

FLORA OF NEW JERSEY PROJECT

Manual and Atlas of the Flora of New Jersey

Guidelines for Contributors

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1.0 Introduction

The Flora of New Jersey Project was founded in 2004 to further the understanding, appreciation, and preservation of the flora of New Jersey and to create publications that facilitate these goals. The *Manual of the Flora of New Jersey* is one product of the members of the FNJ Project. The *Atlas of the Flora of New Jersey* is a related, web- and print-based information resource on the distribution of the state's flora. The primary contributions to the *Atlas* are (1) verifying (and databasing, as appropriate) specimens at regional herbaria, and (2) preparing summary data on taxa for publication in the *Atlas*.

2.0 Background

New Jersey is characterized by a rich and diverse flora of over 2000 native and introduced vascular plant species from seven physiographic provinces, including various unique ecosystems such as the New Jersey Pine Barrens. This flora, investigated and collected for over 300 years, has been the focus of many notable botanists beginning in with John Bartram (1699-1777), who was appointed botanist to King George III in 1765, and Peter Kalm (1715-1779), who from 1748-1751 explored eastern North America and collected plants for Linnaeus. In spite of the importance of New Jersey's flora, there has never been a manual that documents the state's rich botanical resources. A number of important works have been produced during the past century by local individuals including N. L. Britton's *Catalogue of Plants Found in New Jersey* (1889), W. Stone's *The Plants of New Jersey with Especial Reference to the Flora of the Pine Barrens and Geographic Distribution of the Species* (1911), M. Y. Hough's *New Jersey Wild Plants* (1983), and J. D. Montgomery and D. E. Fairbrothers' *New Jersey Ferns and Fern Allies* (1992). These contributions, however, did not include keys, treated only a portion of the state, or treated only a portion of the flora, and all are sufficiently out of date to require the use of additional references. Anderson's *Checklist of the Plants of New Jersey* (2003) is the most recent work of note, but includes only a list of species organized by family, with scientific and common names included for each entry. This latter list is in part a compilation from other sources including *The Plants Database* (USDA and NRCS 2003 -

2006). Checklists of New Jersey plant species can be derived from this latter work and from *The Synonymized Checklist and Atlas with Biological Attributes for the Vascular Flora of the United States, Canada, and Greenland* (Kartesz 1999).

3.0 Purpose of the Manual

The purpose of the *Manual of the Flora of New Jersey* is to provide a guide to the vascular plant species that includes (1) keys to the families, genera, species, and infraspecific taxa; (2) current nomenclature and selected synonyms; and (3) information on habitat, physiographic affinity, wetland and rarity status, and nativity. Detailed descriptions of species and subspecies are not included in the Manual to save space and because this information is readily available elsewhere in regional manuals such as M. L. Fernald (1950) *Gray's Manual of Botany, A Handbook of the Flowering Plants and Ferns of the Central and Northeastern United States and Adjacent Canada*; H. A. Gleason (1952) *New Britton & Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*; and H. A. Gleason and A. Cronquist (1991) *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*; as well as the continuing efforts of the *Flora of North America* (e.g., FNA 2003).

4.0 Purpose of the Atlas

The purpose of the *Atlas of the Flora of New Jersey* is to disseminate detailed information about the state flora in an electronic and print format. The primary use envisioned for the *Atlas* is to allow users to view detailed distribution maps based on herbarium, published, and reliable sight records of the flora. Other features will include an online reference to the taxonomy and nomenclature of the flora (with links to appropriate sections of the *Manual*, as they are completed), an archive of digital photographs, and links to other useful resources (USDA PLANTS, New York Flora Atlas, etc.).

The content of the Atlas will be based on a database containing records from regional herbaria (primarily PH, BKL, NY, and CHRB), publications, and reliable unpublished records (e.g., photographs and field notes). Each record will include standard data (location, date of collection, etc.) that can be used to generate maps and other reports illustrating the collection history of the flora. The Atlas will be a fluid resource, adapting to both new data and user demand.

5.0 Guidelines for Contributors

5.1 Authorship

The Manual shall include an index to contributors in which authors of all treatments will be acknowledged appropriately. Treatments can be adapted from other works, but written permission to modify treatments authored and published by others shall be obtained and submitted to the FNJ Manual Committee at the time of manuscript submission.

5.2 Scope

The Manual and Atlas shall include all native taxa and those introduced that have (1) fully naturalized and established reproducing populations in the landscape, (2) those that have been documented from ballast grounds and waste areas, and (3) those that are occasional garden escapes or persistent plants at old home sites. The Manual and Atlas will not include those taxa that are represented strictly by horticultural examples.

5.3 Documentation

Each taxon included in the Manual shall be represented by at least one herbarium voucher specimen deposited in a recognized institution with a herbarium acronym listed in *Index Herbariorum* (Holmgren & Holmgren 1998 and continuously updated), including for example: Academy of Natural Sciences of Philadelphia = PH; Chrysler Herbarium at

Rutgers University = CHRB; Brooklyn Botanic Garden = BKL; and New York Botanical Garden = NY. The specimen should be cited by location; county; collector and collection number if one exists (in italic); year of collection; and institutional acronym of the repository, for example: (Atsion, Burlington Co., *Stone 915*, 1909, PH). The abbreviation “s.n.” should be included when no collection number is noted on the specimen label. Voucher specimen citations are not always included in the examples provided herein (i.e., Appendices II & III), but will be included in the final versions of these treatments.

The database underlying the Atlas will include whatever relevant digital records are available. The process of acquiring data will be a long-term project (with the exception of the Brooklyn Botanic Garden, no regional herbarium has extensive digital records of its New Jersey collections), so the NJ Flora Project is pursuing grant support and other data entry initiatives. Since the Atlas will be a digital resource, taxa will be published once sufficient information is submitted to make the entry generally useful. As the database develops, the resolution of the maps will improve.

