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Introduction

The need for a comprehensive study and taxonomic revision of asters in Illinois becomes apparent when one looks at the varied treatments of this genus in the principal floristic literature of the state (G.N. Jones 1945, 1950, 1963; Jones and Fuller 1955; Mohlenbrock 1975, 1986; Mohlenbrock and Ladd 1978). Three factors contribute to the differences found in these works: the number of taxa recorded for Illinois, nomenclatural considerations such as those dictated by the principle of priority, and differences in taxonomic concepts and interpretations.

In the first edition of *Flora of Illinois* (G.N. Jones 1945), 33 species are treated under *Aster*, not counting hybrids. Three additional species appear in the third edition (G.N. Jones 1963): *A. chasei* G.N. Jones in Jones & Fuller, a species newly described from Illinois; *A. tataricus* L.f., an occasionally escaped cultivated species; and *A. parviceps* (Burgess in Britton & Brown) Mack. & Bush, probably inadvertently omitted from the first two editions but included in Jones and Fuller (1955). In the most recent *Guide to the Vascular Flora of Illinois*, Mohlenbrock (1986) treats 35 species. A notable change involves the transfer of *A. ptarmicoides* (Nees) Torrey & Gray to *Solidago*. In this revision, I recognize 31 species of *Aster* in the state of Illinois.

My research has concentrated on New World and some Old World species of *Aster* (*sensu lato*) for over 15 years (A.G. Jones 1974, 1977, 1978a, b, c, 1980a, b, 1982, 1983, 1984, 1987; Jones and Hiepko 1981; Jones and Young 1983; Jones and Lowry 1986; and others), and much additional information has been introduced in this current study. My taxonomic concepts are summarized in the conspectus of classification of Illinois *Aster* species (p. 144).

A recent example of a name change necessitated by application of the principle of priority is that of *Aster azureus* Lindley in Hooker. The name is placed in synonymy under *A. oolentangiensis* Riddell (A.G. Jones 1983). Publication of the latter name preceded that of the former by only seven months. Other examples of name changes are *A. juncíformis* Rydb. to *A. borealis* (Torrey & Gray) Prov., and *A. pantotrichus* S.F. Blake to *A. ontarionis* Wieg. (Shinners 1949).

Most differences among various accounts are attributable to disagreements about taxonomic concepts and interpretations. Changes may be the result of the union of two or more species under one [e.g., *Aster simplex* Willd. = *A. lanceolatus* Willd. (Semple 1979; Semple and Chmielewski 1987)], or they may involve elevation to the rank of species of taxa formerly considered at an inferior rank [e.g., *A. ericoides* L. (var.) *parviceps* Burgess in Britton & Brown = *A. parviceps*]. Sometimes names have been misapplied [e.g., *A. ericoides* for *A. pilosus* Willd. (cf. Blake 1930)], and occasionally a species is transferred to another genus [e.g., *A. ptarmicoides* to *Solidago* (Boivin 1972) and *A. brachyactis* S.F. Blake to *Brachyactis* (A.G. Jones 1984)].

The transfer of *Aster ptarmicoides* to *Solidago* is now generally accepted. Characters of habit, phyllaries, and achenes link this species [called Stiff

Aster by Swink (1974)] to the *Oligoneuron* group of *Solidago*. The genetic alliance is further supported by the fact that hybridization between *A. ptarmicoides* and species of the above group is not uncommon. One such hybrid has been reported from Cook County (Higley and Raddin 1891; Pepoon 1927; Jones and Fuller 1955; Swink 1974): *S.* × *lutescens* (Lindley in DC.) Boivin. It was first described as a species: *Diplopappus lutescens* Lindley in DC. [synonyms: *A. lutescens* (Lindley in DC.) Torrey & Gray; *A. ptarmicoides* var. *lutescens* (Lindley in DC.) A. Gray], and *S. riddellii* Frank is probably the other parent species involved in the hybrid.

Following my survey of the tribe Astereae (A.G. Jones 1984, 1985), I proposed returning *Brachyactis* Ledeb. to its originally published status as a separate genus. I have, however, included the single Illinois species *Brachyactis ciliata* (Ledeb.) Ledeb. in this study because it is considered a member of *Aster* in nearly all floristic literature to the present and because recent students of the taxon disagree with my viewpoint (Houle and Brouillet 1985).

Other recent treatments of *Aster* that espouse generic concepts different from mine have been published by Semple and Brouillet (1980a, b) and Reveal and Keener (1981). These treatments, however, which propose segregation from *Aster* of species of *A.* subg. *Virgulus* (Raf.) A.G. Jones ($x = 5$ chromosomes), have not been widely adopted. Evidence of hybridization between species of that assemblage and members of *A.* subg. *Symphyotrichum* (Nees) A.G. Jones ($x = 8$ chromosomes) supports a more conservative generic concept (A.G. Jones 1982; Jones and Young 1983; Allen 1985).

The following chapters are organized in the format used in most floristic manuals. The generic description of *Aster* (*sensu stricto*) is followed by a conspectus of classification of the Illinois species and by an indented key that includes both *Aster* and *Brachyactis*. Next, the species descriptions are given in alphabetic order by scientific name, the last being that of *Brachyactis ciliata*.

Within each entry, vernacular names used in literature dealing with the Illinois flora are listed after the scientific name. A new vernacular name is proposed (with some reluctance) in this work for *Aster fragilis* Willd.: **Brittle Aster**, a translation of the very appropriate specific epithet.

As much as possible, a uniform format is maintained in the descriptions. The diagnosis is followed by a listing of the mitotic ($2n$) chromosome number(s) and by those synonyms of the specific name that are cited for Illinois in other floristic works, including the bibliographic references.

A separate paragraph deals with phenology, ecology, and general geographic distribution. Standard two-letter postal abbreviations are used for names of the states and of the Canadian provinces, for example, AB (Alberta), NF (Newfoundland), PE (Prince Edward Island), PQ (Quebec), and YT (Yukon Territory).

Dot maps show the distribution of native Illinois species at the county level (county names are identified on the preceding map). These maps were based entirely on specimens I have examined, annotated, and recorded, and I may well have missed some counties for which valid records have been published. Previously published maps and lists, however, may include occasional recordings based on misidentifications. In addition to my own collections, I have examined more than 10,000 herbarium specimens for this study, including all material on deposit in the principal Illinois herbaria: DEK, EIU, F, ILL, ILLS, ISM, KNOX, MOR, MWI, and SIU. Abbreviations correspond to those in *Index Herbariorum* (Holmgren et al. 1981). GH, MIN, MO, NY, PH, US, and WIS are among the larger herbaria outside the state that yielded distribution data for the asters of Illinois. Some personal collections were borrowed from P. Shildneck and J. Schwegman.

Varieties are treated following the description of the respective species, either

in a short diagnostic statement or, in cases where a clear distinction by a combination of characteristics is possible, in the form of a key. Varietal synonymies are listed only to the extent that they have been cited for or described from Illinois. One reason for the inconsistency in the handling of varieties is that keys are not very meaningful or practical when a high degree of intergradation or overlap in characteristics exists. Moreover, I am convinced that some commonly recognized varieties have acquired their distinctive characteristics via gene flow from other species.

Hybrids are mentioned at the end of each entry, and some herbarium collections are listed as examples. Although only a few of the putative hybrids observed in the wild have been experimentally reproduced, the fact that closely related *Aster* species have a high degree of genetic homology and do occasionally hybridize is now generally accepted (Wiegand 1928, 1932; Cronquist 1947; Semple and Brammall 1982; and others). The classic example of an experimentally confirmed hybrid that may survive for several seasons is *A.* × *amethystinus* Nutt., pro sp. = *A. ericoides* × *A. novae-angliae* L. (Wetmore and Delisle 1939; A.G. Jones 1978c). At least some viable achenes are commonly produced, and backcrosses to plants of the parent species have been successful. Because of the relatively frequent occurrence of this hybrid, I have included it in the key and given a comparative description after that of one of its parent species (*A. novae-angliae*). Herbarium specimens of putative hybrid individuals, however, are not entirely uniform, and some are undoubtedly backcrosses to one or the other parent. Intergradation between two species is more evident in some cases than in others, and the key to the species generally does not work well for hybrids or for individuals that exhibit a high degree of introgression from other species.

Aside from the hybrid *Aster* × *amethystinus*, I have included in the key and discussed under their closest relatives two adventive species that may or may not be established in Illinois: *A. falcatus* Lindley in Hooker (under *A. ericoides*) and *A. ciliolatus* Lindley in Hooker (under *A. cordifolius* L.). I have also included the exotic species *A. tataricus* because it is treated in current manuals dealing with the flora of Illinois (Gleason 1952; Gleason and Cronquist 1963; G.N. Jones 1963; Mohlenbrock 1975, 1986).

Three species of *Aster* are included in the list of threatened species of Illinois issued by the Department of Conservation on March 14, 1989: *A. furcatus* Burgess in Britton & Brown, *A. schreberi* Nees, and *A. undulatus* L. In my opinion, *A. parviceps* should be considered for inclusion in the list. The latter species and *A. furcatus* are true midwestern endemics, and they may be threatened because the plants grow in vulnerable habitats. Although the number of locality records is considerable and some populations are extensive, these two species are probably not as common today as they used to be. I have been unsuccessful in my search in many places where they had been previously collected. The other two asters currently listed as threatened may be rare in Illinois, but they are very common in some other areas. Illinois populations represent the western limit of range for these species. *Aster schreberi* presents a special situation because Illinois and Wisconsin populations are disjunct from the nearest populations to the east and have been named and described as *A. chasei* (Jones and Fuller 1955). So far I have been unable, however, to find biological evidence that would support taxonomic recognition of these disjuncts as distinct from typical *A. schreberi*, even at the varietal rank. Other species that approach their limit of range in Illinois and are much more common outside the state are *A. borealis*, *A. dumosus* L., *A. macrophyllus* L., and *A. prenanthoides* Muhl. ex Willd.

To help resolve some of the difficulties of species delimitation that have haunted earlier accounts of *Aster*, I have made my keys and descriptions more detailed than

those generally found in floristic works. Many structural features that provide significant taxonomic information are often given short treatment because they are seasonal (e.g., those of mature fruits) or are not always available in herbarium specimens (e.g., rhizomes and basal rosettes). Because I have grown plants of all the species described here and observed them through the seasonal cycle, I have been able to characterize all structural elements. In addition to providing more complete descriptions of the species, this treatment will allow, at least in some cases, the detection of hybrids and populations showing intergradation.

The taxonomic method is an ongoing endeavor, and revisions are needed as more and more is learned about the genetics and natural history of the taxa. No doubt, the definitive account of *Aster* in Illinois will continue to elude us.

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Generic Description of *Aster* L.

Starwort, Wild Aster, Michaelmas Daisy, Frost-flower.

Herbaceous or somewhat suffruticose perennials with caudiciform or short to long-creeping stoloniform rhizome systems but also including some taprooted annuals (all native Illinois asters are perennial). **Stems** erect or decumbent, terete in cross section, or slightly ridged at the upper nodes from decurrent leaf bases, single to few at any point of emergence or cespitose, variously branched, glabrous to densely pubescent, sometimes glandular. **Leaves** simple, alternate, usually polymorphic, those of the basal rosettes and the lower stem often petiolate, those of the middle or upper stem and of the branches (rameal leaves) commonly subsessile or sessile; blades variously shaped, glabrous to densely pubescent, sometimes glandular, the apex acute, acuminate, attenuate, or obtuse to rounded, the margins entire, crenate, or serrate, never lobed, the base cuneate to rounded or cordate, sometimes sheathing or auriculate-clasping. **Capitulescence** paniculiform, corymbiform, racemiform, or rarely spiciform. **Heads** on short to long peduncles (sometimes subsessile), often secund from leaf axils of the terminal branchlets. **Involucre** cylindric, turbinate (often an artifact in pressed and dried specimens), campanulate, or hemispheric, the bracts (phyllaries) in several series. **Phyllaries** imbricated and usually graduated, occasionally subequal in length or the outer ones longer than the inner, commonly with a well-delimited apical green areole and a scarious, often indurate or keeled basal portion, or sometimes with green bands extending along the midrib to the base; phyllaries of the outer series often largely herbaceous. **Receptacle** flat or slightly convex, alveolate with blunt or sharp (rarely bristle-tipped) teeth or merely pitted in older, fruiting heads. **Ray florets** several to many, rarely absent or vestigial, mostly in 1 but sometimes in 2 or more series, pistillate and fertile, the strap-shaped or oblong ligule portion of the corollas white, pink, lavender, purple, or blue, never yellow, the tube portion yellowish green when fresh. **Disk florets** few to many, perfect and fertile, the corollas regular, cylindric or funnelform, usually with well-delimited tube and limb portions, the limb 5-lobed, cream-colored or yellow, often appearing brighter yellow before anthesis because of the presence of yellow pollen, commonly aging to pink or purple after the pollen is shed, the tube usually slender, yellow or greenish. **Style branches** of the disk florets with attenuate, papillate, sterile appendages that are longer than the stigmatic lines. **Pappus** often simple, composed of a single series of relatively uniform, barbellate, capillary bristles, or if more complex, either with 2 series of capillary bristles more or less uniform in length but with those of the inner series clavellately expanded toward the apex, or with an additional (third) outer series of distinct, very short, attenuate bristles (a feature conventionally referred to as a "double pappus"). **Achenes** plump or somewhat compressed, 2–5 times longer than wide, gray or straw-colored to purple or brown, glabrous to variously pubescent, with a species-specific, definite number (3–10) of ribs, these sometimes obscure. **Basic chromosome numbers**: $x = 5$, 8, and 9.

Excluded are *Aster brachyactis* S.F. Blake [= *Brachyactis ciliata* (Ledeb.) Ledeb.] and *A. ptarmicoides* (Nees) Torrey & Gray [= *Solidago ptarmicoides* (Nees) Boivin].

Aster can be distinguished from closely related genera (tribe Astereae) only by a combination of characteristics: sterile appendages of the style branches attenuate, longer than the stigmatic lines; phyllaries in 3 or more usually graduated series; rays never yellow; principal pappus bristles more or less uniform in length, not or scarcely overtopping the disk corollas; achenes usually with a definite number of ribs, not densely striated; flowering period typically late summer and fall.

