Hook. Fl. Bor. Am. 2:127. 1838.—Plant low, only a few cm. high; leaves entire, ovate-spatulate.

North America; the South American records are based on *Ch. macrospermum* Hook. f. *ssp. halophilum* (Phil.) Aellen.

Canada: Nova Scotia, Saskatchewan. United States: Washington, Montana, Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, North Dakota, Maine, New York.

Sect. VIII. THELLUNGIA Aellen in Verh. Naturf. Ges. Basel 41:103. 1930.  
 Perianth of lateral flowers (2-) 3-4-tipped, tips  $\frac{1}{2}$ - $\frac{1}{3}$  free, linear-cochleari-  
 form, seed vertical; perianth of terminal flowers 4-5-tipped, seed horizontal.  
 Basal rosette of leaves; leaves 1-2-pinnate or pinnately lobed; flowers in bracteate  
 glomerules on unbranched stems. One species.

19. CHENOPODIUM ANTARCTICUM (Hook. f.) Benth. et Hook. f.—*Blitum*  
*antarcticum* Hook. f. Fl. Antarc. 2:549. 1847.

Southern South America.

Sect. IX. AGATHOPHYTON (Moq.) Hook. f. in Benth. et Hook. Gen.  
 Pl. 3:52. 1880; Moquin in DC. Prodr. 13(2):84. 1849, as a section of  
*Blitum*.—*Agathophytum* Moq. in Ann. sci. nat., 2e sér., 1:191. 1834, as  
 genus.

Plants perennial. Perianth 4-5-tipped, tips fused to about the middle, broad,  
 ligulate, irregularly sinuate-dentate. Stigmas 2 (-3), long. Seeds vertical.

KEY TO SECTION AGATHOPHYTON

1. Leaves entire, rarely sinuate-dentate ..... 20. *Ch. Bonus Henricus*  
 1. Leaves deeply and sharply sinuate-dentate ..... 21. *Ch. californicum*

20. CHENOPODIUM BONUS HENRICUS L. Spec. Pl. 218. 1753.

Introduced from Europe; Nova Scotia and Quebec to Delaware and Iowa.

21. CHENOPODIUM CALIFORNICUM S. Wats. in Bot. Calif. 2:48. 1880.  
 —*Blitum californicum* S. Wats. in Proc. Am. Acad. 9:101. 1874.—*Blitum*  
*Bonus Henricus* var. *erosum* Moq. in DC. Prodr. 13(2):85. 1849.

Sect. X. CHENOPODIA (C. A. Mey.) em. Aellen in Fl. URSS. 6:54. 1936.  
 —Sect. *Chenopodia* C. A. Meyer in Ledeb. Fl. Alt. 1:403. 1829, in part.—  
 Sect. *Chenopodiastrum* Moq. in DC. Prodr. 13(2):61. 1849, in part.

Perianth with five tips, herbaceous, mostly somewhat keeled. Leaves variable,  
 lanceolate to rhomboidal or cordate to oval. Plants glabrous or with vesiculose  
 hairs. Seeds horizontal. Subsections based on structural differences of seed  
 surfaces.

Subsect. 1. LEJOSPERMA Aellen et Iljin in Fl. URSS. 6:59. 1936.

Seeds smooth or nearly smooth, with indistinct ridges or irregularly and  
 slightly pitted.

KEY TO SUBSECTION LEJOSPERMA

1. Leaves linear, narrowly lanceolate or elongate, entire, slightly trilobed or hastate.  
 2. Leaves linear, entire, 1-nerved.  
 3. Seeds larger than 1 mm. in diam.  
 4. Seed 1.5 mm. in diam. Pericarp free, ivory-white. Plant glabrous, bright  
 green. Branches erect or divaricate ..... 22. *Ch. subglabrum*  
 4. Seed 1-1.5 mm. in diam. Pericarp attached, red, glabrous or slightly  
 farinose. Perianth tips divaricate at maturity ..... 23. *Ch. cycloides*  
 3. Seed less than 1 mm. (0.8 mm.) in diam. Pericarp attached, ivory-white.



- Plant densely farinose. Perianth tips closely enveloping the utricle ..... 24. *Ch. leptophyllum*
2. Leaves narrowly lanceolate or oblong, entire or slightly trilobed or hastate, three-nerved (the upper ones 1-nerved).
3. Pericarp adherent. Plant with a rank odor. Leaves entire ..... 25. *Ch. hians*
3. Pericarp not adherent. Plant without a rank odor.
4. Leaves hastate, with small lateral lobes at the leaf base, median lobe long, almost linear ..... 26. *Ch. papulosum*
4. Leaves narrowly lanceolate and entire or oblong and slightly trilobed, lobes somewhat below the middle of the leaf ..... 27. *Ch. pratericola*
5. Plant erect, tall. Leaves linear or narrowly lanceolate, the lower ones often somewhat trilobed ..... ssp. *eu-pratericola*
6. Leaves narrowly lanceolate or linear, usually entire ..... var. *Thellungianum*
6. Leaves broadly lanceolate, the lower and middle ones somewhat trilobed ..... var. *leptophylloides*
5. Plant low, usually diffusely branched. Leaves oblong, entire ..... ssp. *desiccatum*
1. Leaves rhombic or triangular or broadly lanceolate.
2. Young leaves and inflorescence bright-red. Leaves large, 5-20 cm. long and broad, profusely lobed-dentate. Plant 1-3 m. tall, robust ..... 28. *Ch. giganteum*
2. Plants green, rarely reddish. Leaves 1-10 cm. long, lobed-dentate or entire.
3. Plant usually small, delicate, profusely branched from base. Leaves small, rhombic-trilobed, median lobe often elongate. Without odor (South America) ..... 29. *Ch. carnosulum*
3. Plants usually robust, 20-200 cm. tall, without rank odor (prostrate, with rank odor—*Ch. Vulvaria*). Leaves highly variable.
4. Plant glabrous or glabrescent.
5. Plant growing in woods, large but delicate. Leaves oblong-ovoid to lanceolate, the upper ones entire, the lower ones with few teeth, thin ..... 30. *Ch. Standleyanum*
5. Plant growing as a robust weed. Leaves triangular to rhombic, often sharply dentate, fleshy ..... 31. *Ch. urbicum*
4. Plant farinose or, if glabrescent, dark-green.
5. Perianth tips free almost to the base, narrow at the base. Leaves trilobed, densely farinose on the lower side ..... 32. *Ch. cordobense*
5. Perianth tips fused to the middle, more or less triangular.
6. Leaves broadly triangular-rhombic, at base almost obtuse, with a simple or double lobate tooth (*Ch. petiolare* highly variable). Inflorescence paniculate, terminal.
7. Pericarp not adherent.
8. Seed with crispulate surface markings ..... 33. *Ch. Fremonti*
8. Seed with slightly rugulose surface markings ..... 34. *Ch. pilcomayense*
7. Pericarp adherent. Seed surface with delicate radial ridges..... 35. *Ch. petiolare*
6. Leaves rhombic, entire or dentate or trilobed, not obtuse at base.
7. Plant with a rank odor, prostrate or ascending. Leaves rhombic-ovate to roundish ..... 36. *Ch. Vulvaria*
7. Plants without a rank odor.
8. Leaves usually triangular, as long or a little longer than wide.