5.4 Nomenclature and Systematics

Nomenclature shall be approved by the FNJ Nomenclature Committee and shall reflect accurate precedence and other nomenclatural standards. Although nomenclature and systematics may be consistent with standard treatments such as those in the Flora of North America or recently published monographs, recognition of local entities (not always included in regional or broad treatments) is important to the FNJ Project. Local entities should be included in the Manual when warranted, and should be brought to the attention of the Nomenclature Committee. When a local variant, lacking appropriate nomenclatural combination and not found in recent treatments, is included in the manual, the new combination shall be published in an appropriate journal such as *Bartonia*. The publications could be numbered as “Contributions from the Flora of New Jersey Project.” All taxonomic author citations should follow R. K. Brummitt and C. E. Powell, *Authors of Plant Names* (online at <http://www.ipni.org/index.html>, the web site for *The International Plant Names Index*).

5.5 Keys

A key to the families shall be developed by the Manual committee. Keys to genera within a family as well as species and infraspecific taxa should be succinct, composed of useful, observable characteristics, and constructed with strictly parallel comparisons. See examples: (1) key to the genera of the Chenopodiaceae (Appendix I); (2) keys to species in the genera *Atriplex* and *Chenopodium* (Appendix II and III); and (3) keys to the varieties of *Chenopodium berlandieri* and *C. rubrum* (in Appendix III). No formal descriptions of species and infraspecific taxa will be included in the Flora. Therefore the information in keys to the families and genera, and to species and infraspecific taxa, should assist in taxon identification and should be at the macroscopic level, aided by use of a 10x hand lens.

5.6 Organization for submission to the Manual

The organization of each taxonomic entry to be included in the Manual shall follow technical aspects of the examples attached to the Guidelines (Appendices I-III). When more than one genus from a family is included, keys to the genera (e.g., see Chenopodiaceae) are located after the brief family description. Each genus also shall include a brief description (e.g., see *Atriplex* and *Chenopodium*). Descriptions for genera within the same family shall include parallel construction to enhance their usefulness. For families with one genus and genera with one species, no keys are necessary.

Treatments for species and infraspecific taxa shall not include descriptions. For these levels, contributors shall include authorship of the name; common name(s); synonyms; habitat information including any affinities for ruderal areas; geographic area affinities; wetland status per the USFWS (Reed 1988 and subsequent updates); rarity status per the NJ Natural Heritage Program (NJDEP 2005); and indication of the plant's relationship to nativity when the plant is not native to NJ (e.g., "introduced" or "garden escape", etc.).

No entry for nativity is necessary if the plant is native to NJ; it is implied. Recommended sources of common names include FNA, Fernald (1950), Gleason and Cronquist (1991), Anderson (2003), and *The PLANTS Database*.

Geographic areas (Table 1) shall be identified as the following: New Jersey (NJ) for potential occurrences throughout the state, or northern (NJ-N), central (NJ-C), and southern New Jersey (NJ-S) when appropriate; Valley and Ridge (VR); Highlands (H); Piedmont (P); Coastal Plain (CP) including Inner Coastal Plain (CP-I) and Outer Coastal Plain (CP-O), and Pine Barrens (CP-PB) for a defined portion of the Outer Coastal Plain, when appropriate; Delaware River (DR) including Upper Delaware River (DR-U) above tidewater at Trenton and Lower Delaware River (DR-L) below Trenton; and the Coastal District including coastal strand, barrier islands, and the tidal portions of coastal rivers and streams (CD), including north of the Manasquan River (CD-N) and south of the Manasquan River (CD-S); and the coast of the Delaware Bay and related tidal portions of rivers (CD-DB) (see attached illustration).

5.7 Organization for Submission to the Atlas

The organization of each taxonomic entry to be included in the Atlas shall follow technical aspects of the examples in Appendix IV and those published on the FNJ website (<http://njflora.rutgers.edu>). Family level treatments shall include the scientific name (all names should include the taxonomic authority), the size and distribution of the family worldwide, and a list of genera and number of species in each found in New Jersey. Each genus treatment should include the scientific and common name, the global size and distribution of the genus, and a list of accepted taxa (with authors) for New Jersey. Contributors should also include a list of all synonyms (with authors) sorted by accepted taxon.

Table 1. Geographic Areas of New Jersey.

NJ = New Jersey (for use when a species is potentially +/- ubiquitous)

NJ-N = northern New Jersey

NJ-C = central New Jersey

NJ-S = southern New Jersey

VR = Valley and Ridge

H = Highlands

P = Piedmont

CP = Coastal Plain

CP-I = inner Coastal Plain

CP-O = outer Coastal Plain

CP-PB = Pine Barrens

DR = Delaware River

DR-U = Upper Delaware River (above tides at Trenton)

DR-L = Lower Delaware River (below tides at Trenton to Delaware Bay)

CD = Coastal District

CD-N = outer Coastal District north of and including the Manasquan River

CD-S = outer Coastal District south of the Manasquan River

CD-DB = Delaware Bay

Treatments for species and infraspecific taxa shall include scientific name, common name, synonyms, a list of lower taxa, origin (native or introduced), growth habit, brief description of habitat, range (including geographic affinities, if applicable), frequency, conservation rank (global, national, and state), wetland status per the USFWS (Reed 1988 and subsequent updates), notes on phenology, additional useful comments, and citations for all data and published sources.

The protocol for contributing data records is still under development by the Atlas and Information Technology Committees. Until further notice, all inquires related to data

submission should be addressed to the chairs of those committees. Until the database is integrated with a mapping program, all maps will be at the county level and will be generated manually. To facilitate publication of submissions before the database is fully operational, contributors should provide a list of counties where the taxon has been documented and indicate the form of that documentation (i.e., herbarium specimen(s), publication, or other records).

Photographs and their associated copyright, location, and usage information should be submitted in consultation with the Atlas Committee.

5.8 Examples

5.8.1 Manual

Examples included herein, adapted with permission from the FNA Editorial Committee, are from the family Chenopodiaceae, and include: family description, keys to the genera (Appendix I); descriptions of selected genera [i.e., *Atriplex* (Appendix II) and *Chenopodium* (Appendix III)]; and keys to and information regarding the species and infraspecific taxa. Contributors shall follow exactly the examples provided herein regarding organization, punctuation, fonts (Times New Roman, 12 point), and other technical details. One representative entry for each example genus follows:

Example 1:

Atriplex littoralis L. Narrow-leaved Orach. [syn = *A. hastata* L. var. *littoralis* (L.) Farwell; *A. patula* (L.) var. *littoralis* (L.) A. Gray; *A. patula* ssp. *littoralis* (L.) H. M. Hall & Clements] – Sea beaches and other saline habitats, old ports, ballast dumps; CD, NJ; FACW, “*A. patula*” per Reed 1988; introduced; (Whitehouse Station, Hunterdon Co., R. F. Meyer s.n., 1988, CHRB).

