Chenopodiaceae and Amaranthaceae of New York State

Steven E. Clemants
Brooklyn Botanic Garden

Contributions to a Flora of New York State X
Richard S. Mitchell, Editor

1992

BULLETIN NO. 485

NEW YORK STATE MUSEUM

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12230
Catalpa bignonioides

Gift of
Rupert C. Barneby
"Cherished during his watch"
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PREFACE

Our goal in producing this series is to present a useful and authoritative account of the plants of New York State. These contributions are intended to reflect the knowledge and taxonomic opinions of specialists who prepare the manuscripts while following a generalized format for consistency. Inclusion of ecological, distributional, medical and economic information on each species is also one of our major aims. Habitat references, flowering times, pertinent synonymy, etc., often apply specifically to New York plants rather than to the entire species. Complete illustration should facilitate identification of specimens for those who are not formally trained in botany. Descriptions are original, ordered and as complete as possible to provide sequential cross-referencing.

Distribution maps accompany species of seed plants, ferns, mosses, algae, lichens and some groups of fungi. These are plotted by counties to eliminate pinpointing endangered habitats, while offering an accurate visual picture of past collecting. Maps are based on the master file at the New York State Museum, Albany, supplemented by available data (specimens examined by the authors) from herbaria housing significant New York collections. Data or literature citations for any map may be obtained, on approval, from the State Museum.

We hope that these bulletins will serve individuals with interest in the flora, as well as to provide information for state and Federal agencies, conservation organizations, industry and the scientific community. With these works go our hopes for the preservation and wise use of a precious and life-giving resource — our State’s plant life.

The New York State Flora Committee

The steering council of the New York State Flora Committee met for the first time on January 19, 1976, and established as its goals the promotion of study of the State’s plant resources and the publication of this series of museum bulletins. These contributions will be continually updated after publication for possible incorporation into larger volumes at a later date.

Members of the council at the time of this publication are:

Richard S. Mitchell, Chairman, State Botanist, N. Y. State Museum, Albany (Vascular Plants)
Charles J. Sheviak, Curator of Botany, N. Y. State Museum, Albany (Vascular Plants)
Norton G. Miller, N. Y. State Biological Survey, Albany (Bryophytes)
Clark T. Rogerson, The New York Botanical Garden, Bronx (Fungi)
George J. Schumacher, Biology Dept. SUNY, Binghamton (Algae)
Gordon C. Tucker, N. Y. State Museum, Albany (Vascular Plants)
# CONTENTS

<table>
<thead>
<tr>
<th>Preface</th>
<th>iii</th>
</tr>
</thead>
<tbody>
<tr>
<td>The New York State Flora Committee</td>
<td>iii</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>v</td>
</tr>
<tr>
<td>Important Note</td>
<td>v</td>
</tr>
<tr>
<td>Legend</td>
<td>vi</td>
</tr>
<tr>
<td>Chenopodiaceae</td>
<td>1</td>
</tr>
<tr>
<td><em>Salicornia</em></td>
<td>2</td>
</tr>
<tr>
<td><em>Atriplex</em></td>
<td>6</td>
</tr>
<tr>
<td><em>Spinacia</em></td>
<td>17</td>
</tr>
<tr>
<td><em>Beta</em></td>
<td>17</td>
</tr>
<tr>
<td><em>Salsola</em></td>
<td>19</td>
</tr>
<tr>
<td><em>Suaeda</em></td>
<td>22</td>
</tr>
<tr>
<td><em>Bassia</em></td>
<td>27</td>
</tr>
<tr>
<td><em>Corispermum</em></td>
<td>30</td>
</tr>
<tr>
<td><em>Polycnemenum</em></td>
<td>31</td>
</tr>
<tr>
<td><em>Axyris</em></td>
<td>31</td>
</tr>
<tr>
<td><em>Cyclotoma</em></td>
<td>31</td>
</tr>
<tr>
<td><em>Monolepis</em></td>
<td>33</td>
</tr>
<tr>
<td><em>Chenopodium</em></td>
<td>33</td>
</tr>
<tr>
<td>Amaranthaceae</td>
<td>53</td>
</tr>
<tr>
<td><em>Amaranthus</em></td>
<td>53</td>
</tr>
<tr>
<td><em>Froelichia</em></td>
<td>73</td>
</tr>
<tr>
<td><em>Gomphrena</em></td>
<td>75</td>
</tr>
<tr>
<td><em>Alternanthera</em></td>
<td>75</td>
</tr>
<tr>
<td>Appendix I. (Associated Fungi)</td>
<td>76</td>
</tr>
<tr>
<td>Appendix II. (Associated Insects)</td>
<td>77</td>
</tr>
<tr>
<td>Appendix III. (Miscellaneous Parasites)</td>
<td>82</td>
</tr>
<tr>
<td>Bibliography</td>
<td>83</td>
</tr>
<tr>
<td>Index</td>
<td>98</td>
</tr>
</tbody>
</table>
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IMPORTANT NOTE

All economic uses, folklore, medical and pharmaceutical notes, uses as foodstuffs, etc., are compiled from the literature and do not represent an endorsement by the authors or the New York State Museum. Some of the uses may, indeed, be dangerous if incorrectly employed. Some are not effective and are presented for historical interest only.
LEGEND

FOR ALL MAPS IN THE FOLLOWING PUBLICATION
THE FOLLOWING SYMBOLS APPLY

Solid dot—specimen seen by author; data on file at the State Herbarium (NYS)

Circle—field observation or literature citation with location data and observer’s or author’s name on file (NYS)

FOR ALL ILLUSTRATIONS IN THIS PUBLICATION, THE FOLLOWING LETTER-DESIGNATIONS APPLY:

A. Habit sketch
B. Root
C. Leaf
D. Inflorescence(s)
E. Inflorescence node
F. Bracteoles
G. Flower
H. Fruiting calyx
I. Fruit
J. Seed
Chenopodiaceae (Goosefoot Family)

The Chenopodiaceae: a family of about 100 genera and 1,500 species of herbs and shrubs worldwide. The group is cosmopolitan in distribution and particularly diverse in arid areas. A number of species are halophytic, and many are weeds within and outside of their natural ranges. Goosefoot (Chenopodium album L.), one of the more widespread and common weeds of the world, has followed in the footsteps of man since prehistory, and is sometimes used as a pot herb. Quinoa (Chenopodium quinoa Willd.), is a pseudo-cereal staple food in the Andes, and the fruits of some other species of the genus have been eaten, occasionally. Spinach (Spinacia) is widely used as a salad green and pot herb. Beet (Beta) is used as a pot herb (Swiss chard); the roots are eaten as a vegetable (garden beet), and it may serve as a source of sucrose and glucose (sugar beet). Several genera (particularly Salsola, Salicornia and Suaeda) have been used as sources of soda for the production of soap and glass. Pollen grains of the Chenopodiaceae (and many Amaranthaceae) are unusual in being spherical with numerous surface pores (sometimes called “golf-ball pollen”). Many species of both families are known for the aeroallergenic nature of their pollen. Historically, pollen of the Chenopodium/Amaranth type has been found in Maestrichtian deposits, representing the oldest fossil records of Caryophyllidae. In addition to their pollen, many genera of Chenopodiaceae share other morphological similarities with those of Amaranthaceae, thus, confounding a clear distinction between the families.

The chenopods have been classified in several ways. One recent study (Scott, 1977a) suggested that they be split into three families: Chenopodiaceae, Salsolaceae and Salicorniaceae. Although habit and embryo shape have been used for decades as characters to distinguish these subgroups, these characters are considered by most taxonomists insufficient to warrant the recognition of separate families.

FAMILY DESCRIPTION

A family of annual and perennial herbs and shrubs (rarely trees), sometimes with fleshy, nearly leafless stems. The leaves are alternate (rarely opposite), simple, entire, toothed or lobed, often somewhat succulent, ranging from papery and flat to very fleshy and terete. Leaves are sometimes reduced to sheaths at the nodes, and stipules are lacking. The inflorescences are usually composed of glomerules (congested cymes in the leaf axils), or the glomerules are often borne in compound spikes, panicles or cymes. Occasionally, the inflorescence is not glomerulose, but a simple panicle or spike. Each flower is subtended by a bract and two bracteoles (or both bracteoles may be absent). Flowers are small, usually regular, perfect or less often unisexual, the plants monoecious or dioecious. There are 1-5 (-6) sepals, or sometimes the sepals are absent in staminate flowers. The sepals are distinct or connate (usually only at the base), simple, herbaceous or membranaceous, rarely scarious. Stamens are commonly the same number as the tepals and opposite them, their filaments free or connate at the base, inserted on a disc on the calyx or hypogynous. The anthers are tetrasporangiate and diclinous. The ovary is usually superior (semi-inferior in Beta), 1-locular, 2-3 (-5) carpellate, the ovules solitary, basal, amphitropous or usually campylotropous, bitegmic, crassumucellar. Styles are 1-3, distinct or more or less connate; stigmas are mostly 2-3, dry. The fruit is a utricle or nutlet, usually indehiscent, often subtended by the persistent calyx or by persistent bracteoles. Sometimes, several fruits are aggregated by connation of the somewhat fleshy tepals. The seeds are mostly lenticular, each with an annular, spirally twisted or only slightly curved peripheral embryo, surrounding the usually abundant, starchy, hard perisperm. True endosperm is vestigial or absent.

KEY TO GENERA

1. Leaves reduced to a sheath surrounding the stem, with 2 appressed, opposite scales at the apex; flowers in threes, sunken into the jointed, succulent stem ................................................................. 1. Salicornia
2. Bracteoles enlarged and accrescent in fruit; flowers unisexual ................................................................. (2)
3. Fruit dehiscent; ovary semi-inferior; roots often enlarged ................................................................. 4. Beta
4. Fruit indehiscent; ovary superior; roots not notably enlarged ................................................................. (5)
5. Leaves filiform to linear, linear-lanceolate, or linear-oblong, entire; sessile ................................................................. (11)
6. Leaves spine-tipped, the principal ones filiform; seed orbicular or ovoid, not lenticular; embryo spiralled
6. Leaves not spine-tipped, at most subulate-pointed; seeds lenticular; embryo ring-shaped, horseshoe-shaped or coiled
7. Leaves thick and somewhat fleshy, terete or plano-convex in cross-section; embryo coiled; flowers commonly 3 in the axis of leaves
7. Leaves scarcely fleshy, flat, at least toward the base; embryo ring-shaped; flowers borne variously
8. Calyx forming lateral (horizontal) wings or spines in fruit; leaves pubescent
8. Calyx without lateral spines in fruit, lacking a margin or with vertical, winged keels; leaves variously pubescent or glabrous
9. Flowers with 1 sepal; fruit usually with a vertical winged margin
9. Flowers with 3-5 sepals or sepal lobes; fruit without a margin
10. Sepals fused at the base, not imbricate
10. Sepals imbricate
11. Leaves and stems stellate-pubescent; flowers unisexual
11. Leaves variously pubescent or glabrous, but not stellate pubescent; flowers perfect or occasionally pistillate
12. Fruiting calyx with a broad, lateral wing; inflorescence a diffuse panicle
12. Fruiting calyx wingless or nearly so, sometimes with a vertical, winged keel; inflorescence often consisting of clustered glomerules
13. Sepal 1 per flower
13. Sepals 5 per flower

1. SALICORNIA

Common Names: Glasswort, Saltwort

Authority: Linnaeus, Species PI. 1, p. 3. 1753

A genus of as few as 13, or up to 35 species, depending upon taxonomic interpretation. In the broad sense of the group, adopted here, the genus is cosmopolitan along sea coasts and in other brackish habitats. The glassworts and saltworts are easily recognized by their jointed, fleshy stems, opposite scales, and fleshy spikes. Scott (1977a) split the genus, segregating (as Sarcocornia), members differing in their perennial habit and inflorescence structure. While these characters are sufficient for subgeneric delimitation, the segregation of genera within this easily recognized group seems to serve little purpose, and is not followed here. Three species of Salicornia occur within our range, and a fourth, S. rubra L., is widely scattered in central North America. Salicornia plants were once burned and their ashes used as a source of soda in the production of soap and glass, hence the name glasswort. Sometimes known as samphire greens, they have also been used as food.

Description: Plants with bisexual or pistillate flowers (when polygamomonoecious); stigmas 2, subulate; style 1, lacerate above or ending in stigmas; ovary 1, superior, ovoid, unilocular with a single, basal ovule; fruit an indehiscent utricle sunken into the fleshy spike and surrounded by the perianth, the pericarp membranaceous, non-adherent, closely investing the seed and nearly the same size; seed 1, vertical, homomorphic, minutely hairy; embryo conduplicate; perisperm none; radicle inferior; stamens 1-2, hypogynous; filaments membranaceous, linear; anthers tetrasporangiate; calyx obpyramidal, usually truncate at the summit and 3-4 lobed, fleshy or herbaceous, spongy in fruit, opening by a small terminal slit only; bracts scale-like, sometimes fused and forming a shallow cup; the flowers in groups of three, sessile and sunken into the fleshy rachis; inflorescence terminal, in cylindrical spikes; leaves reduced and fused into a fleshy sheath surrounding the stem, with minute, opposite, scarcely projecting scales at the point of attachment; stems succulent, herbaceous or sometimes slightly woody, erect or sprawling, branched; annuals or perennials with a taproot or horizontal rhizome.

KEY TO SPECIES

1. Plants annual from a taproot; the central flower of each cluster longer than the 2 lateral ones
2. Scales acute to acuminate, mucronate; spike inflated, wider than the stem
3. S. europaea
4. S. bigelovii

1. Plants perennial from a horizontal rhizome; central flower of the cluster not noticeably prominent
2. Scales acute to acuminate, mucronate; spike inflated, wider than the stem
3. S. perennis
1. *Salicornia perennis* Miller

**Common Names:** Saltwort, Glasswort, Samphire, Leatigrass

**Type Description:** Miller, Gard. Dict. ed. 8, *Salicornia* no. 2, 1768

**Synonyms:** *Arthrocnemum perenne* (Miller) Moss, *Salicornia virginica* of authors, not L., *Sarcocornia perennis* (Miller) A. J. Scott

**Origin:** Native to the Atlantic Coasts of Europe and North America

**Habitats:** Sea beaches and salt marshes

**Habit:** Prostrate, succulent subshrub with ascending to erect branch tips

**Flowering:** July-September

**Fruiting:** September-November

**General Distribution:** Europe, Africa and North America; in North America: along the Atlantic Coast from southern New Hampshire to South Carolina

**Description:** Plants with bisexual flowers; stigmas spreading, 0.3-0.6 mm long; style 0.4-0.8 mm long; fruit oblong or ellipsoid; seed greenish-brown to gray, oblong or ellipsoid, 1.2-1.4 mm long, 0.6-0.8 mm broad, testa covered with slender curved hairs; stamens 2; filaments 0.3-0.5 mm, usually not visible from outside the flower; anthers obovoid, yellowish, 0.6-0.8 mm long; calyx fleshy, 3-4-lobed, 0.8-1.0 mm long, central and lateral flowers 1.2-1.5 mm tall, 0.8-1.1 mm broad, subequal or usually the central larger than the lateral, the central flower truncate-obovate, truncate across the top, extending over half way to the top of the joint, lateral flowers obliquely ovate; inflorescence erect, cylindrical spikes, 15-50 cm long, the individual joints 1.8-2.8 mm long, 2.0-2.2 mm broad; inflorescence scales broadly deltate or forming a shallow cup, 1.1-1.5 mm long, 2.5-2.7 mm broad, apex acuminate; stems hard and woody (at least the lower portion), prostrate, rooting, forming mats 1 meter or less in diameter, with erect or ascending non-flowering and flowering stems fleshy, 1-3 dm tall, joints 6-20 mm long, 1-3 mm broad, scales rounded to acute, from a perennial rhizome with fibrous, adventitious roots (2n = 18).

**Nomenclatural Note:** This species has often been treated under the Linnaean name *Salicornia virginica* L., but Ball (pers. comm.) has checked the type of *S. virginica* and found it to be annual, therefore rendering this binomial invalid for this plant. The North American plants may not be conspecific with European *S. perennis*, but, until comparisons of living materials of the American and European plants have been made, I am retaining American populations under the name *S. perennis*.

**Common Names:** Saltwort, Glasswort, Samphire

**Type Description:** Torrey, Bot. Mex. Bound. Surv. p. 184, 1859

**Origin:** Native to northern North America, particularly along the coasts

**Habitats:** Tidal marshes, shores and swales, inland salt lake shores and alkaline flats

**Habit:** Simple-stemmed or branched, succulent annual herbs

**Flowering:** July-September

**Fruiting:** August-November

**General Distribution:** Atlantic coast from southern Maine to South Carolina, west to Utah and the Pacific coast, from northern British Columbia south to Baja California

**Rarity Status:** This species is ranked G5 Q3 by the New York Natural Heritage Program and placed on their watch list.

**Description:** Plants with **bisexual** flowers; **stigmas** erect to spreading, 0.4-0.5 mm long; **style** 0.2-0.4 mm long; **fruit** ovoid to oblong; **seed** greenish to nearly black, ovoid to oblong, 1.6-2.0 mm long, 1.0-1.2 mm broad, testa covered with short curved hairs; **stamens** 1; **filaments** 1.0-1.2 mm long; **anthers** oblong, yellowish, 0.4-0.7 mm; **calyx** herbaceous, 3-lobed, 0.9-1.1 mm long, the central flower 1.7-1.8 mm tall and 1.3-1.5 mm broad, lateral flowers 1.1-1.2 mm tall and 0.7-1.5 mm broad, the central flower extending nearly or quite to the top of the joint, lateral flowers contiguous below the acute lower angles of the central ones; **inflorescences** erect, cylindrical spikes 2-12 cm long, apex obtuse, the individual joints 1.2-3.5 mm long, 2-6 mm broad, usually much wider than long; **inflorescence scales** triangular, 1.5-3.0 mm long, 2.0-4.8 mm broad, often hiding the flowers, acute, mucronate; **stems** succulent, erect, 0.7-2.0 dm tall, green, usually simple at the base, sparsely to copiously branched above, the branches ascending or rarely spreading, stem joints 7-25 mm long, 2-3 mm broad, the sheaths with 2 sterile scales at the summit, sterile scales 2.9-3.5 mm long and 1.8-3.5 mm broad; **root system** annual with a narrow taproot 2-5 cm long and numerous lateral roots (2n = 18).

**Importance:** *Salicornia bigelovii* is currently being studied as a potential source of vegetable oil (Glenn et al., 1991). The seeds contain 26-33 percent oil, 31 percent protein, and are low in fiber and ash. The yield equals or exceeds that of oil crops such as soybean and sunflower, and the plant grows in high salinity areas.
3. Salicornia europaea L.

Common Names: Glasswort, Samphire, Chicken-claws

Type Description: Linnaeus, Species Pl. 1, p. 3, 1753

Synonyms: Salicornia europaea var. simplex (Pursh) Fern., S. prostrata Pall.

Origin: Native to the Atlantic coast of North America

Habitats: Salt marshes

Habit: Erect to prostrate, annual herb

Flowering: July-September

Fruiting: August-November

General Distribution: In North America from Nova Scotia to Georgia along the coast and inland in saline habitats to Michigan, Wisconsin and Illinois; Europe, Asia and North Africa

Description: Plants with bisexual flowers; stigmas erect or spreading, 0.2-0.3 mm long; style ca. 0.1 mm long; fruit oblong to ovoid; seed brown, oblong or ovoid, 1.0-1.5 mm long, 0.6-0.8 mm broad, testa covered with short curved hairs; stamens 1, rarely 0 or 2; filaments 0.3-0.8 mm long; anthers oblong, light yellow, 0.3-0.4 mm long; calyx herbaceous, 3-lobed, 0.5-0.7 mm long, central flower broadly obovate, 2.0-2.5 mm tall, 1.4-1.5 mm broad, much higher than the lateral flowers and reaching two thirds the distance to the apex of the joint, lateral flowers broadly obovate, 1.2-1.5 mm tall, 0.8-1 mm broad, contiguous below the acute lower angles of the central ones; inflorescences erect, cylindrical spikes, 2.5-6.0 cm tall, tapering above, individual joints 2.2-4.0 mm long, 1.5-2.2 (-4.5) mm in diameter, scales obtuse or rounded; inflorescence scales very broadly ovoid or forming a shallow cup, 1.0-1.7 mm long, 2.3-2.9 mm broad, apex acute to rounded; stems erect, 1-5 dm tall, green becoming red or reddish with age, often simple at the base, usually much-branched above, the branches erect or ascending, joints 5-22 mm long, 1.0-2.5 mm diameter, often reddish in age, the sheaths with two scales at the summit, scales broadly acute, 1.0-1.5 mm long, 1.0-1.5 mm broad; root system a slender, annual taproot with numerous lateral fibrous roots (2n = 36).

Nomenclatural Note: This species belongs to a complex group of diploid and tetraploid plants often treated under the inclusive name S. europaea L. Typical S. europaea (in the narrow sense) is a diploid from northern Europe, but plants ranging along the Atlantic coast south of Canada are tetraploid (Ball, pers. comm.), and would not be placed within S. europaea if interpreted in the narrowest sense. The American taxon may be conspecific with a group of European tetraploid annuals, but no studies have been done. If it is not conspecific with any European taxon, then it should be called S. virginica L. That binomial has usually been used...
for the perennial American plant (here called *S. perennis*), but Ball (pers. comm.) has checked the type of *S. virginiaca* and found that it is annual. It therefore bears the earliest name for the American tetraploid annual taxon. I have not followed this name change because the American and European populations have not been studied together. Their relationships have not been resolved, and the nomenclature is still confusing. I am, therefore, using *S. europaea* in the broadest, inclusive sense, with the expectation that it may change in the future.

**Importance:** The fleshy stems of glasswort have culinary importance in France where they are used in several sophisticated recipes. The young stems are also made into pickles in England and Syracuse, New York, and they have, occasionally, been made into salads or used as a garnish. Samphire greens were boiled and served as a survival food for settlers of remote places, particularly in Canada, where their image appears on the Steeves family crest. The plants were also used in medicine (called *herba salicorniae herbaceae*), and occasionally as a source of soda ash for making soap and glass.

### 2. ATRIPLEX

**Common Names:** Orach, Salt-bush, Tumbleweed. Atriplex

**Authority:** Linnaeus. Species PI. II, p. 1052. 1753

A genus of over 250 species of cosmopolitan distribution, but mainly subtropical and arid-temperate. Many species are halophytes of coastal or inland saline habitats, but a few species are widespread weeds on disturbed soils. A few species are cultivated as ornamentals and pot herbs (particularly *A. hortensis*), while several others are important forage plants. The genus is distinctive among our chenopods because of the accrescent bracteoles that surround the fruit. The species are often considered difficult to distinguish, with hybrids cited as part of that problem (particularly hybrids between *A. patula* and *A. prostrata*), but much of the confusion has been due to the plasticity of the leaves of members of those groups and not to their hybridization. Because the most consistent characters are those of the mature bracteoles, ripe, fruiting specimens should be used for identification whenever possible. Many species have C4-photosynthesis and have a distinctive, net-like venation pattern (kranz-type venation), that can usually be seen by scraping off the surface pubescence of the leaf.

**Description:** Plants *monoeocious* or *dioecious*; female flowers: monomorphic or dimorphic: when dimorphic sometimes of two sizes, or with horizontal and vertical seeds; stigmas 2, sub-filiform, thickened or compressed toward the connate bases; style 1 or absent; ovary 1, superior, unilocular with a single, basal ovule; fruit an indehiscent utricle, surrounded by enlarged bracteoles, the pericarp membranaceous, usually non-adherent but closely investing the seed, the fruit therefore nearly the same size as the seed; seed 1, usually vertical, homomorphic or dimorphic (small and black or large and brown), erect or inverted, rarely horizontal (in perianth-bearing flowers), lenticular, testa glabrous; embryo annular, surrounding an abundant, farinaceous perisperm, the radicle inferior, lateral or superior; calyx usually absent, sometimes 3-5 lobed and membranaceous, rarely of 1-5 scale-like sepals; bracteoles 2, accrescent, distinct or usually united at the base and enclosing the fruit, herbaceous, spongy or cartilaginous, entire or toothed, the dorsal surface smooth or variously appressed; male flowers: ovary rudimentary or absent; stamens 3-5, hypogynous; filaments linear, distinct or connate at the base; anthers tetrasporangiate; calyx 3-5 lobed; bracteoles lacking; bracts absent or subtending glochidial only; inflorescences terminal or axillary spikes, panicles or axillary glomerules, the flowers solitary or clustered in glomerules, staminate and pistillate flowers in the same glomerule or glomerules wholly stamineate towards the tips; leaves opposite or alternate, herbaceous, sessile or petioled, venation of the kranz-type or normal dicotyledonous type; stems herbaceous or woody (shrubby), more or less scurfy, farinose or furfuraceous with vesicular hairs; root systems annual or perennial.

#### KEY TO SPECIES

1. **Principal leaves with serrate margins; blades with net-like, kranz-type venation (may require scraping surface to see).**........2
2. **Principal leaves entire or with only two teeth towards the base; blades lacking kranz-type venation.**........(3)
3. **Flowers borne primarily on terminal, bractless, often long spikes, rarely with a few axillary glomerules.**........1. *A. tatarica*
4. **Flowers borne primarily in axillary glomerules, except for a short, terminal, male spike**........2. *A. rosea*
3. **Principal lower leaves linear to lanceolate or elliptic; leaf bases cuneate.**........(4)
4. **Bracteoles obtriangular, broadest above the middle, with 3-5 teeth toward the apex; leaves densely pubescent.**........3. *A. arenaria*
5. **Bracteoles broadly ovoid, triangular or diamond shape, broadest at or usually below the middle, without teeth along the apex; leaves sparsely pubescent.**........(5)
5. Inflorescence with leafy bracts throughout; black seeds rare or absent; brown seeds with the radicle strongly ascending.