9. Median lobes broadly obtuse. Petioles of large leaves often longer than the lamina. Plant loosely branched, the branches long, mostly farinose. Inflorescence cymose..... 37. *Ch. opulifolium*
9. Median lobes acute. Petioles as long or shorter than the blades. Plants low, diffusely branched.
10. Plants densely farinose ..... 38. *Ch. incanum*
10. Plants farinose to glabrescent.
11. Plant delicate, with delicate branches, perianth tips not subulate and at most slightly carinate. Seed smooth, slightly pitted with some undulate lines (see above) ..... 29. *Ch. carnosulum*
11. Plant more robust, with strong branches, perianth tips subulate and carinate. Seed larger, not smooth, irregularly punctate ..... 39. *Ch. pallidicaule*
8. Leaves highly variable, linear to rhombic, often indistinctly trilobed (the lower teeth larger than the upper ones), entire or dentate.
9. Leaves ovate-rhombic, entire or the larger ones with a blunt tooth ..... 40. *Ch. atrovirens*
9. Leaves either more acute or more sharply dentate.
10. Leaves round or rhombic, profusely sinuate-dentate, with long cuneate base, median lobe short and with almost parallel margins, lowest tooth normally situated above the middle ..... 41. *Ch. Zobelii*
10. Leaves not round or rhombic, not profusely sinuate-dentate.
11. Plants or at least leaves farinose.
12. Whole plant farinose. Leaves oblong-rhombic, dentate. Median lobe acute. Inflorescence glomerulose-paniculate ..... 44. *Ch. albescens*
12. Leaves farinose, mostly ovate-rhombic to lanceolate. Inflorescence glomerulose-spicate or paniculate or cymose ..... 46. *Ch. album*
11. Plants pubescent when young, otherwise glabrescent (except *Ch. missouriense* var.)
12. Perianth strongly keeled.
13. Seed 1.25 mm. in diam. Inflorescence paniculate - glomerate, the glomerules small, delicate, usually 1.5-2.5 mm. in diam. Leaves oblong-rhombic, slightly trilobed with acute and dentate median lobe ..... 43. *Ch. missouriense*
13. Seed 1 mm. in diam. Inflorescence spicate. Leaves broadly rhombic, in the lower part lobed-dentate, median lobe acuminate (appearance of *Ch. album* x *Ch. Berlandieri* ssp. *Zschakei*) ..... 45. *Ch. Covillei*
12. Perianth slightly keeled. Leaves ovate-elliptic, typically with almost parallel margins and short cuneate base, upper ones lanceolate ..... 42. *Ch. strictum*

22. CHENOPODIUM SUBGLABRUM (S. Wats.) Nelson in Bot. Gaz. 34:362. 1902.—*Ch. leptophyllum* var. *subglabrum* S. Wats. in Proc. Amer. Acad. 9:95. 1874.

Washington, Montana, South Dakota, Nebraska.

23. CHENOPODIUM CYCLOIDES A. Nelson in Bot. Gaz. 34:363. 1902.  
New Mexico, Kansas.

24. CHENOPODIUM LEPTOPHYLLUM Nutt. apud Moquin in DC Prodr. 13 (2):71. 1879, not of authors.—*Ch. album* var. *leptophyllum* Moq. l.c., in part.—*Ch. inamoenum* Standley in N. Am. Fl. 21:15. 1916.

Montana, Oregon, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico, Texas.

25. CHENOPODIUM HIANUS Standley in N. Am. Fl. 21:16. 1916.  
Wyoming, Nevada, Utah, New Mexico.

26. CHENOPODIUM PAPULOSUM Moq. in DC. Prodr. 13 (2):61. 1849.—*Ch. rafaense* Chodat et Wilczek in Bull. Herb. Boiss., 2e sér., 2:534. 1902.  
Argentina.

27. CHENOPODIUM PRATERICOLA Rydb. in Bull. Torr. Bot. Club 39:310. 1912.—*Ch. leptophyllum* of authors, not of Nutt.

ssp. *eu-pratericola* Aellen, ssp. nov.—Planta erecta. Folia linearia aut anguste-lanceolata, inferioribus saepe  $\pm$  trilobatis.