Example 2:

Chenopodium rubrum L. Red Pigweed, Red Goosefoot, Coast-blite. – Moist, open areas, pond margins, salt marshes, weedy areas. Two varieties in the flora:

1. Stems erect or ascending, leaf margins deeply dentate var. *rubrum*
1. Stems prostrate or spreading, leaf margins entire or shallowly dentate
..... var. *humile*

Chenopodium rubrum var. *rubrum* – Open moist areas, salt marshes, waste areas; CD; FACW; G5, S1.

Chenopodium rubrum var. *humile* (Hooker) S. Watson in W. H. Brewer et al. Marshland Goosefoot. [syn = *Chenopodium humile* Hooker] – Brackish marshes, moist bare soils; CD; NI, FAC+.

5.8.2 Atlas

Examples for the Atlas can be found at <http://njflora.rutgers.edu/equisetaceae.html> and in Appendix IV.

Contributors shall follow the examples in Appendix IV regarding organization, punctuation, and italics. Any font and any reasonable layout, however, are acceptable, because preparing the submissions for the web will involve reformatting.

5.9 Submissions and Contacts

Those wishing to participate in the preparation of the Manual or Atlas should contact the Chair of the Executive Committee, the Chair of the Manual Committee, or the Chair of the Atlas Committee for approval to proceed. A checklist of the taxonomic group approved for preparation, including scientific names proposed for use and selected synonyms, should be provided to the Chair of the Nomenclature Committee for approval by that committee before a draft manuscript of the complete taxonomic group is provided. Draft manuscripts should be submitted in MS WORD as attached email files or on CDs to the appropriate Chair for review and acceptance by the relevant FNJ Committee. FNJ Contact information follows:

- Joe Arsenault, Chair, FNJ Executive Committee: NJPlants@aol.com
- Wayne R. Ferren Jr., Chair, FNJ Manual Committee: wrfjr1@aol.com
- Bill Olson, Chair, FNJ Nomenclature Committee: bolson@maserconsulting.com
- Janet Novak, Chair, FNJ IT Committee: janet@indri.org
- Matt Palmer, Chair, FNJ Atlas Committee: mp2434@columbia.edu
- FNJ Project <http://njflora.rutgers.edu>

6.0 References

- Anderson, K. 2003. A Checklist of the Plants of New Jersey. Woodbury, NJ.
- Britton, N. L. 1889. Catalogue of Plants Found in New Jersey. Final report of the State Geologist, Vol. II, pp. 25-619. Mineralogy, Botany, Zoology. Geological Survey of New Jersey.
- Brummitt, R. K. and C. E. Powell, *Authors of Plant Names* (online at <http://www.ipni.org/index.html>)
- Clements, S. E. and S. L. Mosyakin. 2003. *Chenopodium* Linnaeus, Sp. Pl. 1: 218. In: FNA Editorial Committee, *Flora of North America North of Mexico*. Vol. 4, Magnoliophyta: Caryophyllidae, part 1. Oxford University Press, New York. p. 275-299.
- Fernald, M. L. 1950. *Gray's Manual of Botany*, 8th Ed. D. Van Nostrand Company, New York. 1632 p. [Corrected Printing, 1970]
- FNA Editorial Committee. 2003. *Flora of North America North of Mexico*. Vol. 4, Magnoliophyta: Caryophyllidae, part 1. Oxford University Press, New York.

Gleason, H. A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. Vols. 1-3. The New York Botanical Garden, Bronx, NY.

Gleason, H. A. and Cronquist, A. 1991. Manual of the Vascular Plants of Northeastern United States and Adjacent Canada, Second Ed. The New York Botanical Garden, Bronx, NY. 910 p.

Holmgren, P. K. and N. H. Holmgren. 1998 onwards (continuously updated).
Index Herbariorum. New York Botanical Garden.
<http://sciweb.nybg.org/science2/IndexHerbariorum.asp>

Hough, M. Y. 1983. New Jersey Wild Plants. Harmony Press, Harmony, NJ.

Kartesz, J. T. 1999. A Synonymized Checklist and Atlas with Biological Attributes for the Vascular flora of the United States, Canada, and Greenland. First Edition. In: Kartesz, J. T. and C. A. Meacham. Synthesis of the North American Flora. Version 1.0. North Carolina Botanical Garden, Chapel Hill, NC.

Montgomery, J. D. and D. E. Fairbrothers. 1992. New Jersey Ferns and Fern Allies. Rutgers University Press, New Brunswick, NJ. 293 p.

NJDEP. 2005. List of Endangered Plant Species and Plant Species of Concern. Natural Heritage Program.

Reed Jr., P. B. 1988. National List of Plants Species that occur in Wetlands: Northeast (Region 1). U. S. Fish Wildl. Serv. Biol. Rep. 88(26.2). 111 p.

Stone, W. 1911. The Plants of Southern New Jersey with Especial Reference to the Flora of the Pine Barrens and the Geographic Distribution of the Species. Part II,

Report of the New Jersey State Museum 1910. Trenton, NJ. p. 25-828 + CXXIX plates.

USDA and NRCS. 2003-2006. The PLANTS database. Website <http://plants.usda.gov>

Welsh, S. L. 2003. *Atriplex* Linnaeus, Sp. Pl. 2:1052. In: FNA Editorial Committee, Flora of North America North of Mexico. Vol. 4, Magnoliophyta: Caryophyllidae, part 1. Oxford University Press, New York. p. 322-381.

Welsh, S. L., C. W. Crompton, and S. E. Clements. 2003. *Chenopodiaceae* Ventenat. In: FNA Editorial Committee, Flora of North America North of Mexico. Vol. 4, Magnoliophyta: Caryophyllidae, part 1. Oxford University Press, New York. p. 258-261.