Approximately 200 species, worldwide, mostly in the northern hemisphere, with the center of distribution in temperate North America. Taxonomic boundaries well defined in most species but blurred in some, largely as a result of interspecific hybridization, which is sometimes compounded by polyploidy. Moreover, the species exhibit a high degree of phenotypic variability, and similar morphologies may have evolved from different biological origins. Because many questions regarding the taxonomy of *Aster* cannot be answered at this time, the species concepts adopted in this treatment are relatively conservative.

Conspectus of Classification of Illinois *Aster* Species

Aster L.
- subgenus *Aster*
  - section *Biotia* DC. ex Torrey & Gray
    - *A. furcatus* Burgess in Britton & Brown
    - *A. macrophyllus L.*
    - *A. schreberi* Nees
  - sect. *Macrocephali* (Kitamura) A.G. Jones
    - *A. tataricus* L.f.
- subg. *Daellingeria* (Nees) A. Gray
  - sect. *Triplopappus* (Torrey & Gray) A.G. Jones
    - *A. umbellatus* Miller
- subg. *Ianthe* (Torrey & Gray) A. Gray
  - *A. linariifolius* L.
- subg. *Symphyotrichum* (Nees) A.G. Jones
  - sect. *Concinni* (Nees) Torrey & Gray
    - *A. laevis* L.
    - *A. oolentangiensis* Riddell
  - sect. *Cordifolii* G. Don in Loud.
    - *A. anomalus* Engelm. in Torrey & Gray
    - *A. ciliolatus* Lindley in Hooker
    - *A. cordifolius* L.
    - *A. drummondii* Lindley in Hooker
    - *A. shortii* Lindley in Hooker
    - *A. undulatus* L.
    - *A. urophyllus* Lindley in DC.
  - sect. *Dumosi* Torrey & Gray
    - *A. dumosus* L.
    - *A. fragilis* Willd.
    - *A. lateriflorus* (L.) Britton
    - *A. ontarionis* Wieg.
  - sect. *Porteriani* (Rydb.) A.G. Jones
    - *A. parviceps* (Burgess in Britton & Brown) Mack. & Bush
    - *A. pilosus* Willd.
  - sect. *Salicifolii* Torrey & Gray
    - *A. borealis* (Torrey & Gray) Prov.
    - *A. lanceolatus* Willd.
    - *A. praealtus* Poir.
    - *A. prenanthoides* Muhl. ex Willd.
    - *A. puniceus* L.
  - sect. ***Turbinelli*** (Rydb.) A.G. Jones, stat. and comb. nov.*
    - *A. turbinellus* Lindley in Hooker
- subg. *Virgulus* (Raf.) A.G. Jones
  - sect. *Concolores* Torrey & Gray
    - *A. sericeus* Vent.
  - sect. *Ericoidei* (Nees) Torrey & Gray
    - *A. ericoides* L.
    - *A. falcatus* Lindley in Hooker
  - sect. *Oblongifolii* (Rydb.) A.G. Jones
    - *A. novae-angliae* L.
    - *A. oblongifolius* Nutt.
  - sect. *Patentes* Torrey & Gray
    - *A. patens* Aiton

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* Based on *Aster* (species group) *Turbinelli* Rydb., *Flora of the Prairies and Plains*, 803, 804. 1932. Syn.: *A.* sect. *Eucephalus* subsect. *Turbinelli* (Rydb.) A.G.Jones (1980a). Type species: *A. turbinellus* Lindley in Hooker.

Key to Species of *Aster* and *Brachyactis* in Illinois

1. Plants annual with a taproot; rays absent or vestigial; pappus conspicuous at anthesis, considerably overtopping the corollas ..... *Brachyactis ciliata*
1. Plants perennial (Illinois species); rays typically conspicuous; pappus relatively inconspicuous at anthesis, not or barely overtopping the disk corollas [*Aster*].
   2. Basal and lower cauline leaves long-petiolate, the blades well delimited, with mostly cordate to truncate or sometimes rounded bases.
      3. Capitulescence corymbiform or cymiform; median phyllaries mostly obtuse to rounded at the apex; disk corollas with the apparent tubular portion distinctly longer than the flared or abruptly expanded portion of the limb (including the lobes); achenes fusiform, with 7–10 (rarely more) ribs.
         4. Plants conspicuously glandular in the capitulescence ..... 13. *A. macrophyllus*
         4. Plants typically not glandular (occasionally with a few glands on the peduncles and phyllaries).
            5. Rosettes of basal leaves prominent, often numerous forming a dense ground cover; blades of basal and larger cauline leaves broadly ovate to cordate, glabrous or with sparse indument, the petioles mostly much longer than the blades ..... 24. *A. schreberi*
            5. Rosettes of basal leaves not prominent, relatively few; blades of basal and larger cauline leaves oblong-ovate or lanceolate, harshly scabrous above and densely hirsute below, the petioles usually not longer than the blades ..... 8. *A. furcatus*
      3. Capitulescence variously paniculiform; median phyllaries acute, acuminate, or attenuate, or if obtuse, the apex with a sharp point, never rounded; disk corollas with the tube portion shorter than the expanded limb portion; achens oblong-obovoid, with 4 or 5(6) ribs.
         6. Phyllaries with strongly squarrose or reflexed tips; heads relatively large with (22)25–35 (or more) rays, the involucre hemispherical ..... 1. *A. anomalus*
         6. Phyllaries with appressed or only slightly spreading tips; heads relatively smaller with ca 10–25 rays, the involucre campanulate or cylindrical (or turbinate in pressed specimens).
            7. Upper stem densely hirtellous or puberulent, the indument uniformly distributed around the stem; principal leaves copiously pubescent on both surfaces (or the upper surface glabrous in *A. shortii*).
               8. Cauline leaves sessile and clasping or with auriculate-clasping petioles ..... 30. *A. undulatus*
               8. Cauline leaves not clasping, the petioles slender or winged, often somewhat decurrent but never clasping.
                  9. Leaves of the midstem entire or subentire; rays mostly (12)15–25; heads 1.5–2.5 cm in diameter when the rays are fully extended or pressed ..... 26. *A. shortii*
                  9. Leaves of the midstem sharply serrate or crenate-serrate; rays mostly (8)10–15; heads 1–1.5(1.8) cm in diameter when the rays are fully extended or pressed ..... 4. *A. drummondii*
            7. Upper stem glabrous or puberulent to villous in thin decurrent lines; principal leaves glabrous or variously pubescent.
               10. Phyllaries of the 2nd and 3rd series inward with usually broad, short, rhombic green areoles; leaves of the midstem entire or subentire.
                  11. Leaves of the midstem auriculate-clasping, glabrous, glaucous ..... 9. *A. laevis*
                  11. Leaves of the midstem not clasping, scabrous above and hirsute below, not glaucous ..... 17. *A. oolentangiensis*

10. Phyllaries of the 2nd and 3rd series inward with obovate or usually narrower, lance-rhombic or oblanceolate to linear green areoles; leaves of the midstem variously toothed (sometimes subentire in *A. urophyllus*).
    12. Rays typically white (occasionally faintly lavender); phyllaries with a long-attenuate apex, largely scarious, often only the midrib light green, or the green areoles linear-oblanceolate ..... 31. *A. urophyllus*
    12. Rays typically purple or lavender; phyllaries with variously shaped apices, the green areoles well developed, obovate or lance-rhombic to oblanceolate.
        13. Heads 1–1.5 cm in diameter when the rays are fully extended or pressed; total number of florets 16–30 (Illinois plants); apex of the phyllaries acute or sometimes short-acuminate ..... 3. *A. cordifolius*
        13. Heads 1.5–2.5 cm in diameter when the rays are fully extended or pressed; total number of florets 30–50; apex of the phyllaries attenuate or narrowly acuminate ..... 3a. *A. ciliolatus*
2. Basal and lower cauline leaves sessile to subpetiolate or if apparently petiolate, the blades with a cuneate base or gradually narrowed, not well delimited from the petiolar portion.
    14. Pappus with an outer whorl of very short bristles in addition to 1 or 2 series of much longer (principal) capillary bristles; leaves more or less uniform in contour except for the lowermost, which are usually bracteiform; basal rosettes absent.
        15. Leaves rigid, 1-nerved, lacking secondary nerves, ca 1–3.5 cm long and 0.4 cm or less wide; stems mostly less than 60 cm tall ..... 12. *A. linariifolius*
        15. Leaves flexible, with well-developed secondary nerves, ca 4–12 cm long and 1 cm or more wide; stems mostly more than 60 cm tall ..... 29. *A. umbellatus*
    14. Pappus simple, the bristles typically in a single series and more or less uniform in length; leaves usually variable in contour but the lowermost not bracteiform; basal rosettes present at least during part of the growing season.
        16. Involucres and peduncles, often also the leaves and upper stems, glandular.
            17. Rays (40)50–100; outer and median phyllaries narrowly acuminate to long-attenuate, strongly squarrose; cauline leaves auriculate-clasping ..... 14. *A. novae-angliae*
            17. Rays 12–35; outer and median phyllaries obtuse or acute to short-acuminate, appressed or squarrose; cauline leaves variously inserted.
                18. Cauline leaves auriculate-clasping; phyllaries strongly graduated, appressed or with slightly recurved tips ..... 19. *A. patens*
                18. Cauline leaves not or only slightly clasping, rounded at the base, not auriculate; phyllaries only slightly or not at all graduated, strongly squarrose ..... 15. *A. oblongifolius*
        16. Involucres, peduncles, leaves, and stems not glandular.
            19. Achenes with 7–10 ribs, purple or brown at maturity; phyllaries pubescent on the outer (abaxial) surface; stem pubescence uniformly distributed around the stem, never in lines.
                20. Leaves and phyllaries appressed silvery-silky on both surfaces; ovaries and achenes glabrous ..... 25. *A. sericeus*
                20. Leaves and phyllaries strigillose, hirsute, or cinereous-puberulent; ovaries and achenes pubescent.
                    21. Principal leaves auriculate-clasping; capitulescence an open, divaricately branched panicle; heads mostly on long, stiff peduncles, not crowded and not secund; rays purple ..... 19. *A. patens*
                    21. Principal leaves rounded at the base, only slightly or not at all clasping; capitulescence commonly a racemiform panicle; heads subsessile or on relatively short peduncles, often crowded and secund; rays white or lavender.
                        22. Rays lavender; involucre hemispherical; pappus tawny or rose-tinged ..... 14a. *A. × amethystinus*

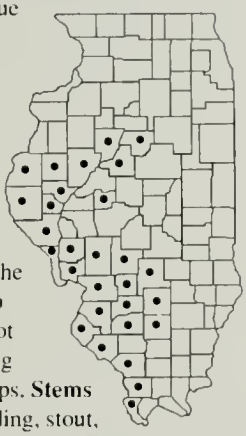
22. Rays typically white; involucre cylindrical to campanulate; pappus white or cream-colored.
    23. Heads commonly secund; involucres usually less than 4.5 mm high; rays 18 or fewer ..... 6. *A. ericoides*
    23. Heads commonly not secund; involucres 5 mm high or more; rays 20 or more ..... 6a. *A. falcatus* var. *commutatus*

19. Achenes with 3–5(6) ribs, variously colored; phyllaries mostly glabrous on the outer surface (rarely puberulent in a few species); stem pubescence variously distributed.
    24. Leaves clasping, often strongly auriculate.
        25. Leaves glaucous; stems glabrous or nearly so; phyllaries strongly graduated, firm, appressed when fresh, the apical green areole usually broad, rhombic, shorter than the scarious basal portion ..... 9. *A. laevis*
        25. Leaves not glaucous; stems variously pubescent; phyllaries not at all or only weakly graduated, often flexible and leaflike, at least somewhat spreading or sometimes reflexed, the apical green areole longer than the scarious basal portion, or often the outer phyllaries largely herbaceous.
            26. Principal cauline leaves serrate to subentire, gradually tapered toward the base; stem variously hispidulous, as well as hirsute, either over the entire length and sometimes coarsely hispid toward the base, or often with only sparse hispidulous indument in the upper portion of the stem, the lower glabrous or nearly so (depending on the variety); phyllaries long-acuminate or attenuate ..... 23. *A. puniceus*
            26. Principal cauline leaves sharply serrate, abruptly contracted below the middle into an entire-margined, sometimes apparently subpetiolar basal portion; stem hirsute or villous, not hispidulous; phyllaries acute or short-acuminate ..... 22. *A. prenanthoides*
    24. Leaves not clasping.
        27. Involucre (7)8–12 mm high; phyllaries in 6–9 series, strongly graduated, blunt-tipped and rounded on the back, largely scarious, the green areoles small, oblong, in the apical $^1/_5$–$^1/_3$ portion ..... 28. *A. turbinellus*
        27. Involucre 3–8(10) mm high; phyllaries in 3–6 series, graduated to varying degrees, acute to attenuate or if obtuse, with a sharply pointed tip, not rounded on the back, the green areoles of various sizes and shapes.
            28. Basal leaves 3–4 times larger than the principal cauline leaves, the blades 10–30 cm long and 5–10 cm wide, gradually tapered into winged petioles 10–40 cm long; phyllaries with a broad green band along the midrib extending to the base ..... 27. *A. tataricus*
            28. Basal leaves (often withered and deciduous at flowering time) mostly not larger than the principal cauline leaves, often much smaller; phyllaries usually with well-defined green areoles.
                29. Phyllaries and rameal leaves with a spinulose bristle at the apex; rhizome system caudiciform lacking stoloniform strands; new shoots initiated at the base of old stems or as root sprouts; achenes gray, the ribs obscure.
                    30. Disk florets 20 or more; involucre somewhat urceolate, (4)5–8 mm high ..... 20. *A. pilosus*
                    30. Disk florets 6–12; involucre cylindric or turbinate, 3–4 mm high ..... 18. *A. parviceps*
                29. Phyllaries and rameal leaves often with a sharp callus point at the apex but lacking a spinulose bristle; rhizome system creeping or if short-branched, the new shoots at least in part initiated at the ends of stoloniform rhizome strands; achenes variously colored at maturity, the ribs mostly prominent.
                    31. Reticulate tertiary venation usually conspicuous on the lower leaf surface, the veinlets often brownish, the enclosed green areolae isodiametric; rays purple or lavender ..... 21. *A. praealtus*