Washington, Idaho, Montana, Oregon, Nevada, Utah, Wyoming, Colorado, California, Arizona, New Mexico, North and South Dakota, Nebraska, Iowa, Kansas, Missouri, Illinois, Indiana, New Jersey, Oklahoma, Texas, Louisiana, Virginia. Mexico, Argentina.

var. *THELLUNGANUM* Aellen in Ostenia: 100. 1933.—*Ch. pratericola* Rydb. and *Ch. leptophyllum* of authors, s. str.

f. *RUBRICAULE* Blom apud Aellen in Fedde Rep. spec. nov. 26: 134. 1929.

var. *leptophylloides* (Murr) Aellen, comb. nov.—*Ch. pratericola* var. *leptophylloides* Aellen in Ostenia :100. 1933.—*Ch. leptophyllum* var. *leptophylloides* Thellung et Aellen in Fedde Rep. spec. nov. 26:134. 1929. *Ch. petiolare* var. *leptophylloides* Murr in Bull. Herb. Boiss., 2e sér., 4:994. 1904.—*Ch. leptophyllum* var. *oblongifolium* of authors, not of S. Wats.

ssp. *DESICCATUM* (A. Nelson) Aellen in Fedde Repert. spec. nov. 26: 136. 1929.—*Ch. desiccatum* A. Nelson in Bot. Gaz. 34: 362. 1902.—*Ch. leptophyllum* var. *oblongifolium* S. Wats. in Proc. Am. Acad. 9:95. 1874, not of authors.—*Ch. oblongifolium* Rydb. in Bull. Torr. Bot. Club 33:137. 1906.

Montana, Idaho, Wyoming, California, Arizona, New Mexico, South Dakota, Nebraska.

28. *CHENOPODIUM GIGANTEUM* Don Prodr. Pl. Nepal. 75. 1825.—*Ch. amaranticolor* Coste et Reynier in Bull. Soc. Bot. France 54:178. 1907.

Southern Georgia (?), northern Florida (?), Cuba (?); Argentina.

29. *CHENOPODIUM CARNOSULUM* Moq. in DC. Prodr. 13 (2):64. 1849.—*Ch. patagonicum* Phil. in Anal. Univ. Santiago 91:421. 1895.—*Ch. fuegianum* Speg. in Anal. Mus. Nac. B. Aires 5:72. 1896-97.—*Ch. scabriceule* Speg. in Anal. Mus. Nac. B. Aires, 2e sér. 4, 7:138. 1902.

Spegazzini (l.c.) described three forms under *Ch. scabriceule*:

f. *pusilla* (Speg.) Aellen, comb. nov.—Plant small, 2-5 cm. high. Leaves rhombic-trilobed. Seed 1 mm. in diam.

f. *robusta* (Speg.) Aellen, comb. nov.—Plant 15-20 cm. high. Leaves hastate-trilobed. Seed 1.25-1.5 mm.

f. *megalospermum* (Speg.) Aellen, comb. nov.—Plant 10-15 cm. high. Leaves also hastate-trilobed. Seed 1.5-2 mm.

Mexico; Ecuador, Bolivia, Chile, Argentina.

30. *CHENOPODIUM STANDLEYANUM* Aellen in Fedde Rep. spec. nov. 26:153. 1929.—*Ch. Boscianum* Moq. Chenop. enum. 21. 1840—and of authors, in part.—*Ch. album* var. *Boscianum* A. Gray Man. ed. 5. 407. 1867.—*Ch. polyspermum* var. *spicatum* A. Gray Man. ed. 2. 363. 1856. (cf. *Ch. Berlandieri* ssp. *Boscianum* [Moq.] Aellen).

South Dakota, Minnesota, Nebraska, Iowa, Kansas, Missouri, New Mexico, Texas, Illinois, Indiana, Ohio, Pennsylvania, Virginia, West Virginia, Florida.

31. *CHENOPODIUM URBICUM* L. Spec. Pl. 218. 1753.

Adventive in Minnesota, Missouri, Illinois. (Standley in N. Am. Fl. 21:12. 1916: "sparsely adventive from Nova Scotia to Ontario, Missouri, and Maryland").

Chile.

32. *CHENOPODIUM CORDOBENSE* Aellen in Fedde Rep. spec. nov. 26:152. 1929.

Argentina.

33. *CHENOPODIUM FREMONTI* S. Wats. Bot. King's Expl. 287. 1871.

Canada: British Columbia. United States: Montana, Oregon, Idaho, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico, North and South Dakota, Nebraska, Texas, Mexico.

f. *FARINOSUM* Aellen in Fedde Rep. spec. nov. 26:142. 1929.—Whole plant more or less farinose.

var. *PRINGLEI* (Standley) Aellen in Fedde Rep. spec. nov. 26:142. 1929.—*Ch. Pringlei* Standley in N. Am. Fl. 21:18. 1916.—Leaves deeply sinuate-dentate.

South Dakota. Mexico.

Fosberg (1941) recognizes three varieties of this species, namely var. *fremontii* Fosberg, *incanum* Wats., and *atrovirens* (Rydb.) Fosberg, and reinstates *Ch. nevadense* Standley (see no. 38a of this synopsis). As Fosberg suggests, the whole complex should be studied carefully on the basis of local distribution and possible hybridization.

34. *CHENOPODIUM PILCOMAYENSE* Aellen in Fedde Rep. spec. nov. 26: 152. 1929.

Argentina.

35. *CHENOPODIUM PETIOLARE* H.B.K. in Humb. et Bonpl. Nov. Gen. et Sp. Pl. 2:191. 1817.—*Ch. paniculatum* Hook. Bot. misc. 2:237. 1831.—*Ch. sparsiflorum* Phil. in Anal. Univ. Santiago 91:419. 1895.—*Ch. bolivianum* Murr in Mag. Bot. Lap. 1:359. 1902, in part.—*Ch. Fremonti* Murr in Allg. Bot. Zeitschr. 12:54-55. 1906. and in Bull. Herb. Boiss., 2e sér., 4:994. 1904, not of S. Wats.