7.0 Appendices: Example Treatments

APPENDIX I

Chenopodiaceae * Goosefoot Family

Herbs (annual or perennial), shrubs, or rarely small trees; sometimes succulent; perianth segments 0 or 5, radial or bilateral, green, inconspicuous; ovary usually superior; seeds 1 per flower. Genera ca. 100, species ca. 1500 (12 genera and 42 species in the flora); worldwide, especially in desert and semiarid regions, often in alkaline or saline habitats.

1. Leaves scale-like; stems fleshy or succulent; plants of saline habitats.
 2. Plants annual; all stems terminated by an inflorescence *Salicornia*
 2. Plants perennial; many stems vegetative. *Sarcocornia*

1. Leaves well developed, not scale-like; stems not fleshy; plants of various habitats.
 3. Inflorescence leaves or bracts tipped with a spine or bristle *Salsola*
 3. Inflorescence leaves or bracts not tipped with spine or bristle. (4)

- 4. Leaves sub-cylindric, fleshy. *Suaeda*
- 4. Leaves with flattened blades, generally not fleshy.
 - 5. Pistillate flowers usually lacking perianth, flowers usually enclosed by 2 bracts; flowers usually unisexual *Atriplex*
 - 5. Perianth present, not enclosed by a pair of bracts; flowers generally bisexual or with some also pistillate. (6)

- 6. Perianth horizontally winged in fruit.
 - 7. Leaf blade margins sinuate-dentate *Cycloloma*
 - 7. Leaf blade margins entire *Kochia*

- 6. Perianth not horizontally winged in fruit.
 - 8. Perianth segments each armed with spiniform, hooked, or conic appendages *Bassia*
 - 8. Perianth segments rounded or keeled abaxially, lacking wings or spines. (9)
 - 9. Ovary partly inferior; plants generally cultivated, not naturalized. *Beta*
 - 9. Ovary superior; plants native or naturalized, generally not cultivated. (10)
 - 10. Perianth lobes 1-3 or absent; stamens 1-3(-5) *Corisperma*
 - 10. Perianth lobes 5, stamens 5. (11)

- 11. Plants glandular *Dysphania*
- 11. Plants farinose or glabrous..... *Chenopodium*

APPENDIX II

Atriplex Linnaeus, Sp. Pl. 2: 1052. 1753; Gen. Pl. ed. 5, 472. 1754
Orach, Saltbush

Herbs, annual or perennial, or shrubs; monoecious or dioecious; often with a scurfy (mealy) vesture. Leaves with or without Kranz anatomy. Staminate flowers with 3-5 parted calyx, ebracteate, stamens 3-5. Pistillate flowers lacking perianth, pistil generally naked, commonly enclosed within a pair of foliaceous bracteoles. Fruiting bracteoles enlarged, often thickened and appendaged; pericarp free. Seeds flattened, generally vertical. Species ca. 250 (8 in the flora); worldwide, many halophytic. All species in the flora are annual herbs; only *A. rosea* has Kranz anatomy.

- 1. Leaves generally green on both surfaces, glabrous or sparingly powdery or finely scurfy. (2)

2. Pistillate flowers of 2 kinds, some with calyx 3-5 lobed and seed horizontal, others lacking perianth and enclosed in a pair of bracteoles; fruiting bracteoles samara-like, strongly compressed *A. hortensis*
2. Pistillate flowers similar, each enclosed in a pair of bracteoles; fruiting bracteoles variously compressed. (3)
3. Bracteoles thickened with spongy tissue, especially toward base. (4)
 4. Lower leaves mostly triangular *A. prostrata*
 4. Lower leaves linear or ovate lanceolate, sometimes toothed or triangular. (5)
 5. Leaves linear or oblanceolate, thin, generally green; seeds ovoid *A. littoralis*
 5. Leaves ovate-lanceolate or linear or triangular and hastate, typically thickened and scurfy; seeds ellipsoid *A. dioica*
3. Bracteoles generally not thickened. (6)
 6. Fruiting bracteoles broadly triangular to ovate, margin united at base; leaves opposite or subopposite at least proximally, typically +/-scurfy *A. dioica*
 6. Fruiting bracteoles rhombic to rhombic-triangular to ovate-rhombic, margin united almost to middle; leaves alternate, green on both surfaces *A. patula*
1. Leaves white to gray, densely and finely scurfy, especially adaxially.
 7. Leaf blades not at all dentate, mostly entire, commonly opposite or subopposite at proximal nodes (8)
 8. Fruiting bracteoles 3.5-7 x 2.6-5 mm, typically longer than broad, faces with or without appendages *A. mucronata*
 8. Fruiting bracteoles 2.5-4.5 x 2.6-5 mm, typically as wide or wider than broad, faces with appendages *A. pentandra*
 7. Leaf blades all or most dentate or sinuate-dentate, alternate or opposite only at proximal-most nodes. (9)
9. Plants erect; seeds 2-2.5 mm; weedy species, mostly in saline places *A. rosea*
9. Plants decumbent; seeds 1.5-2.0 mm; rare ballast plant *A. tatarica*

A. dioica Rafinesque. Thickleaf Orach, Saline Orach. [syn = *A. patula* L. var. *subspicata* (Nuttall) S. Watson; *A. subspicata* (Nuttall) Rydberg; *A. patula* ssp. *hastata* sensu Hall & Clements p.p.] - Sea beaches, salt marshes, and other saline habitats; CD; FACW, apparently included in "*A. patula*" per Reed 1988; *A. subspicata* = G5, S1.1, SE.

A. hortensis L. Garden Orach, Hoary Orach. [syn = *A. nitens* Schkuhr] - Stream and lake shores, roadside, disturbed areas, and gardens; uncommon; escaped from cultivation; NJ.