31. Reticulate tertiary venation inconspicuous on the lower leaf surface, the veinlets rarely brownish, or the enclosed areolae oblong; rays variously colored.
    32. Ovaries and achenes glabrous, purple or brown at maturity, median phyllaries with mostly broad, short, rhombic (rarely lance-rhombic) green areoles; leaves scabrous above and hirsute below ..... 17. *A. oolentangiensis*
    32. Ovaries and achenes strigillose or puberulent, variously colored at maturity; median phyllaries with linear, oblanceolate, or rhombic-obovate green areoles; leaves variously pubescent or glabrous.
        33. Lobes of the disk corollas longer than or as long as the fused portion of the limb (not including the corolla tube); lower leaf surface at least somewhat pubescent; achenes gray at maturity.
            34. Lower leaf surface uniformly short-pubescent; heads not secund; rhizomes distinctly long-creeping, stoloniform, the plants forming colonial stands, usually in moist ground ..... 16. *A. ontarionis*
            34. Lower leaf surface villous to hirtellous along the midrib, otherwise usually glabrous; heads secund; rhizomes short, sometimes tangled but not long-creeping, the plants forming scattered individual clumps, mostly in upland situations ..... 11. *A. lateriflorus*
        33. Lobes of the disk corollas shorter than the fused portion of the limb; lower leaf surface usually glabrous (rarely with a few trichomes along the midrib or slightly scabrous toward the margins); achenes variously colored.
            35. Flowering heads mostly 1.5–2.5 cm in diameter when the rays are fully extended or pressed.
                36. Larger cauline leaves 1–3.5 cm in width, no more than 12 times longer than wide, usually sharply serrate; capitulescence a diffusely branched or elongate panicle; achenes gray ..... 10. *A. lanceolatus*
                36. Larger cauline leaves mostly less than 1 cm in width, 12–15 (or more) times longer than wide, shallowly and remotely serrate to subentire; capitulescence a more or less dichotomously branched round- or flat-topped panicle; achenes purple, or gray with purple streaks ..... 2. *A. borealis*
            35. Flowering heads mostly 0.6–1.5 cm in diameter when the rays are fully extended or pressed.
                37. Median phyllaries (3rd or 4th series inward) ca twice as wide as those of the outer series, typically obtuse, the green areoles rhombic-obovate to broadly oblanceolate; rameal leaves relatively uniform in size; peduncles usually at least 1 cm long (often much longer) with many bracteiform leaves; subsessile heads relatively few ..... 5. *A. dumosus*
                37. Median phyllaries slender, less than twice as wide as those of the outer series, acute or attenuate, the green areoles linear to narrowly oblanceolate; rameal leaves notably unequal in size; peduncles variable in length but the bracteiform leaves typically few; subsessile heads often numerous ..... 7. *A. fragilis*

Description of *Aster* Species

1. *Aster anomalus* Engelm. in Torrey & Gray
Many-rayed Aster, Blue Aster



Herbaceous, with stout branched-caudiciform rhizomes that turn woody with age. **New shoots** arising at or near the base of old stems but also sometimes initiated as root sprouts, the plants forming scattered individual clumps. **Stems** 1–several, erect or ascending, stout, 50–120 cm tall, with ascending or spreading branches mostly from above the middle, uniformly hirtellous or hirsute. **Leaves** polymorphic, the basal and larger cauline ones petiolate, those higher up on the stem gradually reduced in size, changing from subpetiolate to sessile; first leaves of new shoots and of the vernal rosettes with oblong-ovate to lanceolate blades 1–4 cm long and 1–2 cm wide, usually purple at least on the lower surface, densely hirtellous, acute or often with obtuse to rounded tips, the margins few-toothed or subentire; principal cauline leaves with ovate to broadly lanceolate blades 4–9 cm long and (1.5)2.5–5 cm wide, with several pairs of usually arching and anastomosing secondary nerves, hirtellous or hirsute on both surfaces, the apex acute or acuminate with a short callus point, the margins mostly entire to subentire (rarely crenate-serrate), the base cordate, usually with broad sinuses (rarely truncate), the petioles (2)4–8 cm long, slender on the lower leaves, narrowly winged on those of the midstem, densely hirsute to pilose; upper leaves of the main stem lanceolate, entire; rameal leaves abruptly reduced, those of the peduncles bracteiform, 2–6 mm long, mucronulate, intergrading with the phyllaries. **Capitulescence** a usually ample diffuse panicle, the head-bearing branchlets sometimes racemiform. **Flowering heads** 2–3 cm in diameter when the rays are fully extended, on peduncles 0.3–5(10) cm long or rarely subsessile. **Involucre** hemispherical, 5–10 mm high, the phyllaries imbricated in 4–6(7) series. **Phyllaries** graduated, slender, linear-lanceolate, strongly reflexed or squarrose, grayish green, both surfaces typically hirtellous, the apex long-attenuate, often with purple tips and with a conspicuous bristly mucro, the margins scabrous; outer phyllaries 3–4 mm long, ca half as long as the inner, commonly herbaceous to near the base; median and inner phyllaries green in the apical $^1/_2$–$^2/_3$ portion, the basal portion scarious. **Receptacle** alveolate with sharp or bluntish teeth. **Ray florets** (22)25–35 (or more), the corollas 10–15(18) mm long, purple or blue (rarely white), glabrous. **Disk florets** 20–35 (or more), the corollas (4)4.5–5.5 mm long, glabrous or with a few trichomes, the limb only slightly expanded, cream-colored or light yellow turning purple after anthesis, the lobe/limb fraction 0.2–0.25, the tube shorter than the limb. **Pappus** simple, the bristles as long as the disk corollas or slightly shorter, tawny or rose-tinged, slender, attenuate. **Achenes** oblong-obovoid, somewhat compressed, 2.5–3.5(3.8) mm long and 0.8–1.2 mm across, deep purple, or brown with purple speckles, glabrous, with 5 or 6 often irregularly spaced straw-colored ribs. $2n = 16$; reported chromosome counts of $2n = 18$ are probably in error (A.G. Jones 1977, 1980b).

Late August–October. Sandy or loamy clay soils underlain by calcareous rocks or sandstone: rocky open woods, woody hilltops, and dry ridges. Occasional near and along major rivers in the western half of the state, north to Peoria and Woodford counties. The range for the species includes MO, AR, s.e. KS, and e. OK.

There is good evidence in Illinois of intergradation between this species and *Aster shortii* [e.g., *Winterringer 11997* (ISM) from Alexander Co., *Rexroat 8084* (ISM) from Menard Co., and *A.G. Jones 6817* (ILL) from Union Co.].

2. *Aster borealis* (Torrey & Gray) Prov.
Rush Aster

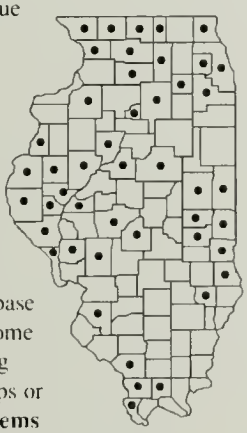
Herbaceous, with very slender, creeping, stoloniform rhizomes. **New shoots** mostly initiated from the rhizomes, the plants forming clonal stands usually interspersed with other vegetation. **Stems** 1–few at any point of emergence, slender, erect, 30–80(100) cm tall, often somewhat zigzag above, branched only in the capitulescence, sometimes red-tinged to slightly glaucous, nearly glabrous or sparsely puberulent in thin decurrent lines (rarely with uniformly distributed indument on the peduncles). **Leaves** polymorphic, the basal and lower cauline ones commonly withered and deciduous at flowering time; basal rosette leaves subpetiolate, the blades variously linear-oblanceolate to ovate or suborbiculate, 0.5–1.5 cm long and 2–6 mm wide, the secondary venation obscure, both surfaces glabrous or minutely puberulent toward the margins, the lower surface also usually purple-tinged, the apex obtuse or rounded, the margins shallowly crenate, abruptly narrowed to a slightly winged subpetiolar portion of variable length, the base dilated and sheathing; principal cauline leaves very slender, linear to linear-oblanceolate, (4)6–15 cm long and 2–6(8) mm wide, with usually only the midrib strongly expressed, glabrous or the upper surface minutely strigillose toward the margins and the lower with a few trichomes along the midrib, the apex attenuate and callus-pointed, the margins usually inrolled, entire or remotely and shallowly serrate, smooth or scabrous, the base sessile and somewhat decurrent; rameal leaves relatively few, ascending or spreading, firm or flexible, entire, similar to the cauline leaves in contour and vestiture, the base somewhat sheathing and decurrent; leaves of the peduncles flexible, not phyllarylike, linear-lanceolate, 4–12 mm long, often red-tinged, and with a slightly dilated or rounded base. **Capitulescence** an open, round- or flat-topped, more or less dichotomously branched, terminal panicle, rarely also with ascending lateral branches initiated in leaf axils of the midstem. **Flowering heads** (1.5)2–2.5 cm in diameter when the rays are fully extended, not crowded and not secund, typically on slender puberulent or glabrous peduncles 1–5 cm in length. **Involucre** broadly campanulate, (5.5)6–7 mm high, the phyllaries imbricated in 4–6 series. **Phyllaries** appressed when fresh or rarely the outermost slightly recurved, subequal or somewhat graduated; outer phyllaries oblong-lanceolate, 3–5 mm long, the innermost slender, linear, 5–6 mm long, the green areoles changing from slenderly oblanceolate to nearly linear, the surfaces glabrous or nearly so, the apex acute, callus-pointed in the outer phyllaries, often red-tipped in the median and inner ones, the margins irregularly ciliolate (rarely villous), or erose-hyaline and with a scarious or reddish rim in the median and inner phyllaries, the basal ½–⅔ portion scarious. **Receptacle** shallowly alveolate with sharp teeth. **Ray florets** 20–30 (or more), the corollas 10–12 mm long, mostly white, sometimes pink or bluish, glabrous or with a few trichomes at the throat and on the tube. **Disk florets** 25–30 (or more), the corollas funnelform, 5–6 mm long, glabrous or nearly so, the limb abruptly expanded at the throat, cream-colored or pale yellow turning pink after anthesis, the lobe/limb fraction 0.2, the tube shorter than the limb. **Pappus** simple, the bristles approximately as long as the disk corolla, whitish, soft, slender, and attenuate. **Achenes** oblong or oblanceolate in contour or often somewhat falcate, plump or slightly compressed, (2.2)2.5–3 mm long, 4–5 times longer than wide, purple, or gray with purple streaks, thinly strigillose, with 4 or 5 straw-colored ribs. $2n = 16, 32$ (mostly), 48. [*A. junceus* misapplied, not of Aiton—Brendel 1887; Pepoon 1927; Deam 1940. *A. junciformis* Rydb.—G.N. Jones 1945, 1950, 1963; Fernald 1950; Gleason 1952; Jones and Fuller 1955; Gleason and Cronquist 1963; Swink 1974; Mohlenbrock 1975; Swink and Wilhelm 1979.]

Late August–October. Wet ground: tamarack bogs, sedge meadows, grassy lakeshores, and calcareous fens. Occasional in the counties including and surrounding Chicago, now probably rare because of destruction of the habitat. The species range is still to be accurately mapped. I have been unable, for example, to locate the specimen cited for Winnebago County by Fell (1955: 144) under the name *Aster junciformis;* the descriptive statement suggests that the plant (found "in boggy places in Coon

Creek bottom") may belong here. According to the floristic literature, the species has been recorded from Anticosti Island, NB, and PQ, westward through ON, MB, SK, s. NT, and s. YT to BC and s. AK, southward to areas surrounding the Great Lakes in NY, PA, OH, and IN, and also including stations in n. IA, ND, SD, n. NE (?), and MT. Excluded are some areas listed in the literature for which the recorded specimens, in my judgment, belong in other species.

The plants may be confused with those of some other species, e.g., *Aster dumosus* var. *strictior* Torrey & Gray, but the latter taxon is distinct by having smaller heads and a strict, thyrsiform capitulescence. The characteristics of *A. borealis* suggest a close relationship in the eastern half of the continent to *A. lanceolatus* and *A. longifolius* Lam., and in the western half to *A. eatonii* (A. Gray) Howell and *A. occidentalis* (Nutt.) Torrey & Gray. Of these four species only *A. lanceolatus* is an element of the Illinois flora, and good evidence exists of intergradation between that species and *A. borealis* [e.g., *Benke 5278* (F) from McHenry Co.].