Ecuador; Peru; Bolivia; Chile; Argentina.

Can be divided as follows:

f. *INCANUM* (Murr) Aellen in Fedde Rep. spec. nov. 26:150. 1929.—*Ch. paniculatum* var. *incanum* Murr in Allg. Bot. Zeitschr. 12:54-55. 1906.—Plant more or less farinose.

f. *HOOKERI* Aellen, l.c.—Leaves almost glabrous.

f. *HASTATUM* Aellen, l.c.—Leaves with divergent tips of hastate lobes.

f. *SCUTATUM* Aellen, l.c. :151.—Leaves with hastate tips pointing slightly downward.

f. *TRILOBUM* Aellen, l.c. :151.—Leaves clearly trilobed, the broader lateral lobes bilobed.

f. *RENIFORME* (Murr) Aellen, l.c. :151.—*Ch. paniculatum* var. *reniforme* Murr in Bull. Herb. Boiss., 2e sér., 4:994. 1904.—Leaves partly reniform to cordate.

36. *CHENOPODIUM VULVARIA* L. Spec. Pl. 220. 1753.

California. According to Standley in N. Am. Fl. 21:20. 1916: "Sparsely adventive from Quebec and Ontario to Maryland and Wisconsin, and in Florida."

37. *CHENOPODIUM OPULIFOLIUM* Schrader in Koch et Ziz, Cat. pl. Palat. 6. 1814.—*Ch. viride* Standley in N. Am. Fl. 21:21. 1916, in part.—? *Ch. flabellifolium* Standley, l.c. 19.

Adventive in Maryland and Illinois.

38. *CHENOPODIUM INCANUM* (S. Wats.) A. Heller in Pl. World 1:23. 1897.—*Ch. Fremonti* var. *incanum* S. Wats. in Proc. Am. Acad. 9:94. 1874.

See comment under 33. *Ch. Fremonti* S. Wats. and under 38a. *Ch. nevadense* Standley.

California, Nevada, Utah, Colorado, Arizona, New Mexico, South Dakota, Nebraska, Kansas, Missouri, Oklahoma, Texas. Mexico.

*Ch. deltaphyllum* Osterhout in Bull. Torr. Bot. Club 57(8):559. 1931 may belong here or to the *Fremonti* complex as defined by Fosberg, either in synonymy or as a variety or form.

38a. CHENOPODIUM NEVADENSE Standley in N. Am. Fl. 21:16, 1916.—Aellen considered this species identical with *Ch. incanum* (Wats.) Heller, as is evident from his annotations on the type sheet (*vide* Fosberg 1941, p. 691). Fosberg (l.c.) reinstated the species and pointed out several distinctive characters. These are: leaves much smaller, less numerous, and less conspicuous than in *Ch. incanum* (Wats.) Heller; flowers in small glomerules or single and prominently pedicellate, mixed, in large, very diffuse panicles making up the upper half to three-fourths of the plant; branching is conspicuously cymose, individual branches becoming even scorpioid; the most notable character is the presence of numerous solitary pedicellate flowers; seed very small, 0.7-0.9 mm. in diam., quite thick; pericarp adherent. See Fosberg 1941, pp. 692-693, for illustrations.

Nevada.

39. CHENOPODIUM PALLIDICAULE Aellen in Fedde Rep. spec. nov. 26:126. 1929.—*Ch. canihua* Cook in Jour. Heredity 16:37. 1925 (with photo, but without description).

Peru, Bolivia.

f. PURPUREUM Aellen, l.c.—Whole plant bright red.

40. CHENOPODIUM ATROVIRENS Rydberg in Mem. N. Y. Bot. Gard. 1:131. 1900.—*Ch. Wolfii* Rydb. in Bull. Torr. Bot. Club 30:248. 1903.—*Ch. aridum* A. Nelson in Bull. Torr. Bot. Club 31: 240. 1904.

Montana, Wyoming, California, Nevada, Utah, Colorado, New Mexico, North Dakota.

41. CHENOPODIUM ZOBELII Ludwig et Aellen in Fedde Rep. spec. nov. 26:131. 1929.

Argentina.

42. CHENOPODIUM STRICTUM Roth in Nov. pl. spec. Ind. or. 180. 1821; Aellen in Mag. Bot. Lap. Bot. 27:105. 1928. Can be divided in:

ssp. STRIATUM (Krasan) Aellen et Iljin in Fl. URSS. 6:65. 1936.—*Ch. album* var. *striatum* Kras. in Mitth. Naturw. Verein Steierm. 30:254. 1893.—Leaves elongate, deeply serrate, often with red margins. Inflorescence glomerulose, spicate.

Native of Orient and southern Asia. Not definitely known to occur in America.

ssp. *glaucophyllum* Aellen, comb. nov.—*Ch. glaucophyllum* Aellen in

Fedde Rep. spec. nov. 26:155. 1929.—Leaves ovate-lanceolate, mostly entire. Inflorescence glomerulose, cymose.

South Dakota, Minnesota, Missouri.

43. *CHENOPODIUM MISSOURIENSE* Aellen in Bot. Not. Lund: 206. 1928; Aellen in Fedde Rep. spec. nov. 26:155. 1929.—*Ch. paganum* Standley in N. Am. Fl. 21:23. 1916, in part, not Rechb.

Missouri, Tennessee.

var. *BUSHIANUM* Aellen in Fedde Rep. spec. nov. 26:156. 1929.—Leaves definitely farinose on lower side.

Missouri, Indiana.