6. Bracteoles broadly triangular to ovate-triangular, usually thick with well-developed spongy inner layer (sometimes lacking); leaves linear to linear-lanceolate; brown seeds 2-3 mm wide, broadly elliptic, more or less basally flat, the radicle median, ascending to pointing outward with the apex curved inward. .................................5. A. subspicata

7. Fruit with bracteoles orbicular or rounded-ovate, 10 mm broad or more, conspicuously reticulate-veined; seed apparently centrally placed within the bracteoles .................................................................7. A. koriensis

8. Principal leaves usually lanceolate with two teeth pointing towards the apex; bracteoles without a spongy inner layer, rhombic-triangular to triangular-hastate with prominent lateral angles ....................................................6. A. patula

9. Principal leaves triangular-hastate, usually with two teeth pointing towards the base; bracteoles with inner spongy layer present (sometimes weakly developed), triangular-hastate to triangular-ovate or broadly ovate; with prominent basal angles ..........................8. A. prostrata

Note: Because fruit and seed measurements are virtually the same in this genus, only the seed sizes are given in the descriptions that follow.
Atriplex tatarica L.

**Common Names:** Tartarian Saltbush, Orach, Atriplex

**Type Description:** Linnaeus, Species Pl. II, p. 1053, 1753

**Origin:** A native of Europe

**Habitats:** Waste places and ballast

**Habit:** Erect to spreading, annual herbs

**Flowering:** July-August

**Fruiting:** September

**General Distribution:** Europe, Asia, the East Indies and northern Africa; adventive in North America: Connecticut, New York, New Jersey, Pennsylvania and elsewhere as a ballast waif

**Description:** Plants monoecious; female flowers: monomorphic; stigmas erect or spreading, 0.6-1.8 mm long; style 0.2-0.3 mm long; ovary spheroid; fruit subrotund, pericarp non-adherent; seed brownish, 1.5-2.0 mm in diameter, 0.2-0.3 mm thick, the radicle ascending: perianth absent: bracteoles 2, sub sessile, rhombic, 3-7 (-15) mm long, 3.0-4.8 mm broad, not compressed, united to the middle. apex foliaceous, acutely 3-lobed and often denticulate, the sides commonly tuberculate or sometimes smooth: male flowers: stamens 5; filaments membranaceous, 0.6-0.8 mm long; anthers ellipsoid, yellow-orange, 0.3-0.4 mm long; perianth 5-lobed, lobes scarious, oblong-ovate, 0.5-0.9 mm long, 0.5-0.7 mm broad, apex acute: bracts absent: inflorescences of glomerules of female flowers in the axils of leaves and in terminal or axillary spikes of either all male flowers or male and female flowers, spikes 2-5 cm long, 2-3 mm broad; leaves alternate with kranz-type venation, triangular-rhombic or deltoid usually hastate or sub hastate, 2-7 (-10) cm long, 1.0-4.2 (-7) cm broad, apex obtuse to acute, base subtruncate, often hastate, deeply or shallowly sinuate-dentate or rarely undulate, thin, densely whitish-turfaceous beneath, usually green and glabrate on the upper surface: petioles 0.5-1.2 cm long; stems erect or ascending, sparsely to densely branched, the branches erect, ascending, or rarely procumbent, 3-15 dm long, slender to stout, obtusely angled, turfaceous when young, glabrate in age; root system an annual taproot (2n = 18).

**Importance:** This species may be used as a source of potash and was once used in folk medicine.
2. *Atriplex rosea* L.

**Common Names:** Red Orach, Rosy Orach, Tumbleweed, Tumbling Orach

**Type Description:** Linnaeus, Species Pl. ed. 2, II, p. 1493, 1763

**Synonym:** *Atriplex spatiosa* A. Nelson

**Origin:** Native to the Mediterranean region of Europe

**Habitats:** Roadside and a variety of disturbed habitats

**Habit:** Erect or ascending, annual herbs

**Flowering:** July-August

**Fruiting:** July-October

**General Distribution:** Mediterranean region, Asia, and Australia; introduced in North America from Nova Scotia to British Columbia south to California and New York

**Description:** Plants monoecious; female flowers: monomorphic; stigmas erect to spreading, 0.4-0.5 mm long; style ca. 0.5 mm long; ovary obovoid; fruit subglobose, pericarp adherent; seed dull brown, subglobose, 2.0-2.3 mm in diameter, 0.6-0.8 mm thick, the radicle lateral; perianth absent; bracteoles 2, subsessile, rhombic or ovate, 3-6 (+12) mm long, 3-6 (+8) mm broad, margin dentate, united to near the middle, the surface usually short-tuberculate, becoming hardened at the base; male flowers: stamens 5; filaments membranaceous, 0.4-0.7 mm long; anthers oblong, yellow-orange, 0.3-0.4 mm long; perianth 4-5 lobed; lobes scarious, oblong-ovate, 0.3-0.5 mm long, 0.3-0.4 mm broad, apex acute; inflorescences of glomerules in the axil of leaves, spikes of sessile glomerules and usually short, interrupted, terminal, staminate spikes; glomerules bisexual or all male, subglobose, the bisexual glomerules 2-4 flowered, 0.3-0.9 cm in diameter, the terminal male glomerules globose, 0.2-0.3 cm in diameter; leaves alternate except the lowermost, with kranz-type venation, ovate or rhombic-ovate to lanceolate, 1.5-7.5 cm long, 0.7-6.0 cm broad, apex acute to somewhat obtuse, base cuneate or rounded, sinuate-dentate above the base, usually grey to whitish, often becoming hard and persistent with age; petioles 0-15 mm long; stems erect to ascending, 1-20 dm tall, much-branched, the lateral branches ascending or spreading, terete, mealy or glabrous; root system annual with a taproot (2n = 18).

**Importance:** The herbage is used to make potash in Greece and its extract finds limited use in medicine as an antiscorbutic and corrective for scrofula. In the western United States, where the species is widely naturalized, it is said to be the cheapest and most satisfactory hog feed, highly prized for fattening swine. The pollen of this species has also been implicated as a causative factor in hay fever in the western United States.
3. *Atriplex arenaria* Nutt.

**Common Names:** Seabeach Orach, Seabeach *Atriplex*

**Type Description:** Nuttall, Gen. N. Amer. Pl. 1: 198, 1818


**Origin:** Native to the North Atlantic Coast of North America

**Habitats:** Sandy seashores and margins of salt marshes

**Habit:** Erect to procumbent, annual herbs

**Flowering:** August-September

**Fruiting:** August-December

**General Distribution:** Along the Atlantic coast from New Hampshire to Virginia

**Description:** Plants monoecious; female flowers: monomorphic; stigmas erect or spreading, 0.6-1.0 mm long; style ca. 0.1 mm long; ovary ovoid, fruit subglobose, pericarp adherent; seed reddish-brown, subglobose, 1.5-2.8 mm in diameter, 0.4-0.5 mm thick, the radicle superior; perianth absent; bracteoles 2, subsessile, obovate to orbicular-obovate, 3.5-7.5 mm long, 4.5-7.5 mm broad, compressed, united to the middle, the apex rounded, sharply dentate above the middle, teeth 3-5, broadly triangular, subequal or the terminal longer than the lateral, bracteole backs with 2 lateral, irregular, dentate crests, or occasionally tuberculate, rarely lacking appendages; male flowers: stamens 5; filaments membranaceous, 0.4-0.6 mm long; anthers ovoid, yellow-orange, 0.3-0.4 mm long; perianth 5-lobed; lobes scarious, oblong-ovate, 0.4-0.5 mm long, 0.4-0.6 mm broad, apex acute; female (and polygamous) inflorescences of glomerules in the axils of the upper leaves, (usually with some male flowers intermixed); male inflorescences terminal spikes, 0.5-3.0 cm long, 2.5-3.5 mm broad, often deciduous from mature plants; glomerules bisexual, or male only, subglobose, male glomerules 2-3 mm diameter, mixed glomerules 6-10 mm in diameter; leaves alternate, lacking kranz-type venation, oblong, oval, broadly obovate or narrowly oblong, 1.2-4.0 cm long, 0.4-1.5 cm broad, rounded to acute at the apex, mucronate, rounded to cuneate at the base, entire or undulate, rarely with 1-2 teeth, thin, densely whitish-furfuraceous beneath, grayish green or glabrate above; petioles 0-2 mm long; stems erect, ascending or procumbent, much-branched, lateral branches procumbent, 1-5 dm long; annual with a branched root system.

**Infraspecific Variation:** This species is closely related to a native of the southeastern U.S. coast, *A. pentandra* (Jacq.) Standl., and has been treated as a subspecies by Hall & Clements (1923).
4. *Atriplex glabra* Scouler & Andrews

**Common Name:** Seaside Orach

**Type Description:** Scouler & Andrews, Fl. Shetland, p. 39, 1845

**Synonyms:** "Atriplex glabra" var. *oblanceolata*

**Origin:** Native to the Northern Atlantic coasts of Europe and North America

**Habitats:** Coastal sands and salt marshes

**Habit:** Erect, procumbent or prostrate perennial herbs

**Flowering:** August

**Fruiting:** September

**General Distribution:** Northwestern Europe and Iceland, and in North America from Greenland to the Northwest Territories south to New England and New York

**Rarity Status:** This species is ranked G4 SH by the New York Natural Heritage Program

**Description:** Plants monoecious; female flowers: monomorphic; stigmas erect or spreading, 0.4-0.5 mm long; style 0.0-0.1 mm long; ovary ovate; fruit spherical to oval, pericarp adherent; seeds dimorphic (with some intermediates): brown or black, brown seeds oval or rounded, 2.3 mm in diameter, 0.2-0.4 mm thick, with the radicle subbasal to median, obliquely pointing outward, the apex blunt, black seeds spheroid to oval, 1.1-1.4 mm in diameter, 0.2-0.4 mm thick, the radical subbasal; perianth absent; bracteoles 2, often with a foot-stalk when arising from leaf axil, triangular-hastate, 3-5 (-11) mm long, 2.7-4.0 mm broad, green, often reddish becoming brown to black with maturity, apex acute to acuminate, base truncate to subcordate or obtuse, margins united at the base, denticate to laciniate, dorsal surface smooth convex, rarely with two small tubercles, spongy inner layers strongly or weakly developed; male flowers: stamens 5; filaments membranaceous, ca. 0.6 mm long; anthers ellipsoid, yellow-orange, ca. 0.4 mm long; perianth 5-lobed; lobes scarious, oblong-ovate, ca. 0.5 mm long, ca. 0.5 mm broad, apex acute; bracts lanceolate, 0.4-1.1 cm long, 0.2-0.6 cm broad; inflorescences single flowers or glomerules in the axil of reduced upper leaves, the uppermost clusters occasionally without bracts and therefore forming a terminal spike; glomerules bisexual, subglobose, 2-5 flowered, 3-4 mm in diameter; leaves alternate, lacking kranz-type venation, lower leaves: triangular-hastate with a pair of broad-based up-curving acute lobes pointing outward, 4-8 cm long, 0.4-1.5 cm broad, apex acute, base truncate, irregularly serrate to sinuate-dentate above the lobes, glabrous or finely farinose, upper leaves: lance-hastate with a pair of out-pointing to up-curving basal lobes or lanceolate and lacking lobes, smaller than lower leaves, sessile to subsessile; petioles on lower leaves 1.5-2.5 mm
long, upper leaves sessile or subsessile; stems prostrate, decumbent or erect, few branched, branches asymmetric, the lowermost wide-spreading and the first 3-6 (-8) pairs opposite, becoming alternate above, stems subangular, green, often red-striped, becoming tough-woody toward the base, straight, 0.3-1.7 dm long; root system annual with a taproot (2n = 18).

**Infraspecific Variation:** The seeds are dimorphic, but brown, convex intermediate seeds are relatively common, and both seed types are often slightly wider than long.

5. *Atriplex subspicata* (Nutt.) Rydberg

**Common Name:** Orach

**Type Description:** Nuttall, Gen. N. Amer. Pl. 1: 199, 1818


**Origin:** Native to North America

**Habitats:** Saline and alkaline soils in waste places

**Habit:** Erect annual herbs

**Flowering:** July-September

**Fruiting:** August-November

**General Distribution:** Newfoundland to British Columbia south to California, Utah, Oklahoma and North Carolina

**Rarity Status:** *Atriplex subspicata* is ranked G5 SH by the New York Natural Heritage Program.

**Description:** Plants monoeious; female flowers: monomorphic; stigmas erect or spreading, 0.2-0.3 mm long; style absent; ovary ovoid; fruit depressed ellipsoid, pericarp adherent; seeds dimorphic: brown or black, the brown seeds depressed ellipsoid, (1.5-) 2.1-2.6 mm long, 2.4-3.0 mm broad, ca. 0.7 mm thick, the radicle generally median ascending with apex abruptly incurved, the black seeds depressed-ellipsoid, (1.4-) 2.5-3.1 mm long, (1.7-) 2.8-3.4 mm broad, ca. 0.7 mm thick, convex, rounded, the radicle generally basal, with the apex incurved; perianth absent; bracteoles 2, sessile, thick, green, blackening with maturity, broadly triangular to ovate triangular, 3.0-5.4 mm long, 4.2-4.5 mm broad, usually longer than wide, margins entire or occasionally with sharp teeth, dorsal surface with one or more tubercles with an inflated inner spongy layer, the surface rarely smooth; male flowers: not seen in New York material; bracts absent or leaf-like; inflorescences terminal and axillary spikes or with a few leafy bracts toward the base, spikes 5-10 cm long; glomerules bisexual, subglobose to irregularly globular, 0.8-1.0 mm in diameter; leaves alternate, lacking kranz-type venation, lanceolate to narrowly lanceolate or linear, rarely ovate to oblanceolate, often with a
pair of outwardly pointing to forward-curving obtuse lobes, 2.5-4.0 (-12) cm long, 0.2-6.0 cm broad, apex acuminate, base cuneate, margins irregularly broad-toothed or entire, green to grayish green, often reddish at or toward maturity, succulent; petioles 1-5 cm long, stems erect or occasionally semierect, 3-15 dm tall, branches 1-many, alternate except for the 2-3 lowermost opposite pairs, stems angular, with light green to green or occasionally red to reddish stripes; root system annual with a taproot (2n = 36, 54).

6. Atriplex patula L.

Common Names: Seaside Orach, Seaside Atriplex, Spearscale

Type Description: Linnaeus, Species PI. II, p. 1053, 1753

Synonyms: Atriplex angustifolia sensu Smith, A. patula var. bracteata of authors, not Westerlund, A. patula var. littoralis A. Gray

Origin: Circumboreal in distribution

Habitats: Saline and brackish areas near the coast; edges of sidewalks, lawns, roads, margins of beaches and other disturbed areas

Habit: Erect to prostrate, annual herbs

Flowering: July-September

Fruiting: August-October

General Distribution: Eurasia; in North America, widely distributed from Newfoundland to British Columbia south to Missouri, Illinois and North Carolina

Description: Plants monocious; female flowers: monomorphic; stigmas spreading, 0.4-0.6 mm long; style absent; ovary ovoid; fruit oval or orbicular, pericarp adherent; seeds dimorphic: brown and black, the brown seeds orbicular, 2-3 (-3.5) mm in diameter, 0.8-1.0 mm thick, the radicle inferior, subbasal, the ascending apex pointed, black seeds oval, 1.6-2.0 mm in diameter, 0.6-0.8 mm thick, often wider above the radicle, the radical basal, pointing outward; perianth absent; bracteoles 2, subsessile, rhombic-triangular to triangular-hastate, 3-6 (-20) mm long, 2.5-5.0 mm broad, green becoming blackened at maturity, united almost to the middle, apex acute to acuminate, base cuneate to broadly obtuse, with lateral angles prominent and usually strongly developed, entire or with 1 or 2 teeth at the lateral angles, dorsal surface smooth or with irregular, laciniate appendages, foliaceous, thin, lacking a spongy inner layer, venation obscure or the midvein alone prominent; male flowers: stamens 5; filaments membranaceous, ca. 0.6 mm long; anthers ovoid, yellow-orange, 0.4-0.5 mm long; perianth 5-lobed; lobes scarious, oblong-
ovale, 0.5-0.7 mm long, 0.4-0.5 mm broad, apex acute; bracts absent; inflorescences terminal and axillary, flexuous spikes 3-12 cm long, formed from widely spaced sessile glomerules. the lower glomerules in the axil of reduced leaves the upper bractless; glomerules bisexual, subglobose, 5-15 flowered, 0.3-1.0 cm in diameter; leaves alternate, lacking kranz-type venation, oblong, oval, broadly obovate or narrowly oblong, 1.2-7.0 (-14) cm long, 0.4-4.0 (-6) cm wide, rounded to acute at the apex, mucronate, rounded to cuneate at the base, entire, undulate, or undulate-dentate, rarely with 1-2 teeth, or 1-2 lobes, outward or apically pointing, thin, densely whitish-furfuraceous beneath, grayish green or glabrate above; petioles 0.4-1.3 cm long; stems erect, ascending or procumbent, strongly ridged, much-branched, branches 1-5 dm long; root system annual with a branched taproot and fibrous lateral roots (2n = 36).

Taxonomic Note: This species and A. prostrata are often confused or treated as varieties of a single species. In fruit, the two species are easily distinguished, in that A. paiula has narrow, rhomboid to triangular bracteoles without much of a spongy layer. The leaves are cuneate at the base, often with two lobes pointing toward to apex. Much of the difficulty in identification has been attributed to hybridization, but I have found very few putative hybrids between these two species.

Importance: Extracts from plants of this species have occasionally been used in folk medicine to cure headaches, “wandering pains” and rheumatism.

7. Atriplex hortensis L.

Common Names: Garden Orach, Mountain Spinach, Garden Atriplex, Garden Scale, Butter-leaves, Wild Beet

Type Description: Linnaeus. Species Pl. II. p. 1053, 1753

Synonyms: Atriplex nitens Schkuhr. A. sagittata Borkhausen

Origin: A native of Asia (Tartary)

Habitats: Weedy areas and disturbed ground, especially around gardens

Habit: Erect, annual herb

Flowering: August

Fruiting: August-October

Distribution: Asia, and naturalized throughout central and southern Europe; in North America from Quebec to Alaska south to Utah, Illinois and New Jersey (Cuba)
Description: Plants monoecious; female flowers: dimorphic, some lacking bracteoles, but with a 5-parted perianth; most flowers with 2 bracteoles, but lacking a perianth; stigmas erect or spreading, ca. 0.2 mm long; style ca. 0.1 mm long or absent; ovary ovoid; fruit oval or depressed-ovoid, the pericarp non-adherent; seeds trimorphic; perianth flowers with horizontal, biconvex, black seeds, oval, 1.4-1.6 (-2) mm in diameter, 0.4-0.8 mm thick, bracteolate flowers bearing 2 seed-types: vertical, black or yellowish-brown seeds, the black seeds, flat, oval, 1.8-2.0 (-4) mm in diameter, 0.4-0.8 mm thick, yellowish-brown seeds oval, 1.2-1.4 mm in diameter, 0.3-0.6 mm thick. radicle vertical; perianth 3-5 lobed on flowers without enlarged bracteoles (absent from flowers with enlarged bracteoles); perianth lobes scarious, oblong, 0.5-0.7 mm long, ca. 0.2 mm broad, apex obtuse; bracteoles orbicular, the size variable, from 4-10 mm long and 3-7 mm broad, larger in cultivated specimens, united at the base, veined; male flowers: stamens 5; filaments membranaceous, 0.3-0.4 mm long; anthers ellipsoid, orange, 0.2-0.3 mm long; perianth 5-lobed; lobes oblong, 0.5-0.7 mm long, 0.4-0.5 mm broad, apex obtuse; bracts absent; inflorescences terminal and axillary, slender spikes mostly 2-8 cm long, the terminal spikes usually arranged in a panicule; glomerules bisexual or occasionally only staminate, 2-8 flowered; leaves alternate, lacking kranz-type venation, triangular or ovate-triangular, hastate, 4-12 (-20) cm long, 1-7 cm broad, apex acute or obtuse, base rounded, truncate, or subcordate, margin entire or irregularly dentate, mealy, becoming glabrous and green; petioles 0.5-3.0 cm long; stems erect or half-decumbent, widely branched from the base, (5-) 15-25 (-30) dm tall; root system annual with a taproot (2n = 18).

Infraspecific Variation: The plants that escape from cultivation within our range appear to be the same as Eurasian A. hortensis ssp. nitens (Schkuhr) Pons., with scurfy lower leaf surfaces and ovate-cordate bracteoles. As Hall and Clements (1923) have pointed out, these characters do not seem to be adequate for separating many specimens from typical A. hortensis. Several authors have suggested that the cultivated A. hortensis is derived through selections from A. hortensis ssp. nitens, and it appears that the escaped and naturalized plants may be reverting back to their ancestral phenotypes.

Importance: Garden Orach has been used as a kitchen vegetable since antiquity. The Greeks and Romans used it much like Spinach, boiling the leaves. Although it is considered inferior to Spinach, it is still used in greens mixtures to a limited extent, especially, to correct the acidity and color of sorrel (Oxalis). The leaves are high in Vitamin C content. A red color-variant (var. atrosanguinea Hort.) is sometimes grown as an ornamental herb. The seeds are used in the Russia and the Baltic nations to produce a blue dye; the plants were once crushed and mixed with wine as a reputed cure for yellow jaundice.
8. *Atriplex prostrata* Boucher ex DC. in Lam. & DC.

**Common Names:** Orach, Spearscale

**Type Description:** Boucher ex De Candolle in Lamarck & De Candolle, Fl. Franç., p. 387, 1805


**Origin:** Of uncertain origin; very widespread and perhaps native to northern Europe

**Habitats:** Saline and brackish soils near the coast; waste places, occasionally in cultivated fields inland

**Habit:** Erect, decumbent or procumbent, annual herbs

**Flowering:** August-September

**Fruiting:** September

**General Distribution:** Europe, Asia and North Africa; in North America from Nova Scotia west to British Columbia south to Illinois, Missouri and South Carolina

**Description:** Plants monoecious; female flowers: monomorphic; stigmas erect or spreading, 0.2-0.3 mm long; style absent; ovary ovoid; fruit oval, pericarp adherent; seeds dimorphic: brown and black, the brown seeds oval, (1.5-) 2.1-2.5 mm in diameter, 0.5-0.6 mm thick, the radicle subbasal, subascending or out-pointing with a blunt, not free apex, black seeds oval, (1-) 1.3-1.8 mm in diameter, 0.4-0.5 mm thick, the radical basal, out-pointing; perianth absent; bracteoles subsessile, triangular-hastate to triangular-ovate or broadly ovate, 1.4-5.2 mm long, 2-5 mm broad, green becoming brown to black at maturity, margins united at the base, apex broadly to moderately acute, the base truncate to obtuse with the lateral angles rounded, entire or with a pair of short teeth at the apex and sometimes at the lateral angles, the dorsal surface smooth or with 2 (often muricate) tubercles, fowtaceous or more or less inflated, a spongy inner layer present, but usually weakly developed, venation obscure or prominent; male flowers: stamens 5; filaments membranaceous, 0.2-0.4 mm long; anthers ellipsoid, yellow-orange, 0.2-0.3 mm long; perianth 5-lobed; lobes scarious, oblong-ovate, 0.3-0.4 mm long, 0.3-0.5 mm broad, apex acute; bracts absent or lanceolate, up to 3 cm long and 1 cm broad; inflorescences terminal and axillary spikes, occasionally with leafy bracts at the base, 2-20 cm long, composed of well-spaced glomerules; glomerules bisexual, or the terminal ones wholly staminate, irregularly globose, 6-8 flowered, 0.3-1.2 cm in diameter; leaves alternate, lacking kranz-type venation, the lower leaves triangular-hastate with a pair of wide-based, obtuse lobes pointing outward, 2-9 cm long, 2-7 cm broad, the apex acute to obtuse or rounded, mucronate, base cordate, truncate or rarely somewhat obtuse, often with a pair of simple or compound teeth toward the outer margin, entire, broadly serrate, dentate or irregularly toothed, green or reddish, the upper leaves smaller and less toothed (or hastate); petioles 1-3 (4) cm long;...
Stems erect, decumbent or procumbent, subangular to angular, green or green-and-stramineous-striped, reddish or not, 1-10 dm tall, little-branched to much-branched, the branches opposite or subopposite, ascending to procumbent, 1-5 dm long; root system annual with a taproot.

**Note:** A species often confused with *A. patula*, however, the broad, truncate leaf bases and broadly ovate bracteoles with spongy layers are distinctive characters of this taxon.

**Importance:** The seeds of *Atriplex patula* were used much like those of Garden Orach, and were said to cure yellow jaundice. The leaves have, occasionally, been eaten as a potherb.

**Waifs:** *Atriplex argentea* Nutt. and *A. serenana* A. Nels. were both collected once in Tompkins county on a newly seeded lawn. *Atriplex laciniata* L., has been reported from New York City but no specimens have been seen.

### 3. SPINACIA

**Common Name:** Spinach

**Authority:** Linnaeus, Species Bl. II. p. 1027, 1753

A genus of 3 species, from southwest Asia.

**Waif:** *Spinacia oleracea* L., garden spinach, has been collected in Albany, Madison, Monroe, New York, Suffolk, Tompkins & Yates Counties as a non-persistent escape from cultivation.

**Importance:** Spinach has long been cultivated for its succulent, edible leaves. The leaves are rich in Vitamins A, B, C and chlorophyll, and their high iron content has caused them to be recommended for persons suffering from anemia.

### 4. BETA

**Common Name:** Beet

**Authority:** Linnaeus, Species Bl. I. p. 222, 1753

A genus of 6-12 species, native to the Mediterranean Region. Cultivated varieties of the garden beet escape, and plants of the wild-growing, European subspecies have been reported in North America as ballast waifs.
1. Beta vulgaris L.