3. ***Aster cordifolius*** L.
Heart-leaved Aster, Blue Wood Aster



Herbaceous, with a branched-caudiciform or creeping horizontal rhizome system (depending on the variety). **New shoots** originating at the base of old stems or from rhizome strands, the plants forming scattered individual clumps or small colonial patches. **Stems** 1–several, erect, (40)60–120 cm tall, often reddish or maroon-colored, commonly somewhat zigzag above, with ascending or divaricate branches from above the middle, typically puberulent in decurrent lines from the upper nodes, in the leaf axils, and on the peduncles, glabrous in the lower stem portion (sometimes entirely glabrous). **Leaves** polymorphic, the basal and principal cauline ones petiolate, those higher up on the stem gradually reduced in size, changing to subsessile or sessile in the branches; leaves of new shoots and of the vernal rosettes with ovate-cordate to suborbiculate blades 1–8 cm (or more) long and 1–3 cm (or more) wide, similar to the cauline leaves in venation and vestiture, purplish below at least during the cool season, the apex acuminate or acute (sometimes obtuse or rounded), the margins coarsely and often irregularly crenate-serrate, the base cordate (rarely rounded), the petioles 1–3 times as long as the blades, ciliate, slender or often winged, dilated toward the sheathing base; blades of principal cauline leaves ovate in contour, 4–10(13) cm long and 2–4(6) cm wide, with several pairs of arching and anastomosing secondary nerves, and a weakly expressed reticulum of tertiary veins with irregular areolae, the upper surface sparsely scabrous or glabrous, the lower thinly villous or hirtellous along the major nerves (rarely over the entire surface) or nearly glabrous, the apex acuminate and callus-pointed, the margins sharply serrate with acuminate callus-pointed teeth, the base deeply cordate or truncate to rounded, the petioles progressively shorter and more broadly winged upward on the stem; rameal leaves subsessile to sessile, ovate-lanceolate, nearly glabrous or minutely puberulent above, acuminate and callus-pointed, the margins entire or commonly somewhat toothed and ciliolate; leaves of the peduncles densely spaced, 1.5–3 mm long, the lower ones flexible, the upper bracteiform and intergrading with the phyllaries. **Capitulescence** a leafy, divaricately much-branched, usually round-topped panicle in the upper $^1/_4$–$^1/_2$ portion of the stem, the head-bearing branchlets rarely racemiform. **Flowering heads** 1–1.5 cm in diameter when the rays are fully extended, often crowded, usually not secund, on densely bracteate peduncles 0.3–2 cm long. **Involucre** narrowly campanulate (sometimes turbinate when pressed and dried), 3.5–5(6) mm high, the phyllaries imbricated in (3)4 or 5 series. **Phyllaries** strongly graduated, the outer ones lanceolate, (1)1.5–2 mm long, the inner slender, linear-oblanceolate, 3.5–4.5(5) mm long, appressed when fresh, glabrous, the green areoles rhombic to obovate and well delimited in the apical $^1/_3$–$^1/_2$ portion, commonly red-tipped, the apex typically acute or obtuse (rarely acuminate) in the outer and median, acuminate to short-attenuate in the inner phyllaries, the

margins erose-hyaline, irregularly ciliolate or thinly villous toward the apex, the basal portion scarious, often somewhat rounded on the back and indurate. **Receptacle** alveolate with sharp teeth. **Ray florets** (8)10–15, the corollas 7–10 mm long, typically purple (rarely pink), glabrous or nearly so. **Disk florets** (8)10–12, the corollas 4–4.5(5) mm long, funnelform, glabrous or with a few trichomes at the throat, the limb abruptly dilated, cream-colored or light yellow turning purple after anthesis, the lobe/limb fraction 0.2–0.25, the tube slightly shorter than the limb. **Pappus** simple, the bristles as long as or slightly shorter than the disk corolla, whitish or faintly rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid or often slightly falcate, somewhat compressed, 2–2.5 mm long and 0.6–0.8 mm across, dull purple or light brown, glabrous, with 4 or 5 ribs. $2n = 16, 32$ (often with 1 or 2 B-chromosomes); reported chromosome counts of $2n = 36$ are probably in error (A.G. Jones 1977). Including *A. sagittifolius* Wedem. ex Willd. (*sensu stricto*—A.G. Jones 1980b, 1987; Jones and Hiepko 1981).

September–October. Loamy or rocky soils in mesic, mostly wooded habitats: open-wooded slopes and bluffs, woodland edges, also in somewhat disturbed ground at road cuts and along ditches. Occasional throughout the state but more common in the northern part. The range of this variable species extends from PE, PQ, NB, NS, and ME south to GA and AL, westward to MN, IA, e. NE, MO, and AR.

Two varieties can be distinguished in Illinois, typical var. *cordifolius* and *Aster cordifolius* var. *sagittifolius* (Wedem. ex Willd.) A.G. Jones [*A. sagittifolius* of authors only in part (see also *A. drummondii* and *A. urophyllus*); *A. cordifolius* subsp. *sagittifolius* (Wedem. ex Willd.) A.G. Jones (1980b)]:

1. Rhizomes notably creeping, with slender stoloniform strands, the plants colonial; leaves of the midstem with slender or narrowly winged petioles, the blades with a deeply cordate base ..... var. *cordifolius*

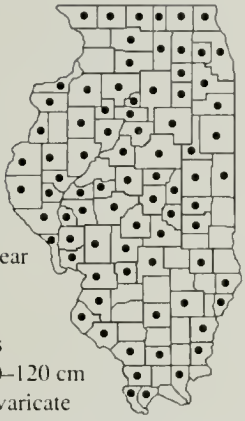
1. Rhizomes short, branched-caudiciform, the plants forming scattered individual clumps; leaves of the midstem with broadly winged petioles, the blades with a truncate or shallowly cordate base ..... var. *sagittifolius*

Plants of var. *sagittifolius* exhibit traits that may have been acquired via gene flow from other species, such as *Aster ciliolatus* and *A. drummondii*. If underground parts are missing, specimens of this taxon can be distinguished only with difficulty from those of typical var. *cordifolius*. There is evidence of intergradation between *A. cordifolius* and *A. drummondii* [e.g., *Henry 2941, 2943* (MWI) from Adams Co. and *Chase 14906* (ILL) from Peoria Co.], *A. laevis* [e.g., *Chase 3728* (ILL) from Tazewell Co.], and *A. urophyllus* [e.g., *Evers 58628* (ILLS) from La Salle Co. and *Fuller & Fisher 353, 370* (ISM) from Union Co.].

3a. *Aster ciliolatus* Lindley in Hooker
Lindley's Aster

I have included this species in the key on the strength of three herbarium specimens collected in Cook County and located at F [*R. Bebb 1570*, Beverly Hills; *F. Gates 43*, Glencoe; *Raddin s.n.*, n. Evanston]. The plants more or less exhibit the traits attributed to *Aster ciliolatus*: stems glabrous or nearly so; principal leaves glabrous or sparsely ciliate below along the major nerves; peduncles with no or few bracteiform rameal leaves; heads relatively large, the involucres 6–7 mm high; phyllaries lanceolate, long-attenuate, with lance-rhombic green areoles and indurate, scarious or somewhat discolored bases. In fact, the Gates collection was annotated by Sherff as *A. lindleyanus* Torrey & Gray, a synonym of *A. ciliolatus*. Field study is needed to ascertain whether this transcontinental boreal species is really an established element of the Illinois flora. The plants may be waifs, or they may be part of a hybrid swarm involving *A. cordifolius* and *A. ciliolatus* (or some other species, e.g., *A. laevis*).

4. *Aster drummondii* Lindley in Hooker
Drummond's Aster

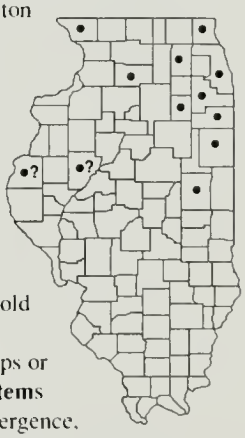


Herbaceous, with stout branched-caudiciform rhizomes that often turn woody with age. **New shoots** originating at or near the base of old stems, the plants forming scattered individual clumps. **Stems** 1–several, erect, stout, 60–120 cm tall, with ascending or divaricate branches mostly from above the middle, uniformly soft-hirtellous in the branches, coarsely hirsute on the main stem, the indument often in lines, sometimes glabrescent in the lower portion. **Leaves** polymorphic, the basal and lower cauline ones petiolate, those higher up on the stem gradually or abruptly reduced in size; leaves of new shoots and vernal rosettes with ovate-oblong to suborbiculate blades 1–6(10) cm long and 1–3(5) cm wide, purplish below at least during the cool season, copiously soft-pubescent on both surfaces, the apex acute, obtuse, or rounded, the margins crenate-serrate; principal cauline leaves with broadly ovate to ovate-lanceolate blades 6–12(15) cm long and 3–5(6) cm wide, with 5–12 pairs of arching and anastomosing secondary nerves, thinly soft-pubescent to scabrous or rarely glabrous above, copiously hirtellous to hirsute below, the apex acuminate to attenuate and usually callus-pointed, the margins crenate-serrate to sharply (sometimes doubly) serrate, the base cordate or truncate, sometimes oblique; petioles (2)4–8 cm long, usually conspicuously winged and with ciliate margins; upper leaves of the main stem lanceolate, subsessile; rameal leaves oblong-lanceolate, sessile, typically pubescent, callus-pointed, shallowly toothed to entire and ciliolate; leaves of the peduncles bracteiform, 2–5 mm long, intergrading with the phyllaries. **Capitulescence** a usually ample panicle, distinctly overtopping the leafy stem portion, the terminal branchlets often racemiform. **Flowering heads** 1–1.5(1.8) cm in diameter when the rays are fully extended, on densely bracteate peduncles 0.2–4 cm long, or sometimes subsessile and secund. **Involucre** campanulate (or turbinate when pressed and dried), (3.5)4–6 mm high, the phyllaries imbricated in (3)4 or 5 series. **Phyllaries** strongly graduated, the outer ones lanceolate or subulate, 1.5–2 mm long, the inner linear-lanceolate, ca three times as long as the outer, appressed or slightly spreading, typically glabrous but occasionally puberulent on the abaxial surface and thinly puberulent on the adaxial surface, the apical green areoles rhombic to oblong or oblanceolate, the apex acuminate or attenuate, often red-tipped, the margins irregularly ciliolate toward the apex, and with a scarious rim extending to the tapered portion of the tip, the basal $^1/_4$–$^1/_2$ portion scarious except for the often green midrib. **Receptacle** shallowly alveolate with sharp or blunt teeth. **Ray florets** (8)10–15 (or more), the corollas 7–12 mm long, purple or lavender (sometimes white), glabrous. **Disk florets** (10)13–15 (or more), the corollas 3.5–4.5(5) mm long, funnelform, glabrous, the limb abruptly dilated at the throat, cream-colored or light yellow turning deep purple after anthesis, the lobe/limb fraction 0.18–0.25, the tube slender, slightly shorter than the limb. **Pappus** simple, the bristles subequal, slightly shorter than the disk corolla, whitish or rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, often slightly falcate, somewhat compressed, (1.5)2–3 mm long and 0.6–1 mm across, dull purple or brown, glabrous or often sparsely puberulent in the top portion, with 4 or 5 ribs. $2n = 16, 32$ (mostly); reported chromosome counts of $2n = 36$ are probably in error (A.G. Jones 1977). [*A. sagittifolius* Wedem. ex Willd. var. *drummondii* (Lindley in Hooker) Shinners—Fernald 1950; Kibbe 1952; Dobbs 1963; Swink 1974; Mohlenbrock 1975; Swink and Wilhelm 1979. *A. undulatus* misapplied, not of L.—Mead 1846; Higley and Raddin 1891; Pepoon 1927; Kibbe 1952; Dobbs 1963.]

August–October. Loamy or rocky soils in mesic, mostly wooded habitats; stream banks, open-wooded slopes, thickets and edges of swamps; also sometimes in disturbed ground along roads and ditches. Common throughout the state. The range of this variable species extends from s. MN east to c. OH, south to w. MS, n. LA, and c. TX, and west to IA, e. NE, e. KS, and e. OK.

Plants in Illinois belong mostly in typical var. *drummondii*, including *Aster drummondii* var. *rhodactis* Benke, described from Cook County [*Benke 4830* (F)] and characterized by rose-colored rays and "rufescent" leaves and stems. Individuals exhibiting phyllaries that are puberulent on the back may fall within the limits of *A. finkii* Rydb., a species (or more likely a hybrid) described from Iowa and recognized by Shinners (1941) as an endemic of the driftless area of s.w. WI. I have recorded collections of these plants from 16 counties throughout the state and did not detect geographic or ecological patterns or any consistent correlation of this trait with other characters. Occasional hybridization with and gene flow from *A. shortii* or *A. undulatus* (or both) may in part account for the occurrence of puberulent phyllaries in *A. drummondii*. I find it impossible, therefore, to give taxonomic recognition to this morphological variant. There is also strong evidence of intergradation between *A. drummondii* and *A. urophyllus* [e.g., *Evers 28089* from Jo Daviess Co., *28300* from Pope Co., *71937* from Adams Co., and *77383* from Lee Co. (all at ILLS)].

5. *Aster dumosus* L. var. ***strictior*** Torrey & Gray
Bushy Aster, Rice-button Aster



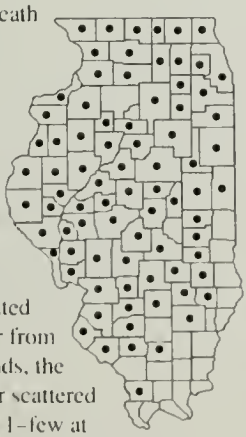
Herbaceous, with a creeping stoloniform rhizome system. **New shoots** mostly initiated from the rhizomes or sometimes at the base of old stems, the plants forming scattered individual clumps or small colonial patches. **Stems** 1–few at any point of emergence, slender, erect, 30–70(100) cm tall, terete, the branches commonly ascending (this variety), sometimes divaricate, slightly ridged from decurrent leaf bases, sparsely puberulent in lines or nearly glabrous, the indument more copious on the peduncles and sometimes uniformly distributed. **Leaves** somewhat polymorphic, the basal and larger ones mostly withered and deciduous at flowering time; basal rosette leaves spatulate, 1–5 cm long, glabrous or minutely scabrous above, usually purple-tinged below, crenate-serrate, abruptly narrowed to a coarsely ciliate subpetiolar portion, dilated and sheathing at the base; principal cauline leaves linear to linear-oblanceolate, 3–10 cm long and 2–3(5) mm wide, with (usually) only the midrib strongly expressed, scabrous or glabrescent above, glabrous below, the apex acute with a sharp callus point, the margins usually inrolled, scabrous, shallowly serrulate or rarely entire, the base sessile and often somewhat decurrent but not clasping; rameal leaves numerous, bracteiform, linear-oblong, rather uniform in size at each branch level and with relatively few clusters of smaller leaves in the axils, ascending or spreading, scabrous-margined, and callus-pointed, those of the peduncles densely spaced, 1–3 mm long, intergrading with the phyllaries. **Capitulescence** a narrow panicle with stiffly ascending racemiform branches above the middle, or sometimes more broadly and diffusely branched from the lower nodes. **Flowering heads** 0.8–1.5 cm in diameter when the rays are fully extended, typically on slender, puberulent or glabrous peduncles 1–5 cm (or more) in length (rarely subsessile). **Involucre** 3–5 mm high, narrowly campanulate (or turbinate when pressed and dried), the phyllaries imbricated in 4 or 5 series. **Phyllaries** strongly graduated, appressed or slightly spreading, glabrous on the abaxial surface but often with a few trichomes on the adaxial surface, the green areoles well delimited, rhombic-obovate to broadly oblanceolate, the apex obtuse or acute, the margins irregularly ciliolate, hyaline, and also with a scarious rim, the basal $^2/_3$ portion scarious except for the often slightly keeled green or brown midrib; outer phyllaries 1–1.5 mm long, oblong-lanceolate, those largest in surface area (3rd or 4th series inward) more than twice as long and ca twice as wide as the outer ones, linear or somewhat expanded toward the apex; innermost phyllaries very slender. **Receptacle** shallowly alveolate with sharp teeth. **Ray florets** 15–25 (or more), the corollas 4–6(8) mm long, typically pink or lavender (sometimes white), glabrous. **Disk florets** 15–20 (or more), the corollas narrowly funnelform, 3.5–4.5 mm long, glabrous, the limb cream-colored or light yellow turning pink after anthesis, the lobe/limb fraction 0.25–0.35, the tube shorter than the limb. **Pappus** simple, the bristles approximately as long as the disk corolla, whitish, soft, slender, and attenuate. **Achenes** oblong-obovoid, plump or slightly compressed, 1.5–2.5 mm long and 0.5–0.7 mm across, pink, or

straw-colored with pink streaks, strigillose and sometimes minutely puncticulate, with 3–5 prominent ribs, the sculpturing conspicuous even in immature ovaries. $2n = 16, 32$, sometimes with additional B-chromosomes.