44. *CHENOPODIUM ALBESCENS* Small Fl. SE. U.S. 385, 1903.—*Ch. Berlandieri* ssp. *Zschackei* var. *glaucoviride* Aellen in Fedde Rep. spec. nov. 26:58. 1929.

Texas, Arizona, Iowa.

45. *CHENOPODIUM COVILLEI* Aellen in Fedde Rep. spec. nov. 26:153. 1929. (Appearance of *Ch. album* x *Berlandieri* ssp. *Zschackei*).

Oregon.

46. *CHENOPODIUM ALBUM* L. Spec. Pl. 219. 1753.

ssp. *EU-ALBUM* (Ludwig) Aellen.—*Ch. album* ssp. *eu-album* Ludwig in Asch. and Graeb. Syn. 5:40. 1913, in part.—Leaves ovate-rhombic to rhombic or ovate-lanceolate to lanceolate, mostly irregularly sinuate-dentate, often slightly trilobed. Inflorescence spicate, paniculate or cymose.

var. *polymorphum* Aellen, var. nov.—*Ch. album* var. *eu-album* Ludwig in Schinz und Keller Fl. Schweiz 2:95. 1914, in part.—Folia paulum trilobata (deinde rhombica), lobus medius paulatim apicem versus attenuatus aut folia integerrima (tum plerumque oblongo-ovalia ad lanceolata) aut irregulariter dentata.

Leaves slightly trilobed (and then  $\pm$  rhombic), median lobes attenuated towards the tips, or leaves entire (and then mostly lanceolate-ovate to lanceolate) or irregularly dentate.

Throughout North America. Adventive? Sporadic in Ecuador, Chile, Brazil, and Argentina.

f. *spicatum* (Koch) Aellen, comb. nov.—*Ch. album* var. *spicatum* Koch Syn. Fl. Germ. 606. 1837.—Leaves dentate, farinose. Inflorescence densely spicate, erect.—Depauperate growth form of dry localities.

f. *glomerulosum* (Rechb.) Aellen, comb. nov.—*Ch. glomerulosum* Fl. Germ. exc. 579. 1832.—Leaves mostly ovate-rhombic, slightly farinose. Inflorescence loosely glomerulose, paniculate.—Most common form.

f. *cymigerum* (Koch) Aellen, comb. nov.—*Ch. album* var. *cymigerum* Koch Syn. Fl. Germ. 606. 1837.—*Ch. viride* of most authors, not of

Linnaeus.—Leaves ovate-lanceolate, mostly entire to dentate (few teeth), slightly farinose to glabrous. Inflorescence cymose.

f. *lanceolatum* (Muhl.) Aellen, comb. nov.—*Ch. lanceolatum* Muhl. in Willd. Enum. 291. 1809.—Plant often large. Leaves small, acuminate, dentate, lower side becoming glabrous. Inflorescence glomerulose, paniculate.

var. *Borbassii* (Murr) Aellen, comb. nov.—*Ch. Borbassii* Murr in Progr. Oberr. Innsbr. 56. 1891.—Lower third of leaves mostly with a large lobe, the median lobe with nearly parallel margins, rather blunt. Inflorescence pyramidal, paniculate.

Not definitely recorded from America.

var. *microphyllum* (Boenn.) Aellen, comb. nov.—*Ch. microphyllum* Boenn. Fl. Monast. 1824.—Leaves small, at most 3 cm. long; ovate-lanceolate, nearly entire or irregularly sinuate-dentate. Inflorescence paniculate. Glomerules small, olive green.

District of Columbia.

var. *Stevensii* Aellen, comb. nov.—*Ch. album* var. *Stevensii* Aellen in Fedde Rep. spec. nov. 26:130. 1926.—Leaves oblong-ovate, slightly below the middle with 1-2 large teeth, otherwise entire or slightly dentate, with long, cuneate base (the lower veins originate 0.5 cm. above the leaf base). Inflorescence bracteate, short, axillary, densely glomerulose.

North Dakota.

var. *dacoticum* Aellen, comb. nov.—*Ch. album* var. *dacoticum* Aellen in Fedde Rep. spec. nov. 26:131. 1929.—Leaves large, to 8 cm. long, triangular-rhombic, deeply lobed, doubly dentate. Petiole short,  $\frac{3}{4}$  of lamina. Inflorescence small, spicate.

North Dakota.

ssp. *FALLAX* Aellen in Bot. Not. Lund: 208. 1928.—Lower and median leaves broadly ovate-rhombic, with short and broad leaf basis, lower teeth placed low, profusely sinuate-dentate, tip usually obtuse or almost truncate. Petiole  $\frac{1}{3}$ - $\frac{1}{2}$  of lamina. Inflorescence short, spicate, bracteate.

North Dakota.

Subsect. 2. *CELLULATA* Aellen et Iljin in Fl. URSS. 6:59. 1936.—Seed surfaces indistinctly marked or distinctly alveolate.

KEY TO SUBSECTION CELLULATA

1. Alveolae of seed surface abutting.
2. Plant with a rank odor, copiously farinose. Leaves broadly rhombic-ovate, the lower part with a lateral divaricate tooth, otherwise entire or dentate..... 47. *Ch. Watsoni*
2. Plant generally without rank odor (except some forms of *Ch. Berlandieri* ssp. *eu-Berlandieri* and ssp. *Zschackei*).
3. Seed less than 1 mm. (0.8-0.9 mm.) in diam. Leaves linear, median lobe linear, long, with almost parallel margins ..... 48. *Ch. serotinum*