Common Names: Garden Beet, Beetroot, Mangel Wurzel, Swiss Chard, (Seaside Beet)

Type Description: Linnaeus, Species Pl. 1, p. 222, 1753

Origin: A native of Europe

Habitats: Waste places, especially in coastal areas and around vegetable gardens

Habit: Erect or prostrate, annual herbs

Flowering: August

Fruiting: September

General Distribution: Coastal Europe; in North America widely scattered but hardly naturalized, occurring as a garden escape or waif, especially in coastal areas from New York to British Columbia

Description: Plants with bisexual flowers; stigmas 2-3, oblong to triangular, spreading, 0.6-0.7 mm long; style absent; ovary 1, partially inferior, depressed obovoid, unilocular, with a single basal ovule; fruit an indeschisent utricle, depressed-ovoid, the pericarp attached to the perianth below, above fleshy or indurate, non-adherent, 0.7-1.6 mm long, 1.3-2.5 mm broad; seed 1, homomorphic, horizontal, black, orbicular to reniform, 1.5-2.0 mm in diameter, 1.2-1.5 mm thick, testa smooth, glabrous; embryo annular; perisperm copious; radicle centrifugal; stamens 5, perigynous; filaments linear, membranaceous, 0.9-1.0 mm long; anthers tetrasporangiate, globose, yellow, 0.5-0.6 mm long; perianth 5-lobed, urceolate; lobes adherent to the base of the ovary and to others of the same glomerules, herbaceous to coriaceous, oblong, becoming linear, 0.9-1.3 mm long, 0.5-0.9 mm broad, apex obtuse, strongly carinate forming a hood; bracts linear to linear-lanceolate, 1.0-1.3 cm long, 0.5-5 mm broad, often absent from the upper part of the inflorescence; pedicels very short, the flowers forming glomerules; bracteoles absent; inflorescence terminal, of simple or paniculate spikes and axillary glomerules, in dense spikes at first, these becoming much-elongated and interrupted in fruit; glomerules 1-8 flowered, sessile, the flowers often connivent in fruit due to the swollen perianth and receptacle; leaves simple, alternate and basal, herbaceous, basal leaves oval or ovate-oblong, 13-18 (-70) cm long, 4-15 cm broad, apex rounded or obtuse, the base subcordate and abruptly decurrent, entire or subacute, often undulate, fleshy, green to dark red or purple, the blades of the cauline leaves broadly ovate to lanceolate, acute to acuminate; petioles of basal leaves often as long as the blades, the cauline leaves subsessile; stems herbaceous, 6-12 (-20) dm tall, 1-several from each root, erect or proclinet, usually glabrous throughout; root system annual or biennial (perennial), branched and somewhat woody, showing rings of growth in cross-section, the cultivated beets developing a swollen taproot, conic to broadly depressed-fusiform, white, or often with yellow to dark red-purple pigmentation, up to 15 (-35) cm long and 18 cm in diameter (2n = 18).
Infraspecific Variation: Two subspecies have been collected in New York State. *Beta vulgaris* ssp. *vulgaris* (the garden beet) has an unbranched greatly swollen root that is often top-shaped, erect stems and glomerules with 1-8 flowers that cling together. *Beta vulgaris* ssp. *maritima* (L.) Arcang. usually has a branched, non-swollen root, procumbent stems and glomerules of mostly 1-2 flowers that are not strongly coherent.

Importance: *Beta vulgaris* is unique among cultivated plants. It has been brought into cultivation four separate times for four different uses. The most common cultivar is the garden beet, the root of which is usually boiled or pickled. The red-purple juice is a notoriously difficult stain to remove from clothing, and it has been used as a dye for both food and apparel. Swiss chard has been selected for its leaves that are edible as salad greens or boiled like spinach. The foliage of most beets is very high in calcium oxalate content and can numb the palate or even result in oxalate poisoning if too much of the substance is ingested. The sugar beet has been selected for its high sucrose content, and it serves as a major source of refined sugar. Cultivated forms often have up to 13 percent sugar. The crop called Mangels Wurtzel has been selected for roots that are high in nutritive value, making them ideal for use as livestock fodder. There are also a number of cultivars of beet and chard that are grown for their colorful foliage.

5. SALSOLA

Common Names: Russian Thistle, Salsola, Tumbleweed

Authority: Linnaeus, Species Pl. I, p. 222, 1753

A genus of 120-150 species; cosmopolitan but most diverse in the Asia. *Salsola* grows mostly along sea-coasts and in other saline or alkaline habitats. Many species have been used for extracting potash.

Description: Plants with bisexual flowers; stigmas 2 (-3), subulate; style 1 or absent; ovary 1, superior, unilocular with a single, basal ovule; fruit a dehiscent or indehiscent utricle, included in the perianth, the pericarp fleshy or membranaceous, non-adherent; seed 1, horizontal, rarely inverted, erect or oblique; embryo spiral or coiled-spiral; perisperm absent; radicle centrifugal; stamens 5 or fewer, hypogynous or rarely inserted on a minute disk; filaments linear; anthers tetrasporangiate; perianth deeply 5-lobed (rarely 4-lobed), incurved over the fruit at maturity, the tips connivent and erect, transversely carinate or winged; bract narrowly triangular, the apex spinose; pedicels very short, the flowers subsessile; bracteoles 2, narrowly triangular, apex spinose; inflorescences are terminal spikes with solitary flowers, or fascicles in the axils of leaf-like bracts; leaves simple, usually alternate, succulent, sessile or clasping; petioles absent; stems herbaceous or woody, glabrous or pubescent; root system an annual taproot or perennial stalk.

KEY TO SPECIES

1. Sepals stiff, somewhat spinose, with a distinct mid-vein and a very small or absent wing; plants usually hispid; early leaves linear to lanceolate ................................................................. 1. *S. kali*  
2. Sepals soft with an obscure mid-vein and prominent, broad wings; plants often glabrous; early leaves long, linear, filiformous ................................................................. 2. *S. pestifer*
1. *Salsola kali* L.

**Common Names:** Russian Thistle, Salsola, Barilla

**Type Description:** Linnaeus, Species Pl. I, p. 222, 1753

**Synonym:** *Salsola kali* var. *caroliniana* (Walt.) Nutt.

**Origin:** Native to Eurasia

**Habitats:** Sea beaches and in sandy soil near the coast

**Habit:** Erect, annual herb

**Flowering:** July-September

**Fruiting:** September-November

**General Distribution:** Native to eastern Europe and western Asia (Russia), now widespread in North America: Newfoundland to Georgia, especially along the coast

**Description:** Plants with bisexual flowers; **stigmas** 2, erect, 1.2-1.5 mm long; **style** 0.4-0.6 mm long; **ovary** obovoid; **fruit** obconic, closely investing the seed and nearly the same size; **seed** black, orbicular, 1.4-2.0 mm tall, 2-3 mm wide; **stamens** usually 5; **filaments** membranaceous, 1.4-2.0 mm long; **anthers** elliptic, yellow, 0.4-0.9 mm long; **perianth** 3-6 mm wide, rarely with short transverse wings in age; **lobes** scarious becoming hardened in fruit, lanceolate, 2.0-2.4 mm long, 1.2-2.0 mm broad, pungent; **bracts** 5-8 mm long, 1.5-4.0 mm broad, their bases (in age) much thickened, indurate and closely enclosing the fruit; **bracteoles** like the bracts but smaller; **inflorescence** of terminal spikes, 8-15 cm long, 13-20 mm broad, with 2-3 flowers at each node, of which only the lowermost develops; **leaves** linear, 3-7 cm long, 1.3-2.3 mm wide, pungent-tipped, thick and succulent, sebaceous or glabrous; **stems** 3-6 (-10) dm tall, much-branched, the branches very stout, ascending or spreading, hispid, glabrate, sometimes glabrous, striate, commonly tinged with red; **root system** annual with a tap-root (2n = 36).

**Importance:** Young shoots are sometimes eaten as a pot herb. The plant was once burned and the ashes used in making soap and glass. The juice of the fresh plant has been said to be an excellent diuretic.
2. Salsola pestifer A. Nelson

Common Name: Russian Thistle


Synonyms: Salsola iberica Sennen & Pau, S. kali var. ruthenica (Iljin) Soó in Soó and Ivorka, S. kali var. tenuifolia Tausch, not Mey., S. ruthenica Iljin, S. tragus of NY reports, not L.

Origin: A native of Northern Eurasia

Habitats: Cultivated fields and waste places, especially along railroads and where the soil is sandy

Habit: Erect, annual herb

Flowering: July-September

Fruiting: September-November

General Distribution: Southern Europe and Russia, now widespread throughout the world; in North America from Quebec to British Columbia south to Missouri and New York

Description: Plants with bisexual flowers; stigmas 2, erect with curling tips, 1.0-1.4 mm long; style 0.4-1.0 mm long; ovary obovoid; fruit obconic, closely investing the seed and nearly the same size; seed black, obconic, 1.5-2.0 mm long, 2-3 mm wide; stamens usually 5; filaments membranaceous, 1.8-2.5 mm long; anthers elliptic, yellow, 0.5-1.2 mm long; perianth 6-10 mm wide (including wings), transversely winged in age, the wings thin, crenate or dentate, conspicuously veined, often tinged with red, the perianth of the lower axil often merely carinate or with short thick wings; lobes (in flower) membranaceous, lanceolate, 1.5-1.7 mm long, 1.1-1.8 mm broad, apex acuminate, the lower portion becoming hardened and laterally winged in fruit, the upper portion remaining membranaceous, bracts narrowly lanceolate, broad-based, 0.5-1.5 cm long, 1.5-2.5 mm broad, closely enclosing the fruit, not connivent; bracteoles similar to the bracts but smaller; inflorescence of terminal and axillary spikes 1-6 cm long, 10-18 mm broad, with 2-3 flowers at each node, of which only the lowermost develops; leaves filiform, 1.2-4.5 cm long, 0.4-0.6 mm wide, pungent-tipped, subterete and succulent, scabrous or glabrous; stems 3-6 (-10) dm tall, much-branched, the branches very stout, ascending or spreading, short-villous or scabrous, sometimes nearly or quite glabrous, striate, commonly tinged with red; root system annual with a taproot (2n = 36).

Nomenclatural Note: This species is, occasionally, known under the name S. australis R. Br. (see, for example, Botschantzev, 1974), but Crompton (pers. comm.) has seen the type of S. australis and determined it to be S. kali; therefore, the earliest name for this species is S. pestifer.
Common Name: Sea-blite

Authority: Forsskål, Fl. Aegypt. Arab. p. 69, 1775

A genus of about 100 species of cosmopolitan distribution, except in boreal climates, and most diverse in the Middle East. Nearly all species of the genus are halophytes, found in salt marshes, salt lakes and other saline or alkaline habitats.

Description: Plants with bisexual flowers, or monoecious or dioecious; stigmas 2-5, filiform; style absent; ovary 1, superior, unilocular, with a single basal ovule; fruit an indehiscent utricle enclosed by the infolded perianth, and closely enveloping the seed, the pericarp membranaceous, usually non-adherent; seed 1, homomorphic, horizontal or vertical, lenticular; embryo coiled in a flat spiral; perisperm scanty or none; radicle centrifugal; stamens 5, hypogynous; filaments linear, distinct; anthers tetrasporangiate; perianth 5-lobed; bracts leaf-like, subtending the glomerules; bracteoles 2, scarious; inflorescences small irregular glomerules in axil of leaves; leaves simple, alternate, mostly succulent, narrow and often terete, never spine-tipped; stems more or less fleshy-herbaceous (or suffrutescent), glabrous to short-pubescent, from an annual taproot or perennial rootstalk.

KEY TO SPECIES

1. Mature seeds 1.0-1.5 mm diameter; sepals connivulate or carinate .......................................................... (2)
2. Sepals unequal, 1 or 2 connivulate, the others slightly keeled ............................................................... 1. S. calceoliformis
3. Sepals rounded on abaxial surfaces ............................................................................................................. 3. S. maritima
4. Sepals carinate abaxially ............................................................................................................................. 4. S. rolandii
5. Sepals rounded or carinate ........................................................................................................................ 3. S. linearis
1. *Suaeda calceoliformis* (Hook.) Moq.

**Common Names:** Matted Sea-blight, American Seepweed

**Type Description:** Hooker. Fl. Bor. Amer. 2: 126, 1838


**Origin:** A native of western North America and the boreal northeast

**Habitats:** Salt marshes (coastal in New York)

**Habit:** A prostrate to decumbent, occasionally erect, annual herb

**Flowering:** August-October

**Fruiting:** September-November

**General Distribution:** Newfoundland to the Northwest Territories south to California, Texas, Michigan and New Jersey

**Description:** Plants with bisexual flowers (or some unisexual by abortion); stigmas 2, erect or spreading, 0.1-0.2 mm long; ovary depressed-ovoid; fruit depressed-ovoid or ellipsoid, pericarp non-adherent, closely investing the seed, the fruit therefore nearly the same size as the seed; seed horizontal, dark red when young, black when mature, ovoid to ellipsoid, 1.0-1.5 (-1.7) mm in diameter, 0.5-0.7 mm thick, testa verrucose under high magnification; stamens 5; filaments membranaceous, 0.5-0.6 mm long; anthers oblong, yellow, 0.3-0.4 mm long; perianth 1.4-1.8 (-2) mm wide; lobes membranaceous, irregular and unequal, ovate to deltate, 0.5-0.8 mm long, 0.4-0.8 mm broad, one or two of the sepals usually more strongly hooded and corniculate than the others, horn 0.3-0.4 mm long, with a transverse wing occasionally developed at the base; bract linear, 2-10 mm long, 0.8-1.5 mm broad; inflorescences terminal on lateral branches, subspicate, the flowers crowded in the axils of reduced leaves, some flowers also in the axils of lateral branches; glomerules 1.5-2.5 mm in diameter; leaves linear, mostly semiterete, rarely flat, apex acute, margins entire, fleshy or succulent, green, occasionally becoming red or purple, lower leaves (0.5-) 1-4 cm long, 0.2-1.0 mm wide, shorter and broader (to 1.5 mm wide) in the inflorescence; stems prostrate or decumbent, occasionally erect, 20-65 cm tall, branches 1 to many, 19-31 cm long, spreading ascending to horizontal, the abundant flowering branches ascending or occasionally erect, mostly from the base of the plant, the lowermost sometimes opposite, stems rounded, mostly brownish green and slightly woolly at the base, glabrous; root system annual with a woody taproot up to 50 cm long (2n = 54).
Nomenclatural Note: Atlantic coastal plants have, usually, been treated under the name *S. americana*, but Bassett & Crompton (1978b) have combined the eastern taxon with the widespread western taxon *S. calceliformis* (often treated under the name *S. depressa*). I agree that the eastern plants fall within the range of variation of the western species.

2. *Suaeda linearis* (Ell.) Moq.

Common Name: Southern Sea-blite

Type Description: Elliott, Bot. S. C. & Ga. vol. 1, p. 332, 1821

Synonym: *Dondia linearis* (Ell.) Heller

Origin: Native to the Atlantic Coast of North America

Habitats: Salt marshes and sea beaches primarily along the coast

Habit: Erect, annual herb

Flowering: August-September

Fruiting: September-October

General Distribution: The Atlantic Coast of North America, from New York to the Yucatan Peninsula, Mexico and the West Indies

Rarity Status: This species is ranked G5 S3? by the New York Natural Heritage Program, and it appears on their watch list.

Description: Plants with bisexual flowers (or some unisexual by abortion); **stigmas** 2 (-5), spreading, 0.1-0.2 mm long; **ovary** depressed-ovoid; **fruit** depressed-ovoid, pericarp non-adherent, closely investing the seed and nearly the same size; **seed** horizontal, ovoid, black, 1.0-1.5 mm in diameter, 0.6-0.8 mm thick, the testa minutely reticulate; **stamens** 5; **filaments** membranaceous, 0.6-0.9 mm long; **anthers** oblong, yellow, ca. 0.2 mm long; **perianth** 1.5-2.0 mm wide; **lobes** membranaceous, broadly ovate to deltate, 0.5-0.6 mm long, 0.7-1.1 mm broad, equally carinate, apex obtuse; **bract** linear, 2-7 mm long, 0.7-1.1 mm broad; **inflorescences** terminal and axillary, spikes, 4-12 cm long, 2-4 mm broad, some glomerules in the axil of branches; **glomerules** 1-3 flowered, 2-4 mm in diameter; **leaves** narrowly linear, semiterete, apex acute, dark green, not glaucous, 0.7-1.5 (2.5) cm long, 3-5 mm wide, shorter in the slender elongated flowering branches; **stems** erect to ascending or decumbent, 2-9 dm tall, profusely branched, the slender branches ascending or spreading; **root system** annual, a taproot, sometimes persisting in warm regions.
Note: The similar species *Suaeda richii* Fern., with a non-keeled calyx, should be sought out in New York, since it is found in both Massachusetts and New Jersey. No specimens of that species from the State have been seen to date.


**Common Name:** White Sea-blite

**Type Description:** Linnaeus, Species Pl. 1, p. 221, 1753

**Synonyms:** Chenopodium maritimum L., Dondia maritima (L.) Druce, D. fernaldii Standley, *Suaeda fernaldii* Standley

**Origin:** A native of Europe

**Habitats:** Coastal marshes

**Habit:** Growing mostly in wet salt marshes, high, tidal beaches and coastal mud flats

**Flowering:** August-September

**Fruiting:** September-November

**General Distribution:** Coastal Europe; introduced in North America along the Atlantic Coast from Quebec to Florida and also reported from the Pacific Coast

**Rarity Status:** This species is ranked G5 S3 by the New York Natural Heritage Program and has been placed on their watchlist.

**Description:** Plants with bisexual flowers (or some unisexual by abortion); stigmas 2-3 (-5), erect or spreading, 0.5-0.7 mm long; ovary depressed-ovoid; fruit depressed-ovoid, pericarp non-adherent, closely investing the seed and nearly the same size; seed horizontal, red-brown to black, ovoid, (1.5-) 1.8-2.2 mm in diameter, 0.7-0.9 mm thick, testa faintly reticulate; stamens 5; filaments membranaceous, 1.0-1.7 mm long; anthers oblong, yellow, 0.4-0.5 mm long; perianth 2.0-3.3 mm wide; lobes membranaceous, broadly ovate to deltate, 1.5-1.7 mm long, 0.7-1.0 mm broad, pale green, rounded or obscurely carinate on back, occasionally hooded or keeled at maturity, the apex rounded to obtuse; bracts oblong, 0.5-0.7 mm long; inflorescences of glomerules in the axils of leaves; glomerules subglobose, 1-3 (-4) flowered, 3-5 mm in diameter; leaves linear, mostly subterete, occasionally flat, ascending or spreading, fleshy to succulent, the apex acute, margins entire, glaucous, dark green, 0.5-4.0 (-5) cm long, 0.8-1.7 mm wide, the leaf base only slightly, if at all, wider than the rest of the blade; stems erect to ascending, decumbent or prostrate, terete, mostly light brown, and slightly woody at the base, plants 0.5-6 dm tall, profusely branched, the slender branches ascending to spreading or decumbent, mostly from the lower parts of the plant; root system a slightly woody taproot, annual, but sometimes persisting in warmer regions (2n = 36).

**Variation:** This is a highly variable species, but all of our specimens are the typical var. *maritima.*
Importance: This species is used for potash extraction in Europe and Asia. The fresh plant has laxative properties that disappear on boiling.

4. *Suaeda rolandii* Bassett & Crompton

Common Name: Sea-blite


Origin: A native of the coasts of northeastern North America

Habitats: Salt marshes

Habit: Erect or procumbent, annual herb

Flowering: August-September

Fruiting: September-October

General Distribution: Nova Scotia to Quebec south to New Jersey along the coast

Rarity Status: This species is very rare throughout its range, and it has been proposed as a Federally Endangered species, currently ranked G1G2Q SH by the New York Natural Heritage Program.

Description: Plants with bisexual flowers (or some unisexual by abortion); stigmas 2-3, erect or spreading, ca. 0.2 mm long; ovary depressed-ovoid; fruit depressed-ovoid, pericarp non-adherent except on the more flattened fruits, where it is adherent, closely investing the seed and nearly the same size; seed horizontal, dimorphic, black or reddish brown, the more flattened. brown seeds developing later in the season, 1.5-2.3 mm in diameter, 0.5-0.7 mm thick, testa of the black and reddish-brown seeds shiny and finely reticulate, whereas the flattened, brown seeds are dull with no distinctive surface pattern; stamens 2-5; filaments membranaceous, ca. 1 mm long; anthers oblong, white, ca. 0.2 mm long; perianth ca. 3.5 mm in diameter; lobes membranaceous, ovoid, ca. 1 mm long, 1.0-1.5 mm broad, hooded and keeled abaxially, the apex rounded; bracts oblong, 0.4-1.2 mm long; inflorescences of glomerules in the axils of leaves; glomerules subglobose, 1- to 3-flowered, 4-5 mm in diameter; leaves linear, mostly subterete, occasionally flat, ascending or spreading, very fleshy and succulent, the apex acute, margins entire, glaucous, dark-green, 1.7-2.5 (-3) cm long, 0.7-1.5 mm wide, the base of leaf not wider than the rest of the blade, becoming bract-like and shorter towards the inflorescence; stems erect or procumbent, the plants 2-7 dm tall, branches 1-several, ascending or erect, mainly from the uppermost part of the plant, stems rounded, light brownish-green, becoming woody at the base near maturity; root system annual with a woody taproot (2n = 90).

Note: This species is apparently allotetraploid in origin, derived from *S. calceoliformis* and *S. maritima.*
7. BASSIA

Common Names: Bassia, Summer-cypress (Kochia)


A genus of about 30 species, when recognized in the broad sense. Kochia is nearly cosmopolitan in distribution. Scott (1978a) combined Kochia and Bassia, citing the only difference between the two genera as the nature of the calyx in fruit. Kochia has a winged fruiting calyx, whereas Bassia has no wings, but it may have spines or other protuberances. Scott also noted that some Kochia species have spines with wings developed between them. The following treatment follows Scott in combining the two genera.

Description: Plants with all bisexual flowers or polygamous; stigmas 2 (-3), filiform; style 1 or absent; ovary 1, superior, unilocular with a single basal ovule; fruit an indehiscent utricle, enclosed in the accrescent perianth, pericarp membranaceous, non-adherent; seed 1, homomorphic, horizontal, rarely vertical in a few bisexual flowers; embryo annular or subannular; perisperm abundant, farinaceous, or absent; perianth 5-lobed, connate to above the middle with reflexed lobes, becoming accrescent, chartaceous in fruit, with horizontal wings, spines, lobes or without appendages; bracts linear; bracteoles absent; inflorescences of terminal spikes of single or paired flowers, or rarely glomerules at the nodes; leaves simple, alternate, herbaceous or succulent; petioles very short or absent; stems herbaceous, with an annual taproot or perennial root system.

KEY TO SPECIES

1. Fruiting perianth winged ................................................................. 1. B. scoparia
2. Fruiting perianth with spines or tubercles .................................................................(2)
   1. Leaves linear to filiform; fruiting perianth with short, connate tubercles ............................................. 2. B. hirsuta
   2. Leaves oblanceolate; fruiting perianth with long, curled spines ............................................. [B. hyssopifolia, a wait]
1. *Bassia scoparia* (L.) A. J. Scott

**Common Names:** Summer-cypress, Belvedere-cypress, Fire-weed, Kochia, Mock-cypress, Mexican fire-bush

**Type Description:** Linnaeus, Species Pl. I, p. 221, 1753

**Synonyms:** *Kochia alata* Bates, *K. scoparia* (L.) Roth ex Schrad.

**Origin:** Native to Asia and southern Europe

**Habitats:** Waste places

**Habit:** Erect, annual herbs

**Flowering:** Late July-September

**Fruiting:** Late August-October

**General Distribution:** Native to Eurasia; naturalized in North America from Nova Scotia to British Columbia south to Colorado, Texas and Pennsylvania

**Description:** Plants with bisexual flowers (sometimes functionally unisexual); stigmas 2 (-3), erect or spreading, 1-2 mm long; style 0.2-0.3 mm long; ovary depressed-ovoid; fruit depressed-ovoid, 1.4-1.6 mm long, 0.9-1.2 mm broad, the pericarp free, eventually disintegrating; seed horizontal, brown to black, obovoid, 1.4-1.6 mm in long, 0.9-1.2 mm broad, 0.4-0.6 mm thick, testa smooth or glandular; stamens 5; filaments membranaceous, 1.0-1.3 mm long; anthers ellipsoid, light yellow, ca. 0.5 mm long; perianth 2-4 mm in diameter at maturity, star-shaped; lobes triangular, 0.4-0.5 mm long, 0.5-0.6 (-1.5) mm broad, in fruit accrescent, chartaceous, each lobe bearing a highly variable membranaceous dorsal lobe or wing, varying from short and tuber-like to usually flat, oblong-rotund or rotund, semi-membranaceous, cellular reticulate, often striate, entire, lobed or bifid, lobes or wings 0.4-0.7 (-1) mm long and 0.7-1.5 mm broad; bracts linear, 3-18 mm long; inflorescences terminal spikes, 3-10 cm long, or flowers spaced along the branches in the axils of leaves, the flowers sessile, usually paired, sometimes single, rarely in 3-5 flowered glomerules, the flowers enclosed by tufts of short or long hairs; leaves thin, linear to lanceolate or oblanceolate to narrowly obovate, 2-7 (-10) cm long, 0.5-8.0 (-12) mm broad, apex acute or obtuse to rounded, tapering to the base, entire, ciliate, usually villous or pilose, with hairs to ca. 6 mm long, glabrate (especially above); petioles 0.3 mm long; stems erect, 3-20 (-40) dm tall, usually branched from the base, the branches erect to spreading, very leafy, glabrous, short-villous or short-pilose, with silvery or rust-colored hairs, stems and branches yellowish-green, green or streaked with red, often turning red or reddish purple in fall; root system annual with a taproot (2n = 18).

**Infraspecific Variation:** Several forms and varieties have been described; those with very narrow, thread-like leaves have been called "*Kochia scoparia* var. *culata* Faw.;" those with broader leaves and downy stems have been called "*K. scoparia* var. *pubescens* Fenzl.," while the typical plants have broader leaves and sparsely hairy to glabrous stems.
2. *Bassia hirsuta* (L.) Aschers. ex Schwein.