Late August–October. Moist or wet ground; bogs and sandy or calcareous flats. Not common in Illinois; apparently concentrated in the northeastern part of the state, south to Champaign County and west to Lee County. Collections recorded from Hancock and Jo Daviess counties may belong in or near *Aster fragilis* rather than *A. dumosus*. Our records mark the northwestern limit for this extremely variable species, the range of which extends from ME to s. ON, MI, and s. WI, south to s. FL and LA, and southwest to MS, AR, the s.e. corner of OK, and e. TX.

Good evidence suggests intergradation between this taxon and the often sympatric populations of *Aster fragilis* [e.g., *A.G. Jones 3303* (ILL) from Iroquois Co.] and *A. lanceolatus* var. *interior* (Wieg.) Semple & Chmielewski [e.g., *A.G. Jones 3304* (ILL) from Iroquois Co. and *E.J. Hill 100, 1884* (ILL) from Cook Co.]. In fact, all characteristics that, according to Torrey and Gray (1841) and Wiegand (1928), distinguish *A. dumosus* var. *strictior* from typical var. *dumosus* may be traceable to similar characteristics in one or both of the above-mentioned taxa, e.g., the "strict" branching habit, the often racemiform and relatively short-peduncled exposition of heads, and the comparative paucity of indument. These species are closely related and share a basic chromosome number of $x = 8$.

6. ***Aster ericoides*** L.
White Prairie Aster, Heath Aster, Wreath Aster



Herbaceous, with a strongly creeping (Illinois plants) or short caudiciform rhizome system, depending on the variety. **New shoots** initiated at the base of old stems or from stoloniform rhizome strands, the plants forming colonies or scattered individual clumps. **Stems** 1–few at any point of emergence, erect, the branches ascending or often somewhat fastigiate and arching, 30–80(100) cm tall, uniformly and often harshly pubescent, the trichomes appressed-strigose, ascending, or spreading to reflexed hirsute (depending on the variety), the lower stem portion sometimes glabrescent. **Leaves** numerous, firm, sessile, entire, variously pubescent on both surfaces, often with clusters of smaller leaves at the nodes and in the axils of the larger ones, commonly all except the rameal leaves withered and deciduous at flowering time; basal rosette leaves spatulate or oblanceolate, 2–6 cm long and 1 cm or less wide, triple-nerved, i.e., with 1(sometimes 2) pair(s) of secondary nerves running from the base more or less parallel to the midrib, the surfaces sparsely pubescent or often glabrous, the apex rounded or obtuse and with a clear spinule, the base sheathing; principal cauline leaves linear to linear-lanceolate, (1)3–6 cm long and 2–7 mm wide, with only the midrib prominent or triple-nerved as in the basal leaves, grayish green, the indument strigose or hirsute (depending on the variety), the apex acute or obtuse and spinulose, the base rounded or slightly clasping; rameal leaves similar in contour, color, and vestiture, abruptly reduced in size, those of the peduncles bracteiform, oblong-ovate, 1.5–5(6) mm long, usually squarrose or sometimes appressed to ascending, intergrading with the phyllaries. **Capitulescence** a somewhat fastigiately branched panicle or often pyramidal at the top, the head-bearing branchlets arching, racemiform. **Flowering heads** numerous, small, mostly less than 1 cm in diameter when the rays are fully extended, crowded and secund, subsessile arising from the leaf axils, or on densely bracteate peduncles 0.5–1(2) cm long. **Involucre** cylindric or narrowly campanulate, ca 3–4 mm high, the phyllaries imbricated in 3 or 4 series. **Phyllaries** strongly graduated, firm, squarrose, with a well-delimited oblanceolate or spatulate green areole in the apical portion, the basal $^1/_4$–$^1/_2$ portion scarious and somewhat indurate; outer phyllaries oblanceolate to spatulate, 1.5–2 mm long, at least somewhat pubescent on both surfaces, often conspicuously scabrous-hirsute abaxially, the apex acute to obtuse and with a prominent spinule, the margins scabrous; inner phyllaries linear-lanceolate, more slender than the outer and median, 3–4 mm long, usually glabrous, acuminate or attenuate. **Receptacle** alveolate with sharp teeth. **Ray florets** 8–18(20), the corollas 4–6(7) mm long, white (rarely pink or

bluish), glabrous or with a few trichomes on the tube. **Disk florets** 8–12(15), the corollas narrowly funnelform, 2.5–4 mm long, glabrous or with a few trichomes at the throat, the limb gradually expanded, light yellow turning purple after anthesis, the lobe/limb fraction 0.3–0.35, the tube ca half as long as the limb. **Pappus** simple, the bristles about as long as the disk corolla, whitish, soft, slender, and attenuate. **Achenes** plump, oblong-obovoid, often somewhat falcate, 1.2–2 mm long and 0.4–0.6 mm across, deep purple turning brown when weathered, sericeous or densely strigillose, and with 7–9 ribs. $2n = 10$ (mostly), 20. Including *A. exiguus* Rydb. [*A. multiflorus* Aiton—Mead 1846; Brendel 1887; Higley and Raddin 1891; Pepoon 1927; Benke 1928.]

September–October. Unshaded habitats: prairie remnants, dunes, gravelly exposed slopes, and open woods; also in somewhat disturbed ground that still supports native prairie vegetation, e.g., roadsides and railroad rights-of-way, but usually not in severely weedy situations. Widely distributed throughout the state. The species range extends over much of the North American continent, in the East from s. ME to s. VA, in the Midwest from s. ON and s.e. MB to AR, and in the West from SK, AB, and e. BC through e. WA, n.e. OR, ID, and the Great Plains to NM, TX, e. AZ, and n. Mexico.

Plants of Illinois belong in subsp. *ericoides* (A.G. Jones 1978b, c), comprising var. *ericoides* and var. *prostratus* (Kuntze) S.F. Blake [*Aster exiguus*—G.N. Jones 1945, 1950, 1963; Fell 1955; Jones and Fuller 1955; Mohlenbrock and Voigt 1959]. Although these two varieties are widely sympatric and plants with intermediate characteristics have been recorded, the identity and integrity of the taxa seem to be largely maintained as follows:

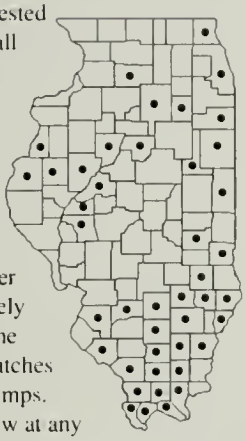
1. Pubescence of stems, leaves, and phyllaries often relatively sparse and soft, appressed-strigose, or trichomes on the stems sometimes ascending ..... var. *ericoides*
1. Pubescence of stems, leaves, and phyllaries copiously and harshly hirsute, the trichomes on the stems spreading or somewhat reflexed ..... var. *prostratus*

In addition, two color forms originally described from Illinois by Benke (1928, 1932b) are occasionally observed: *Aster ericoides* f. *caeruleus* (Benke) S.F. Blake (plants with blue to purplish rays), and *A. ericoides* f. *gramsii* Benke (plants with "rose-red" rays). Also included here are Illinois collections cited as belonging in the hybrid *A. ericoides* var. *prostratus* × *A. pilosus* (Mohlenbrock 1986). The hybrid formula was originally published as *A. exiguus* × *pilosus* and attributed to H.E. Ahles (Jones and Fuller 1955: 468). These plants are not hybrids but are somewhat atypical individuals of var. *prostratus*, probably the result of injury, e.g., from mowing. Hybridization is well documented and rather common between *A. ericoides* and *A. novae-angliae*. The plants are known under the binomial *A.* × *amethystinus* Nutt., pro sp. (see discussion under **14a**).

6a. *Aster falcatus* Lindley in Hooker var. ***commutatus*** (Torrey & Gray) A.G. Jones
Western Heath Aster [*A. commutatus* (Torrey & Gray) A. Gray—Fernald 1950]

A few specimens collected along a railroad track in Kane County [*Sherff 1798* (F, ILL)] seem to approach the characteristics of and perhaps belong in this taxon, which is of common occurrence from the Dakotas and Nebraska westward, especially in the Great Plains. The plants exhibit a somewhat decumbent sprawling habit, heads that are not secund and are somewhat larger than is typical for *Aster ericoides*, and an abundance of larger cauline leaves not usually present at flowering time in plants of *A. ericoides*. I have included this western taxon in the key, but if the Illinois plants really belong here, rather than representing aberrant forms of *A. ericoides* that resulted from some kind of injury or other environmental influence, they are almost certainly waifs. I do not share the view of Jones and Fuller (1955: 468), who suggested that collections of "*Aster commutatus* sensu Fernald (1950) 1433, quoad pl. Ill.—Non (Torr. & Gray) A. Gray (1884)" are hybrids between *A. ericoides* (as *A. exiguus*) and *A. pilosus*.

7. *Aster fragilis* Willd.
Brittle Aster (my suggested vernacular name), Small White Aster



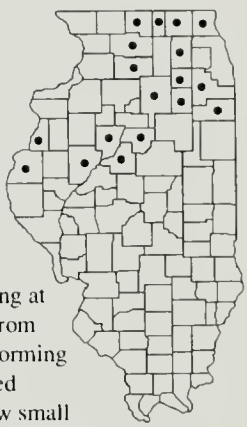
Herbaceous, with creeping (sometimes short) horizontal rhizomes. **New shoots** arising mostly from slender stoloniform rhizomes, rarely at the base of old stems, the plants forming colonial patches or scattered individual clumps. **Stems** slender, erect, 1–few at any point of emergence, 30–80(100) cm tall, commonly branched from below the middle, the branches divaricate or ascending, brittle, often slightly ridged from decurrent leaf bases, minutely puberulent in thin decurrent lines, the main stem usually glabrescent to glabrous. **Leaves** somewhat polymorphic, with clusters of smaller leaves in axils of the larger ones at most nodes, the principal leaves commonly withered and deciduous at flowering time; basal rosette leaves subpetiolate, spatulate or oblanceolate, 1–4 cm long and less than 1 cm wide, usually purple-tinged below, with several weakly expressed and anastomosing secondary nerves, glabrous, the apex acute or obtuse, the margins crenate, the subpetiolar portion sparsely ciliate, winged, and somewhat dilated toward the sheathing base; principal cauline leaves linear to linear-oblanceolate, 2–6 cm (or more) long and (1)2–3 mm wide, usually with only the midrib strongly expressed, both surfaces glabrous or the upper minutely puberulent, the apex acute to attenuate with a sharp callus point, the margins often inrolled, scabrous, entire or shallowly serrulate, the base sessile, usually slightly sheathing and decurrent; rameal leaves numerous, linear or oblong, ascending or spreading, notably unequal in size, the smaller bracteiform, those of the peduncles often aciculiform, 1–2 mm long, glabrous, intergrading with the phyllaries. **Capitulescence** a diffuse panicle, the head-bearing branchlets typically racemiform and often arching. **Flowering heads** 0.6–1 cm in diameter when the rays are fully extended, often crowded but commonly not secund, subsessile, or on slender peduncles 0.2–3 cm (or more) in length. **Involucre** 2.5–4 mm high, narrowly campanulate or turbinate, the phyllaries imbricated in 4 or 5 series. **Phyllaries** strongly graduated, appressed or the outer ones spreading, glabrous, the green areoles linear to linear-oblanceolate, usually extending over the entire length of the midrib, the apex acute, the margins sparsely ciliolate and with a scarious rim extending to near the apex; outer phyllaries slender, linear, 0.8–1 mm long; median and inner phyllaries linear-oblanceolate, the innermost 2.5–3.5 mm long, those largest in surface area (3rd or 4th series inward) typically less than twice as wide as the outer ones. **Receptacle** alveolate with sharp teeth. **Ray florets** (12)16–20, the corollas 3–4(6) mm long, white (rarely pink), glabrous. **Disk florets** 16–20 (or more), the corollas narrowly funnelform, 2.5–3.5 mm long, glabrous, the limb abruptly dilated at the throat, cream-colored or light yellow turning pink after anthesis, the lobe/limb fraction 0.35–0.45, the lobes notably recurved, the tube slightly shorter than the limb. **Pappus** simple, the bristles approximately as long as the disk corolla, whitish, soft, slender, sometimes slightly flattened at the acute apex. **Achenes** oblong-obovoid, plump or slightly compressed, 1.0–1.8 mm long and ca 0.5 mm across, gray, thinly strigillose, with 4 or 5 often obscure ribs. $2n$ = 16, 32. [*A. vimineus* misapplied, not of Lam. (cf. Jones and Hiepko 1981; Jones and Lowry 1986), including *A. vimineus* var. *subdumosus* Wieg.—Deam 1940; G.N. Jones 1950, 1963; Jones and Fuller 1955; Mohlenbrock and Voigt 1959; Gleason and Cronquist 1963; Steyermark 1963; Mohlenbrock 1975, 1986; Swink and Wilhelm 1979; and others.]

Late August–October. Moist or wet ground: bogs, meadows, lakeshores, streamsides, and open bottomlands. Occasional throughout much of the state. The range of this variable species extends from ME south to FL, and at its western limit from s. WI southward through MO and AR to LA and e. TX.