A. littoralis L. Narrow-leaved Orach. [syn = *A. hastata* L. var. *littoralis* (L.) Farwell; *A. patula* (L.) var. *littoralis* (L.) A. Gray; *A. patula* ssp. *littoralis* (L.) H. M. Hall &

Clements] – Sea beaches and other saline habitats, old ports, ballast dumps; CD, NJ; FACW, apparently included in “*A. patula*” per Reed 1988; introduced; (Whitehouse Station, Hunterdon Co., *R. F. Meyer s.n.*, 1988, CHRB).

A. mucronata Rafinesque. Quelite, Crested Orach. [syn = *A. arenaria* Nuttall; *A. cristata* Humboldt & Bonpland ex Willdenow var. *arenaria* (Nuttall) Kuntz; *A. pentandra* (Jacquin) Standley ssp. *arenaria* (Nuttall) H. M. Hall & Clements] – Sandy seashores, salt marshes; CD; FAC-, “*A. arenaria*” per Reed 1988; (Tuckerton, Ocean Co., *M. R. Newcomb s.n.*, 1974, CHRB). Note: *Atriplex pentandra* (Jacquin) Standley in N. L. Britton et al., a related southern species, may also occur in NJ with this species.

A. patula L. Spear Orach, Spearscale. [syn = *A. hastata* L. ssp. *patula* (L.) S. Pons; *A. hastata* var. *patula* (L.) Farwell; *Teutiopsis patula* (L.) Selak] – Ruderal weed of non-saline disturbed places; CD, NJ; introduced; (Ocean City, Cape May Co., *B. Long 13,262*, CHRB).

A. pentandra (Jacquin) Standley in N. L. Britton et al. Seashore Orach. [syn = *Axyris pentandra* Jacquin; *A. texana* S. Watson; *A. wardii* Standley] - Ballast and possibly seashores with *A. mucronata* Rafinesque (see above); NJ, CD?; (Ballast, Camden, Camden Co., *Burk s.n.*, 1873, CHRB).

A. prostrata Boucher ex de Candolle in J. Lamarck and A. P. de Candolle. Thinleaf Orach, Triangle Orach. [syn = *A. triangularis* Willdenow; *A. patula* var. *hastata* auct. non (L.) Gray; *A. patula* ssp. *hastata* Hall & Clements 1923, non (L.) Hall & Clements] – Sea beaches, salt marshes, and other saline habitats; CD; FACW, apparently included in “*A. patula*” per Reed 1988; introduced and possibly native.

A. rosea L. Tumbling Orach. - Disturbed, often riparian, alkaline, or saline habitats and ballast dumps; NJ, CD; FACU; introduced; (Camden, Camden Co., *C. F. Parker s.n.*, 1880, CHRB).

A. tatarica L. Tatarian Orach. - Ballast and waste grounds (Camden); NJ; introduced; (Ballast, Camden, Camden Co., *C. F. Parker s.n.*, 1875, CHRB).

APPENDIX III

Chenopodium Linnaeus, Sp. Pl. 1: 218. 1753; Gen. Pl. ed. 5, 103. 1754 Goosefoot

Herbs, annual or perennial; monoecious or dioecious; farinose, with small white inflated hairs or glabrous; not fleshy. Leaves alternate, petiolate or sessile. Flowers generally bisexual, bracteoles absent. Fruits utricles or achenes, indehiscent or irregularly dehiscent. Seeds lenticular or subglobose, horizontal or vertical, pericarp adherent or non-adherent. Species 100+ (x in the flora); worldwide. [excluding *Dysphania* R. Brown]

1. Seed vertical or both horizontal and vertical; leaf blades glabrous or farinose.
 2. Perianth segments 5; plants perennial *C. bonus-henricus*
 2. Perianth segments 3; plants annual. (3)
3. Leaf blades lanceolate or oblong, glaucous adaxially *C. glaucum*
3. Leaf blades generally triangular or rhombic, green abaxially. (4)
 4. Glomerules 3-10 mm diameter, generally sessile on unbranched terminal spikes; seeds all vertical *C. capitatum*
 4. Glomerules 2-5 mm diameter generally sessile on lateral spikes; seeds horizontal and vertical *C. rubrum*
1. Seeds all horizontal; leaf blades generally farinose.
 7. Flowers individually arranged in panicles; leaf blades glabrous. (8)
 8. Leaves sinuate-dentate; seeds 1.3-1.9 mm diameter *C. simplex*
 8. Leaves entire; seeds 0.8-1.3 mm diameter *C. polyspermum*
 7. Flowers in loose or dense glomerules; leaf blades usually glabrous. (9)
 9. Leaves ovate, rhombic, triangular, or lanceolate to 2 (<3) times longer than broad. (11)
 9. Leaf blades linear, linear-lanceolate or oblong-ovate, 3 times longer than broad (10)
 10. Leaves with 1 vein, blades linear, margins entire *C. leptophyllum* (?)
 10. Leaves with 3 veins from base, linear, linear lanceolate, or narrowly oblong or triangular rhombic, margins usually entire *C. pratericola*
 11. Seeds horizontally honeycomb-pitted *C. berlandieri*
 11. Seeds smooth or areolate. (12)
 12. Leaves triangular. (13)

- 13. Seeds 0.8-1.2 mm diameter, seed margin round; leaf blades often with basal lobes *C. urbicum*
- 13. Seeds 1-1.5 mm diameter, seed margin acute; leaf blades without basal lobes *C. murale*

- 12. Leaves ovate to broadly ovate, rhombic, or lanceolate, usually variously lobed or toothed. (14)
 - 14. Leaf blades without teeth except for basal lobes or teeth (15)
 - 15. Flowers in different stages of development in same glomerule *C. stanleyanum*
 - 15. Flowers more or less in same stages of development in same glomerule *C. vulvaria*
 - 14. Leaf blades often with lateral teeth and basal lobes, or lanceolate. (16)
- 16. Leaves widely ovate, as long as broad, lateral lobes equaling terminal lobe *C. opulifolium*
- 16. Leaves ovate, rhombic, or lanceolate, longer than broad; lateral lobes when present smaller than terminal lobe. (17)
 - 17. Leaf margins more or less parallel below the obtuse apex; leaves lanceolate to narrowly elliptic; inflorescence generally moniliform, not profusely branched *C. strictum*
 - 17. Leaf margins tapering to an acute apex; leaves ovate, rhombic, or lanceolate; inflorescence branched spicate or cymose *C. album*

C. album L. Lamb's-quarters, Pigweed [syn = *C. lanceolatum* Muhl.; see *C. strictum* Roth.] – Disturbed soils, waste places in open areas and habitats; NJ; introduced. Variable, with many named groups and hybrids (Moorestown, Burlington Co., *W. R. Ferren* 472, 1969, CHRB).