**Common Name:** Bassia

**Type Description:** Linnaeus. Species Pl. I. p. 221, 1753

**Origin:** A native of Coastal Europe

**Habitats:** Coastal saline or brackish soils

**Habit:** Erect, annual herb

**Flowering:** August

**Fruiting:** September

**General Distribution:** Coastal Europe, introduced into the United States along the coast from New England to Maryland

**Description:** Plants with bisexual flowers; stigmas 2. erect or spreading, ca. 0.6 mm long; style ca. 0.2 mm long; ovary depressed-globose; fruit depressed-oblong, pericarp free; seed horizontal, lenticular, dark brown to black, oblong, 1.2-1.8 mm long, 0.8-1.2 mm broad, 0.4-0.6 mm thick, testa glabrous; stamens 5; filaments membranaceous, 0.8-1.0 mm long; anthers ellipsoid. light yellow, 0.4-0.5 mm long; perianth 1.2-2.0 mm wide; lobes deltate, 0.9-2.0 mm long, 0.4-0.7 mm wide, pubescent, incurved in flower, persistent and incurved over the seed in fruit, developing short, stout dorsal tubercles on 3 of the lobes, the tubercles 0.5-1.0 mm long; bracts absent; inflorescences of solitary flowers or in short spikes from the upper leaf axils, 3.5-5.0 cm long; leaves fleshy, linear-oblong to linear, semi-terete, 0.5-1.0 cm long, 0.8-1.4 mm broad, apex rounded, pubescent; petioles absent; stems 1.5-4.0 dm tall, branching from the base, the branches erect, turning pink in autumn; root system annual with a taproot (2n = 18).

**Importance:** This plant has been used on the island of Cyprus for soda extraction.

**Wafs:** *Bassia hyssopifolia* (Pall.) Kuntze, which differs from *B. hirsuta* in having flat leaves and curved spines up to 1.5 mm long on the fruiting perianths, was found by Joseph Monachino in three locations in Queens Co. in the 1940s, but it has not been reported since.
8. CORISPERMUM

Common Name: Bugseed

Authority: Linnaeus Species Pl. I. p. 4, 1753

A genus of 60 species in the north temperate parts of the world. The genus is diverse, and distinctions between species are often difficult to make. For instance, one important character is the presence of winged fruit; however, Brooks (1986) stated that some plants have both winged and wingless fruits. The North American plants needs to be studied in connection with Eurasian materials.

KEY TO SPECIES

1. Fruit lacking conspicuous wing-margins ..........................................................[C. orientale, a waif]
2. Fruit conspicuously wing-margined .................................................................(2)
   2. Spikes dense; bracts closely overlapping and all at least as broad as the fruit .......................1. C. hyssopifolium
   2. Spikes loose; bracts not distinctly overlapping, especially along lower-most portion of spike, and at least the lower bracts much narrower than the fruit ...............................................................[C. nitidum, a waif]

1. Corispermum hyssopifolium L.

Common Name: Bugseed

Type Description: Linnaeus. Species Pl. I. p. 4, 1753

Synonyms: Cycloloma hyssopifolium var. americana Nutt., C. americanum Nutt., C. marginale Rydb., C. imbricatum A. Nels., C. simplicissinum Lunell

Origin: A native of Eurasia

Habitats: Sandy fields or beaches

Habit: An erect, annual herb

Flowering: August-September

Fruiting: September-October

General Distribution: Illinois to North Dakota and Idaho south to Texas and Arizona

Description: Plants with bisexual flowers; stigmas 2, subfiliform, recurved, ca. 0.4 mm long; style 1, ca. 0.6
mm long; **ovary** 1, ovoid, unilocular, with a single, basal **ovule**; **fruit** an oval to rounded, flattened or concave, indehiscent utricle, 3.3-4.2 mm long, 2.0-2.8 mm broad, exserted from the perianth, but usually hidden by the bract, the margin with a pale wing, 0.2-0.5 mm wide, pericarp somewhat hardened and loosely surrounding the seed, non-adherent; **seed** 1, vertical, homomorphic, stramineous, oval, 3.5-4.0 (-5) mm long, 1.2 (-4) mm broad, testa glabrous; **embryo** anular; **perisperm** abundant, farinose; **radicle** basal; **stamens** 1-3 (-5), hypogynous; **filaments** linear, membranaceous, 0.5-1.0 mm long, distinct; **anthers** tetrasporangiate, ellipsoid, yellow, 0.5.0.8 mm long; **perianth** 1 sepal, scarious, oblong, 0.6-1.0 mm long, 0.4-0.9 mm broad, apex rounded; **bract** often imbricate, linear to oval, usually erect, 4-10 mm long, 2.0-2.6 mm broad, acute or acuminate, stellate pubescent or glabrate, the lowest longer and narrower, all except the lowest as broad as or broader than the fruit, these rarely narrower; **bracteoles** absent; **inflorescences** terminal and axillary spikes 4-9 cm long, 4-8 mm broad, the flowers at each node solitary or in glomerules; **leaves** simple, alternate, herbaceous, broadly linear, 0.5-4.0 (-9) mm long, 0.1-0.3 (-0.5) mm broad, entire, cuspidate, glabrous or stellate-pubescent; **petioles** absent; **stems** herbaceous, slender, much-branched, 1.5-6.0 dm tall, the branches spreading, striate, glabrous or stellate-villosus, often tinged with red, sparsely leafy; **root system** annual with a taproot.

**Waifs:** *Corispermum micranthum* Kitaibel ex Schultes has been collected in Buffalo (Erie Co.), Rochester (Monroe Co.), and Mechanicsville (Saratoga Co.); *C. orinital-c* Lamarck was collected in Buffalo (Erie Co.) and New York City (New York Co.) in the nineteenth century but not since.

### 9. POLYCNEMUM

**Common Name:** Polycnemum  
**Authority:** Linnaeus, Species Pl. 1, p. 35, 1753  
A genus of 6-7 species, native to Europe and central Asia.  
**Waif:** *Polycnemum majus* A. Br., was collected at Moquette Mill, Yonkers (Westchester Co.) in 1890.

### 10. AXYRIS

**Common Name:** Russian Pigweed  
**Authority:** Linnaeus, Species Pl. II, p. 979, 1753  
A genus of seven species native to northern Asia and Europe; *A. amaranthoides* is often a contaminant of grain in Europe, and it has now become naturalized in the Great Plains.  
**Waif:** *Axyris amaranthoides* L. appeared at the Port of Albany (Albany Co.) and was collected in 1950.

### 11. CYCLOLOMA

**Common Name:** Winged Pigweed  
**Authority:** Moquin-Tandon, Chenop. Monogr. Enum. p. 17, 1840  
A monotypic genus native to North America.
1. *Cyrtoloma atriplicifolium* (Spreng.) Coult.

**Common Name:** Winged Pigweed

**Type Description:** Sprengel, Bot. Gart. Hal. Nachr. 1: 35, 1801

**Synonym:** *Salsola atriplicifolia* Spreng.

**Origin:** A native of central North America

**Habitats:** Sandy fields, beaches, blowouts, roadsides and waste places

**Habit:** A densely-branched, erect to spreading annual herb

**Flowering:** July-September

**Fruiting:** August-November

**General Distribution:** Native from Indiana to Saskatchewan south to Mexico and Texas, now introduced eastward to Quebec, New York and New Jersey

**Description:** Plants polygamodioecious; stigmas 3, subfiliform, erect or spreading, 0.5-1.0 mm long; **style** 1, ca. 0.1 mm long, or absent; **ovary** 1, superior, depressed-ovoid, densely tomentose, unilocular with a single basal **ovule**; **fruit** a depressed-globose, indehiscent utricle, pericarp membranaceous, pubescent, non-adherent, closely investing the seed and nearly the same size; **seed** 1, horizontal, lenticular, black, 1.4-1.5 mm in diameter, 0.8-1.0 mm thick, testa glabrous; **embryo** annular; **perisperm** farinose, abundant; **radical** centrifugal; **stamens** 5, hypogynous; **filaments** subulate, membranaceous, 1.0-1.2 mm long; **anthers** tetraropangiate, oblong, yellow, 0.2-0.3 mm long; **perianth** 5-lobed, hemispheric, developing a broad, dentate, membranaceous wing, 2.5-4.0 mm diameter, more or less villous, becoming red or purple in fruit; **lobes** triangular-ovate, 0.4-0.6 mm long, 0.4-0.8 mm broad, infeclx, apex obtuse, carinate; **bract** narrowly oblong to narrowly elliptic, 0.3-1.0 cm long, 0.3-0.9 mm broad, entire or toothed; **bracteoles** absent; **inflorescence** a broad panicle, 9-19 cm long, 5-15 cm broad, the flowers solitary at each node, sessile; **leaves** simple, alternate, herbaceous, oblong or narrowly oblong, 2-8 cm long, 0.6-1.5 cm broad, apex acute, base usually tapering to a petiole, margins coarsely and irregularly sinuate-dentate, teeth acute, mucronate, young leaves white-tomentose, becoming glabrate, then usually falling from fruiting plant; **petioles** 0-8 mm long; **stems** herbaceous, erect or spreading, densely branched, 1.5-8.0 dm tall, as broad as tall, the branches slender, obtusely angled, striate, white villous-tomentose when young, becoming glabrate; **root system** annual with a taproot.
### 12. MONOLEPIS

**Common Names:** Poverty Weed, Spear-leafed Goosefoot, Monolepis

**Authority:** Schrader, Index Semin. Horti Acad. Goeth. p. 4, 1830

A genus of 3-6 species native to northern Asia, North America, and Patagonia.

*Wait:* *Monolepis nuttalliana* (Schultes) Greene, was collected once at Cornell University (Tompkins Co.) in 1932 and has been reported from Monroe County.

### 13. CHENOPODIUM

**Common Names:** Pigweed, Goosefoot

**Authority:** Linnaeus, Species PI. 1, p. 218, 1753

A genus of 70-150 species worldwide. The plants are often associated with xeric environments and most species are weedy within and outside their ranges. *Chenopodium* is notorious for its taxonomic difficulty, largely attributable to phenotypic plasticity, but with some of the variability resulting from hybridizations. Compounding this situation is the large number of species named within the past 75 years, particularly within the *Chenopodium album* complex, leading to many conflicting taxonomic treatments. Many of these recently-described taxa are probably best considered varieties of earlier-named species. Some pigweeds are well-known as tumbleweeds and noxious garden pests. Other species are grown as pot-herbs, and *C. ambrosioides* L., Mexican tea, is extracted for "oil of chenopodium," which has medicinal properties. Quinoa (*C. quinoa* Willd.) is a South American grain staple in the highlands of the Andes. Scott (1978b) reviewed the classification of the subtribe Chenopodinae (including *Blitum, Chenopodium, Dysphania*, and *Monolepis*). In his review he placed *Chenopodium capitatum* and related species in the genus *Blitum*, based upon the fleshy perianth, vertical seed with a superior radicle, and the hippocrepiform embryo. I have followed the more traditional concept of *Chenopodium* by continuing to include these species within the genus. I feel that further comparative studies with other genera of the family are needed to clarify the morphological lines along which *Chenopodium* might best be split.

**Description:** Plants with *bisexual* or rarely *unisexual* flowers, then the terminal flower of glomerules often male or bisexual and the lateral female; **stigmas** 2-5, filiform; **style** 1, or usually absent; **ovary** 1, superior, unilocular with a single basal **ovule**; **fruit** an indescent utricle, often enclosed in the infolded perianth, the pericarp membranaceous or fleshy, adherent or not; **seed** 1, horizontal or vertical, usually lenticular; **embryo** annular or incompletely annular, surrounding the copious farinaceous perisperm, the **radicle** inferior or centrifugal; **stamens** 3 or fewer, hypogynous or subperigynous; **filaments** linear, distinct or sometimes connate at the base; **anthers** tetrasporangiate; **perianth** a single series, usually 3 lobes, rarely 3-4, commonly united at least at their bases; **bract** present or absent, usually subtending glomerules, blade-like or needle-like; **bracteoles** absent; **inflorescences** terminal or axillary spikes, or the flowers often clustered into axillary glomerules; **leaves** simple, alternate, herbaceous, pinnatifid, usually unlobed, margin entire, dentate or serrate; **petioles** present or absent; **stems** herbaceous, rarely suffrutescent, usually either glandular or farinaceous, covered with small, white, inflated hairs; **annual** or **perennial** from shallow root systems, or, more often from a taproot.

**KEY TO SPECIES**

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Calyx not obviously veined, sepals usually fused only near the base; leaves entire, toothed or lobed (rarely pinnatifid)</td>
<td><em>(C. multifidum)</em></td>
</tr>
<tr>
<td>2.</td>
<td>Plants variously pubescent or glandular pubescent but not completely glabrous or farinose (mealy)</td>
<td><em>(C. aristatum)</em></td>
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<tr>
<td>3.</td>
<td>Seeds chiefly horizontal, 0.7-1.0 mm broad</td>
<td><em>(C. ambrosioides)</em></td>
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<tr>
<td>4.</td>
<td>Leaves linear, entire or nearly so; plants not aromatic</td>
<td><em>(C. pinnatifidum)</em></td>
</tr>
<tr>
<td>5.</td>
<td>Flowers in glomerules and short spikes, the upper bracteate; lower leaves serrate, the upper leaves entire; pericarp smooth</td>
<td><em>(C. botryos)</em></td>
</tr>
</tbody>
</table>
6. Seeds vertical, occasionally with a few horizontal seeds in the same inflorescences ........................................ (7)
7. Plants perennial; stigmas more than 0.8 mm long; seeds more than 1.5 mm diameter .........................5. C. bonus-heiniclus
8. Leaves glabrous, the undersurfaces not white or sparsely whitened; flowers in globose heads ......................... (9)
9. Terminal flower vertical like the others; flowers borne in capitate glomerules; fruits fleshy, bright red ..................(10)
10. Glomerules subtended by bracts ..........................................................................................[C. foliosum, a waif]
11. Primary leaves linear, ca. 5 times longer than wide, less than 2 cm in width ........................................ (12)
12. Flowers in small cymes; plants glabrous or pubescent. [C. aristatum, a waif]
13. Fruits maturing unevenly, such that mature fruit and young perfect flowers may be present in a glomerule at the same time; leaves thin; sepals weekly or not at all keeled ..................................................(14)
14. Leaf margins with short, ascending teeth; leaves rounded or tapered at the base, gradually reduced upward on the stem, intergrading with entire inflorescence bracts; seeds 1.1-1.5 mm in diameter .............................10. C. standleyanum
15. Inflorescence-axes and abaxial sepal surfaces glabrous ................................................................................ (16)
16. Leaves ovate to oblong, entire, or rarely with a single, inconspicuous tooth on each margin; stems 4-angled ........(17)
17. Leaves deltate, the margins dentate; stems not 4-angled ..............................................................................12. C. urticum
18. Seeds with acute margins; testa minutely and closely pitted ........................................................................13. C. marale
19. Perianth lobes united to above the widest portion of the seed; leaves with 3 basal lobes ..................[C. opulifolium, a waif]
20. Sepals spreading, not closed over the seed; leaves serrate; seeds oval in outline .........................14. C. strictum
21. Pericarp alveolate-reticulate or reticulate ...............................................................................................15. C. berlandieri
22. Pericarp smooth or mottled .........................................................................................................................16. C. album
1. Chenopodium multifidum L.

Common Name: Cut-leaf Goosefoot

Type Description: Linnaeus, Species Pl. 1. p. 220, 1753

Synonym: Roubieva multifida (L.) Moq.

Origin: A native of South America

Habitats: Waste ground and ballast dumps

Habit: Prostrate to ascending perennial herbs

Flowering: July-October

Fruiting: July-October

General Distribution: Brazil to Argentina and Chile; adventive in North America, near the coast, from New York to Florida and from Oregon to California

Description: Plants with bisexual flowers; stigmas 2 (-5), erect or spreading, 0.3-0.4 mm long; style 0.1-0.2 mm long; ovary ovoid to oblong; fruit obovoid, the pericarp membranaceous with many yellow, glandular hairs near the apex, smooth, loosely adherent; seed vertical, dark reddish-brown, suborbicular to ovoid, 0.8-1.1 mm long, 0.8-0.9 mm broad, testa smooth; stamens 5; filaments membranaceous, 0.7-0.9 mm long; anthers ellipsoid, yellow, 0.4-0.5 mm long; perianth urceolate, shallowly 5-lobed, 1.5-2.0 mm long, 1.1-1.3 mm broad in fruit, obovoid, reticulate-nerved, puberulent; lobes 0.1-0.5 mm long, 0.6-0.8 mm broad, rounded, accrescent and coriaceous with age; bracts and bracteoles absent; inflorescence of glomerules in the axils of leaves; glomerules subglobose, 1.8-2.5 mm in diameter; leaves oblong, deeply pinnatifid, 1.0-4.5 cm long, 0.2-2.0 cm wide, or the upper smaller segments oblong, apex acute to obtuse, entire or dentate; petioles absent; stems much-branched, the branches prostrate or ascending, 1.5-7.0 dm long, striate, white villous when young, sometimes glabrate with age; root system annual with a taproot.
2. *Chenopodium pumilio* R.Br.

**Common Name:** Goosefoot

**Type Description:** R. Brown, Prodr. 1: 407, 1810

**Synonym:** *C. carinatum, sensu* American authors, not R. Br.

**Origin:** Native to Australia

**Habitats:** Waste areas on rocky, sandy, or gravelly ground and sidewalk crevices

**Habit:** Erect, annual herbs

**Flowering:** June-September

**Fruiting:** August-October

**General Distribution:** Australia; introduced in North America from Massachusetts south to Washington D.C., and from Missouri to Texas and California

**Description:** Plants with **bisexual** flowers; **stigmas** 3, erect or spreading, 0.1-0.3 mm long; **style** absent; **ovary** ovoid; **fruit** ovoid, the pericarp membranaceous, slightly rugose, adherent; **seed** vertical, reddish brown, ovoid, 0.6-0.7 mm long, 0.5-0.6 mm broad, testa smooth; **stamens** 0 or 1; **filaments** membranaceous, 0.3-0.4 mm long; **anthers** globose, yellow, 0.2-0.3 mm long; **perianth** 5-lobed; **lobes** elliptic to oblong, 0.6-0.7 mm long, 0.2-0.3 mm broad, usually cucullate or carinate, apex acute, usually covered with glands, partially enclosing the seed, united only at the base; **bract** 3-16 mm long, 0.4-6.0 mm broad, elliptic, apex obtuse, margin crenate dentate, petiolate; **bracteoles** absent; **inflorescences** of axillary glomerules or axillary cymes; **glomerules** subglobose, 1.5-2.5 mm in diameter; **leaves** oblong to ovate-oblong, 1.4-2.7 cm long, 0.6-1.5 cm broad, reduced somewhat in the inflorescence, yellow-green with yellow glands, the apex obtuse, base cuneate, margins coarsely sinuate-dentate with obtuse lobes; **petioles** 0.3-1.5 cm long; **stems** much-branched from the base, the branches stout, prostrate or 2-4 dm tall, whitish, glandular villous throughout; **root system** annual with a taproot.
3. Chenopodium ambrosioides L.

Common Names: Mexican Tea, Spanish Tea, Wormseed

Type Description: Linnaeus, Species Pl. I, p. 219, 1753

Synonyms: Chenopodium ambrosioides var. anthelminticum (L.) A. Gray, C. ambrosioides var. chilense of New York authors not (Schrad.) Speg., C. anthelminticum L.

Origin: A native of tropical America

Habitats: Disturbed areas as a weed

Habit: Erect or ascending, annual or short-lived, perennial herbs

Flowering: August-October

Fruiting: August-November

General Distribution: Maine to southern Ontario, south to Central America; also introduced in Europe, Asia and Africa

Description: Plants with bisexual flowers; stigmas 3, erect or spreading, 0.2-0.4 mm long; style absent; ovary ovoid; fruit ovoid, the pericarp rugose to smooth, non-adherent; seed horizontal or vertical, reddish-brown, ovoid, 0.6-1.0 mm in diameter, 0.4-0.5 mm thick, testa rugose to smooth; stamens 4-5; filaments membranaceous, 0.5-0.7 mm long; anthers globose, yellow, 0.3-0.4 mm long; perianth 4-5 lobed; lobes ovate, 0.7-1.0 mm long, 0.4-0.5 mm broad, obtuse on back, apex obtuse, upper half free, covering the seed at maturity; bract lanceolate, oblanceolate, spatulate or linear, the apex obtuse, acute or attenuate, 0.3-2.5 cm long, 0.5-7.0 mm broad; bracteoles absent; inflorescences lateral leafy-bracted or naked spikes, 3-7 cm long; leaves with the smell of kerosene, ovate to oblanceolate, the lower ones mostly lanceolate, 2-8 (-12) cm long, 0.5-4.0 (-5.5) cm wide, entire, dentate or laciniate, apex obtuse to attenuate, base cuneate, copiously glandular-punctate (glands rarely lacking); petioles on lower leaves to ca. 18 mm long, upper leaves sessile; stems erect to ascending, much-branched, 3-10 dm tall, more or less glandular-pubescent, strongly aromatic; root system annual with a taproot (2n = 16, 32, 36, 48, 64).

Infra-specific Variation: This is a highly variable species or group of species. In New York State, two morphological variants occur: plants with leafy bracts interrupting the inflorescence (typical C. ambrosioides), and plants without bracts, “C. anthelminticum.” According to Woroshilov (1942) typical C. ambrosioides takes 60-75 days to mature, while C. anthelminticum takes 145 days. There are, however, many apparent morphological intermediates, and the taxonomy of the group has not been resolved. It is treated here as a single, polymorphic species.
Importance: *Chenopodium ambrosioides* has been used as medicine to treat numerous ailments. Perhaps the most important use has been as a vermifuge (particularly for roundworms). The active ingredient is the volatile oil, Ascaridol, which has proven very effective, but its serious overdose side-effects have sometimes lead to death. Loss of human life from ingesting leaves or seeds, however, has not been reported. *Chenopodium* extract has also been used as a fever-reducing stomatic, an expectorant, treatment to soothe menstrual cramps, and it has been administered in larger doses to induce fetal abortion. The leaves have been used to make a weak tea, and the extract serves as a food flavoring in Mexico. The essential oil is allelopathic to many other plants, including vegetables, so, in Mexico, it is often grown in a secluded corner of the garden.

4. *Chenopodium botrys* L.

Common Names: Jerusalem-oak, Feather-geranium

Type Description: Linnaeus, Species Pl. 1, p. 219, 1753

Origin: A native of Europe

Habitats: Waste places and sandy shores, occasionally a weed along roads and in waste areas

Habit: An erect, annual, herb

Flowering: July-September

Fruiting: August-October

General Distribution: Europe and Asia; naturalized in North America from Quebec to the Northwest Territories and south to California, Missouri and Virginia

Description: Plants with bisexual flowers; stigmas 2, erect, 0.2-0.5 mm long; style absent; ovary ovoid; fruit depressed-ovoid, the pericarp membranaceous, rugose, usually with translucent, whitish stripes, adherent; seed usually horizontal, black, ovoid-globose, 0.6-0.8 mm broad, 0.5-0.6 mm thick, testa rugose; stamens 5; filaments membranaceous, 0.7-0.8 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 5-lobed; lobes elliptic, ovate to oblong, 0.7-0.9 mm long, 0.5-0.6 mm broad, obtuse on the abaxial surface, apex acute to obtuse, densely glandular-pubescent abaxially. Lobes covering the seed at maturity, united only at the base; bract and bracteoles absent; inflorescence of terminal, compound cymes, (9-) 17-23 cm long; glomerules absent; leaves lanceolate to narrowly elliptic, ovate, 1.5-4.0 cm long, 0.6-2.7 cm broad, upper leaves much smaller, margins sinuate, pinnatifid, occasionally entire; petioles 0-2.5 mm long; stems erect, branched, 9-47 (-60) cm tall, covered with short-stalked, glandular hairs, slightly aromatic; root system annual with a taproot (2n = 18).

Importance: Pollen of this species has been cited as a cause of hay fever. In France, the extract has been used as an expectorant.
5. Chenopodium bonus-henricus L.

Common Name: Good-King-Henry

Type Description: Linnaeus, Species Pl. 1, p. 218, 1753

Origin: A native of Europe

Habitats: Waste places and cultivated ground

Habit: An erect, perennial herb

Flowering: June-August

Fruiting: June-October

General Distribution: Adventive from Europe; in North America: from Nova Scotia to Alberta south to Illinois and New York

Description: Plants with bisexual flowers; stigmas 2, spreading, 0.6-1.2 (-1.5) mm long; style absent; ovary ovoid or obovoid; fruit obovoid, pericarp membranaceous, more or less smooth, adherent; seed vertical, reddish-brown, obovoid, 1.5-1.7 mm long, 1.4-1.6 mm wide, testa rugose; stamens 5; filaments 0.5-0.6 mm long, membranaceous; anthers ellipsoid, yellow, 0.4-0.6 mm long; perianth 4-5 lobed; lobes oblong, 1.0-1.5 mm long, ca. 1 mm broad, scarcely abaxially keeled, apex obtuse to rounded, not covering the seed at maturity, glabrous, united into a tube 0.4-0.6 mm long; bract ovate to lanceolate, 1-5 cm long, 1.2-4.0 cm broad, apex acuminate, base cuneate; bracteoles absent; inflorescence mostly terminal, compound spike, 5-13 cm tall, 4-10 cm broad; leaves broadly hastate to triangulate, 4.5-10.0 cm long, 3-7 cm broad, apex acute, entire, except for the basal lobes; petioles 1-10 cm long; stems erect to ascending, branched, 2.5-5.0 (-7) dm tall, somewhat viscid and farinose; perennial, with a thick, woody root system (2n = 36).

Importance: This plant has, occasionally, been cultivated for its leaves, which are used like spinach. It is gently laxative and has been used as a remedy for indigestion.

Note: The specific epithet “bonus-henricus” was not intended to refer to King Henry but, instead, to distinguish this plant from “malus Henricus” or “bad-Henry” (Mercurialis annua L.). The name Henry in this case is said to refer to elves and kobolds (‘Heinz’ and ‘Heinrich’).
6. *Chenopodium glaucum* L.