Most if not all Illinois populations belong in *Aster fragilis* var. *subdumosus* (Wieg.) A.G. Jones, a taxon typified by a collection [*Ridgway*

68 (GH)] from Olney, Richland County (Wiegand 1928: 171; A.G. Jones 1984). These plants differ from typical var. *fragilis* mainly by having relatively long peduncles, i.e., by somewhat resembling plants of *A. dumosus*. Good evidence suggests occasional hybridization and gene flow between *A. fragilis* and several other taxa that share the basic chromosome number of $x = 8$, such as *A. dumosus*, *A. lateriflorus* [e.g., *A.G. Jones 3108* (ILL) from Clark Co. and *Jelinek 221* (ILL) from Pope Co.], *A. lanceolatus* var. *interior* [e.g., *Mead s.n.* (ILL) from Hancock Co.], and *A. ontarionis* [e.g., *Shildneck 15860* (ILL) from Cass Co. and *Neill 16357* (ISM) from St. Clair Co.].

8. *Aster fureatus* Burgess in Britton & Brown
Forked Aster

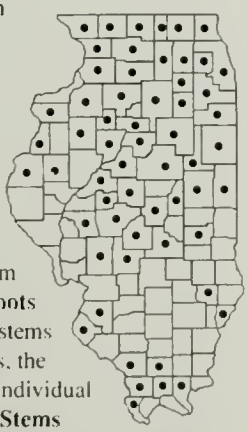


Herbaceous, with a creeping, horizontal rhizome system producing fleshy, stoloniform rhizome strands. **New shoots** arising at the base of old stems or from the rhizomes, the plants forming colonial stands or scattered individual clumps, the few small rosettes produced later in the season typically vanishing shortly after the first killing frost. **Stems** 1–several, erect, often somewhat zigzag in the upper portion, (30)50–120 cm tall, the branches typically confined to the capitulescence, ascending, more or less dichotomously forked, somewhat ridged from decurrent leaf bases, the indument uniformly distributed around the stem, hirtellous or puberulent on the upper stem and in the branches, the lower portion of the stem glabrescent. **Leaves** polymorphic, those of the basal rosettes and the main stem petiolate; leaves of new shoots and of the autumnal rosettes with oblong to ovate-lanceolate blades 4–10 cm long and 2–5 cm wide, rugose, with an often reddish midrib and several pairs of pinnate secondary nerves, minutely scabrous above and hirsute below, the apex acute or obtuse, the margins serrate, the base rounded or obliquely subcordate, the petioles short, winged, sheathing at the base; cauline leaves gradually reduced in size upward on the stem, those of the midstem with ovate to lance-ovate blades 10–12(15) cm long and (3)6–8 cm wide, rugose, with (6)8–12 pairs of pinnate secondary nerves, and with a weakly expressed reticulum of tertiary veins with more or less isodiametric areolae, harshly scabrous on the upper surface, densely hirsute over the entire lower surface resulting in a grayish green color, the apex acuminate with a long mucro, the margins sharply serrate with conspicuously mucronate teeth, the base shallowly cordate or truncate to rounded; petioles slender, mostly shorter than the blades, glabrous or irregularly ciliate, the base slightly dilated, sheathing, and somewhat decurrent; rameal leaves relatively few, similar in contour but abruptly reduced in size, subpetiolate to sessile, the base slightly clasping or sheathing, the midrib strongly keeled and decurrent; leaves of the peduncles 0–3, often bracteiform and phyllarylike, depending on the position, sometimes closely subtending the heads. **Capitulescence** variable, broad-topped, comparatively few-headed and cymiform in the natural habitat but often ample, much-branched, and compound corymbiform in disturbed situations. **Flowering heads** 2.5–3.5 cm in diameter when the rays are fully extended, not crowded and not secund, the peduncles 0.5–3(5) cm long, often leafless or nearly so, densely hirtellous or villous. **Involucre** campanulate (rarely hemispherical when pressed and dried), 6–8(10) mm high, the phyllaries imbricated in 5–7 series. **Phyllaries** appressed when fresh, strongly graduated, the outer ones ovate, 1.5–3 mm long, the innermost linear-lanceolate, 5.5–7.5 mm long, those of the outer 2 or 3 series twice as wide as the inner, puberulent on both surfaces, the apex obtuse or rounded, the margins lanate, erose-hyaline, and also often (median and inner phyllaries) with a red rim, the chlorophyllous areoles poorly delimited, with fuzzy edges, broadly obovate to rhombic or oblong, in the apical $^1/_4$–$^1/_3$ portion or rarely extending to the base in the form of bands, the basal $^1/_2$–$^2/_3$ portion scarious, indurate, and keeled or rounded on the back. **Receptacle** shallowly alveolate with blunt teeth. **Ray florets** (12)15–20, the corollas 12–18 mm long, white (sometimes aging to pink), glabrous. **Disk florets** 25–35 (or more), the corollas funnelform, 6–7(8) mm long, glabrous, the limb partway slenderly tubular, abruptly dilated 1–1.5 mm above the point of insertion of the filaments, cream-colored

or light yellow turning purple after anthesis, the fraction of lobe/expanded limb portion 0.4–0.5, the apparent tube (i.e., including the tubular limb portion) distinctly longer than the expanded limb portion. **Pappus** slightly shorter than the disk corolla, whitish or somewhat tawny, the bristles in 2 series, those of the inner series firm, with a clavellately expanded apex, those of the outer somewhat shorter, more slender, and attenuate. **Achenes** fusiform, plump, (2.5)3–3.5(4) mm long and 1–1.2 mm across, dull purple or brown, thinly puberulent in lines or glabrescent, with 8–10(12) densely spaced, often straw-colored ribs. $2n = 18$, with 0–several B-chromosomes. [*A. divaricatus* misapplied, not of L.—Mead 1846; Kibbe 1952.]

(Late July) August–October. Low springy or marshy ground in woody areas, usually underlain by sandstone or limestone; lower (mostly north-facing) slopes and edges on the cutting (eroding) sides of streams and rivers. Rare and possibly threatened, apparently less common now than is indicated by the collection records, although occasional stands are extensive. The populations are restricted to the northern one-third of the state, extending south along the major rivers to Tazewell, Fulton, and Hancock counties. The species range includes scattered stations in s. MI, w. IN, s.e. WI, e. IA, and s.e. MO.

9. *Aster laevis* L.
Smooth Aster, Smooth Blue Aster



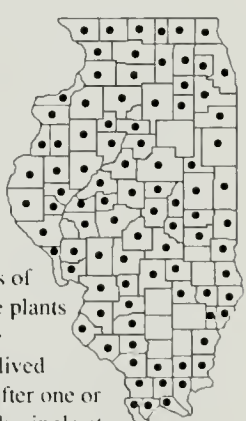
Herbaceous, with branched caudiciform or tangled rhizomes that turn woody with age but also producing stoloniform rhizome strands. **New shoots** arising at the base of old stems or from rhizome branches, the plants forming scattered individual clumps or small patches. **Stems** 1–several, erect, (30)50–120 cm tall, with stiff, typically ascending, and commonly somewhat ridged branches above the middle, often reddish in the lower portion, glaucous and essentially glabrous except for sparse hirsute indument on the peduncles and in the leaf axils. **Leaves** polymorphic, somewhat fleshy, glabrous and glaucous, the basal and larger cauline ones sometimes withered at flowering time; basal rosette leaves commonly with long, winged, and basally dilated petioles, the blades oblong or ovate to lanceolate, 3–10 cm (or more) long and ca 1–3 cm wide, the apex acute or obtuse to rounded, the margins subentire or crenate-serrate, the base rounded or truncate; principal cauline leaves subsessile or mostly sessile, extremely variable in size and shape, oblong-ovate or lanceolate to linear, sometimes abruptly constricted above the base, (4)8–15 cm long and (1)2–4.5 cm wide, with 1–several pairs of ascending secondary nerves, and a weakly expressed reticulum of tertiary veins with more or less isodiametric areolae, the apex acute or obtuse, usually callus-pointed, the margins entire or shallowly crenate-serrate, and minutely scabrous, the base often strongly auriculate-clasping; rameal leaves similar in contour but abruptly reduced in size, with a clasping or sheathing and somewhat decurrent base; leaves of the peduncles usually densely spaced, bracteiform, lance-subulate, 3–6 mm long, with an often purple callus point, intergrading with the phyllaries. **Capitulescence** a narrow or often somewhat flat-topped panicle in the upper $^1/_4$–$^1/_2$ of the stem, the branches commonly stiffly ascending (rarely arching). **Flowering heads** 1.5–2.5(3) cm in diameter when the rays are fully extended, terminal on somewhat ridged and often sparsely puberulent peduncles varying from 0.2 to 6 cm (or more) in length. **Involucre** campanulate, 4.5–7(8) mm high, the phyllaries imbricated in 4–6 series. **Phyllaries** strongly graduated, firm, appressed when fresh, the outer ones subulate or lanceolate, 1.5–2 mm long, the median and inner ones three times as long, linear or often slightly expanded toward the apex, the surfaces glabrous, the apical green areoles well defined, rhombic to lance-rhombic, glaucous, commonly smaller in area than the scarious basal portion, the apex obtuse, acute, or acuminate, with a sharp and often red or purple callus point, the basal portion of outer and median phyllaries usually keeled and indurate. **Receptacle** alveolate with sharp and typically bristle-tipped teeth. **Ray florets** 15–25(30), the corollas (10)12–15 mm long, blue or purple (rarely white), glabrous. **Disk florets** 15–25 (or more), the corollas narrowly funnelform, (4.5)5–6 mm

long, glabrous, the limb slightly dilated at the throat, yellow turning purple after anthesis, the lobe/limb fraction ca 0.2, the tube slightly shorter than the limb. **Pappus** simple, the bristles usually somewhat shorter than the disk corolla, tawny or rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, plump or somewhat compressed, 2–3 mm long and 0.8–1.3 mm across, deep purple at maturity, or brown when weathered, glabrous, with 4 or 5 often irregularly spaced ribs, $2n = 48$.

August–October. Mesic, mostly open habitats: prairie remnants, meadows, lakeshores, stream banks, open woods, and exposed slopes; also in somewhat disturbed ground along roads and railroad rights-of-way. Fairly common throughout most of the state. The range of the species extends from PQ south to GA and AL, northwest to AB, BC, and s. YT, and in the Rocky Mts. and Great Plains southward through c. CO to NM and the Guadalupe Mts. in w. TX.

Although somewhat variable, Illinois plants are assigned to typical var. *laevis*. There is evidence of occasional hybridization and intergradation with other species that share the basic chromosome number of $x = 8$, such as *Aster lanceolatus* [e.g., *Benke 5280* (F)—cf. Benke 1932b], *A. puniceus* [e.g., *Fuller 13293a* (F) from McHenry Co.], *A. oolentangiensis* [e.g., *Heitmann & Heitmann 1027* (F) from Fulton Co.], and *A. lateriflorus* [e.g., *Benke 2927* (F) from Kane Co.].

10. *Aster lanceolatus* Willd.
Panicled Aster



Herbaceous, with a strongly creeping horizontal rhizome system. **New shoots** initiated mostly at the tips of stoloniform rhizomes, the plants extensively clonal but the connecting strands short-lived and often disintegrating after one or two seasons. **Stems** mostly single at any point of emergence, often stout, erect, 40–120(150) cm tall, pubescent in thin decurrent lines from the upper nodes, usually glabrescent or glabrous below the middle, often branching from near the base or producing in midsummer secondary shoots composed of clusters of smaller leaves plus a few heads at most of the nodes and in the leaf axils. **Leaves** polymorphic, the basal and larger cauline ones often withered or deciduous at flowering time; basal rosette leaves petiolate or subpetiolate, the blades elliptic-oblanceolate or obovate to suborbiculate, 1–8 cm long and 0.5–2 cm wide, often purplish below, with several pairs of anastomosing secondary nerves, glabrous, the apex acute, obtuse, or rounded, the margins coarsely crenate, the petioles winged and with a few long marginal cilia, the base dilated and sheathing; principal cauline leaves sessile or subsessile, elliptic or oblanceolate to linear-lanceolate, (4)6–15 cm long and (0.5)1–2(3.5) cm wide, gradually reduced in size up the stem, with relatively weakly expressed secondary nerves and a reticulum of tertiary veins with oblong areolae, glabrous (rarely scabrellous above), the apex acute to attenuate and callus-pointed, the margins sharply serrate, the base cuneate and somewhat decurrent; rameal leaves similar in contour and texture but mostly entire, those of the peduncles relatively few, flexible, 2–6(10) mm long, rarely somewhat intergrading with the phyllaries. **Capitulescence** an ample, leafy, diffuse or often narrowly elongate panicle. **Flowering heads** 1–2(2.5) cm in diameter when the rays are fully extended, rarely secund, the peduncles 0.5–5 cm in length. **Involucre** campanulate, 3.5–6(7) mm high, the phyllaries imbricated in 3–5(6) series. **Phyllaries** somewhat or often strongly graduated, comparatively slender, appressed or slightly spreading, the outer ones 1.5–3 mm long, the inner 3–6 mm; outer and median phyllaries linear-oblanceolate, glabrous on the abaxial surface, sparsely puberulent on the adaxial surface, the green areoles linear-oblanceolate, the apex acute to acuminate and callus-pointed, the margins somewhat ciliolate, erose-hyaline, and with a narrow scarious rim extending to the tip, the basal $^1/_4$–$^1/_2$ portion scarious and slightly dilated; innermost phyllaries linear, very slender, acuminate to attenuate. **Receptacle** alveolate with sharp teeth. **Ray florets** 20–35 (or more), the corollas 7–10(12) mm long, white (rarely pink),

glabrous. **Disk florets** (15)20–30 (or more), the corollas funnelform, 3–5(6) mm long, glabrous, the limb cream-colored turning purple after anthesis, dilated at the throat, with comparatively long recurved lobes, the lobe/limb fraction 0.35–0.45(0.5), the slender tube somewhat shorter than the limb. **Pappus** simple, the bristles as long as the disk corolla or often slightly longer, whitish, soft, slender, and attenuate. **Achenes** oblong-obovoid, somewhat compressed, 1.5–2 mm long and 0.5–0.8 mm across, gray, thinly strigillose, 4- or 5-ribbed. $2n = 32, 64$ (mostly), rarely 40 or 48. Including *A. simplex* Willd. and *A. interior* Wieg. (Semple 1979; Semple and Chmielewski 1987). [*A. paniculatus* Lam. non Miller; *A. tradescantii* misapplied, not of L.]