C. berlandieri Moquin-Tandon. Pit-seed Goosefoot.

Three varieties in the flora:

- 1. Seeds 1 – 1.3 mm var. *boscianum*
- 1. Seeds 1.2 – 2 mm (2)
 - 2. Inflorescences large and drooping; seeds 1.7 – 2 mm var. *bushmanum*
 - 2. Inflorescences small and erect; seeds 1.3 – 1.9 mm var. *macrocalycium*

C. berlandieri var. *boscianum* (Moquin-Tandon) Wahl [syn = *Chenopodium boscianum* Moquin-Tandon] - Beaches, sandy soils, marshes; CD; (East Millstone, Somerset Co., *H. F. Buell s.n.*, 1967, CHRB).

C. berlandieri var. *bushmanum* (Aellan) Cronquist in H. A Gleason and A. Cronquist [syn = *Chenopodium bushianum* Aellan] – Disturbed areas, cultivated ground, woods, river banks; NJ, N J-R.

- C. berlandieri* var. *macrocalyrium* (Aellan) Cronquist in H. A. Gleason and A. Cronquist - Coastal sands, beaches, salt marshes; CD; G4, S2; (Cape May, Cape May Co., *W. H. Witte s.n.*, 1930, CHRB).
- C. bonus-henricus* L. Good King Henry, Wild Spinach. - Waste ground; escaped from cultivation; NJ; introduced.
- C. capitatum* (L.) Ambrosi. Strawberry-blight. - Gardens, meadows, thickets, open woods, old fields; NJ. Represented in the flora by var. *capitatum* (Orange, Essex Co., *N. L. Britton s.n.*, 1884, CHRB).
- C. glaucum* L. Oak-leaf Goosefoot. - Waste places, shorelines, especially with brackish soils; CD, NJ; DR-L; FACW-. Represented in the flora by var. *glaucum* (Ballast, Petty's Island, Camden Co., *C. F. Parker s.n.*, 1886, CHRB).
- C. leptophyllum* (Moquin-Tandon) Nuttall ex. S. Watson. Narrow-leaf Goosefoot. [syn = *C. album* L. var. *leptophyllum* Moquin-Tandon in A. P. de Candolle and A. L. P. P. de Candolle]. - Open, often disturbed sandy places, fields; NJ; FAC; (Cape May, Cape May Co., *W. H. Witte s.n.*, 1927, CHRB).
- C. murale* L. Nettle-leaved Goosefoot, Sowbane. - Waste places, roadsides, railroads, open oak woods; NJ; introduced; (Swedesboro, Gloucester Co., *B. Heritage s.n.*, 1889, CHRB).
- C. opulifolium* Schrader ex de Candolle in J. Lamarch and A. P. de Candolle. Sea Port Goosefoot. - Disturbed soils in open habitats; NJ; introduced. [listed by K. Anderson]
- C. polyspermum* L. Many-seeded Goosefoot - Disturbed soils, waste places, gardens; NJ; introduced. Two varieties in the flora:
- 1. Stems spreading, leaf apices obtuse, greenish var. *polyspermum*
 - 1. Stems erect, leaf apices acute, maturing reddishvar. *acutifolium*
- Chenopodium polyspermum* var. *acutifolium* (Smith) Gaudin - Ballast; NJ, DR-L; (Camden, Camden Co., *I. Martindale s.n.*, 1877, CHRB).
- Chenopodium polyspermum* var. *polyspermum* - Ballast; NJ, DR-L; (Camden, *C. F. Parker s.n.*, 1876, CHRB).
- C. pratericola* Rydberg. Desert Goosefoot, Narrow-leaf Goosefoot. [syn = *C. desiccatum* A. Nelson var. *leptophylloides* (Murr.) Wahl] - Open, sandy soils, often in saline or alkaline habitats; CD; FACW?, "*C. leptophyllum*" per Reed 1988(?); G5, S2.
- C. rubrum* L. Red Pigweed, Red Goosefoot, Coast-blite. - Moist, open areas, pond margins, salt marshes, weedy areas. Two varieties in the flora:

1. Stems erect or ascending, leaf margins deeply dentate var. **rubrum**
1. Stems prostrate or spreading, leaf margins entire or shallowly dentate
..... var. **humile**

C. rubrum var. **rubrum** – Open moist areas, salt marshes, waste areas; CD, NJ;
FACW; G5, S1, SE.

C. rubrum var. **humile** (Hooker) S. Watson in W. H. Brewer et al. Marshland
Goosefoot. [syn = *Chenopodium humile* Hooker] – Brackish marshes, moist bare
soils; CD; NI, FAC+.

C. simplex (Torrey) Rafinesque. Maple-leaved Goosefoot. [syn = *Chenopodium
hybridum* L. var. *simplex* Torrey; *C. gigantospermum* Aellen; *C. hybridum* var.
gigantospermum (Aellen) Rouleau] – Woods, thickets, wooded slopes, fields and waste
places; NJ; G5, S2; (Gloucester City, Camden Co., *B. Long 74001*, 1951, CHR B)

C. stanleyanum Aellen. Woodland Goosefoot. – Disturbed soils in shaded, wooded
areas; NJ; G5, S2.

C. strictum Roth. [syn = various entities in the *C. album* group including *C.
glaucophyllum* Aellen, previously recognized as native]. – Disturbed, weedy areas; NJ;
introduced.

C. urbicum L. City Goosefoot. – Waste places, especially in urban areas; NJ;
introduced; (Gloucester City, Camden Co., *K. K. Mackenzie s.n.*, 1920, CHR B).

C. vulvaria L. – Disturbed, weedy areas, ballast; NJ, DR-L; introduced; (Ballast,
Camden, Camden Co., *C. F. Parker s.n.*, 1879, CHR B).