**Common Name:** Oak-leaf Goosefoot

**Type Description:** Linnaeus. Species Pl. I, p. 220, 1753

**Synonyms:** *C. salinum* Standl., *C. glaucum ssp. salinum* (Standl.) AeHlen

**Origin:** A native of Europe

**Habitats:** Waste places, especially soils that are more or less brackish

**Habit:** Erect, annual, herbs

**Flowering:** July-August

**Fruiting:** August-September

**General Distribution:** Nova Scotia west to the Northwest Territories, south to California, Missouri and Virginia

**Description:** Plants with bisexual flowers; stigmas 2; spreading, 0.1-0.2 mm long; style absent; ovary depressed-ovoid; fruit ovoid or round in outline, the pericarp membranaceous, smooth, non-adherent; seed usually horizontal, but occasionally vertical, reddish brown, vertical seeds ovoid to round in outline, 0.6-0.9 mm in diameter, 0.2-0.3 mm thick, horizontal seeds lentilcuar, round, 0.7-0.9 mm in diameter, 0.4-0.5 mm thick, testa rugose-punctate; stamens 5; filaments membranaceous, 0.4-0.5 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 3-5 lobed; lobes obovate to oblong, ca. 0.5 mm long, 0.4-0.5 mm broad, obtuse abaxially, apex obtuse, covering the seed at maturity, fused at base; bract and bracteoles absent; inflorescence of axillary or terminal spikes, 5-10 cm tall, the flowers at each node in glomerules; glomerules subglobose, 1.8-2.5 mm in diameter; leaves lanceolate to oblong or ovate, 0.5-4.0 cm long, 0.3-1.5 cm broad, apex obtuse, base cuneate, margins undulate dentate, teeth obtuse, densely white mealy beneath; petioles 0-1 cm long; stems erect to prostrate, branched from the base, 0.5-2.5 (-4) dm tall, striate; annual with a taproot (2n = 18).

**Infraspecific Variation:** Material with acute lobed and acute leaf apices and mostly with bracts subtending the flowers have been separated as *C. glaucum var. salinum* which is more common in western United States.
7. Chenopodium rubrum L.

Common Names: Red pigweed, Red Goosefoot, Coast-blite

Type Description: Linnaeus, Species Pl. I, p. 218, 1753

Synonyms: Chenopodium chenopodioides (L.) Aellen, C. humile Hook., C. rubrum var. humile (Hook.) S. Wats.

Origin: Uncertain, possibly native to both North America and Eurasia

Habitats: Salt marshes

Habit: Erect or spreading, annual herbs

Flowering: August-September

Fruiting: August-October

General Distribution: Eurasia; in North America from Nova Scotia to Alaska south to California, Missouri and New Jersey

Rarity Status: Chenopodium rubrum is ranked G5 S1 by the New York Natural Heritage Program.

Description: Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.2 mm long; style ca. 0.1 mm long or absent; ovary ovoid; fruit ovoid, pericarp membranaceous, smooth, non-adherent; seed vertical or occasionally horizontal, reddish-brown, ovoid, 0.7-1.0 (-1.2) mm high, 0.6-0.8 mm broad, testa reticulate-punctate; stamens 5; filaments membranaceous, 0.3-0.5 mm long; anthers globose, yellow, 0.2-0.4 mm long; perianth 5-lobed; lobes lanceolate to elliptic, 0.9-1.0 mm long, 1.0-1.2 mm broad, rounded or occasionally keeled on back, apex obtuse to rounded, glabrous, covering the seed at maturity, united only at the base; bracts linear, 4-20 mm long, 0.2-1.5 mm broad; bracteoles absent; inflorescence of axillary glomerules; glomerules subglobose, 2-5 mm diameter; leaves triangular to rhomboid, 1-9 cm long, 1-6 cm broad, green, tinged with red or purple, especially at bases, fleshy, apex obtuse to acute, base cuneate, margins with a few large, obtuse teeth on each side, rarely entire; petals 0.5-4.5 mm long; stems erect to ascending, rarely decumbent, angular, glabrous, much-branched, 3-6 (-8) dm tall; root system annual, with a taproot (2n = 18).

Infraspecific Variation: This is a highly variable species worldwide. Smaller, often prostrate plants with nearly entire leaves have been called C. humile Hook. Chenopodium chenopodioides plants have 3-4 sepals (vs. usually 3 sepals in typical C. rubrum) in the flowers with vertical seeds, and sepals united nearly to the tip. Bassett and Crompton (1982) concluded that C. chenopodioides and C. humile were ecological variants of C. rubrum, their treatment is followed here.

Common Names: Strawberry-blight, Indian-paint

Type Description: Linnaeus, Species Pl., I, p. 4, 1753

Synonym: Blitum capitatum L.

Origin: Native to Eurasia

Habitats: Dry soil, chiefly in thickets, open woods and in old fields or clearings in forest

Habit: Erect, annual herb

Flowering: June-September

Fruiting: June-September

General Distribution: Eurasia; in North America from Nova Scotia to Alaska south to California, Missouri and New Jersey

Description: Plants with bisexual flowers; stigmas 2, erect or spreading, 0.2-0.4 mm long; style 0.1-0.2 mm long; ovary ovoid; fruit ovoid, pericarp membranaceous, smooth, adherent; seed vertical, black, lenticular, 0.6-0.9 mm broad, 0.7-1.2 mm high, testa reticulate-punctate; stamens 3; filaments membranaceous, ca. 0.5 mm long; anthers globose, light yellow, ca. 0.2 mm long; perianth 3-lobed; lobes ovate, 0.6-0.7 mm long, 0.4-0.5 mm broad, not keeled, apex acute, becoming deep red and fleshy, covering the seed at maturity, united at the base; bract and bracteoles absent; inflorescence terminal spikes 5-10 cm tall, the flowers in glomerules at the nodes; glomerules globose, 5-12 mm in diameter; leaves triangular to triangular-hastate, 2.5-10.0 cm long, 1-9 cm broad, apex acute, base truncate, margins sharply dentate or occasionally entire, green on both surfaces, rather fleshy; petioles 1.5-10.0 cm long; stems erect to ascending, branched from the base, 1.5-7.5 dm tall, glabrous, green, stems angular; root system annual with a short taproot (2n = 18).

Importance: The fleshy fruits are sometimes eaten raw or cooked, and the leaves are sometimes cooked as a spinach substitute. The red fruits have been used to color wine and as a rouge.

**Common Name:** Narrowleaf Goosefoot

**Type Description:** Rydberg, Bull. Torrey Bot. Club, vol. 39, p. 310, 1912


**Origin:** A native of the western United States

**Habitats:** Sea beaches, sandy or brackish soils and railroad rights-of-way

**Habit:** Erect, annual herbs

**Flowering:** June-August

**Fruiting:** August-October

**General Distribution:** Maine to the Northwest Territories, south to Mexico, Louisiana and North Carolina

**Description:** Plants with bisexual flowers; stigmas 2, erect, 0.2-0.3 mm long; style ca. 0.1 mm long; ovary depressed-ovoid; fruit depressed-ovoid, the pericarp membranaceous, smooth, non-adherent; seed horizontal, black, lenticular, ovoid, 1.0-1.4 mm broad, 0.5-0.8 mm thick, testa verrucate; stamens 4-5; filaments membranaceous, 0.4-0.7 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 4-5 lobed; lobes lanceolate, 0.8-1.0 mm long, 0.5-0.7 mm broad, keeled along the midvein, apex acute, densely farinose, often obscuring the seed at maturity, united at the base; bract linear, up to 5 mm long, or absent; inflorescences of terminal and axillary spikes, 1-5 cm tall, 1.5-3.5 mm broad; glomerules subglobose, 1.5-3.5 mm in diameter; leaves 3-veined, fleshy, linear, narrowly lanceolate, oblanceolate, or oblong-elliptic, or ovate-lanceolate, 1.3 cm long, 0.5-1.0 mm broad, apex acute, base cuneate, margins entire, lower surfaces densely white-mealy; petioles 4-10 mm long; stems erect to spreading, unbranched or branched from the base, 15-45 cm tall, densely farinose; root system annual with a taproot (*2n* = 18).

**Note:** Most New York State collections of this species are from sea beaches on Long Island. In these locations the plant is found in association with a number of indisputably native plants, including *Amaranthus pumilus* Raf. and *Atriplex artemaria* Nutt. Most authors have considered the eastern U.S. populations to be introductions but this might need to be reconsidered.

**Infraspecific Variation:** This is a highly variable species, whose western members have been studied by Crawford and collaborators. They recognized *C. dessicatum* as distinct from *C. pratericola* on the basis of habit and enclosure versus exposure of the mature fruit by the calyx lobes. In New York State, there are specimens that fit both species (as defined by Crawford *et al*.), but there are also apparent intermediates in one or both characteristics. *Chenopodium dessicatum* and *C. pratericola* of New York are
here treated as a single, variable species; the habit illustration depicts a plant that would fit within the morphological limits of *C. dessicatium* if both species were recognized. *Chenopodium foggii* Wahl has been reported from New York by Wahl (1954). It usually grows in relatively natural, partially shaded habitats under hardwood trees or shrubs, and this may account for the more "leggy" habit described for it. I have seen only a few sheets determined by Wahl, and these are not sufficient to prompt a suggestion as to the appropriate status of the taxon. In addition, there is confusion in the literature. Whereas, Wahl states that the pericarp of *C. foggii* is markedly separable, Bassett & Crompton (1982) say that the pericarp is adherent (an important character in their key). While the identity and relationships of *C. foggii* await further research, I am, tentatively, placing the name in synonymy under *C. pratericola*.

10. *Chenopodium standleyanum* Aellen

**Common Names:** Goosefoot, Standley's Goosefoot

**Type Description:** Aellen, Feddes Repert. Sp. Nov. Regni Veg., vol. 26, p. 153, 1929

**Synonyms:** *Chenopodium album* var. *boscinum* (Moq.) A. Gray; *C. boscinum* Moq. in part; *C. polyspermum* var. *spicatum* A. Gray

**Origin:** Native to eastern North America

**Habitats:** Shaded, wooded areas, often in disturbed soils

**Habit:** Erect, annual herbs

**Flowering:** August-September

**Fruiting:** September

**General Distribution:** New York and Ontario to South Dakota, south to Texas and Florida

**Rarity Status:** This species is ranked G5 SH by the New York Natural Heritage Program.

**Description:** Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.2 mm long; style absent; ovary depressed-ovoid; fruit depressed-ovoid, pericarp membranaceous, smooth, non-adherent; seed horizontal, ovoid, black, lenticular, 0.9-1.3 mm in diameter, 0.6-0.8 mm thick, testa reticulate-alveolate to smooth; stamens 5; filaments membranaceous, ca. 0.3 mm long; anthers globose, yellow, ca. 0.1 mm long; perianth 5-lobed; lobes obovoid, 0.5-0.7 mm long, 0.5-0.7 mm broad, faintly (or not at all) abaxially keeled, apex rounded, scarcely farinose, partially covering the seed at maturity; bract and bracteoles absent; inflorescences terminal and axillary, flexuous spikes and panicles, 6-15 cm long, the flowers within them differing in stages of development; leaves...
oblanceolate, 2.0-4.5 cm long, 0.5-1.5 cm broad, apex acute to acuminate, base cuneate, margins entire, or with a few teeth toward the base; **petioles** 5-25 mm long; **stems** erect, branched, 20-60 cm tall, angular, glabrous; **root system** annual with a taproot (2n = 18).


**Common Name:** Maple-leaf Goosefoot

**Type Description:** Torrey, Ann. Lyceum Nat. Hist. New York, vol. 2, p. 239, 1827

**Synonyms:** *Chenopodium gigantospermum* Aellen. *C. hybridum* L. var. gigantospermum (Aellen) Rouleau. *C. hybridum* var. *simplex* Torr.

**Origin:** Native to eastern North America

**Habitats:** Woods and thickets, sometimes in waste places and in fields

**Habit:** Erect, annual herbs

**Flowering:** July-October

**Fruiting:** July-October

**General Distribution:** Quebec to the Northwest Territories, south to California, Texas and Virginia

**Description:** Plants with **bisexual flowers**; **stigmas** 2, erect or spreading, 0.1-0.2 mm long; **style** absent; **ovary** depressed-ovoid; **fruit** depressed-ovoid, the pericarp chartaceous, smooth, non-adherent; **seed** horizontal, black, lenticular, 0.9-1.0 mm high, 1.3-1.9 mm broad, testa smooth; **stamens** 5; **filaments** 0.3-0.5 mm long, membranaceous; **anthers** globose, yellow, 0.1-0.2 mm long; **perianth** 5-lobed; **lobes** fused at base, ovate to lanceolate, 0.7-1.0 mm long, 0.4-0.6 mm broad, slightly keeled abaxially, apex retuse, glabrous, margins meeting or separated by as much as their width, exposing more than half the seed at maturity; **bract** and **bracteoles** absent; **inflorescence** terminal and axillary, flexuous spikes and panicles, 6-15 cm long, the flowers in small widely spaced glomerules; **glomerules** irregularly globose, the flowers in different stages of development, 0.5-2.0 mm diameter; **leaves** ovate to triangular, 3.5-15.0 cm long, 2.9 cm broad, apex acute, base cordate to truncate, margins sinuate with 1-5 coarse acute teeth, upper leaves entire or with a few small teeth; **petioles** 1.5-4.5 mm long; **stems** erect, branched, 3-15 dm tall, grey, slightly mealy; **root system** annual with a taproot (2n = 36).

**Note:** This species has often been treated as part of *C. hybridum*, but typical *C. hybridum* is native to Europe and has more or less convex-lenticular, sometimes obliquely lenticular seeds with rounded margins and a foveolate-reticular surface. *Chenopodium simplex*, by contrast, has strongly convex-lenticular seeds with bluntly-keeled margins and smooth surfaces. *Chenopodium hybridum* has been reported from New York but I have seen no specimens.
12. *Chenopodium urbicum* L.

**Common Name:** City Goosefoot

**Type Description:** Linnaeus, Species Pl. 1, p. 218, 1753

**Origin:** A native of Europe

**Habitats:** Waste places, especially about cities and towns, and along railroad tracks

**Habit:** Erect, annual herbs

**Flowering:** August-September

**Fruiting:** August-September

**General Distribution:** Europe, Asia; in North America from Nova Scotia to Ontario and Wisconsin south to Missouri and Maryland

**Description:** Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.2 mm long; style absent; ovary depressed-ovoid; fruit depressed-ovoid, the pericarp membranaceous, papillose to smooth, non-adherent; seed horizontal (rarely, a few oriented vertically), black or reddish-brown, ovoid, lenticular, 0.8-1.2 mm broad, 0.5-0.6 mm thick, margin is rounded, testa rugose; stamens 5; filaments membranaceous, 0.3-0.5 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 5-lobed; lobes broadly ovate to elliptic, 0.6-0.8 mm long, 0.4-0.8 mm broad, rounded or with a slight broad abaxial keel, apex obtuse, glabrous, only slightly covering the seed at maturity; bract and bracteoles absent; inflorescences erect, terminal panicles, and usually axillary, simple or compound spikes, 3.0-4.5 cm long, with glomerules at the nodes; glomerules subglobose, 2.0-3.5 mm in diameter; lower leaves mostly triangular, the upper triangular to lanceolate, 3-11 cm long, 3-10 cm broad, apex obtuse to acute, base truncate to cuneate, margins sinuate to dentate, often with obtuse to acute outward-pointing lobes at base; petioles 15-35 mm long; stems erect, simple or rarely branched, 3-10 dm tall, glabrous, stems angular, striated; root system annual with a taproot (2n = 36).
13. *Chenopodium murale* L.

**Common Names:** Sowbane, Nettle-leaf Goosefoot

**Type Description:** Linnaeus. Species Pl. 1, p. 219, 1753

**Origin:** A native of Europe

**Habitats:** Waste places and along railroad tracks

**Habit:** Erect, annual herbs

**Flowering:** August

**Fruiting:** September-October

**General Distribution:** Quebec to British Columbia south to Mexico and Florida

**Description:** Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.4 mm long; style absent; ovary depressed-ovoid; fruit depressed-ovoid, pericarp membranaceous, pustulate, becoming smooth at maturity, adherent; seed horizontal, black, ovoid, lenticular, 1.1-1.5 mm in diameter, 0.6-0.8 mm thick, the margin acute, testa minutely rugose; stamens 5; filaments membranaceous, 0.5-0.7 mm long; anthers globose, yellow, 0.4-0.5 mm long; perianth 5-lobed; lobes ovate, 0.5-0.8 mm long, 0.6-0.7 mm broad, keeled abaxially, apex acute to obtuse, farinose, lobes covering the seed at maturity; bract and bracteoles absent; inflorescences terminal and axillary panicles, 6-7 cm tall, 4-5 cm broad, the flowers at each node in glomerules; glomerules subglobose, 2-4 mm in diameter, or the flowers not in glomerules; leaves rhombic-ovate, 2-4 (-8) cm long, 1-3 cm broad, apex acute to obtuse, base cuneate to subcordate, margins irregularly dentate; petioles 10-25 mm long; stems ill-scented, erect, branched, lower branches decumbent, 1-6 (-10) dm tall, glabrous to sparsely mealy; root system annual with a taproot (2n = 18).

**Importance:** The leaves and young stems are used as a salad herb.
14. *Chenopodium strictum* Roth
    var. *glaucophyllum* (Aellen) Wahl

**Common Name:** Goosefoot

**Type Description:** Roth, Nov. Pl. Spec., p. 180, 1821

**Origin:** A native of northeastern North America

**Habitats:** Sunny habitats, natural clearings and disturbed ground in weedy areas

**Habit:** Erect, annual herbs

**Flowering:** August-September

**Fruiting:** September-October

**General Distribution:** Prince Edward Island to British Columbia south to California, Arkansas and New York

**Rarity Status:** This taxon is ranked G5T? S1 by the New York Natural Heritage Program.

**Description:** Plants with *bisexual* flowers; **stigmas** 2, erect or spreading, 0.3-0.4 mm long; **style** absent; **ovary** depressed-ovoid; **fruit** depressed-ovoid, the pericarp membranaceous, smooth, adherent; **seed** horizontal, black, oval, lenticular, 0.9-1.5 mm in diameter, 0.4-0.5 mm thick, testa smooth; **stamens** 5; **filaments** membranaceous, 0.4-0.6 mm long; **anthers** oblong, yellow, 0.2-0.3 mm long; **perianth** 5-lobed; **lobes** ovate, 0.5-0.7 mm long, 0.6-0.7 mm broad, slightly keeled on back midrib, reflexed and exposing the fruit at maturity, farinose; **bract** and **bracteoles** absent; **inflorescence** terminal spikes, 1-3 cm long, the flowers at each node in glomerules; **glomerules** globose, 1.8-2.0 mm in diameter; basal **leaves** oblong-ovate to ovate-lanceolate, 1.7-3.6 cm long, 1.0-2.8 cm broad, apex obtuse, base cuneate, margins finely serrate, upper leaves tending toward lanceolate and entire; **petiole** absent, the blades sessile; **stems** erect, branched, up to 10 dm tall, glabrous to sparsely farinose, angular, green to red striped; **root system** annual with a taproot (2n = 36).

**Note:** This species has often been cited under the name *C. striatum* Krašan [C. *album* ssp. *striatum* (Krašan) Murr]. That name is a synonym of *Chenopodium strictum* var. *strictum* which is native to Asia and can be recognized by the prominently serrate, oblong-ovate lower leaves which are 3 or more times longer than wide.

**Common Name:** Pigweed

**Type Description:** Moquin-Tandon, Chenop. Monogr. Enum., p. 23, 1840

**Origin:** A native of North America

**Synonym:** *Chenopodium paganum* of American Authors, not Reichenb.

**Habitats:** Disturbed, moist areas such as roadside ditches

**Habit:** Erect, annual herbs

**Flowering:** August-October

**Fruiting:** September-October

**General Distribution:** Throughout most of North America; introduced and naturalizing in Europe

**Description:** Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.5 mm long; style 0.1-0.2; ovary depressed-ovoid; fruit depressed-ovoid, pericarp membranaceous, alveolate-rugose, adherent;
seed horizontal, brown to black, ovoid; lenticular, (1.3-) 1.5-2.0 mm broad, 0.7-0.9 mm thick, testa rugose; stamens 5; filaments membranaceous, 1.0-1.2 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 5-lobed, 2.1-2.5 mm in diameter; lobes ovate to deltate, 1.0-1.5 mm long, 0.9-1.3 mm broad, apex obtuse; filaments membranaceous, 1.0-1.2 mm long; anthers globose, yellow, 0.2-0.3 mm long; perianth 5-lobed, 2.1-2.5 mm in diameter; lobes ovate to deltate, 1.0-1.5 mm long, 0.9-1.3 mm broad, apex obtuse, farinose, the adaxial keel often prominent, calyx lobes enlarged, obscuring the fruit in maturity; bract and bracteoles absent; inflorescences erect to drooping, terminal compound spikes, 5-15 cm long; glomerules at the nodes, irregularly rounded, 4-7 mm in diameter; leaves narrowly to broadly rhombic or ovate, 1.5-8.0 (-15) cm long, 0.7-5.0 cm broad, apex acute, base cuneate to truncate, margins serrate or irregularly dentate (to entire in shade forms); petioles 7-70 mm long; stems erect to semi-erect, much-branched to simple, 2-10 dm tall, ribbed, farinose; root system annual with a taproot (2n = 36).

KEY TO VARIETIES

1. Style base (stylopodium) often prominent, with a small yellow area of separable pericarp; perianth lobes prominently keeled

1. Style base less prominent or lacking; perianth parts usually not prominently keeled

2. Inflorescence large and drooping; seeds 1.5-2 mm in diameter

2. Inflorescence small and erect; seeds 1.4-1.7 mm in diameter

15a. Chenopodium berlandieri var. macrocalycium (Aellen) Cronq.


Synonym: Chenopodium macrocalycium Aellen

Origin: Native to the Mid-Atlantic Coast of North America

Habitats: Coastal sands, beaches

Habit: Erect, annual herbs

General Distribution: Along the Atlantic coast, from Nova Scotia to North Carolina

Rarity Status: This variety is ranked G4T4 S3? by the New York Natural Heritage Program and has been placed on their watch-list

15b. Chenopodium berlandieri var. bushianum (Aellen) Cronq.


Synonyms: Chenopodium bushiana Aellen, C. paganum Reichenb. in part.

Origin: Native to northeastern North America

Habitats: Disturbed areas, mostly as a weed in cultivated ground

General Distribution: Quebec to Ontario south to Missouri and Virginia

Note: The related species, Chenopodium quinoa, Willd. may have been collected in New York City. The specimen was too young for positive identification. Quinoa is an important grain crop in the Andean Highlands of South America.

Chenopodium berlandieri var. boscianum (Moq.) Wahl has been reported from New York, but, true C. berlandieri var. boscianum is found only along the Gulf coast. These reports probably refer to Chenopodium standleyanum.
16. Chenopodium album L.

Common Names: Lamb's-quarters, Goosefoot, Pigweed

Type Description: Linnaeus, Species Pl. 1, p. 219, 1753

Origin: A native of Eurasia that has followed man around the world

Habitats: Disturbed soils in open habitats such as roadsides, foot paths, pavement cracks, shores, gardens, meadows and lawns

Habit: Erect, annual herbs

Flowering: July-September

Fruiting: August-November

General Distribution: Cosmopolitan and ubiquitous, scattered throughout North America, except in areas of extreme desert conditions, from Newfoundland to Alaska south to Mexico

Description: Plants with bisexual flowers; stigmas 2, erect or spreading, 0.1-0.2 mm long; style absent;
ovary depressed-ovoid; fruit depressed-ovoid, the pericarp membranaceous, smooth to papillate, adherent or usually non-adherent; seed horizontal, black, lenticular, round in outline, 0.9-1.6 mm broad, 0.5-0.7 mm thick, testa smooth, papillate or with faint reticulate-rugose ridges; stamens 5; filaments membranaceous, 0.6-0.7 mm long; anthers globose, yellow, 0.3-0.4 mm long; perianth 5-lobed; lobes ovate, 0.7-1 mm long, 0.7-1.1 mm broad, the midrib keeled on back, apex obtuse, farinose, largely covering the upper half of the seed at maturity; bract and bracteoles absent; inflorescences terminal and axillary, compound spikes 2-19 cm long, flowers usually in glomerules at the nodes, with occasional single-flowered peduncles present; glomerules sub-globose, 3-4 mm in diameter; leaves ovate-lanceolate or rhombic-lanceolate, to broadly oblong, 1.0-5.5 (-12) cm long, 0.5-3.8 (-8) cm broad, apex acute, base cuneate, margins sinuous-dentate to shallowly serrate or entire; petioles 1.0-2.5 cm long; stems erect to sprawling, simple to much-branched, 1-25 dm tall, branch tips pinkish and farinose with crowded leaf bases, the stems angular, greenish or sparsely farinose, sometimes tinged with red at maturity; root system annual with a taproot (2n = 36, 54).

**KEY TO VARIETIES**

1. Fruits 1.1-1.5 mm in diameter; flowering from mid-July onward; lower leaves more than 1.5 times longer than wide ..............
   16a. *Chenopodium album* var. *album*

1. Fruits 0.9-1.2 mm in diameter; flowering from mid-September onward; lower leaves less than 1.5 times longer than wide ......
   16b. *Chenopodium album* var. *missouriense* (Aellen) Bassett & Crompton

**Synonyms:** *Chenopodium album* var. *lanceolatum* (Muhl.) Coss. & Germ., *C. lanceolatum* Muhl.

**Origin:** A native of Eurasia

**Habitats:** Disturbed areas from cultivated fields to vacant lots and pavement cracks

**General Distribution:** Cosmopolitan; in North America from Newfoundland to Alaska south to Mexico

**Variation:** Whereas Bassett and Crompton (1982) considered *C. lanceolatum* to be a form of *C. album*, the two are here considered to be minor variants of the same taxon. Apparently, the differences between these two taxa are phenotypic responses to habitat, in that *C. album* grows on cultivated ground and has an erect growth habit, while *C. lanceolatum* grows in vacant lots, roadsides, etc., and has a more sprawling habit.

16b. *Chenopodium album* var. *missouriense* (Aellen) Bassett & Crompton

**Type Description:** Aellen, Bot. Not., p. 206, 1928

**Synonyms:** *Chenopodium missouriense* Aellen, *C. peganum* Reichenb. in part

**Origin:** Eastern-central North America

**Habitats:** Disturbed areas

**General Distribution:** New York to Ontario south to Missouri and Tennessee

**Rarity Status:** This taxon has been ranked G5T5 S3? by the New York Natural Heritage Program and placed on their watchlist.

**Note:** *Chenopodium album* is one of the more widespread and common angiosperms on earth. Several other species have often been recognized as infraspecific taxa under *C. album*, including *C. berlandieri*, *C. strictum* and their varieties. This treatment follows Bassett and Crompton (1982) in only including *C. missouriense* and *C. lanceolatum* in the complex.