3. Seeds larger than 1 mm. in diam.
  4. Seed 1-1.5 mm. in diam., black. Leaves ovate or elliptic or rhombic, quite wide. Median lobe obtuse or acuminate ..... 49. *Ch. Berlandieri*
  5. Greatest width of leaves at or above the middle or, if lateral lobes below the middle are present, then leaves more or less ovate with a rather obtuse median lobe.
    6. Leaves small, 1-3 cm. long, 0.5 cm. wide, ovate-lanceolate, the upper ones lanceolate to linear and entire, the lower ones with two small lateral teeth and several minor ones ..... ssp. *Boscianum*
    6. Leaves large, ovate or elliptic or ovate-rhombic, somewhat trilobed; lateral lobes usually at or above the middle ..... ssp. *Zschackei*
    7. Plant copiously farinose, ivory-white.
      8. Leaves short, obtuse, slightly trilobed, often with a rank odor ..... var. *foetens*
      8. Leaves larger, ovate-elliptic, dentate, without odor ..... var. *farinosum*
    7. Plant farinose or glabrescent.
      8. Lateral lobes below the middle of leaf, distal part of leaf obtuse ..... var. *californicum*
      8. Lateral lobes usually at or above the middle of the leaf ..... var. *typicum*
  5. Greatest width of leaf below the middle of the blade.
    6. Leaves oblong-lanceolate, almost entire ..... ssp. *Esauae*
    6. Leaves sharply dentate.
      7. Leaves indistinctly trilobed, but even the upper ones sharply and profusely dentate ..... ssp. *yucatanum*
      7. Leaves distinctly trilobed.
        8. Lateral lobes well developed, often divaricate and bipartite. Median lobe at least near base with almost parallel margins.
        9. Inflorescence terminal, ebracteate, paniculate-pyramidal with divaricate branches. Plant foetid ..... ssp. *eu-Berlandieri*
        9. Inflorescence glomerulose-spicate, bracteate. Plant not foetid ..... ssp. *pseudo-petiolare*
      8. Lateral lobes not divaricate, median lobe acuminate.
        9. Leaves at the base broadly rounded to acuminate. Lateral lobes tooth-like. Median lobe wide, with few to many teeth ..... ssp. *platyphyllum*
        9. Leaves cuneate at the base, smaller. Median lobe narrowly triangular, acute, entire or slightly dentate ..... ssp. *Ludwigianum*
    4. Leaves broadly trilobed, with a broadly triangular median lobe. Seed large, 1.5-1.75 mm. in diam., black ..... 50. *Ch. Quinoa* ssp. *Milleanum*
  1. Canals separating the alveolae of the seed surface (here belong also *Ch. album* x *Berlandieri* and a few plants of *Ch. Quinoa* ssp. *Milleanum*).
    2. Seed with acute margin ..... 51. *Ch. lenticularis*
    2. Seeds with rounded margin.
      3. Plants foetid.
        4. Plant delicate. Leaves triangular, slightly lobed-dentate, with acute median lobes ..... 52. *Ch. arizonicum*
        4. Plant robust. Most leaves definitely trilobed, with wide lateral lobes

- and a nearly linear median lobe ..... 53. *C. hircinum*
- 5. Larger leaves more or less trilobed or with well developed lower lateral teeth.
  - 6. Seed with a maximum diam. of 1.1 mm. ....
  - ..... ssp. *cu-hircinum* var. *typicum*
  - 6. Seed 1.5-2 mm. in diam. .... ssp. *catamarcense*
  - 5. Larger leaves ovate-rhombic, slightly trilobed, profusely dentate .....
  - ..... ssp. *eu-hircinum* var. *andinum*
- 3. Plants not foetid.
  - 4. Leaves linear, entire. Plant glabrous ..... 54. *Ch. pallescens*
  - 4. Leaves dentate or lobed. Plants farinose.
    - 5. Alveolae indistinct, shallow. Leaves broadly trilobed, profusely and sharply dentate ..... 55. *Ch. viride*
    - 5. Alveolae quite distinct, deep. Leaves not trilobed.
      - 6. Seeds 1.25-2.5 mm. in diam. Perianth loosely adhering to the fruit. Plants large or, at least, robust.
        - 7. Perianth dark green or almost black. Leaves broadly rhombic to broadly ovate-rhombic. Seed large, 2.-2.5 mm. in diam. (rarely 1.25-1.5 mm.) ..... 56. *Ch. Bushianum*
        - 7. Perianth yellow, large, almost stellate when spread out.....
        - ..... 57. *Ch. macrocalycium*
      - 6. Seed 1-1.25 mm. in diam. Perianth firmly enveloping the fruit. Plant small. Leaves ovate to lanceolate, with a simple tooth in the middle or entire ..... 58. *Ch. Philippianum*

47. CHENOPODIUM WATSONI A. Nelson in Bot. Gaz. 34:362. 1902. Colorado, Arizona, New Mexico, South Dakota.

f. GLABRESCENS Aellen in Fedde Rep. spec. nov. 26:120. 1929. —*Ch. neomexicanum* Standley in N. Am. Fl. 21:19. 1916.—Plant green slightly farinose or glabrous. New Mexico.

48. CHENOPODIUM SEROTINUM L. Cent. pl. 2:12, 1756, in part.—*Ch. ficifolium* Smith Fl. Brit. 1:276. 1800. Eurasia; may be found adventive in America.

49. CHENOPODIUM BERLANDIERI Moq. Chenop. enum. 23. 1840.—Polymorphic species. ssp. BOSCIANUM (Moq.) Aellen in Fedde Rep. spec. nov. 26:61. 1929. —*Ch. Boscianum* Moq. Chenop. enum. 21. 1840, in part. Missouri, Louisiana, Virginia, North Carolina, Alabama, Florida.

ssp. ZSCHACKEI (Murr) Zobel Verz. Anhalt. Phanerog. 3:70. 1909.—*Ch. Zschackei* Murr in Deutsche Bot. Monatsschr. 19:39. 1901.—*Ch. album* for most part of American authors, not of Linnaeus.

var. FOETENS (Ludwig) Aellen in Fedde Rep. spec. nov. 26:57. 1929.—*Ch. Berlandieri* Rasse *foetens* Ludwig in Asch. and Graeb. Syn. 5:83. 1913. South Dakota, Missouri, Texas.

f. INTEGRUM Aellen, l.c.—Plant small. Leaves entire or slightly dentate.

var. FARINOSUM (Ludwig) Aellen in Fedde Rep. spec. nov. 26:56. 1929.—*Ch. Berlandieri* Rasse *farinosum* Ludwig in Asch. and Graeb. Syn. 5:82. 1913.—*Ch. dacoticum* Standley in N. Am. Fl. 21:22. 1916.