APPENDIX IV

Sample Atlas Submission: *Equisetum arvense*

(A web-formatted version of these examples can be found at the end of this
appendix.)

Equisetum arvense L.
Field Horsetail

Synonyms
Equisetum calderi Boivin

Equisetum arvense L. var. *alpestre* Wahlenb.
Equisetum arvense L. var. *boreale* (Bong.) Rupr.
Equisetum arvense L. var. *campestre* Wahlenb.
Equisetum arvense L. var. *riparium* Farw

Lower taxa
none

Origin
native

Growth habit
forb/herb

Habitat
open, moist to dry, sandy or sterile soils, including cinders

Range
statewide, but not common in the Pine Barrens

Frequency
common

Rank
G5 N5? S5

Status
none

Wetland status
US: FACU; FACW-; Northeastern region: FAC

Reproductive parts present
March to May

Comments
Stems with scattered stomata; sheaths with approximately 12 brown, acuminate teeth; blunt-tipped cones. Fertile stems appear before the sterile, whorl-branched ones. An extremely variable species.

Sources

Herbarium records: Academy of Natural Sciences (PH), Brooklyn Botanic Garden (BKL), Chrysler Herbarium at Rutgers University (CHRB), New York Botanical Garden (NY), United States National Herbarium (US).

HOUGH, M.Y. 1983. New Jersey wild plants. Harmony Press, Harmony, New Jersey, USA.

MONTGOMERY, J. D., and D. E. FAIRBROTHERS. 1985. New Jersey ferns and fern-allies. Rutgers University Press, New Brunswick, New Jersey, USA.

NatureServe. 2006. NatureServe explorer: an online encyclopedia of life, Version 4.7. Website <http://www.natureserve.org/explorer> [Accessed 10 March, 2006].

New Jersey Natural Heritage Program. 2005. List of Endangered Plant Species and Plant Species of Concern. New Jersey Department of Environmental Protection, Trenton, New Jersey, USA.

U.S. Department of Agriculture and Natural Resources Conservation Service. 2006. The PLANTS database. Website <http://plants.usda.gov> [Accessed 6 March 2006].

Counties

documented by herbarium specimen: all

documented by publication: none

other documentation: none

Sample Atlas Submission: *Equisetum*

Equisetum L.

Horsetails

Found nearly worldwide. Fifteen species.

In New Jersey, six species and three named hybrids.

Equisetums in New Jersey

Equisetum arvense L.

Equisetum x ferrissii Clute [*hyemale x laevigatum*]

Equisetum fluviatile L.

Equisetum hyemale L. var. *affine* (Engelm.) A.A. Eat.

Equisetum x litorale Kühlewein ex Rupr. [*arvense x fluviatile*]

Equisetum x mackaii (Newm.) Brichan [*hyemale x variegatum*]

Equisetum pratense Ehrh.

Equisetum sylvaticum L.

Equisetum variegatum Schleich. ex F. Weber & D.M.H. Mohr var. *variegatum*

Accepted names and synonyms

Equisetum arvense L. (Field Horsetail)

Equisetum arvense L. var. *alpestre* Wahlenb.

Equisetum arvense L. var. *boreale* (Bong.) Rupr.

Equisetum arvense L. var. *campestre* Wahlenb.

Equisetum arvense L. var. *riparium* Farw.

Equisetum calderi Boivin

Equisetum x ferrissii Clute [*hyemale x laevigatum*]

Equisetum hyemale L. var. *elatum* (Engelm.) Morton

Equisetum hyemale L. var. *intermedium* A.A. Eat.

Equisetum intermedium (A.A. Eat.) Rydb.

Equisetum fluviatile L. (Water Horsetail)

Equisetum fluviatile L. var. *limosum* (L.) Gilbert

Equisetum limosum L.

Equisetum hyemale L. (Scouring Rush)

var. *affine* (Engelm.) A.A. Eat.

Equisetum affine Engelm.

Equisetum hyemale L. ssp. *affine* (Engelm.) Calder & Taylor

Equisetum hyemale L. var. *californicum* Milde

Equisetum hyemale L. var. *pseudohyemale* (Farw.) Morton

Equisetum hyemale L. var. *robustum* (A. Braun) A.A. Eat.

Equisetum praealtum Raf.

Equisetum robustum A. Braun

Hippochaete hyemalis (L.) Bruhin

Hippochaete hyemalis (L.) Bruhin ssp. *affinis* (Engelm.) W.A. Weber

Equisetum x litorale Kühlewein ex Rupr. [*arvense x fluviatile*] (Shore Horsetail)

Equisetum x mackaii (Newm.) Brichan [*hyemale x variegatum*]

Equisetum trachyodon (A. Braun) W.D.J. Koch

Equisetum variegatum Schleich. ex F. Weber & D.M.H. Mohr var. *jesupii*
A.A. Eat.

Equisetum pratense Ehrh. (Meadow Horsetail)

Equisetum sylvaticum L. (Sylvan Horsetail)

Equisetum sylvaticum L. var. *multiramosum* (Fern.) Wherry

Equisetum sylvaticum L. var. *pauciramosum* Milde

Equisetum variegatum Schleich. ex F. Weber & D.M.H. Mohr (Variegated Horsetail)

var. *variegatum*

Equisetum variegatum Schleich. ex F. Weber & D.M.H. Mohr var. *anceps*
Milde

Hippochaete variegata (Schleich. ex F. Weber & D.M.H. Mohr) Bruhin

Sources

GLEASON, H. A., and A. CRONQUIST. 1991. Manual of vascular plants of northeastern United States and adjacent Canada, 2nd ed. New York Botanical Garden, Bronx, New York, USA.

Herbarium records: Academy of Natural Sciences (PH), Chrysler Herbarium at Rutgers University (CHRB).

HOUGH, M. Y. 1983. New Jersey wild plants. Harmony Press, Harmony, New Jersey, USA.

MONTGOMERY, J. D., and D. E. FAIRBROTHERS. 1985. New Jersey ferns and fern-allies. Rutgers University Press, New Brunswick, New Jersey, USA.