**Waifs:** *Chenopodium aristatum* L., collected at a cotton mill, Yonkers, Westchester Co.; *Chenopodium berlandieri* var. *zschackei* (Murr) Murr; *Chenopodium fremontii* has been reported from Tompkins County; *Chenopodium foliosum* (Moench) Aschers., wool mills, Yonkers, Westchester Co. and reported from Troy (Rensselaer Co.); *Chenopodium graveolens* was reported from Onondaga Co. but no specimens have been seen; *Chenopodium opulifoilum* Schrad., probably occurred as a waif; the specimens were collected when immature; *Chenopodium polyspermum* L., Genesee, Oneida, Rensselaer Counties, and reported from Onondaga Co., not seen in over 50 years; *Chenopodium vulvaria* L., Monroe County and reported from Queens and Richmond counties, not seen in over 50 years.
Amaranthaceae (Amaranth Family)

The Amaranthaceae: a family of about 65 genera and 900 species, of nearly cosmopolitan distribution. Amaranths are particularly widespread in tropical and subtropical regions, with relatively few species in cooler climates. Amaranth/chenopod type pollen has been found as early in the fossil record as the Maestrichtian Period. Several species (notably Celosia, Amaranthus and Gomphrena) are familiar garden ornamentals. Species of Amaranthus are of considerable importance as foods (pseudo-grains and pot herbs) in many parts of the world, and certain so-called “grain-amaranths” are being studied as potential crops to be grown in the United States and elsewhere for sale on the world market. Amaranthus species have also been extracted for dyes.

FAMILY DESCRIPTION

A family of annual or perennial herbs, often woody at the base (suffrutescent), seldom climbers, sub-shrubs, shrubs or, rarely, small trees. The stems are erect to decumbent, trailing, or climbing, usually from a taproot. Leaves are alternate or opposite, simple and usually entire; sometimes the margin is undulate, infrequently serrulate, dentate or shallowly lobed. Petioles are long to absent, the leaf blades then sessile. Stipules are absent. The inflorescences are compact cymes or clusters arranged in axillary or terminal, simple or compound spikes, panicles, heads or rarely racemes (or flowers may be solitary). Each flower is subtended by 1 bract and usually 2 bracteoles. Bracts and bracteoles are usually scarious, often spinose, the bract being persistent, while the bracteoles either fall with the fruit or not. The flowers are small, generally regular in symmetry, bisexual or less often unisexual, sometimes aborted. Sepals are usually 4 or 5, seldom 1-3 or absent; they are free or connate, equal to subequal, imbricate, often dry and scarious or chartaceous. Stamens are as many as the sepals and opposite them, seldom fewer, their filaments distinct or, more often, connate at their bases into a tube; a nectary ring is often present within the tube base, and the tube is often toothed or lobed (with “pseudostaminodia”), alternate with the anthers. Anthers tetrasporangiate and diithecal, or, less often, bisporangiate and unithecal. The ovary is superior, 1-locular with 2-3 (-4) carpels. The style is terminal, usually solitary. Stigmas may be entire and capitate, 2-3 lobed, with segments capitate to subulate and erect or divergent, persistent. Ovules are solitary, and basal (rarely apical and pendulous), or, in a few genera, there are several ovules on a basal or short, free central placenta. The ovules are campylotropous or amphitropous, bitemgic and crassinucellar. The fruit is a dry, 1-several seeded, indehiscent, circumscissile, or irregularly dehiscent utricle or pyxis (rarely a berry or drupe). Seeds are small, mostly lenticular, subglobose to subreniform, brown to black, erect or inverted, sometimes enclosed by a small to large, bivalved aril, its testa usually shining-crustaceous. The embryo is peripheral, annular, and surrounding abundant, starchy, hard or granular perispem. The radicle is either basal or superior. The true endosperm is nearly or quite absent. The 2 cotyledons are incumbent.

KEY TO GENERA¹

1. Leaves alternate; flowers unisexual, the plants monoecious or dioecious .................................................................1. Amaranthus
1. Leaves opposite; flowers bisexual .............................................................................................................................................(2)
   2. Sepals connate, with long, dense hairs on the outside; inflorescences of interrupted, compound spikes, not immediately subtended by leaves; perianth tube bearing a lateral crest or spines in fruit ..............................................................................................................................................2. Froelichia
   2. Sepals free, glabrous; inflorescences terminal heads, or short, axillary spikes; perianth tube without lateral spines ......(3)
3. Inflorescences immediately subtended by one or more leaves .................................................................3. Gomphrena
3. Inflorescences not subtended by leaves .................................................................................................................................4. Alternanthera

1. AMARANTHUS

Common Name: Amaranth

Authority: Linnaeus. Species pl. I, p. 989, 1753

A genus of about 90 species, now distributed nearly world-wide but best developed in the New World. Amaranths have long been used for a variety of purposes. Three species are important grain crops in the neotropics. The seeds are high in proteins, particularly those high in lysine. Seeds of the “pseudocereals” have been found in several archaeological sites in the New World and in

¹Celosia argentea L., cocks-comb, is a showy garden plant, commonly cultivated in New York State, that may occasionally escape, but no specimens or records of this have been seen. Members of this genus have several seeds per ovary and alternate leaves.
Europe, and they may have been among the earliest plants domesticated by man. Many species are also used as pot herbs and vegetables. A few species with highly-pigmented foliage and flowers are used as ornamentals and dye plants. Several amarths are noxious weeds, and a few species are known to concentrate nitrates and become poisonous to livestock.

**Description:** Plants with unsexual flowers, either monoecious or dioecious; stigmas 2-4, subulate, papillose, sometimes interpreted as style branches; style 1 or absent; ovary 1, ovoid, absent in staminate flowers, unilocular; ovule 1, basally attached, erect, the micropyle inferior, funiculus short; fruit a circumscisilse, irregularly-dehiscient, or indehiscent utricle, pericarp membranaceous; seed 1, vertical, lenticular to subglobe; embryo coiled in a ring around the perisperm; perisperm mealy; radicle basal; stamens 3-5, hypogynous, absent in female flowers; filaments free to the base, linear, opposite sepals; anthers bisporangiate, dorsifixed, introrse; perianth of 3-5 sepals, absent or rudimentary in carpellate flowers; sepals distinct, membranaceous, subequal or the outer exceeding the inner, glabrous, the midrib faint to broad, usually excurrent and often spinose; peduncles usually elongate; bracts lanceolate; bracteoles 2; inflorescences terminal and axillary spikes or compound spikes, or the flowers in axillary glomerules; glomerules unisexual or bisexual, when bisexual the first (terminal) flower is male and succeeding flowers are female; leaves simple, alternate, entire or undulate, rhombic, lanceolate, ovate, oblanceolate, obovate, or rarely spatulate and emarginate, sometimes somewhat fleshy, green to reddish or yellowish, the midrib often excurrent and sometimes spinose; petioles usually elongate; stipules absent but spines sometimes replacing them at leaf bases; stems herbaceous to suffrutescent, erect, ascending, or infrequently decumbent, simple or much-branched from the base, sometimes striate or fleshy, green to reddish or whitish, borne on a stout, annual taproot or rarely a perennial rootstalk.

**KEY TO SPECIES**

1. Plants with spines at leaf bases; terminal spikes with male flowers at apex and female flowers at base ..........1. *A. spinosus* (2)

2. Plants dioecious; inflorescences terminal only; perianth of female flowers usually with 0-2 sepals (3)

3. Plant pistillate ..................................................(4)

4. Fruit indehiscent; stamens lacking or sporadically present and rudimentary, less than 1 mm long, without visible midveins (5)

5. Seeds 0.8-1.2 mm long; utricle 2.2-3.5 mm long; leaf-blades usually narrowly lanceolate to linear (6)

6. Sepals 1-2 (-3), lanceolate to linear .................4. *A. rudis*

7. Bract 0.6-1.3 mm long, the midrib scarcely excurrent 2. *A. rudis*

8. Bract 0.6-1.3 mm long, the midrib scarcely excurrent 3. *A. tuberculatus*

9. Bract 1.0-1.5 mm long, shorter than outer sepals ...........................4. *A. rudis*

10. Inflorcescence composed of axillary glomerules only (11)

11. Inflorcescence with long, terminal panicle, occasionally with axillary glomerules (14)

12. Fruits circumscissile, smooth; leaves neither crisped nor fleshy (13)

13. Fruits circumscissile, smooth; leaves conspicuously crisped or fleshy (13)

14. Fruits circumscissile; sepals of female flowers 3-5 .........7. *A. crispus*

15. Fruits circumscissile; sepals of female flowers 1-2 ...16. *A. deflexus, a waif*

16. Fruits muricate, shorter than to about equaling the perianth (16)

17. Fruits smooth or slightly wrinkled, ca. twice as long as the perianth ....................................16. *A. deflexus, a waif*
1. Bracts longer than the fruit; seeds dark brown to black, common weeds

17. Bracts shorter than the utricle; seeds usually pale ivory to reddish brown; rare escapes from cultivation

18. Sepals all acute or obtuse; inflorescence branches short and thick, often spreading

18. Sepals (at least the outer ones) acute to acuminate; inflorescence branches long or slender or both, often ascending

19. Bract about 5 mm long, with a very heavy midrib; stigmas thick at base; sepals and stamens 3-5

19. Bract 3-4 mm long, with moderately heavy midrib; stigmas slender at base; sepals and stamens 5

20. Inflorescence stiff; bract equaling stigmas, with a moderately heavy midrib; stigmas thick at base

20. Inflorescence lax; bract not equaling the stigmas or exceeding utricle, with slender midrib; stigmas slender at base

21. Sepals straight, the inner one oblong, subacute; stigmas erect

21. Sepals recurved, the inner ones spatulate, obtuse or emarginate; stigmas spreading

1. Amaranthus spinosus L.

Common Names: Spiny Amaranth, Thorny Amaranth

Type Description: Linnaeus, Species Pl. II, p. 991, 1753

Origin: Native to tropical America

Habitats: Waste areas, dumping grounds, ballast heaps

Habit: Erect, annual herbs

Flowering: July-August

Fruiting: August-September

General Distribution: Widespread in the tropics, and introduced in temperate areas; in North America: southern Ontario to southern Manitoba south to Florida and Mexico

Description: Plants monoecious; female flowers: stigmas 3, erect, 0.4-1.3 mm long; style absent; fruit dry, circumscissile (rarely indehiscent or irregularly bursting), ovoid to ellipsoid, 1.5-2.0 mm long, 0.7-1.0 mm broad, smooth above, wrinkled below, stramineous; seed black to dark reddish-brown, lenticular, round in outline, 0.7-1.0 mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals 5, oblong, obtuse to acute, 1-nerved, nerve excurrent, 1.0-1.7 mm long, 0.6-0.7 mm broad; bracts ovate to lanceolate or subulate, 0.5-3.0 mm long, 0.2-1.1 mm broad, tapering to a stout, subulate green tip; male flowers; stamens 5; filaments membranaceous, 1.5-2.1 mm long; anthers ellipsoid, light yellow to reddish, 0.6-1.3 mm long; sepals 5, lance-oblong, acute to acumi-
nate, the outer sepals subulate-tipped, 1.0-2.1 mm long, 0.6-0.7 mm broad; bracts ovate to lanceolate, 0.8-2.5 mm long, 0.5-0.8 mm broad, spinose-tipped; bracteoles ovate, 0.7-0.9 mm long, 0.4-0.5 mm wide; inflorescences terminal and axillary, erect or drooping, leafless spikes, 3-8 cm long, 5-7 mm broad; glomerules unisexual, sessile, the pistillate glomerules in leaf axil or at the proximal nodes of spikes, 0.7-1.0 mm in diameter, staminate glomerules at the distal nodes of the spikes, 0.7-1.1 cm in diameter; leaves ovate to ovate-lanceolate or rhombic-ovate, 1.5-5.5 (12) cm long, 0.5-3.2 cm broad, apex obtuse, broadly rounded or emarginate, spinose mucronate, base broadly cuneate, surfaces glabrous to sparingly pubescent; petioles slender, 0.5-5.0 (-9) cm long, often pubescent, bearing in the axil 2 rigid, sharp-pointed spines, 2-11 (-25) mm long; stems stout, succulent, erect or ascending, 2.5-6.5 (-12) dm tall, sulcate, often reddish, glabrous below, more or less pubescent above; root system annual, with a taproot that is sometimes branched (2n = 34).

**Infraspecific Variation:** Several minor variants have been named, based on presence of spines and color of the inflorescence. None of these occur in New York State.

**Importance:** Young, soft-spined plants are sometimes eaten as a pot herb. In Latin America a decoction of the plants is used as a remedy for rheumatism and bladder inflammations, taken as an emmenagogue, used for bathing to allay fever and applied to external inflammations. The crushed or lightly cooked leaves may serve as a poultice. A root decoction is also taken as a diuretic and for bladder distress.

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2. *Amaranthus cannabinus* (L.) Sauer

**Common Name:** Salt-marsh Water-hemp

**Type Description:** Linnaeus. Species PI. II, p. 1027. 1753


**Origin:** A native of eastern North America

**Habitats:** Tidal mudflats, marshes, swamps and river banks, most common in sandy places from fresh to salt water shores

**Habit:** Erect, slightly succulent, annual herbs

**Flowering:** July-September
Fruiting: July-late October

General Distribution: Atlantic Coast from Maine to northeastern Florida and inland along tidal waterways (Hudson River)

Description: Plants dioecious; female flowers: stigmas 3-5, erect to spreading, 0.7-1.2 mm long; style absent; fruit fleshy, indehiscent, ovoid to turbinate, 2.2-3.5 (-4) mm long, 2.4-3.5 mm broad, with 3-5 prominent, dentate or tuberculate, longitudinal ridges corresponding with the stigmas, green when young, often becoming rugose and black when mature; seed dark reddish-brown, obovoid to ellipsoid, flattened with a depressed endosperm, 1.9-3.0 mm in diameter, 0.9-1.1 mm thick, testa minutely granulate to nearly smooth; sepals usually absent, rarely 1-2, irregular, 0.6-1.0 mm long, 0.3-0.4 mm broad; bracts lanceolate to ovate or oblong, 1.2-1.6 (-2.2) mm long, 0.4-0.5 mm broad, acute, midrib moderately heavy, scarcely excurrent; male flowers: stamens 5; filaments membranaceous, 1.5-1.6 mm long; anthers ellipsoid, light yellow, 1.0-1.5 mm long; sepals 5, oblong, 1.9-3.0 mm long, 0.8-1.0 mm broad, the inner ones emarginate, the outer acute, membranaceous with a narrow, excurrent midvein; bracts lanceolate, 0.6-1.3 mm long, 0.4-0.8 mm broad, midrib very slender, scarcely excurrent; female inflorescences terminal and axillary, often flexuous, leafy or leafless spikes, 5-20 cm long, 5-10 mm broad (occasionally glomerules are found in leaf axils); male inflorescences terminal and axillary, leafless, spikes 4-15 cm long, 5-7 mm broad, glomerules occasionally clustered in leaf axils; glomerules unisexual, sessile, pistillate glomerules often spaced along the rachis, 0.6-1.0 cm in diameter, usually with reduced leaves subtending basal glomerules, staminate glomerules usually densely clustered on the rachis, 0.5-0.6 cm in diameter; leaves narrowly lanceolate to linear, 5-15 cm long, 1-2 (-3) cm wide, apex long-attenuate or acuminate, with a rounded or obtuse tip, acute to attenuate at the base, glabrous to minutely tomentose; petioles slender, 1.5-5.5 cm long, glabrous to minutely tomentose; stems stout, erect, 3-30 dm tall, often enlarged at the base, smooth or sulcate, green, with ascending branches; root system annual with a short, thick taproot and fibrous lateral rootlets.
3. *Amaranthus tuberculatus* (Moq. ex DC.) Sauer

**Common Names:** Rough-fruited Water-hemp, Tall Water-hemp

**Type Description:** DeCandolle, Prodr. 13(2): 277, 1849


**Origin:** Native to central North America

**Habitats:** Exposed margins of rivers, creeks, lakes, ponds, marshes, and bogs or artificially disturbed areas, such as roadside ditches, fields and gardens

**Habit:** Prostrate to erect, succulent, annual herbs

**Flowering:** July-August

**Fruiting:** August-September

**General Distribution:** Vermont and Connecticut west to North Dakota south to Nebraska, Tennessee and Louisiana

**Description:** Plants dioecious; female flowers: stigmas 2-4, erect or spreading, 0.6-1.0 mm long; style absent; fruit dry, indehiscent or irregularly bursting, globose to ovoid, 1.0-2.3 mm long, 0.6-1.0 mm broad, sometimes with faint ridges corresponding to the stigmas, smooth or irregularly tuberculate, often reddish; seed dark reddish-brown to black, lenticular, round or obovoid in outline, 0.6-1.0 mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals usually absent, occasionally 1-2, irregular, rudimentary, 0.6-1.0 mm long, 0.2-0.4 mm broad; bracts lanceolate or subulate, 1.2-1.6 mm long, 0.3-0.6 mm broad, acuminate to attenuate, midrib excurrent far beyond the lamina tip as a rigid, sharp point; male flowers: stamens 5; filaments membranaceous, 1.0-1.2 mm long; anthers ellipsoid, yellow, 1.1-1.5 mm long; sepals 5, oblong to ovate, 2.5-3.0 mm long, 0.5-0.7 mm broad, the inner ones obtuse or emarginate, the outer acuminate, midveins narrow, excurrent; bracts 1.0-1.5 mm long, 0.4-0.6 mm broad, midrib very slender, excurrent; female inflorescences terminal and axillary, usually leafy spikes, 2-10 cm long, 5-10 mm broad (occasionally glomerules are found in leaf axils); male inflorescences terminal and axillary spikes, 3-14 cm long, 4-12 mm broad, and occasional glomerules clustered in the axil of leaves; glomerules unisexual, sessile, the pistillate ones usually spaced along rachis without reduced leaves, the staminate ones usually densely clustered; leaves glabrous, the blades extremely variable in size and shape, broadly ovate to lanceolate or the uppermost lance-linear, 1-15 cm long, 0.5-5 cm wide, apex usually acute to acuminate,
sometimes obtuse, narrowed toward the obtuse, often emarginate tip, the base obtuse or cuneate; petioles slender, 1-7 cm long, glabrous; stems stout, prostrate, ascending or erect, 1-30 dm tall, smooth or sulcate, green or tinged with red, with ascending branches; root system annual with a long, thin, often branched taproot (2n = 32, 64).

**Infraspecific Variation:** Prostrate plants with small, spatulate leaves and poorly developed inflorescences (thryses) have been separated as var. *prostrata* Uline & Bray. This variety is, apparently, merely a late-autumn form of the typical variety, not a genotypically distinct entity (Sauer, 1955).

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4. *Amaranthus rudis* Sauer

**Common Name:** Water-hemp

**Type Description:** Sauer, Madroño, vol. 21, p. 428, 1972

**Synonyms:** *Acnida tamariscinus* Nutt., *Amaranthus tamariscinus* (Nutt.) Wood

**Origin:** Native to central North America

**Habitats:** Margins; river floodplains, streambanks, sandbars, muddy lakeshores, edges of ponds and marshes; weedy on roadsides, railroad right-of-ways, and in fields and gardens

**Habit:** Erect, annual herbs

**Flowering:** August

**Fruiting:** August-October

**General Distribution:** Native from Wisconsin to North Dakota south to Texas and Louisiana, widely introduced *i.e.*: West Virginia, California, New York; also naturalized in Eurasia

**Description:** Plants dioecious; female flowers: stigmas 3-4, erect to spreading, 0.8-1.0 mm long; style absent; fruit dry, circumscissile, globose to ovoid, 1.2-1.6 mm long, 0.9-1.1 mm broad, smooth to rugose or tuberculate, sometimes with faint ridges of tubercles corresponding to the stigmas, often reddish; seed dark reddish-brown to black, lenticular, round in outline, 0.9-1.1 mm in diameter, 0.4-0.5 mm thick, testa smooth; sepals 1-2 (-3) the shorter sepal rudimentary, 0.3-1.0 mm long, ca. 0.3 mm broad, the longer narrowly lanceolate, acuminate, midvein sometimes branched, excurrent, 1.3-2.0 mm long, 0.3-0.4 mm broad; bracts linear to lanceolate, 1.8-2.2 mm long, 0.3-0.5 mm broad, attenuate with a stout, excurrent midrib; male flowers: stamens
5; filaments membranaceous, 1.2-2.5 mm long; anthers ellipsoid, yellow, 1.5-1.7 mm long; sepals 5, oblong to ovate, inner sepals 2.2-2.5 mm long, 0.6-0.7 mm broad, obtuse or emarginate, outer sepals 2.6-3.1 mm long, 0.6-0.8 mm broad, acuminate, with a conspicuous, excurrent midvein; bracts lanceolate, 1.0-1.5 mm long, 0.2-0.6 mm broad, with moderately heavy, excurrent midrib; female inflorescences terminal and axillary, usually leafy spikes, 3-40 cm long, 6-15 mm broad; male inflorescences terminal and axillary, usually leafy spikes, 5-20 cm long, 8-10 mm broad; glomerules unisexual, sessile, 3-5 mm broad; leaves oblong to lance-oblong, sometimes lanceolate or ovate, 1-10 cm long, 0.4-3.5 cm broad, rounded or obtuse at the apex, acute to attenuate at the base, upper leaves much-reduced and narrowly oblong, glabrous; petiole slender, 0.6-5.0 cm long, glabrous; stems stout, erect or ascending, 5-20 dm tall, striate-angulate or smooth, green or glaucescent, unbranched, or usually with ascending branches, glabrous or nearly so; root system annual with taproot (2n = 32, 48).

5. *Amaranthus albus* L.

**Common Names:** Tumbleweed, Tumbleweed-amaranth

**Type Description:** Linnaeus, *Syst. Nat.*, ed. 10, 11, p. 1268, 1759

**Synonym:** *Amaranthus graecizans* of American authors *pro parte*, not L.

**Origin:** Native to central North America

**Habitats:** Fields, roadides, along railroad tracks, weedy in waste areas and rarely naturalized along shores; in its native range also in dry prairies and stream valleys

**Habit:** Erect, annual herbs

**Flowering:** June-August

**Fruiting:** August-October

**General Distribution:** Nova Scotia to British Columbia south to Mexico; adventive in eastern North America, Europe, Asia, Africa and South America

**Description:** Plants monoecious; female flowers: stigmas 3, erect, 0.4-0.7 mm long, swollen at base; style absent; fruit dry, circumscissile, obvoid to subglobose, often with transverse ridges near the septum, 0.9-1.5 mm long, 0.9-1.1 (-1.3) mm broad, rugose, stramineous to dark, gray-brown, sometimes tinged with red; seed dark reddish-brown, lenticular, round in outline, 0.8-
1.0 (-1.2) mm in diameter, 0.5-0.6 mm thick, testa smooth; **sepals** 3, oblong to linear, acute to acutish, 1-nerved, the nerve not excurrent, green along the nerve, often tinged with red, 0.8-1.2 mm long, 0.3-0.5 mm broad; **bract** oblong-lanceolate, 2.0-2.6 mm long, 0.3-0.6 mm broad, acuminate, midrib excurrent into a pungent point, spreading; **male flowers**: **stamens** 3; **filaments** membranaceous, 0.5-1.0 mm long; **anthers** ellipsoid, light yellow, 0.5-0.8 mm long; **sepals** 3, oblong, cuspidate, 1.2-2.3 mm long; **bract** lanceolate; **inflorescences** of axillary glomerules; **glomerules** bisexual, sessile, 2-3 mm in diameter; **leaves** elliptic to oblong, spatulate or obovate, 0.5-4.2 (-7) cm long, 0.4-2.3 cm broad, larger leaves usually early deciduous, obtuse to retuse at the apex, conspicuously mucronate, cuneate at the base, conspicuously veined, veins whitish beneath, glabrous; **petioles** slender, 0.5-1.5 (-5) cm long, glabrous; **stems** stout, erect, 3-12 dm tall, striate, whitish, glabrous or sparingly puberulent or villous, especially near the ends, densely branched, the branches ascending or divaricate; **root system** annual with a taproot (2n = 32).

**Infraspecific Variation**: In our range, plants are pyramidal, but in the western United States the plants often have a spherical to void “tumbleweed” shape. Red-tinted plants have been separated as forma *rubricaudus* (Thell.) Priszter.

**Importance**: This species is a common weed in many parts of the world, becoming a nuisance where windblown aggregations of the dead plants collect massively.

**Somatical Note**: This species has long been known under the name *A. graecizans* L., but Thellung (Ascherson & Graebner, 1919) showed that *A. graecizans* is exclusively a European plant. *Amaranthus graecizans* can be distinguished from *A. albus* by its short bracts and from *A. blitoides* S. Wats, by its 3 sepals, which are shorter than the fruit. No true *A. graecizans* from North America has been seen.

**Common Names:** Prostrate Pigweed, Tumbleweed

**Type Description:** S. Watson, Proc. Am. Acad., vol. 12, p. 273, 1877

**Synonym:** *Amaranthus graecizans* of American authors *pro parte*, not L.

**Origin:** A native of western North America

**Habitats:** Pastures, fields, roadsides, railroad tracks, dumps and other waste areas; in its native range also in dry prairies and stream valleys

**Habit:** Spreading, annual herbs

**Flowering:** July-early September

**Fruiting:** August-October

**General Distribution:** Manitoba to British Columbia south to California and Texas, adventive eastward to the Atlantic coast, Mexico, West Indies and Eurasia

**Description:** Plants *monoecious*; female flowers: stigma 3, spreading, 0.5-0.7 mm long, swollen at base; style absent; fruit dry, circumscissile, obovoid to sub-globose, 1.5-2.1 mm long, 1.4-1.8(-2) mm broad, usually smooth, stramineous, sometimes tinged with red; seed black, lenticular, round in outline, 1.3-1.6 (-1.8) mm in diameter, 0.9-1.0 mm thick, testa smooth; sepals 4-5, oblong to narrowly oblong, acuminate, 1-nerved, green along the nerve, 1.2-2.7 mm long, 0.5-0.7 mm broad; bract oblong to lanceolate, 1.0-2.5 mm long, 0.4-0.6 mm broad, acute to acuminate, midrib excurrent into a pungent point; male flowers: stamens 3; filaments membranaceous, 0.7-1.7 mm long; anthers ellipsoid, light yellow, 1.0-1.1 mm long; sepals 4-5, oblong, acute, 1.3-2.0 mm long, 0.4-0.6 mm broad; bract oblong to lanceolate, acute to acuminate, 1.5-2.2 mm long, 0.4-0.9 mm broad; inflorescences of axillary glomerules; glomerules bisexual, sessile, 3-5 mm in diameter; leaves obovate to oval, spatulate or elliptical, 0.8-2.3 (-4) cm long, 0.2-1.4 cm broad; apex rounded to acute, base cuneate to attenuate, conspicuously veined, veins whitish beneath. the smaller leaves with whitish margins, glabrous; petioles stout, 0.2-2.0 cm long, glabrous; stems stout, prostrate, 1.1-6.0 dm long, smooth to striate, whitish to pale green, rarely tinged with red, glabrous or sparingly puberulent, densely-branched; root system annual with a tap-root (2n = 32).