Colorado, New Mexico, South Dakota, Missouri.

var. CALIFORNICUM Aellen in Fedde Rep. spec. nov. 26:57. 1929. California.

var. TYPICUM (Ludwig) Aellen in Fedde Rep. spec. nov. 26:52. 1929.—*Ch. Berlandieri* var. *typicum* Ludwig in Asch. and Graeb. Syn. 5:81. 1913.

Oregon, Idaho, Montana, Wyoming, California, Nevada, Utah, Colorado, Arizona, New Mexico, North and South Dakota, Minnesota, Kansas, Missouri, Oklahoma, Texas, Louisiana, Illinois. Mexico.

Varies as follows:

f. ANGUSTIUS (Ludwig) Aellen in Fedde Rep. spec. nov. 26:55. 1929.—*Ch. Berlandieri* var. *typicum* f. *angustus* Ludwig in Asch. and Graeb. Syn. 5:82. 1913.—Leaves narrower, with a longer tip.

f. LATIFOLIUM (Ludwig) Aellen, l.c.—*Ch. Berlandieri* var. *typicum* f. *latifolium* Ludwig, l.c.—Leaves broader, often somewhat round.

f. DENTATUM Aellen, l.c.—Leaves profusely dentate.

f. PEDUNCULARE Aellen, l.c. — Terminal inflorescence large, cymose.

f. NEGLECTUM Aellen, l.c.—Inflorescence short, axillary, cymose.

f. PURPURASCENS Ludwig et Aellen in Fedde Rep. spec. nov. 26:56. 1929.—Mature plant colored red.

f. GRACILE Aellen, l.c. :56.—Plant small, 1-2 dm. high. Leaves a few centimeters long.

f. GROSSUM Aellen, l.c. :56.—Perianth 3 mm. wide. Glomerules 6-8 mm. in diam. Inflorescence cymose.

ssp. ESAUAE Aellen in Fedde Rep. spec. nov. 26:59. 1929. California, Idaho (?), South Dakota (?).

ssp. YUCATANUM Aellen in Fedde Rep. spec. nov. 26:59. 1929. New Mexico. Mexico.

ssp. EU-BERLANDIERI Aellen in Fedde Rep. spec. nov. 26:62. 1929.—*Ch. Berlandieri* Moq. Chenop. enum. 23. 1840, s. str.—*Ch. Palmeri* Standley in N. Am. Fl. 21:19. 1916.

Texas. Mexico.

ssp. PSEUDO-PETIOLARE Aellen in Fedde Rep. spec. nov. 26:60. 1929.—*Ch. petiolare* of North American authors.

California, Nevada, Arizona, New Mexico, Kansas, Texas, Florida. Mexico.

ssp. *PLATYPHYLLUM* (Issler) Ludwig in Schinz u. Keller Fl. Schweiz 2:94. 1914.—*Ch. platyphyllum* Issler in Allg. Bot. Zeitschr. 8:193. 1901.  
Washington, Oregon, Wyoming, Colorado.

var. *OPULIFOLIFORME* Aellen in Fedde Rep. spec. nov. 26:58. 1929.  
—Leaves triangular, with broadly spatulate base, trilobed with broad lateral lobes each with two teeth.

Nevada, New Mexico, South Dakota.

var. *COLORADENSE* Aellen, l.c. :59.—Leaves broadly triangular, obtuse at nearly right angles near base, not lobed, but profusely dentate.

Colorado.

ssp. *LUDWIGIANUM* Aellen in Fedde Rep. spec. nov. 26:59. 1929.—*Ch. ferulatum* Lunell in Am. Midl. Nat. 3: contents 4. 1914.

North Dakota.

50. *Chenopodium Quinoa* ssp. *Milleanium* Aellen comb. nov.—*Ch. hircinum* ssp. *Milleanium* Aellen in Fedde Rep. spec. nov. 26:122. 1929.  
Ecuador.

51. *CHENOPODIUM LENTICULARE* Aellen in Fedde Rep. spec. nov. 26:152. 1929.

Texas.

52. *CHENOPODIUM ARIZONICUM* Standley in N. Am. Fl. 21:19. 1916.—*Ch. Parryi* Standley, l.c. :21.

Utah, Arizona. Mexico.

53. *CHENOPODIUM HIRCINUM* Schrader Ind. Sem. Hort. Gotting. :2. 1833.

ssp. *EU-HIRCINUM* Aellen in Fedde Rep. spec. nov. 26:120. 1929.

var. *TYPICUM* Ludwig et Aellen in Fedde Rep. spec. nov. 22:121. 1929. Polymorphic.

Colombia, Ecuador, Peru, Bolivia, Chile, Paraguay, Uruguay, Argentina. Elsewhere often adventive.

f. *genuinum* Aellen, f. nov.—Lobus medius  $\pm$  parallelo-marginatus, paulum dentatus. Lobi laterales 1-2-dentati.

f. *MULTIDENTATUM* (Ludwig) Aellen in Fedde Rep. spec. nov. 26:121. 1929.—*Ch. hircinum* f. *multidentatum* Ludwig in Asch. and Graeb. Syn. 5:86.1913.—Median lobes profusely dentate.

f. *acutatum* (Ludwig) Aellen, comb. nov.—*Ch. hircinum* f. *acutatum* Ludwig, l.c.—Median lobes acute.

f. *ANGUSTIFOLIUM* (Ludwig) Aellen, l.c.—*Ch. hircinum* f. *angustifolium* Ludwig, l.c.—Leaves smaller; median lobes acute.

f. *DEMINUTUM* (Ludwig) Aellen, l.c. 122.—*Ch. hircinum* f.