August–October. Low moist or swampy ground: woods, pastures, bottomlands of rivers and streams, ditch margins, and lakeshores. Very common. Under the broad taxonomic concept adopted by Semple and Chmielewski (1987), the species has a transcontinental range that includes localities in nearly every state and province of North America.

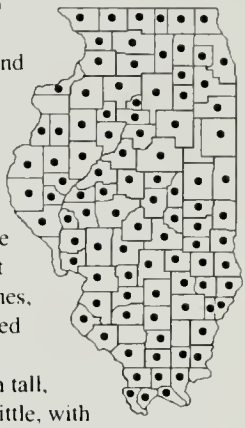
Three varieties can be distinguished in Illinois: 1) var. *lanceolatus* [*Aster paniculatus*—Brendel 1887; Higley and Raddin 1891; Pepoon 1927; Deam 1940; G.N. Jones 1945, 1950; Fell 1955. *A. simplex* var. *ramosissimus* (Torrey & Gray) Cronq.—Fernald 1950; Gleason 1952; Dobbs 1963; Gleason and Cronquist 1963; Steyermark 1963], 2) var. *simplex* (Willd.) A.G. Jones [*A. simplex* (sensu stricto)—Mead 1846; Fernald 1950; Gleason 1952; Kibbe 1952; Jones and Fuller 1955; Mohlenbrock and Voigt 1959; G.N. Jones 1963; Gleason and Cronquist 1963; Swink 1974; Mohlenbrock 1975, 1986; Swink and Wilhelm 1979. *A. paniculatus* var. *simplex* (Willd.) Burgess in Britton & Brown—Wiegand 1933; Deam 1940. *A. lanceolatus* subsp. *simplex* (Willd.) A.G. Jones—1984], and 3) var. *interior* (Wieg.) Semple & Chmielewski [*A. tradescantii* sensu auct. non L.—Mead 1846; Brendel 1887; Higley and Raddin 1891; Pepoon 1927; G.N. Jones 1950; Fell 1955. *A. vimineus* sensu auct., pro parte, non Lam.—Higley and Raddin 1891; Kibbe 1952. *A. interior*—Deam 1940; G.N. Jones 1945; Jones and Fuller 1955; Mohlenbrock and Voigt 1959. *A. simplex* var. *interior* (Wieg.) Cronq.—Fernald 1950; Gleason 1952; Gleason and Cronquist 1963; Swink 1974; Swink and Wilhelm 1979. *A.* × *interior* Wieg., pro sp.—A.G. Jones 1980a, b. *A. lanceolatus* subsp. *interior* (Wieg.) A.G. Jones—1984]. Plants of these three varieties show a great deal of intergradation. For the most part, however, they may be distinguished as follows:

1. Flowering heads 1–1.5 cm in diameter when the rays are fully extended; involucres 3–4 mm high; disk corollas 3–3.5 mm long; branchlets often racemiform ..... var. *interior*
1. Flowering heads 1.8–2.5 cm in diameter when the rays are fully extended; involucres (4)4.5–7 mm high; disk corollas typically (4)4.5–5.5 mm long; branchlets usually not racemiform.
   2. Leaves of the midstem linear-lanceolate, 12 times (or more) longer than wide .... var. *lanceolatus*
   2. Leaves of the midstem elliptic-lanceolate to oblanceolate, mostly less than 11 times longer than wide..... ..... var. *simplex*

For a different interpretation see Semple and Chmielewski (1987). These authors do not regard *Aster simplex* as sufficiently distinct from typical *A. lanceolatus* to merit taxonomic recognition. Collections of var. *simplex* from the central and southern parts of the Midwest, however, consistently seem to differ in several ways from the more northern populations of var. *lanceolatus*. Aside from the key characters mentioned and the somewhat differential geographic distribution, plants of var. *simplex* occur more frequently in shady bottomland woods, whereas plants of both var. *lanceolatus* and var. *interior* are more common in the unshaded habitats of bogs, meadows, lakeshores, and ditch margins.

Good evidence suggests that this extremely variable species occasionally hybridizes and intergrades with other species of the $x = 8$ chromosome number assemblage, e.g., *Aster borealis*, *A. fragilis*, *A. laevis*, *A. lateriflorus*, *A. puniceus*, and others that are not elements of the flora of Illinois.

11. ***Aster lateriflorus*** (L.) Britton
Starved Aster, Calico Aster, Side-flowered Aster, White Woodland Aster



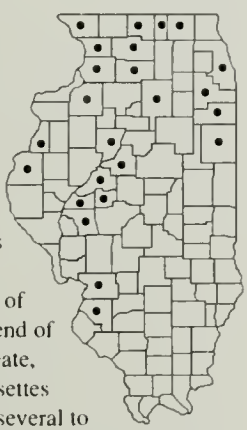
Herbaceous, with a short, somewhat tangled rhizome system. **New shoots** initiated at the base of old stems or from short ascending rhizome branches, the plants forming scattered individual clumps. **Stems** 1–several, 30–80(120) cm tall, comparatively slender, brittle, with ascending or often divaricate branches from the lower nodes resulting in a sprawling or bushy habit, the indument villous or hirtellous, usually in decurrent lines from the leaf bases, sometimes uniformly distributed in the upper branches, the main stem often glabrescent or glabrous. **Leaves** polymorphic, the larger cauline ones at least in part persistent throughout the flowering period; basal rosette leaves subpetiolate, the blades spatulate or obovate to suborbiculate, the upper surface minutely puberulent or glabrous, the lower surface villous along the midrib (rarely glabrous) and sometimes purplish, the margins crenate-serrate, abruptly narrowed to the winged, ciliate, somewhat sheathing subpetiolar base; principal cauline leaves sessile or subsessile, mostly elliptic-oblanceolate, rarely linear, (3)5–10(15) cm long and (0.2)1–2(3.5) cm wide, gradually reduced in size up the stem, usually with several pairs of anastomosing secondary nerves, and a weakly expressed reticulum of tertiary veins with oblong areolae, the upper surface typically scabrellous, the lower surface villous or hirtellous along the midrib but otherwise usually glabrous, the apex acuminate to attenuate with a sharp callus point, the margins serrate and minutely scabrous, the base cuneate and somewhat decurrent; rameal leaves similar in contour, more or less glabrous, entire, those subtending the head 1–few, oblong-lanceolate, 1.5–3 mm long, flexible, not phyllarylike. **Capitulescence** an often ample diffuse panicle, commonly branched from below the middle, the head-bearing branchlets slender and wiry, arching, racemiform. **Flowering heads** small, 0.8–1.3 cm in diameter when the rays are fully extended, often crowded, secund, sessile or subsessile, the peduncles rarely more than 1 cm in length. **Involucre** campanulate (turbinate when pressed and dried), 3.5–4.5(5) mm high, the phyllaries imbricated in (3)4 or 5 series. **Phyllaries** strongly graduated, appressed or slightly spreading, glabrous on the abaxial surface, the apical green areoles obovate-oblanceolate, the basal $^1/_3$–$^2/_3$ portion scarious except for the green midrib; outer phyllaries linear-lanceolate, 1–2 mm long, less than half as long as the inner, acute and callus-pointed; median phyllaries linear or often slightly expanded toward the acute to acuminate apex, sparsely puberulent on the adaxial surface, the margins irregularly ciliolate, erose-hyaline, and with a narrow scarious (sometimes reddish) rim extending to the tip; innermost phyllaries very slender, linear, 3.5–4.5 mm long. **Receptacle** alveolate with sharp or bluntish teeth. **Ray florets** 10–15(20), the corollas (4)5–8 mm long, white, glabrous. **Disk florets** 10–15(20), the corollas funnelform, (2.5)3.5–4.5 mm long, glabrous or with a few trichomes, the limb abruptly dilated at the throat, cream-colored or light yellow before anthesis, soon turning deep magenta, the lobe/limb fraction 0.5–0.75, the lobes strongly reflexed, the slender tube slightly shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, white, soft, slender, and attenuate. **Achenes** oblong-obovoid, plump or slightly compressed, (1.3)1.8–2.2 mm long and 0.5–0.7 mm across, gray, sparsely strigillose, obscurely 3–5 ribbed. $2n = 16$, 32 (mostly), 48. Including *A. pendulus* Aiton, *A. horizontalis* Desf., and *A. hirsuticaulis* Lindley in DC. [*A. vimineus* Lam. (see A.G. Jones 1984: 379; Jones and Lowry 1986). *A. diffusus* Aiton—Brendel 1887; Higley and Raddin 1891. *A. miser* sensu Aiton non L.—Mead 1846.]

Late August–October. Wooded slopes, high banks of streams and rivers, and edges of bogs; Illinois plants more common in well-drained or upland situations than in wet ground habitats. Common throughout the state. The range of the species extends in the East from NB, ME, PQ, and s. ON south to FL, and to the west from MN and e. IA through e. KS to LA and s.e. TX.

Varietal names can be assigned to collections from Illinois only with the greatest difficulty because of a great deal of intergradation, not only between the varieties that have been described (Wiegand 1928) but also involving gene flow from other species with a basic chromosome number of $x = 8$, e.g., *Aster dumosus*, *A. fragilis*,

A. lanceolatus, and *A. ontarionis*. The majority of specimens more or less fit the circumscription and concept of typical var. *lateriflorus*. Plants of var. *horizontalis* (Desf.) Farw. [*A. lateriflorus* var. *pendulus* sensu Wieg. non (Aiton) Burgess in Britton & Brown] are not uncommon, especially in the southern half of the state. The characteristics that weakly distinguish this variety (very small heads combined with a sprawling habit and a tendency toward relatively moist habitats) may have been introduced in part through gene flow from *A. fragilis*. Illinois collections labelled *A. lateriflorus* var. *hirsuticaulis* (Lindley) Porter [sensu Pepoon 1927] are partly referable to *A. ontarionis* and partly to typical var. *lateriflorus*. The range of var. *hirsuticaulis* [including var. *tenuipes* Wiegand (1928)] probably does not extend to Illinois; these plants are common in the northeastern states and in Canada west to s. ON.

12. *Aster linariifolius* L.
Flax-leaved Aster,
Savory-leaved Aster



Tufted, often suffruticose, with a tangled or cormoid-caudiciform rhizome system that turns woody with age. **New shoots** arising at the base of old stems but also at the end of ascending, densely bracteate, rhizome strands; basal rosettes absent. **Stems** cespitose, several to many, slender and wiry, (10)20–40(60) cm tall, simple, or few-branched only in the capitulescence (unless injured through grazing or mowing), cinereous, puberulent, sometimes glabrescent toward the base. **Leaves** numerous, firm, densely spaced, sessile, ascending or spreading to squarrose, more or less uniform in contour, linear or nearly so, entire, those of the main stem 1.5–2.5(3.5) cm long and 1.5–2.5(4) mm wide, with a keeled midrib, the secondary venation not evident, glabrous except for the scabrous margins and the midrib below, the epidermal cells of both surfaces strikingly bulliform (hand lens needed to see this), the apex acute with a sharp callus point; lowermost cauline leaves bracteiform; rameal leaves abruptly reduced in size, those of the peduncles intergrading with the phyllaries. **Capitulescence** racemiform or corymbiform in the upper 1/6–1/4 of the stem. **Flowering heads** relatively few per stem, commonly fewer than 30, 1.5–3 cm in diameter when the rays are fully extended, on leafy peduncles 0.5–5(15) cm in length. **Involucre** turbinate or campanulate, (6)8–10(12) mm high, the phyllaries imbricated in 5–8 series. **Phyllaries** strongly graduated, firm, appressed, often largely scarious on the abaxial surface, the green areoles not well defined, centered in the apical 1/4–1/2 portion or forming two bands along the whitish midrib, sometimes extending to the base; phyllaries of the outer 2 or 3 series 2.5–4 mm long, lanceolate, notably keeled, the apex acute with a red callus point, the margins ciliate to fimbriate, or lanate toward the apex, those of the 5th or 6th series inward largest in surface area, (6)7–8(10) mm long, linear-lanceolate, keeled or rounded on the back, often with a red rim, the apex obtuse or rounded, the margins conspicuously lanate over the entire length. **Receptacle** alveolate with sharp teeth. **Ray florets** 13–17, the corollas (10)12–15(18) mm long, violet or reddish purple (rarely white), glabrous. **Disk florets** 20–30 (or more), the corollas narrowly funnelform, 5–6.5(8) mm long, glabrous, the limb gradually expanded, light yellow turning reddish after anthesis, the lobe/limb fraction ca 0.2, the tube slightly shorter than the limb. **Pappus** tawny, "double" (according to literature references) but often composed of 3 series of bristles, the principal bristles firm, in 1 or 2 series, somewhat unequal, 4–7 mm long, as long as the disk corolla or slightly shorter, with at least the innermost clavellately expanded and flattened toward the apex; bristles of the outermost whorl distinctly shorter, 1 mm long or less, and attenuate. **Achenes** obconic, plump, 2.5–3(3.5) mm long, ca 1 mm across, dull purple or brown, 3–5 ribbed, the color and sculpturing of the pericarp often obscured by densely sericeous indument. $2n = 18$. [*Diplopappus linariifolius* (L.) Hooker—Mead 1846.]

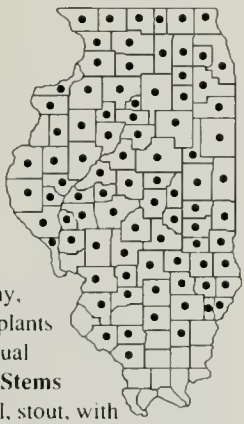
Late August–October. Dry sandy, loamy, or rocky soils: exposed slopes and ridges, open woods, dunes, and barrens. Most prominent in the northern half of the state but extending south to St. Clair County. The range of the species extends from s. PQ and ME south to FL, and to the west from MN through s. MO, s.e. KS, and e. OK to e. TX.