U.S. Department of Agriculture and Natural Resources Conservation Service. 2006. The PLANTS database. Website <http://plants.usda.gov> [Accessed 29 August 2006].

Sample Atlas Submission: *Equisetaceae*

Equisetaceae Michaux ex DeCandolle Horsetail Family

Found nearly worldwide. One genus.

In New Jersey, one genus:

Equisetum L.

Sources

GLEASON, H. A., and A. CRONQUIST. 1991. Manual of vascular plants of northeastern United States and adjacent Canada, 2nd ed. New York Botanical Garden, Bronx, New York, USA.

U.S. Department of Agriculture and Natural Resources Conservation Service. 2006. The PLANTS database. Website <http://plants.usda.gov> [Accessed 29 August 2006].



Plants of New Jersey

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[Equisetaceae](#) >> *Equisetum*

Equisetum L.

Horsetails

Found nearly worldwide. Fifteen species.

In New Jersey, six species and three named hybrids.

Equisetums in New Jersey

[See also lists with synonyms, arranged [alphabetically](#) or by [accepted name](#).]

[Equisetum arvense](#) L.

[Equisetum x ferrissii](#) Clute [*hyemale x laevigatum*]

[Equisetum fluviatile](#) L.

[Equisetum hyemale](#) L. var. *affine* (Engelm.) A.A. Eat.

[Equisetum x litorale](#) Kühlewein ex Rupr. [*arvense x fluviatile*]

[Equisetum x mackaii](#) (Newm.) Brichan [*hyemale x variegatum*]

[Equisetum pratense](#) Ehrh.

[Equisetum sylvaticum](#) L.

[Equisetum variegatum](#) Schleich. ex F. Weber & D.M.H. Mohr var. *variegatum*

Alphabetical listing of species and synonyms

Equisetum affine — see [Equisetum hyemale var. affine](#)

[Equisetum arvense](#)

Equisetum arvense var. *alpestre* — see [Equisetum arvense](#)

Equisetum arvense var. *boreale* — see [Equisetum arvense](#)

Equisetum arvense var. *campestre* — see [Equisetum arvense](#)

Equisetum arvense var. *riparium* — see [Equisetum arvense](#)

Equisetum calderi — see [Equisetum arvense](#)

[Equisetum x ferrissii](#)

[Equisetum fluviatile](#)

Equisetum fluviatile var. *limosum* — see [Equisetum fluviatile](#)

[Equisetum hyemale var. affine](#)

Equisetum intermedium — see [Equisetum x ferrissii](#)

Equisetum limosum — see [Equisetum fluviatile](#)

[Equisetum x litorale](#)

[Equisetum x mackaii](#)

Equisetum praealtum — see [Equisetum hyemale var. affine](#)

[Equisetum pratense](#)

Equisetum robustum — see [Equisetum hyemale var. affine](#)
[Equisetum sylvaticum](#)
Equisetum sylvaticum var. *multiramsum* — see [Equisetum sylvaticum](#)
Equisetum sylvaticum var. *pauciramsum* — see [Equisetum sylvaticum](#)
Equisetum trachyodon — see [Equisetum x mackaii](#)
[Equisetum variegatum var. variegatum](#)
Equisetum variegatum var. *jesupi* — see [Equisetum x mackaii](#)
Hippochaete hyemalis — see [Equisetum hyemale var. affine](#)
Hippochaete variegata — see [Equisetum variegatum var. variegatum](#)

Sources

- GLEASON, H. A., and A. CRONQUIST. 1991. Manual of vascular plants of northeastern United States and adjacent Canada, 2nd ed. New York Botanical Garden, Bronx, New York, USA.
Herbarium records: Academy of Natural Sciences (PH), Chrysler Herbarium at Rutgers University (CHRB).
- HOUGH, M. Y. 1983. New Jersey wild plants. Harmony Press, Harmony, New Jersey, USA.
- MONTGOMERY, J. D., and D. E. FAIRBROTHERS. 1985. New Jersey ferns and fern-allies. Rutgers University Press, New Brunswick, New Jersey, USA.
- U.S. Department of Agriculture and Natural Resources Conservation Service. 2006. The PLANTS database. Website <http://plants.usda.gov> [Accessed 29 August 2006].
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[Equisetaceae](#) >> [Equisetum](#) >> *Equisetum arvense*

Equisetum arvense L.

Field Horsetail



[larger map](#)

Synonyms *Equisetum calderi* Boivin
Equisetum arvense L. var. *alpestre* Wahlenb.
Equisetum arvense L. var. *boreale* (Bong.) Rupr.
Equisetum arvense L. var. *campestre* Wahlenb.
Equisetum arvense L. var. *riparium* Farw

Lower taxa none

Origin native

Growth habit forb/herb

Habitat open, moist to dry, sandy or sterile soils, including cinders

Range statewide, but not common in the Pine Barrens

Frequency common

Rank G5 N5? S5

Status none

Wetland status US: FACU, FACW-; Northeastern region: FAC

Reproductive parts present March to May

Comments An annual plant having stems with scattered stomata; sheaths with approximately 12 brown, acuminate teeth; blunt-tipped cones. Fertile stems appear before the sterile, whorl-branched ones. An extremely variable species.

Sources

Herbarium records: Academy of Natural Sciences (PH), Brooklyn Botanic Garden (BKL), Chrysler Herbarium at Rutgers University (CHRB), New York Botanical Garden (NY), United States National Herbarium (US).

HOUGH, M.Y. 1983. New Jersey wild plants. Harmony Press, Harmony, New Jersey, USA.

MONTGOMERY, J. D., and D. E. FAIRBROTHERS. 1985. New Jersey ferns and fern-allies. Rutgers University Press, New Brunswick, New Jersey, USA.

NatureServe. 2006. NatureServe explorer: an online encyclopedia of life, Version 4.7. Website <http://www.natureserve.org/explorer> [Accessed 10 March, 2006].

U.S. Department of Agriculture and Natural Resources Conservation Service. 2006. The PLANTS database. Website <http://plants.usda.gov> [Accessed 7 September 2006].

Species page by Gerry Moore and Janet Novak.

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