**Importance:** This species has become a common weed in fields.

**Note:** See the nomenclatural discussion following *A. albus*. 
7. *Amaranthus crispus* (Lesp. & Thév.) Terrace.

**Common Name:** Crisp-leaved Amaranth

**Type Description:** Lespinasse & Théveneau, Bull. Soc. Bot. France vol. 6, p. 656, 1859

**Synonym:** *Eucoilis crispus* Lesp. & Thév.

**Origin:** A native of Argentina

**Habitats:** Sidewalks, ballast and waste ground about cities

**Habit:** Spreading, mat forming, annual herbs

**Flowering:** July-August

**Fruiting:** August-October

**General Distribution:** A native of Argentina, naturalized in southern Europe and in parts of the United States (New York)

**Description:** Plants monoecious; female flowers: stigmas 3, spreading, 0.4-0.7 mm long; style absent; fruit indehiscent, ellipsoid, 1.5-2.0 mm long, 0.7-1.0 mm broad, rugose, stramineous; seed black to dark reddish-brown, lenticular, obovoid, 0.7-1.0 mm in diameter, 0.4-0.5 mm thick, testa smooth; sepals 5, oblong-spatulate, obtuse with 1 white, excurrent nerve, 1.2-1.7 mm long, 0.5-0.6 mm broad; bract lanceolate to oblong, 1.0-1.5 mm long, ca. 0.5 mm broad, acute, the midrib excurrent into a pungent point, spreading; male flowers: stamens 5; filaments membranaceous, 0.4-0.5 mm long; anthers ellipsoid, light yellow, 0.6-0.7 mm long; sepals 5, oblong, acute, 1.0-1.2 mm long, 0.4-0.8 mm broad; bract lanceolate, 1.0-1.1 mm long, 0.3-0.4 mm broad; inflorescences of axillary glomerules; glomerules bisexual, sessile, 2.5-4.0 mm in diameter; leaves rhombic-ovate to oblong, 0.5-1.1 (-2.5) cm long, 3-7 mm broad, apex acute, base cuneate, conspicuously crisped, puberulent beneath, prominently veined, sparsely pubescent; petioles stout, 0.2-0.7 cm long, sparsely pubescent; stems slender, prostrate, forming mats 2-8 dm in diameter, striate, stramineous, much-branched; root system annual with a taproot.

**Common Names:** Seabeach Amaranth, Coast Amaranth

**Type Description:** Rafinesque, Med. Reps. II., vol. 5, p. 360, 1808

**Synonym:** *Eroldia pumilus* (Raf.) Chapm.

**Origin:** Native to the Mid-Atlantic Coast of North America

**Habitats:** Sandy sea beaches and inlets, storm washouts, sometimes within the tidal zone, but often inhabiting wrack or drift-lines at the high-water mark

**Habit:** Fleshy, prostrate to ascending, annual herbs

**Flowering:** July-August

**Fruiting:** August-September

**General Distribution:** The Atlantic Coast, primarily on barrier islands, from Rhode Island and New York south to South Carolina; a "fugitive" species that does not necessarily occur throughout its potential range at any given time

**Rarity Status:** This species was thought to be extirpated in New York State until the summer of 1990, following a Carolina hurricane, when populations showed up on the beaches of three Long Island counties. The New York Natural Heritage Program ranks the species G2 S1, globally imperiled throughout its range, and critically imperiled in New York State. The Federal status of the species is C2, making it a candidate for listing pending further study.

**Description:** Plants **monoeccious; female flowers:** stigmas 3, spreading, 0.6-0.7 mm long; **style** absent; **fruit** fleshy, indehiscent, ovoid to obovoid, 2.5-4.0 mm long, 2.0-2.6 mm broad, rugose, faintly 5-ribbed, stramineous; **seed** dark reddish-brown to black, lenticular, oval, 1.7-2.2 mm in diameter, 1.1-1.3 mm thick, testa smooth; **sepals** 5, narrowly oblong-spatulate, obtuse, 1-nerved, green along the nerve, 2.5-3.0 mm long; **bract** lanceolate, 0.9-1.2 mm long, 0.2-0.3 mm broad, acute, midrib not excurrent; **male flowers:** **stamens** 5; **filaments** membranaceous, 1.0-1.1 mm long; **anthers** ellipsoid, light yellow, 1.0-1.5 mm long; **sepals** 5, oblong, obtuse, 1.6-2.0 mm long, 0.9-1.1 mm broad; **bract** lanceolate, 0.9-1.2 mm long, 0.2-0.3 mm broad; **inflorescences** of axillary glomerules; **glomerules** bisexual, sessile, 5.5-11.0 mm in diameter; **leaves** clustered at the ends of the branches, obovate to suborbicular, 0.8-2.0 cm long, 0.7-1.4 cm broad, apex rounded or commonly emarginate, base rounded to attenuate, decurrent, glabrous, fleshy, prominently veined, the veins often red-purple; **petioles** stout, 0.2-1.1 cm long, glabrous; **stems** stout, succulent, prostrate or ascending, 0.4-3.0 dm tall, striate, greenish or red to stramineous, densely branched, the branches ascending or divaricate; **root system** annual with a taproot.
9. *Amaranthus blitum* L.

**Common Names:** Livid Amaranth, Purplish Amaranth

**Type Description:** Linnaeus, Species PI. II, p. 990, 1753

**Synonyms:** *Amaranthus lividus* L., *A. ascendens* Loisel.

**Origin:** A native of tropical America

**Habitats:** Weedy in waste areas, gardens, dumps, shores, and along railroad tracks

**Habit:** Spreading, succulent herbs

**Flowering:** June-August

**Fruiting:** August-October

**General Distribution:** Widespread in the tropics and warm-temperate areas; in North America, naturalized from Quebec and Ontario south to Maryland

**Description:** Plants *monoeocious*; female flowers: stigmas 3, erect or spreading, 0.1-0.3 mm long; style absent; fruit dry, indehiscent, globose to ovoid, 1.2-2.0 mm long, 1.2-1.9 mm broad, smooth, green; seed dark reddish-brown to black, lenticular to rotund, 0.8-1.0 mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals 3, oblong to oblanceolate, obtuse to acute, with a single midnerve, 0.7-1.4 mm long, 0.4-0.5 mm broad; bract oblanceolate, 0.7-1.3 mm long, ca. 0.3 mm broad, obtuse to acute, the midrib not excurrent; male flowers: stamens 3; filaments membranaceous, ca. 1 mm long; anthers ellipsoid, light yellow, 0.5-0.6 mm long; sepals 3, lanceolate, acuminate, 0.9-1.2 mm long, 0.3-0.5 mm broad; bract lanceolate, acuminate, 0.5-0.7 mm long, ca. 0.3 mm broad; inflorescences terminal and axillary, leafless spikes, 2-7 cm long, 5-8 mm broad (often with glomerules in the leaf axils); glomerules bisexual, sessile, 3-7 mm in diameter; leaves rhombic-ovate to broadly ovate, 1-8 cm long, 0.7-4.5 cm broad, glabrous, apex deeply emarginate, the lobes broad and rounded, base cuneate to rounded; petioles slender, 0.5-6.0 cm long, glabrous; stems slender to stout, succulent, erect to prostrate, forming mats 5-20 dm wide, striate, green, or with a reddish tinge, glabrous; root system annual with a taproot (2n = 34).
10. *Amaranthus retroflexus* L.

**Common Names**: Pigweed, Green Amaranth, Wild Beet, Redroot Amaranth, Redroot Pigweed

**Type Description**: Linnaeus, Species PI. II, p. 991, 1753

**Synonym**: *Galliaria scabra* Bub.

**Origin**: A native of the northeastern United States

**Habitats**: Waste ground, cultivated ground, along railroad tracks, ballast, stream banks and stony beaches

**Habit**: Erect, annual herbs

**Flowering**: July-August

**Fruiting**: August-October

**General Distribution**: Nova Scotia to the Northwest Territories south to Mexico, now spread throughout temperate regions of the world

**Description**: Plants monoecious; female flowers: stigmas 3, erect, 0.7-0.9 mm long; style absent; fruit circumscissile, subglobose, 1.2-1.8 mm long, 1.0-1.3 mm broad, rugose above, stramineous; seed black and lustrous, lenticular, obovate or oval, 0.9-1.2 mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals 5, linear-oblong, rounded or truncate, apex usually emarginate, often mucronate, whitish except for the green midnerves, 2.2-3.2 mm long, 0.7-1.0 mm broad; bract lanceolate to ovate, 3.7-7.0 mm long, 0.7-1.0 mm broad, tapering to a stout subulate tip; male flowers: stamens 5; filaments membranaceous, 0.9-1.5 mm long; anthers ellipsoid, light yellow, 0.9-1.0 mm long; sepals 5, ovate-oblong to lanceolate, 2.0-2.6 mm long, 0.6-0.9 mm broad, acute to acutish, the midnerves with an excurrent tip ca. 3 mm long; bract narrowly lanceolate, 3.7-7.0 mm long, 0.7-1.0 mm broad, acuminate; inflorescences terminal compound spikes and axillary spikes, 1.0-4.5 (-8) cm long, 0.7-1.5 cm broad, occasionally with glomerules in the axils of the upper leaves; glomerules bisexual, subsessile, tightly congested and not distinct; leaves lanceolate, lanceolate-ovate to obovate-oblanceolate, 2-12 mm long, 1.5-7.0 cm broad, apex acute to obtuse, often emarginate, base acute or obtuse, sometimes crisped, glabrous above, more or less villous to puberulent beneath, prominently veined, the veins white beneath; petioles slender, 1.5-8.0 cm long, usually villous; stems stout, erect or ascending, 3-30 dm tall, obtusely angled, green or whitish, abundantly villous at least above; root system annual with a taproot (2n = 34).

**Infraspecific Variation and Hybridization**: Several varieties and subvarieties have been named in Europe, including plants with red-tinted stems and inflorescences, called subvar. *rubriceulis* Thell. Those plants with longer bracteoles on the female flowers 1.3-1.5 times as long as the flowers (a common situation in NY) have been called *A. retroflexus* var. *delilei* (Richter & Loret)
Thell., the typical variety has longer bracteoles, twice as long as the female flowers. These proposed taxa merge completely, show no other distinctions, and are, therefore, not assigned taxonomic rank in this treatment. *Amaranthus retroflexus* hybridizes with several other species, most commonly *A. hybridus* and *A. powellii*. Introgression of *A. retroflexus* genes into *A. hybridus* is reported as one reason for well-known difficulties in determining the identity of *A. hybridus* plants. In New York State, one should have little difficulty distinguishing most individuals of these species from those of *A. retroflexus*, but there are specimens that show traits of both species.

**Importance:** Under certain soil and moisture conditions, *Amaranthus retroflexus* accumulates nitrates and may retain them in amounts that are poisonous to livestock. The stems and branches are the primary nitrate storage organs. In some areas, however, the species has been reported as palatable to sheep as oats and is said to have nutrient-composition and digestibility characteristics equivalent to those of high-quality alfalfa. The species is listed as a noxious weed in a number of states, and it may, also, be an alternate host for a number of detrimental crop diseases. It is known to reduce some crop yields significantly through competition.

11. *Amaranthus powellii* S. Watson

**Common Names:** Amaranth, Powell’s Amaranth

**Type Description:** S. Watson, Proc. Amer. Acad. 10: 347, 1875

**Origin:** Native to the western United States

**Habitats:** Usually a weed of cultivated fields, but also found on waste ground, roadsides, along railroad tracks and in dumps

**Habit:** Erect, annual herbs

**Flowering:** July-August

**Fruiting:** August-October

**General Distribution:** Prince Edward Island to British Columbia south to Mexico, Texas and Pennsylvania

**Description:** Plants monoecious; female flowers: stigmas 3, spreading, 0.5-0.7 mm long; style absent; fruit circumscissile, oval, 1.8-2.2 mm long, 1.1-1.4 mm broad, rugose above, stramineous; seed reddish-brown.
to usually black, lenticular, round in outline, 1.0-1.3 mm in diameter, 0.5-0.6 mm thick. testa smooth; **sepals** 3-5, oblong or linear-oblong, acute, 1-nerved, the nerve usually excurrent as a spinose tip, 1.5-3.0 mm long, 0.5-0.6 mm broad; **bract** linear-lanceolate, longer bracts 4.0-7.5 mm long, 0.9-1.2 mm broad, attenuate with a rigid spinose tip; **male flowers:** **stamens** 3 (-5); **filaments** membranaceous, ca. 1 mm long; **anthers** ellipsoid, light yellow, 0.5-0.6 mm long; **sepals** 5, narrowly oblong to ovate, 2-3 mm long, 0.5-0.6 mm broad, 1-nerved, the nerve usually excurrent; **bract** linear-lanceolate, 4-7 mm long, 0.9-1.1 mm broad; **inflorescence** a terminal spike or compound spike, 1.0-4.5 cm long, 1.0-1.8 cm broad; **glomerules** bisexual, subsessile, closely congested and not measurable; **leaves** rhombic-ovate to lanceolate, or deltoid-elliptic, 1.5-10.0 (-12) cm long, 0.5-4.0 cm broad, apex acute to rounded, sometimes emarginate, base cuneate to rounded, glabrous or sparsely pubescent; **petioles** slender, 1-5 cm long, glabrous or sparsely pubescent; **stems** stout, erect, 3-20 dm tall, striate, green or whitish, glabrous below, usually villous above; **root system** annual with a taproot (2n = 34).

**Interspecific Variation and Hybridization:** This species is reported to hybridize with *A. retroflexus*, *A. tuberculatus*, and *A. hybridus*. Sauer and Davidson (1961) reported sterile hybrids between *A. retroflexus* and *A. powellii* only occurring since 1922. Hybrids involving *A. powellii* should be expected in New York, particularly since *A. powellii* is becoming more widespread.
Description: Plants monoecious; female flowers: stigmas 3, erect or spreading, 0.3-0.5 mm long; style absent; fruit obovoid, circumscissile, 1.2-2.1 mm long, 0.9-1.3 mm broad, usually smooth, stramineous; seed black or dark reddish-brown, lenticular, round in outline, 0.8-1.1 (-1.5) mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals 5, oblong to ovate or lanceolate, acute, scarious, 1-nerved, the nerve usually excurrent, 1.2-2.1 mm long, 0.4-0.5 mm broad; bracts lanceolate to ovate, 2.2-3.4 (-4.2) mm long, 0.6-0.7 mm broad, tapering to short spinose tip; male flowers: stamens 5; filaments membranaceous, 0.6-1.0 mm long; anthers ellipsoid, light yellow, 0.6-0.7 mm long; sepals usually 5, narrowly oblong to ovate, acute, 1-nerved, the nerve usually excurrent, 1.7-2.0 mm long, 0.2-0.3 mm broad; bract lanceolate to ovate, 2.0-2.7 mm long, 0.4-0.6 mm broad; inflorescences terminal compound spikes and axillary spikes, 10-25 cm long, ca. 1 cm broad; glomerules bisexual, subsessile, tightly congested and not distinct; leaves lanceolate to ovate or rhombic-ovate, 3-15 cm long, 1-7 cm broad, apex acute or rarely rounded, base cuneate or rounded, pubescent beneath or glabrous, prominently veined; petioles slender, 1.5-9.0 cm long, pubescent; stems stout, erect or ascending, 3-15 (-25) dm tall, striate, pale green, usually tinged with red, rough puberulent below or glabrous, villous above; root system annual with a stout taproot (2n = 32).

Interspecific Variation and Hybridization: Much of the taxonomic difficulty with the A. retroflexus, A. powelli, A. hybridus complex may be attributed to hybridization. Murray (1940) found little fertility in F1 hybrids, and F2 generation plants are rarely produced; however, hybrids are reported to be common where these species co-occur in nature. In fact, Sauer (1950) suggested that much of the variation reported in A. hybridus is the result of introgression from A. retroflexus. Intermediate specimens are readily apparent in New York collections. In general, specimens that exhibit mostly A. hybridus characters have been treated as A. hybridus, a situation complicated by the fact that this species is also reported to hybridize with other members of the genus.
13. *Amaranthus hypochondriacus* L.

**Common Name:** Prince’s-feather

**Type Description:** Linnaeus, Species Pl. II, p. 991, 1753

**Origin:** Probably originally native to Mexico, derived from *A. hybridus* or *A. powellii* through selection by man

**Habitats:** Waste places and cultivated ground

**Habit:** An erect, annual herb

**Flowering:** July-August

**Fruiting:** August-October

**General Distribution:** Arizona to Guatemala, now escaping in scattered localities from New York to Wisconsin and Missouri

**Description:** Plants monoecious; female flowers: stigmas 3, erect or spreading, 0.4-0.6 mm long, thick at base; style absent; fruit circumscissile, subglobose, 2.0-2.4 mm long, 1.1-1.4 mm broad, often rugose, stramineous to deep red; seed black or dark reddish-brown or creamy in cultivated forms, lenticular, round in outline, 1.0-1.3 mm in diameter, 0.8-0.9 mm thick, testa smooth; sepals commonly 5, oblong to ovate, acute, 1-nerved, the nerve usually excurrent, 1.7-2.3 mm long, 0.5-0.8 mm broad; bract lanceolate to ovate, 2.8-3.4 mm long, 0.8-1.0 mm broad, tapering to short spinose tip; male flowers: stamens 5; filaments membranaceous, 1.0-1.4 mm long; anthers ellipsoid, light yellow, 0.7-0.9 mm long; sepals usually 5, narrowly oblong to ovate, 3.0-3.3 mm long, 0.5-0.6 mm broad, acute, 1-nerved, the nerve usually excurrent; bract lanceolate to ovate, 2.6-3.0 mm long, 1.0-1.2 mm broad; inflorescences terminal, compound spikes, spikes 6-17 cm long, 0.9-1.4 cm broad; glomerules bisexual, subsessile, closely congested and not measurable; leaves lanceolate to ovate or rhombic-ovate, 3-15 cm long, 1-7 cm broad, apex acute or rarely rounded, base cuneate, pubescent beneath or glabrous, prominently veined; petioles slender, 1.5-9.0 cm long, pubescent; stems stout, erect or ascending, 3-25 dm tall, strate, pale green, usually tinged with red, rough-puberulent or glabrous below, villous above; root system annual with a taproot (2n = 32).

**Importance:** This species is an important grain amaranth, and is the most prevalent species grown in the United States for Amaranth grain. It is grown more extensively in many parts of the tropics, particularly Mexico and India, where the fruits are toasted, popped like corn, or ground into flour — often mixed with syrup or honey to make candies. Among the Aztecs, this species was a very important ritual plant. Idols were made from a paste composed of ground, toasted amaranth seeds and, according to one report, the blood of human sacrifices. During major religious festivals, such idols were broken into pieces and eaten by the faith-
ful. The Spaniards considered this practice a perverse parody of the Catholic Eucharist and forbade it. Cortez even went so far as to burn all grain amaranth fields.

**Interspecific Variation and Hybridization:** This species is very similar to *Amaranthus hybridus*, and it is believed to be derived from that species or possibly *A. powellii* through selection as a grain crop. In general, the larger inflorescences, shorter bracts, and thick-based stigmas separate this species from *A. hybridus*, but the plants are often difficult to separate from it in New York, because *A. hypochondriacus* appears to be reverting to its "wild" form after it escapes.

14. *Amaranthus cruentus* L.

**Common Names:** Blood Amaranth, Purple Amaranth

**Type Description:** Linnaeus, *Syst. Nat.* ed. 10, p. 1269, 1759

**Origin:** Southern Mexico and Guatemala, probably through selective cultivation of *A. hybridus*

**Habitats:** Waste ground, dumps, cultivated fields and borders

**Habit:** Erect, annual herbs

**Flowering:** July-August

**Fruiting:** August-October

**General Distribution:** Scattered throughout much of the world particularly in the tropics. In North America, from Quebec to Alberta south to Mexico and Maryland

**Description:** Plants monoecious; female flowers: stigmas 3, erect, 0.4-0.5 mm long, slender at base; style
absent; **fruit** ovoid to broadly ovoid, circumscissile, 1.4-1.6 mm long, 1.1-1.4 mm broad, smooth to somewhat rugose on the upper half, stramineous or usually red; **seed** black or dark reddish-brown, lenticular, round in outline, 1.0-1.3 mm in diameter, 0.5-0.6 mm thick, testa smooth; **sepals** 5, oblong to narrowly oblong, obtuse to rounded, sometimes erose, the outer ones acute with an excurrent vein, red, reddish-orange or purple or sometimes green or stramineous, the inner ones faintly 1-nerved, not carinate, 1.0-1.7 mm long, 0.3-0.5 mm broad; **bract** lanceolate to ovate, 1.5-2.0 mm long, 0.5-0.9 mm broad, tapering to a short pungent tip; **male flower**: **stamens** 5; **filaments** membranaceous, 0.9-1.0 mm long; **anthers** ellipsoid, light yellow, 0.5-0.8 mm long; **perianth** of 5 sepals; **sepals** oblong-ovate, 1.0-1.7 mm long, 0.6-0.7 mm broad, acute, 1-nerved, the nerve excurrent; **bract** lanceolate to ovate, 1.2-1.4 mm long, 0.5-0.6 mm broad; **inflor Es cences** terminal compound spikes, 4-5 (-15) cm long, 4-5 (-12) mm broad, and lateral spikes 1.5-5.0 cm long, 0.3-0.6 mm broad; **glomerules** bisexual, subsessile, closely congested; **leaves** elliptic to ovate-lanceolate or rhombic-ovate, 3-30 cm long, 1.5-10.0 cm broad, apex attenuate or acute, the tip usually obtuse, base acute to attenuate, sparsely pubescent or glabrate; **petioles** slender, 2-20 cm long, often pubescent; **stems** stout, erect, 5-20 dm tall, striate, green or red, usually pubescent, villous near the inflorescence; **root system** annual with a taproot (2n = 32, 34).

**Infraspecific Variation:** A fairly homogenous species in our area, but intermediates are likely occur where the species grows sympatrically with *A. hybridus*.

**Importance:** One of the grain amaranths, also cultivated in many parts of the world as a pot herb. It is grown in Latin America and India for the seed, which is used as a grain in baking. The flour produced is high in protein content. It is also grown as an ornamental, a dye plant and a pot herb.

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15. *Amaranthus caudatus* L.

**Common Names:** Purple Amaranth, Love-lies-bleeding

**Type Description:** Linnacus. Species Pl. II, p. 990, 1753

**Origin:** The Andes, probably derived from *A. hybridus* through prolonged cultivation and selection

**Habitats:** Roadsides, gardens, waste places and cultivated ground

**Habit:** Erect, annual herbs

**Flowering:** June-August

**Fruiting:** August-September

**General Distribution:** South America; naturalized in North America from Quebec to Missouri south to Mexico
Description: Plants monoecious; female flowers: stigmas 3, spreading, 0.4-0.5 mm long, slender at base; style absent; fruit circumscissile, subglobose, 1.6-2.5 mm long, 0.9-1.2 mm broad, somewhat rugose on the upper half, stramineous or usually red; seed usually yellowish-white and dull, sometimes red to nearly black and lustrous, lenticular, round in outline, 0.9-1.2 mm in diameter, 0.5-0.6 mm thick, testa smooth; sepals 5, oblong, lance-oblong or spatulate, acute to attenuate, 1-nerved, usually red or purplish, but sometimes green, 1.4-2.0 mm long, 0.8-1.0 mm broad; bract lanceolate to ovate, 1.7-2.3 (-3.1) mm long, 0.9-1.1 mm broad, attenuate to a spinose subulate apex; male flowers: stamens 5; filaments membranaceous, 1.3-1.9 mm long; anthers ellipsoid, light yellow, ca. 0.8 mm long; sepals 5, oblong to ovate, 1.7-2.5 mm long, 0.5-0.9 mm broad, carinate, the midnerve excurrent as a pungent tip, usually tinged with red; bract lanceolate to ovate, 1.7-2.0 mm long, 0.7-0.8 mm broad; inflorescences terminal simple or compound spikes, terminal spikes usually pendant, (8-) 25-30 cm long, 0.8-1.0 cm broad, lateral spikes often lacking, or 2-7 cm long, 5-6 mm broad; glomerules bisexual, subsessile, closely congested; leaves alternate, lanceolate to ovate or rhombic-ovate, 3.5-10.0 (-20) cm long, 1.6-5.5 cm broad, apex acute or abruptly acute, base acute, conspicuously veined; petioles slender, 2-4 (-18) cm long, glabrous to sparsely tomentose; stems stout, erect, 3-10 (-20) dm tall [even larger in cultivation], striate, green or whitish often tinged with red, glabrous or sparsely villous around the inflorescence; root system annual with a taproot (2n = 32, 34).

Importance: This species is one of the grain amaranths that are important sources of food in some tropical countries. It is often grown as an ornamental or dye plant as well.

Variation: This species is probably derived through artificial selection from A. hybridus. Escaping populations are expected to cross with A. hybridus or revert to a wild state that does not exhibit the long “tail-like” inflorescence.

Waifs: Amaranthus deflexus L., with old reports from Albany, Schenectady, Richmond and Queens Counties; Amaranthus palmeri S. Wats., has been collected in Albany, Tompkins and Queens Counties.; Amaranthus viridis L. (A. gracilis Desf.), an old report from Rochester (Monroe Co.), Suffolk Co. and, recently, collected in Bronx County.