*deminutum* Ludwig, l.c.—*Ch. hircinum* f. *microphyllum* Thellung ap. Parodi in Rev. Fac. Agr. Vet. 1 (7):192. 1930.—Leaves smaller than in the typical plant.

f. *subtrilobum* (Issler) Aellen, comb. nov.—*Ch. trilobum* Issler in Allg. Bot. Zeitschr. 8:174. 1902.—*Ch. hircinum* var. *subtrilobum* Issler in Allg. Bot. Zeitschr. 10:43. 1904.—Leaves very small. Branches long and thin.

var. *ANDINUM* Aellen in Fedde Rep. spec. nov. 26:122. 1929.  
Peru.

ssp. *CATAMARCENSE* Aellen in Fedde Rep. spec. nov. 26:122. 1929.  
Argentina.

54. *CHENOPODIUM PALLESCENS* Standley in N. Am. Fl. 21:15. 1916.  
New Mexico, Oklahoma.

55. *CHENOPODIUM VIRIDE* L. Spec. Pl. 219. 1753, not of most authors.  
Northern Eurasia. Not definitely recorded from America.

56. *CHENOPODIUM BUSHIANUM* Aellen in Fedde Rep. spec. nov. 26:63. 1929.—*Ch. album* and *Ch. paganum* of most North American authors, in part; not of Linnaeus and Reichenbach.—*Ch. album* ssp. *Collinsii* Murr in Bull. Herb. Boiss., 2e sér., 4:990. 1904.

Canada. United States: from North Dakota to Arkansas, North Carolina and New York.

f. *ACUTIDENTATUM* Aellen, l.c. 119.—Leaves profusely and sharply dentate.

var. *CINERASCENS* Aellen, l.c. :119.—Perianth farinose, gray. Seed somewhat smaller.

57. *CHENOPODIUM MACROCALYCIUM* Aellen in Fedde Rep. spec. nov. 26:119. 1929.  
Massachusetts.

58. *CHENOPODIUM PHILIPPIANUM* Aellen in Fedde Rep. spec. nov. 26:123. 1929.  
Chile.

Subsect. 3. *UNDATA* Aellen et Iljin in Fl. URSS. 6:54. 1936. Seed surface marked by distinct, undulate ridges.

#### KEY TO SUBSECTION UNDATA

1. Leaves ovate or ovate-rhombic, profusely dentate, irregularly sinuate-dentate to lacinate-serrate, more or less farinose, rather thick. Seed with acute margin ..... 59. *Ch. murale*
1. Leaves ovate to ovate-lanceolate, usually entire, thin. Seed with round margin..... 60. *Ch. polyspermum*

59. *CHENOPODIUM MURALE* L. Spec. Pl. 219. 1753.

Probably naturalized throughout the temperate and tropical regions of the Americas.

60. *CHENOPODIUM POLYSPERMUM* L. Spec. Pl. 220. 1753.

var. *ACUTIFOLIUM* (Sm.) Gaudin Fl. Helvet. 2:259. 1828.—Inflorescence  $\pm$  pyramidal, elongated.

var. *OBTUSIFOLIUM* Gaudin, l.c.—Inflorescence cymose, axillary, ebracteate. Upper leaves obtuse or mucronate.

According to Standley in N. Am. Fl. 21:13. 1916: "sparsely adventive in the United States from Maine to New Jersey and Tennessee, and in Oregon."

Subsection. 4. *GROSSEFOVEATA* Aellen et Iljin in Fl. URSS. 6:55. 1936.—Seed surface normally with round or elongated grooves and lacerated, broad margins but without radial ridges. Leaves deeply sinuate-dentate, with cordate base. Inflorescences terminal, pyramidal, ebracteate.

KEY TO SUBSECTION *GROSSEFOVEATA*

1. Grooves quite distinct ..... 61. *Ch. hybridum*  
 1. Grooves indistinct, shallow, irregular or almost wanting ..... 62. *Ch. gigantospermum*

61. *CHENOPODIUM HYBRIDUM* L. Spec. Pl. 219. 1753.  
 Not yet recorded from America.

62. *CHENOPODIUM GIGANTOSPERMUM* Aellen in Fedde Rep. spec. nov. 26:147. 1929.—*Ch. hybridum* of American authors, not of Linnaeus.

Canada: British Columbia, Alberta, Manitoba, Ontario, Quebec. United States: from Washington to California, Texas, Virginia, New York and Connecticut.

var. *typicum* Aellen, var. nov.—Semen 1.5-2 mm. in diam. latum. Pericarpium adhaerens. Perianthii lacinae lanceolatae vel oblongo-ovatae.

f. *cymosum* Aellen, comb. nov.—*Ch. gigantospermum* f. *cymosum* in Fedde Rep. spec. nov. 26:147. 1929.—Inflorescence cymose.

f. *spicatiforme* Aellen, comb. nov.—*Ch. gigantospermum* f. *spicatiforme* Aellen, l.c.—Inflorescence spicate.

f. *Griffithsii* Aellen, comb. nov. *Ch. gigantospermum* f. *Griffithsii* Aellen, l.c.—Inflorescence short, turning red.

var. *STANDLEYANUM* Aellen, l.c.—Seed large, to 3 mm. Pericarp not strongly adhering. Perianth tips broader.

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