2. FROELICHIA

Common Name: Snake-cotton

Authority: Moench, Methodus, p. 50, 1794.

A genus of about 12 species, native to the Western Hemisphere from the middle latitudes of the United States south to Argentina and west to the Galapagos. Most species are found in the southwestern United States or Brazil. Two are known to occur in the eastern United States, but only one is reported from New York State. Froelichia floridana (Nutt.) Moq. var. floridana is found along the Coastal Plain as far north as New Jersey. It differs from F. gracile (Hook.) Moq. in having larger calyces (more than 5 mm long) with deeply and irregularly dentate crests and a profusely branching habit.
1. *Froelichia gracilis* (Hook.) Moq.

**Common Names:** Cotton-weed, Slender Snake-cotton

**Type Description:** W. J. Hooker, Icon. Pl., vol. 3, pl. 256, 1840

**Synonym:** *Oplotheca gracilis* Hook.

**Origin:** A native of the southwestern United States

**Habitats:** Sandy areas including sand dunes, prairies, pastures, stream valleys, sometimes in open woodlands; in eastern North America this species is often found on old cinders along railroads beds.

**Habit:** Erect or procumbent, taprooted annuals

**Flowering:** July-August

**Fruiting:** August-October

**General Distribution:** Probably native only west of the Mississippi River from Iowa to Colorado south to Texas and Chihuahua, Mexico; introduced in the east along railroads and highways, and now fairly widespread from New York to Ontario and Minnesota south to Florida

**Description:** Plants with bisexual flowers; stigma capitate, irregularly lobed, ca. 0.2 mm in diameter; style 1, 0.6-1.0 mm long; ovary 1, superior, unilocular, ovoid; ovule solitary, pendulous from the tip of the funiculus, the micropyle superior; fruit a membranaceous, indehiscent utricle, enclosed by the indurate calyx, 2.0-2.5 mm long, ca. 1.5 mm in diameter; seed 1, yellowish or reddish-brown, ovoid to pyriform, 1.2-1.7 mm long, ca. 1.2 mm in broad, testa smooth and usually lustrous; embryo annular, surrounded by a central, mealy perisperm, the radicle superior, usually germinating while enclosed within the calyx; stamens 5; filaments connate, the tube 1.8-3.0 mm long; anthers sessile on the staminal tube, alternating with 5 acute to obtuse lobes of the tube, ellipsoid, light yellow, 0.4-0.5 mm long; perianth a 5-lobed calyx tube that is conic to flask-shaped, 2.2-3.6 (-5) mm long, 1.7-2.2 mm broad (excluding spines), densely wooly with 2 lateral rows of distinct spines that are 0.4-0.9 mm long, the faces with 1-3 blunt or spine-like tubercles near the base; calyx lobes oblong-linear, obtuse to acute, 0.7-1.4 mm long, 0.3-0.4 mm broad; pedicels very short, the flowers subsessile in spikes; bracteoles 2, detaching with the fruit, round, acute to emarginate (sometimes acuminate), scarious, 1.2-2.0 mm long, 1.5-1.8 mm broad, shorter than the calyx, white, yellowish, brownish, or blackish, glabrous; peduncle erect, 2.2-3.0 mm long, or absent from lateral spikes; bract at the base of the peduncle persistent, ovate, stramineous to brown, scarious, (0.5-) 1.2-2.0 mm long, 0.7-0.9 mm broad, glabrate, apex acuminate; inflorescence a raceme of spikes 0.7-3.2 cm long, (5-) 7-8 (-10) mm broad, lateral spikes sessile; leaves opposite, entire, often clustered near the base, linear, linear-lanceolate, narrowly oblanceolate to elliptic-lanceolate, 2.2-7.0 (-12) cm long, 2-7 (-12) mm wide, acute to acuminate
at the apex, cuneate at the base, sericeous or tomentose to silky on both surfaces; petioles absent; stems slender, (1-) 2-5 (-7) dm tall, simple or usually much-branched at the base, the branches ascending or somewhat procumbent, densely or sparsely villous-tomentose and sometimes viscid above; root system annual with a single taproot.

3. GOMPHRENA

**Common Name:** Globe Amaranth  
**Authority:** Linnaeus, Species Pl. 1, p. 224, 1753

A genus of an estimated 100 species, mostly of the tropics, subtropics and warm-temperate regions of the New World, except for approximately 18 species native to Australia. The globe-amaranth (*Gomphrena globosa* L.) is commonly cultivated and occasionally escapes, but it does not persist in New York.

**Waifs:** *Gomphrena globosa* L. has been reported around New York City and from Orient Point, Suffolk Co.; *G. martiana* Gill. ex Moq. in DC., was collected earlier in the century near Yonkers wool mills, Westchester County.

4. ALTERNANTHERA

**Common Name:** Alligator-weed  
**Authority:** Forsskål, Fl. Aegypt. Arab., p. 28, 1775

A genus of approximately 80 species (some estimates as high as 200). Most species occur in the American tropics and subtropics. Several species are aggressive weeds that have become naturalized in many parts of the world. None are persistent in New York.

**Waif:** *Alternanthera pungens* Kunz has been collected once in the past century from a wool-waste area in Yonkers (Westchester Co.), but it has not been seen since.
SOME FUNGI ASSOCIATED WITH PLANT SPECIES IN THIS TREATMENT

The following fungi associated with species in this treatment are listed to append the comprehensive treatment of fungal hosts published by Farr et al., 1989. The reader is referred to that book for a more exhausted list of fungi. This list only includes species represented by specimens at the New York State Museum with host information.

PERONOSPORALES

Albugo blitii (Biv.-Bern.) Kuntze, on Amaranthus retroflexus, A. viridis, A. cannabinus

UREDINALES

Puccinia suhnitens Diet., on Atriplex hastata [A. prostrata]
Uromyces shearianus Arthur, on Atriplex hastata [A. prostrata]

HYPHOMYCETES

Cercospora dubia (Pers.) Wint., on Chenopodium album
Cladosporium herbarum (Pers.) Link ex Fr., on Chenopodium album, Amaranthus sp.
APPENDIX II

A list of some insects associated with plant species in this treatment.

COLLEMBOLA

Bourletiella hortensis Fitch (Seedling Springtail), feeds on seedlings of Chenopodium album (Bassett & Crompton, 1978b)

THYSANOPTERA

Aeolothrips fasciatus L., on Chenopodium album (Bassett & Crompton, 1978b)
Haplothrips faurei Hal., on Chenopodium album (Leonard, 1928)
Taeniothrips vulgarissimus (Hal.), on Chenopodium album (Bassett & Crompton, 1978b)
Thrips fascipennis (Hal.), on Chenopodium album (Bassett & Crompton, 1978b)
Thrips tabaci Lindemann, on Chenopodium album (Bassett & Crompton, 1978b)

ORTHOPTERA

Orchelimum vulgare Harris (Common Meadow Katydid), laying eggs in Chenopodium (Leonard, 1928)

HEMIPTERA

Miridae

Atomoscelis modestus (Van Duzee), on Chenopodium album (Bassett & Crompton, 1978b)
Chlamydatus associatus (Uhler), on Beta vulgaris (Knight, 1941)
Lygus lineolaris (P. de B.), Tarnished Plant Bug, on Chenopodium album (Bassett & Crompton, 1978b), collected on Amaranthus retroflexus (Weaver & McWilliams, 1980)
Melanotrichus coagulatus Uhler, on Chenopodium album (Bassett & Crompton, 1978b)
Melanotrichus flavosparus Sahib., on Chenopodium album (Bassett & Crompton, 1978b); on Chenopodium album and Beta vulgaris (Knight, 1941)
Reuteroscopus ornatus (Reuter) on Chenopodium album (Knight, 1941)
Reuteroscopus sulphureus (Reuter) on Chenopodium album (Knight, 1941)

Tingitidae

Corythaica venusta (Champion) on Salsola pestifer (Drake, 1965)
Derephysia foliacea (Fallén) on Chenopodium (Drake, 1965)
Orthotylus flavosparsus (Sahib.), on Chenopodium album (Leonard, 1928)

Piesmatidae

Piesma cinereum (Say), food: Chenopodium album (Leonard, 1928), found on pigweed and many other plants, occurs throughout the US (Arnett, 1985)

HOMOPTERA

Aphidae

Aphis abbreviata Patch, feeding on Chenopodium album (Bassett & Crompton, 1978b)
Aphis brevisiphona Theobald, on Beta vulgaris and Chenopodium (Patch, 1938)
Aphis evonymi Fabricius on Atriplex, and Beta vulgaris, Amaranthus retroflexus (Patch, 1938)
Aphis fabae Scop., Bean Aphid, feeds on Chenopodium album (Bassett & Crompton, 1978b)
Aphis gilletti Cowen on Amaranthus retroflexus (Patch, 1938)
Aphis gossypii Glover, Cotton Aphid, feeds on Chenopodium album (Bassett & Crompton, 1978b)
Aphis helianthi Monell on Amaranthus (Patch, 1938)
Aphis laburni Kaltenbach, feeds on Chenopodium album (Bassett & Crompton, 1978b); on C. album and Bassia hyssopifolia (Patch, 1938)
Aphis maidi-radicis Forbes, feeds on Chenopodium album (Bassett & Crompton, 1978b); on Amaranthus hybsis, A. retroflexus, A. spinosus and C. album (Patch, 1938)
Aphis medicaginis Koch, feeds on Chenopodium album (Bassett & Crompton, 1978b); on Amaranthus, Chenopodium album, Bassia scoparia, and Salsola pestifer (Patch, 1938)
Aphis middletonii (Thomas), Erigeron Root Aphid, feeds on Chenopodium album (Bassett & Crompton, 1978b); on Chenopodium album and Amaranthus retroflexus (Patch, 1938)

Aphis ochropus Koch. on Chenopodium polyspermum (Patch, 1938)

Aphis papaveris Fab., feeds on Chenopodium album (Bassett & Crompton, 1978b); on Beta vulgaris and Chenopodium album (Patch, 1938)

Aphis rumicis L., feeds on Chenopodium album (Bassett & Crompton, 1978b); on Atriplex hortensis, A. patula, Beta vulgaris, Chenopodium album, C. ambrosioides, C. polyspermum, Spinacea oleracea, Amaranthus retroflexus (Patch, 1938)

Aphis spiraecola Patch, feeds on Chenopodium album (Bassett & Crompton, 1978b); on C. album, C. ambrosioides, and Amaranthus (Patch, 1938)

Bipersona torticauda Gillette on Salsola pestifer (Paich, 1938)

Forda betae Westwood on Beta vulgaris (Patch, 1938)

Hayhurstia atriplicis L., on Chenopodium album (Bassett & Crompton, 1978b)

Hyalopterus atriplicis L., feeds on Chenopodium album (Bassett & Crompton, 1978b); Atriplex hastatum, A. hortensis, A. patula, Beta vulgaris, Chenopodium album, C. hybridum, C. murale, C. polyspermum, C. urbicum, C. vulvaria, Amaranthus paniculatus, A. retroflexus (Patch, 1938)

Macrosiphum gei Koch, feeds on Chenopodium album (Bassett & Crompton, 1978b); Atriplex, Beta vulgaris, Chenopodium album, Cycloloma atriplicifolia, Spinacea (Patch, 1938)

Macrosiphum solanifolii Ashmead, feeds on Chenopodium album (Bassett & Crompton, 1978b); Atriplex, Beta vulgaris, Chenopodium album, Spinacea oleracea, Amaranthus retroflexus, A. spinosus (Patch, 1938)

Macrosiphum sonchi L. on Beta vulgaris, Chenopodium (Patch, 1938)

Macrosiphum schranki Theobald on Amaranthus (Patch, 1938)

Myzus persicae (Sulzer), green peach aphid, feeds on Chenopodium album (Bassett & Crompton, 1978b), Amaranthus retroflexus is an alternate host in peach and apple orchards in Washington State (Weaver & McWilliams, 1980); on Atriplex, Beta vulgaris, Chenopodium album, C. viride, Salsolakali, Salsola tragus, Spinacea oleracea, Amaranthus (Patch, 1938)

Myzus pseudosolani Theobald, feeds on Chenopodium album (Bassett & Crompton, 1978b); on Chenopodium album, Amaranthus hybridus, and A. retroflexus (Patch, 1938).

Pemphigus balsamiferae Williams on Beta vulgaris (Patch, 1938)

Pemphigus betae Doane, feeds on lamb’s quarters (Bassett & Crompton, 1978b); on Beta vulgaris and Chenopodium album (Patch, 1938)

Pemphigus bursarius L. on Chenopodium (Patch, 1938)

Pemphigus lactucae Fitch on Beta vulgaris (Patch, 1938)

Pemphigus erigeronensis on Beta vulgaris (Patch, 1938)

Semiaphis dauci Fabricius on Chenopodium (Patch, 1938)

Thecabius aflinis Kaltenbach on Chenopodium (Patch, 1938)

Trifidaphis perniciosus Nevsky on Beta, Chenopodium (Patch, 1938)

Trifidaphis phaseoli Passerini on Beta, Amaranthus “greecizans” (native A. albus complex), A. retroflexus (Patch, 1938)

Trifidaphis radicicola on Beta and Chenopodium spp.

Xerophilaphis plotnikovi Nevsky on Beta vulgaris (Patch, 1938)

Xerophilaphis salsolacearum Nevsky on Salsola (Patch, 1938)

Cicadellidae

Eutettix tenella, (leaf-hopper that carries the curly-top disease of the sugar-beet) host plant.

LEPIDOPTERA

Lycaenidae

Brephidium exilis (Boisduval) on Atriplex patula, A. prostrata, Chenopodium (Tietz, 1972)

Plebultina emigdionis (Grinnell) on Atriplex sp. (Tietz, 1972)

Sphingidae

Hyles lineata (Fab.) on Beta vulgaris, Chenopodium, Amaranthus (Tietz, 1972)

Arctiidae

Aphantesis arge (Drury) on Chenopodium (Tietz, 1972)

Aphantesis virgo (L.) on Chenopodium (Tietz, 1972)

Diacrisia virginica (Fab.) on Beta vulgaris, Amaranthus (Tietz, 1972)

Eustigmae acrae (Drury) on Beta vulgaris, Amaranthus spinosus (Tietz, 1972)
Isa isabella (Abbott & Smuth) on Beta vulgaris (Tietz, 1972)

Coleophoridae
Coleophora amaranthella Braun, feeds on seeds of Amaranthus hybridus (Forbes, 1923)
Coleophora annulatella (Tengstr., larva eats seeds of Chenopodium spp. and Atriplex spp. (Bassett & Crompton, 1978b)
Coleophora linearpulvella (Chambers), severe seed predation on Amaranthus retroflexus and A. hybridus (Weaver & McWilliams, 1980).

Gelechiidae
Chrysopea hermannella Fab., on Chenopodium (Leonard, 1928), (Forbes, 1923)
Chrysopea inquinula Clemens, on Chenopodium (Forbes, 1923)
Chrysopea hermannella Fab., on Chenopodium album (Bassett & Crompton, 1978b)
Gnorimoschema chenopodella Bsk., Chenopodium (Leonard, 1928)
Scrobipalpa abscaletella Fisch. v. Ross., mines leaves of Chenopodium album (Bassett & Crompton, 1978b)
Scrobipalpa atriplicella Fisch. v. Ross., on Chenopodium album (Bassett & Crompton, 1978b)
Scrobipalpa nitentella Fuchs, eats flowers and seeds of Chenopodium album (Bassett & Crompton, 1978b)

Hesperiidae
Erymis martialis (Seudder) on Amaranthus sp., A. retroflexus (Tietz, 1972)
Plolisora cautulus (Fab.), Sooty-wing, Chenopodium album, Amaranthus (Leonard, 1928), larvae feed on lamb’s quarters, other Chenopodiaceae and Amaranthaceae (Arnett, 1985); on Amaranthus (Tietz, 1972)

Pyralidae
Blepharomastix vallis Guene., Chenopodium (Leonard, 1928) (Forbes, 1923)
Herpetogramma bipunctalis (Fab.) on Beta vulgaris (Forbes, 1923)
Hymenia fascialis Cr., Hawaiian Beet-webworm, beet, chard, Amaranthus, and various weeds (Leonard, 1928); Beta vulgaris and Amaranthus (Forbes, 1923)
Hymenia perspectalis (Hbn.), Spotted Beet Webworm, larva on Beet and chard (Leonard, 1928), larvae feed on beets, chard (Arnett, 1985); on Beta vulgaris (Forbes, 1923)
Loxocege sticticalis (L.), Sugar-beet Webworm (Leonard, 1928), larvae general feeders, including on cultivated plants (Arnett, 1985) (Forbes, 1923)
Ostrinia nubilalis (Hb.), European Corn Borer, Amaranthus retroflexus is severely attacked (Weaver & McWilliams, 1980)

Geometridae
Empetrumia subnotata Hb., larvae feed on flowers and seeds of Chenopodium album (Bassett & Crompton, 1978b)

Noctuidae
Agrotis ipsilon (Hufnagel), Black Cutworm Moth, larvae can survive and pupate on Amaranthus retroflexus in Indiana (Weaver & McWilliams, 1980); on Beta vulgaris (Tietz, 1972)
Agrotis natalis Guenee on Beta vulgaris (Tietz, 1972)
Agrotis orthogonia (Morrison) on Beta vulgaris (Tietz, 1972)
Agrotis subterranea (Fab.) on Beta vulgaris, Amaranthus (Tietz, 1972)
Anisca infecta (Ochsenheimer) on Beta vulgaris (Tietz, 1972)
Apanche devastator (Brace) on Beta vulgaris (Tietz, 1972)
Antographa californica (Speyer), Alfalfa Looper, larvae have been collected on Amaranthus sp. in California (Weaver & McWilliams, 1980); on Beta vulgaris (Tietz, 1972)
Antographa fabricifer Kirby on Beta vulgaris (Tietz, 1972)
Antographa ni (Hubner) on Beta vulgaris (Tietz, 1972)
Antoplusia egea (Gn.), Bean Leaf Skeletonizer, larvae have been collected on Amaranthus sp. in California (Weaver & McWilliams, 1980)
Euxoa auxiliaris (Grote) on Beta vulgaris (Tietz, 1972)
Euxoa lacticans (Smith) on Beta vulgaris (Tietz, 1972)
Euxoa messoria (Harris) on Beta vulgaris (Tietz, 1972)
Euxoa minus (Grote) on Beta vulgaris (Tietz, 1972)
Euxoa ochrogaster (Guenee) on Beta vulgaris (Tietz, 1972)
Euxoa tessellata (Harris) on Beta vulgaris (Tietz, 1972)
Euxoa tristictula (Morrison) on Beta vulgaris (Tietz, 1972)
Heliothis zea (Boddie) on Amaranthus sp. (Tietz, 1972)
Mamestra configurata Walker on Beta vulgaris (Tietz, 1972)
Melanchrapieta (Harris) on Beta vulgaris (Tietz, 1972)
Ochropleura plecta (L.) on Beta vulgaris (Tietz, 1972)
Papaipema nebris (Guenee) on Beta vulgaris (Tietz, 1972)
Peridroma margaritosa (Haworth) on Beta vulgaris (Tietz, 1972)
Pseudoleititia unipuncta (Haworth) on Beta vulgaris (Tietz, 1972)
Scatogramma trifolii (Rottenburg), feeds on young plants of Chenopodium album (Bassett & Crompton, 1978b); on Beta vulgaris (Tietz, 1972)
Spodoptera eridania (Cramer) on Beta vulgaris, A. retroflexus (Tietz, 1972)
Spodoptera exigua (Hubner) on Beta vulgaris, Atriplex sp., Amaranthus retroflexus (Tietz, 1972)
Spodoptera frugiperda (Abbot & Smith) on Beta vulgaris (Tietz, 1972)
Spodoptera ornithogalli Guenee on Beta vulgaris, Amaranthus retroflexus, A. spinosus (Tietz, 1972)
Spodoptera praefecta Grote on Beta vulgaris (Tietz, 1972)
Trichoplusia ni Hb., Cabbage Looper, larvae have been collected on Amaranthus species in California (Weaver & McWilliams, 1980)

Xestia c-nigrum (L.) on Beta vulgaris (Tietz, 1972)

DIPTERA

Agromyzidae
Agromyza pusilla Meig., on Amaranthus viridis (Cuba), Beta vulgaris, Spinacia oleracea (North America) (Frost, 1923)
Agromyza scutellata Fall., Chenopodium botryum (NA) (Frost, 1923)
Phytomyza affinis Fall., Spinacia oleracea (Europe) (Frost, 1923)
Phytomyza albiceps Meig., on Atriplex sp (Europe) (Frost, 1923)

Drosophilidae
Scaptomyza adusta Loew, on Amaranthus retroflexus (NA) (Frost, 1923)
Scaptomyza graminium Fall., Chenopodium album (Europe) (Frost, 1923)

Ephydridae
Hydrellia leucotoma Meig., Chenopodium album (Europe) (Frost, 1923)

Oscinidae
Chlorops assimilis Macq., Beta vulgaris (Europe) (Frost, 1923)

Anthomyiidae
Hylemyia betarum Lint., Beta vulgaris (NA) (Frost, 1923)
Hylemyia floccosa Macq., Beta vulgaris (NA) (Frost, 1923)
Hylemyia jagax Meig., host plants: Amaranthus retroflexus, Beta vulgaris, Chenopodium album, Spinacia oleracea (NA) (Frost, 1923)
Hylemyia substriata Stein., Beta vulgaris, Beta vulgaris var. macrorhiza (NA) (Frost, 1923)

Pegomyia betae (Curtis), Beet Leaf Miner, Spinach Leaf Miner, this species mines the leaves of beets, spinach, and similar plants (Arnett, 1985)
Pegomyia hyoscyami Panz., Spinach Leaf Miner, larvae mine leaves of beet, spinach, Chenopodium (Leonard, 1928); Amaranthus retroflexus, Atriplex hastata, Beta vulgaris (NA), Beta vulgaris var. macrorhiza (Europe), Chenopodium album (NA), Chenopodium muriare (Europe), Spinacia oleracea (NA) (Frost, 1923)
Pegomyia nigrirhis Zett., Atriplex patula, Beta vulgaris, Chenopodium album (Europe) (Frost, 1923)
Pegomyia Ruficaps Stein, Beta vulgaris (NA) (Frost, 1923)
Pegomyia sulcans Rond., Chenopodium sp. (Europe) (Frost, 1923)

COLEOPTERA

Chrysomelidae
Systena frontalis (Fr.), Red-headed Flea Beetle, Amaranthus retroflexus is a major food plant of the fleabed in Iowa (Weaver & McWilliams, 1980)

Curculionidae
Cosmobaris americana Casey, reported to attack members of the Amaranthaceae as well as sugar beets throughout the United States (Weaver & McWilliams, 1980)
HYMENOPTERA

Brachidae
Agathisra sancta (Say), host is Pholisora catallus, the larvae of which are known to devour goosefoot or pigweed (Chenopodium) and amaranth (Amarantus) (Viereck, 1916)
Apataelis trachynotus Vieereck, claims to have been reared from Pegomyia vicina, infesting Chenopodium (Viereck, 1916)
Microbracon antipes (Prov.), a parasite of lepidopterous larvae boring in such weeds as Amaranth (Leonard, 1928)
Microplitis manesctrac Weede, parasitic upon the painted mamestra (Mamstra picta), the larva of which is especially destructive to cabbages and beets (Viereck, 1916)

Eulophidae
Sympiesis chenopodii Ashmead, reared from a Lithocolletis miner of Chenopodium hybridum (Viereck, 1916)

Apoidea
Andrena piperi Vieereck visits flowers of Salsola kali (Krombein et al., 1979)
Dianthidium dubium dilectum Timberlake visits flowers of Chenopodium (Krombein et al., 1979)
Dianthidium subparvum Swenk, visits flowers of Chenopodium (Krombein et al., 1979)
Hyllaeus bistimatus Forster visits flowers of Amaranthaceae (Krombein et al., 1979)
Hyllaeus conspicuus (Metz.) Wash, visits flowers of Salsola kali (Krombein et al., 1979)
Megachile policaris Say, visits flowers of Salsola (Krombein et al., 1979)
Megachile sidakeae Cockerell visits flowers of Salsola (Krombein et al., 1979)
Megachile wheeleri Sask. visits flowers of Chenopodium (Krombein et al., 1979)
Melissodes coreopsis Robertson visits flowers of Salsola pestifer (Krombein et al., 1979)
Melissodes pulula LaBerge visits flowers of Salsola kali (Krombein et al., 1979)
Melissodes subagiles Cockerell visits flowers of Salsola kali (Krombein et al., 1979)
Melissodes tepida timberlakei Cockerell visits flowers of Salsola kali (Krombein et al., 1979)
Melissodes tristis Cockerell visits flowers of Salsola kali and S. pestifer (Krombein et al., 1979)
Nomia melanderi Cockerell visits flowers of Beta vulgaris and Salsola kali (Krombein et al., 1979)
Perdita calloleuca calloleuca Cockerell visits flowers of Salsola kali (Krombein et al., 1979)
Perdita calloleuca convergens Timberlake visits flowers of Suaeda (Krombein et al., 1979)
Perdita zebra flavens Timberlake visits flowers of Salsola kali (Krombein et al., 1979)
APPENDIX III
MISCELLANEOUS PARASITES

Nematodes

*Aphelenchoides fragariae* (Ritz.-Bos), on *Amaranthus* spp. (Weaver & McWilliams, 1980)

*Ditylenchus dipsaci* (Kuchn) Filip., on *Chenopodium album* (Bassett & Crompton, 1978b)

*Heteroda Marionii* (Cornu) A. Schm., on *Amaranthus* spp. (Weaver & McWilliams, 1980)

*Meloidogyne raedecicola* (Greef.), on *Amaranthus* spp. (Weaver & McWilliams, 1980)

*Meloidogyne* sp., on *Chenopodium album* (Bassett & Crompton, 1978b).

*Pratylenchus pratensis* (DeMan) Filip., on *Amaranthus* spp. (Weaver & McWilliams, 1980), on *Chenopodium album* (Bassett & Crompton, 1978b).
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<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acnida</td>
</tr>
<tr>
<td>altissima</td>
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<tr>
<td>cannabina</td>
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