13. *Aster macrophyllus* L.
Large-leaved Aster,
Big-leaved Aster

Herbaceous, with a strongly creeping horizontal rhizome system. **New shoots** arising mostly at the ends of stoloniform rhizome branches, the plants typically forming extensive colonies, the autumnal basal rosettes numerous, prominent, often forming a dense ground cover. **Stems** 1–few at any point of emergence, erect, sometimes slightly zigzag in the upper portion, 30–70(90) cm tall, terete or somewhat angular above from decurrent leaf bases, often maroon-colored, the branches confined to the capitulescence, ascending, the upper stem and branches pubescent with white, multicellular, antrorsely curved or spreading trichomes and also invested with sessile or stipitate glands, the lower stem glabrescent or glabrous. **Leaves** polymorphic, those of the basal rosettes and the lower half of the stem petiolate; basal rosette leaves largest, the blades broadly ovate to cordate, (8)15–25 cm long and (6)8–12(15) cm wide, with 6–12 pairs of pinnate secondary nerves, and a reticulum of tertiary veins with more or less isodiametric areolae, the upper surface minutely scabrous or glabrous, the lower thinly puberulent, especially along the nerves, the apex acuminate with a sharp mucro, the margins crenate-serrate, each tooth mucronate, the base deeply cordate and sometimes slightly oblique, the petioles 1–2 times as long as the blades, with slightly winged and ciliate margins, dilated and sheathing at the base; cauline leaves gradually reduced in size up the stem, blades of the larger ones nearly as wide as long, similar to the basal leaves in contour and vestiture except for sparse glandularity along the midribs below, the petioles shorter and progressively more broadly winged upward on the stem; upper stem leaves subpetiolate or often sessile and clasping, ovate or obovate to oblanceolate; rameal leaves relatively few, abruptly reduced but variable in size, ovate or oval, the upper surface scabrous and stipitate-glandular, especially along the midrib and the margins, the lower surface more sparsely so, the apex acute or acuminate, the margins crenate-serrate to entire, the base rounded or cuneate, the 0–few leaves of the peduncles ovate-lanceolate, 2–5 mm long, thinly to densely glandular, attenuate, not intergrading with the phyllaries. **Capitulescence** a dichotomously branched corymbiform panicle in the upper $^1/_3$–$^1/_2$ portion of the stem, the branchlets short and firm. **Flowering heads** variable, ca 2–3 cm in diameter when the rays are fully extended, sometimes crowded in the individual cymules, the peduncles 0–2.5 cm long, often densely glandular-hirsute. **Involucre** campanulate or hemispherical, (6)8–10 mm high, the phyllaries imbricated in (4)5–7 series. **Phyllaries** appressed or somewhat spreading, strongly graduated, those of the outer 2(or 3) series ovate, 2–3 mm long and ca half as wide, acute to obtuse, the green areoles oblong-obovate, in the apical $^1/_3$–$^1/_2$ portion (rarely extending to the base in the outer phyllaries), the basal portion mostly scarious, indurate, keeled, or rounded on the back, glandular-puberulent over the entire abaxial surface (outermost phyllaries) or only in the chlorophyllous zone and along the midrib (median phyllaries), the adaxial surface more or less glabrous, the margins lanate and glandular toward the apex, hyaline toward the base, and with a scarious or often reddish rim; phyllaries of the innermost series slenderly linear-lanceolate, (6)7–9 mm long, ca 1 mm wide, acute, largely scarious or sometimes red-rimmed. **Receptacle** alveolate with sharp teeth. **Ray florets** 10–15, the corollas 10–13 mm long, varying from white to deep lavender, glabrous. **Disk florets** 20–30 (or more), the corollas funnelform, 7–8 mm long, glabrous, the limb partway slenderly tubular, more or less abruptly flared ca 1.5–2 mm above the point of insertion of the filaments, cream-colored or light yellow aging to purple, the lobes reflexed, the fraction of lobe/expanded limb portion 0.6–0.7, the apparent tube (i.e., including the tubular limb portion) much longer than the expanded limb portion. **Pappus** tawny, in 2 series of somewhat unequal bristles, those of the inner series about as long as the disk corolla, firm and with a clavellately expanded apex, those of the outer slightly shorter, more slender, and attenuate. **Achenes** slenderly fusiform or cylindric, 3.5–4(4.5) mm long and 1–1.2 mm across, dull purple or brown, glabrous or with a few scattered trichomes near the top, with 8–10 thick, densely spaced (sometimes double-stranded), glossy, golden-brown ribs. $2n = 72$.

August–October. Moist or swampy ground (sometimes dry soil) in wooded areas. Local, rare in this state, recorded only from Cook and Lake counties, much more common to the north and east of Illinois. The range of this variable species extends in the East from NS, PE, NB, and PQ south to GA, in the Midwest from ON south to s.e. IN, and at the western limit from e. MB through e. MN to n.e. IA.

14. *Aster novae-angliae* L.
New England Aster



Herbaceous, with a tangled or sometimes caudiciform rhizome system. **New shoots** arising at the base of old stems or from short, fleshy, horizontal rhizomes, the plants forming scattered individual clumps or small patches. **Stems** 1–several, 50–150 cm tall, stout, with ascending or divaricate branches from above the middle, densely hispidulous-hirsute or pilose, stipitate-glandular in the upper portion, the lower portion less pubescent and usually brown in color. **Leaves** numerous, polymorphic, the basal and lower cauline ones often withered and deciduous at flowering time; basal rosette leaves spatulate, ca 2–6 cm long and 0.5–1.5 cm wide, with 1–3 pairs of anastomosing secondary nerves more or less aligned with the midrib or margins, sparsely hirsute on both surfaces, the margins ciliolate and occasionally with a few shallow teeth; principal cauline leaves sessile and entire, oblong or lanceolate, with several pairs of weakly expressed secondary nerves, and a reticulum of tertiary veins with more or less isodiametric areolae; leaves of the midstem ca 5–10 cm long and 5–15(20) mm wide, thinly strigose above, hirsute or hispidulous below, and invested with both sessile and stipitate glands (more copiously so in the upper leaves), the apex acute and mucronulate, the margins pustulate-scabrous, the base auriculate-clasping; rameal leaves similar in contour and vestiture, gradually reduced in size, the 1–4 small leaves of the peduncles not phyllarylike. **Capitulescence** a leafy, broad, round-topped or somewhat corymbiform panicle in the terminal ($^1/_{10}$)$^1/_6$–$^1/_3$ portion of the stem. **Flowering heads** 2–4.5(5) cm in diameter when the rays are fully extended, often crowded but not secund, the peduncles 0.3–4 cm long, glandular and hispidulous, commonly somewhat dilated just below the head. **Involucre** broadly hemispherical, 5–15 mm high, the numerous phyllaries imbricated in 4–6 series. **Phyllaries** slender, linear-lanceolate, long-acuminate or attenuate, commonly strongly squarrose or reflexed, mostly subequal in length, (5)6–12(15) mm long or the outer ones slightly shorter (rarely longer) than the inner; outer phyllaries largely herbaceous, dark green and often purple-tinged, densely invested with both stipitate and sessile glands; median and inner phyllaries scarious in the basal $^1/_3$–$^1/_2$ portion. **Receptacle** shallowly alveolate or merely pitted. **Ray florets** numerous, ca 50–100, the corollas 10–20(25) mm long, rose-colored to deep purple (rarely white), with a few trichomes near the throat. **Disk** 5–15 mm in diameter. **Disk florets** numerous, 50 or more, the corollas narrowly funnelform, (4)5–7 mm long, thinly puberulent in the throat region, the limb only slightly expanded, light yellow turning purple after anthesis at least in the lobes, the lobe/limb fraction 0.2–0.25, the tube ca half as long as the limb. **Pappus** simple, the bristles somewhat unequal and often slightly shorter than the disk corolla, tawny or rose-tinged, soft, slender, and attenuate. **Achenes** oblong to obconic, plump, 1.8–2.5(3) mm long, ca 0.6–1 mm across, dull purple or brown, obscurely glandular and densely sericeous, with 7–9 ribs. $2n = 10, 20$, occasionally with supernumerary chromosomes.

August–October. Unshaded mesic situations: prairie remnants, open woods, streamsides, fens, also in disturbed soils of pastures, old fields, roadsides, and railroad rights-of-way. Common throughout the state; also widely cultivated and often escaped, a fact that partly accounts for the various color forms observed. The range extends from s. PQ, s. ON, and ME south to AL, MS, and AR, west to s. MB, e. ND, e. NE, and e. KS, with scattered stations in WY, CO, OK, and NM.

Including f. *roseus* (Desf.) Britton [var. *roseus* (Desf.) DC.—Higley and Raddin 1891; Pepoon 1927; Benke 1928], plants with rose-colored rays; and f. *geneseensis* House (Benke 1932a), a white-rayed form. A short-lived, large-headed, white-rayed individual found in Champaign County (*A.G. Jones 2604*), to which

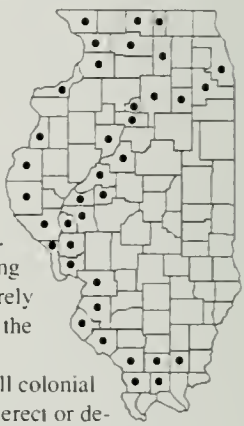
I have applied the latter name, possessed an extra set (genome) of chromosomes (A.G. Jones 1980b). When cross-pollinated from a typical individual, a few viable achenes were produced that grew into typical purple-rayed plants. Hybrids between plants of *Aster novae-angliae* and *A. ericoides* [*A.* × *amethystinus*] are occasionally found in Illinois (see **14a**).

14a. ***Aster* × *amethystinus*** Nutt., pro sp.
[*A. ericoides* × *A. novae-angliae*]

This hybrid is readily identifiable (Benke 1930) and has also been produced experimentally (Wetmore and Delisle 1939; A.G. Jones 1978c). The plants occur with sufficient frequency in Illinois to warrant inclusion in the key and a comparative diagnosis: **Habit** similar to that of *Aster novae-angliae*, the plants usually with a tangled rhizome system and short stoloniform strands forming small patches. **Stems** erect, aging to a light brown color, densely hispidulous-hirsute but not glandular. **Leaves** numerous, sessile, at least some of the larger cauline ones persistent throughout the flowering period and with clusters of smaller leaves produced in the axils; principal cauline leaves linear or oblong to elliptic-oblanceolate, 4–6 cm long and 3–6 mm wide, copiously and harshly hirsute on both surfaces but not glandular, the apex acute or obtuse, mucronulate, the margins entire and scabrous, the base rounded or slightly clasping but not auriculate; rameal leaves similar in contour and vestiture, those of the peduncles few, oblong-lanceolate, 3–5 mm long, not intergrading with the phyllaries. **Capitulescence** an ample leafy panicle with ascending branches and a pyramidal or round top. **Flowering heads** intermediate to the two parent species in most characteristics, 1.3–2 cm in diameter when the rays are fully extended, often crowded, sometimes secund. **Involucre** hemispherical, 4–6 mm high. **Phyllaries** strongly reflexed, somewhat graduated or often subequal, scabrous-puberulent but not glandular, mostly with a conspicuous, scarious basal portion. **Ray florets** 20–30 (or more), the corollas 5–10 mm long, lavender. **Disk** 4–7(8) mm in diameter. **Disk florets** 20–30 (or more), the corollas 3–4 mm long. **Pappus** tawny or rose-tinged. **Achenes** fusiform or obconic, 1.5–2 mm long, dull purple or brown, densely sericeous but not glandular, 7–9 ribbed, $2n = 10$.

Collections of this hybrid have been recorded in habitats shared with the parental species from Champaign, Cook, De Witt, Du Page, Fulton, McHenry, Menard, Peoria, Piatt, Richland, Vermilion, and Winnebago counties. The specimens show considerable variability and are probably not all first generation hybrids.

15. ***Aster oblongifolius*** Nutt.
Aromatic Aster



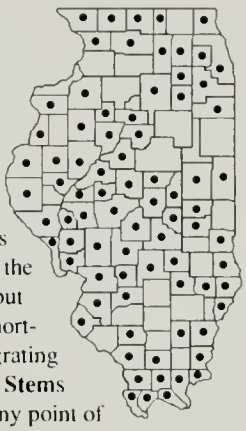
Herbaceous, with a tangled, often stoloniform or sometimes caudiciform rhizome system. **New shoots** usually arising from rhizome strands (rarely at the base of old stems), the plants forming scattered sprawling clumps or small colonial stands. **Stems** 1–several, erect or decumbent, brittle, 15–70(100) cm tall, with ascending or divaricate branches from below the middle, variably hispidulous-hirsute or hirtellous and also glandular, more copiously so on the branches, the lower stem usually lacking glands. **Leaves** numerous, at least some of the larger cauline ones persistent throughout the flowering period; basal rosette leaves oblanceolate or spatulate, 2–5(7) cm long and 0.5–1.5 cm wide, with 1–3 pairs of secondary nerves aligned with the midrib or the margins, hirsute, often also glandular (rarely glabrous or nearly so), the apex rounded and with a short mucro, the margins entire and coarsely ciliate (sometimes remotely toothed); principal leaves sessile, oblong or linear-lanceolate, (1.5)3–10 cm long and 0.5–1.5(2) cm wide, usually with 1–3 pairs of weakly expressed and anastomosing secondary nerves, and a reticulum of tertiary veins with more or less isodiametric areolae, the upper surface usually scabrous and often glandular, the lower copiously hirsute, the apex acute or obtuse, spinulose-mucronulate, the margins entire and scabrous-ciliolate, the base rounded or slightly clasping but not auriculate, often with axillary clusters of smaller leaves; upper cauline and rameal leaves gradually reduced in size, similar in contour, copiously invested with both sessile

and stipitate glands; leaves of the peduncles bracteiform, densely spaced, several to many, linear or oblong, 3–8 mm long, spinulose, usually spreading or squarrose, rarely ascending, more or less intergrading with the phyllaries. **Capitulescence** an often ample, leafy, diffuse paniele commonly branching from the lower nodes. **Flowering heads** 1.5–3 cm in diameter when the rays are fully extended, usually not secund, on glandular-hispidulous peduncles 0.5–5 cm in length. **Involucre** campanulate (or hemispherical when pressed and dried), 5–7(8) mm high, imbricated in 4–6 series. **Phyllaries** not strongly graduated, sometimes subequal, 3.5–7(8) mm long, densely glandular on both surfaces and along the margins, those of the outer 2 or 3 series with strongly squarrose tips; outermost phyllaries sometimes largely herbaceous, oblanceolate, acute; median phyllaries green in the apical $^1/_3$–$^1/_2$ portion, linear-lanceolate, long-acuminate or attenuate, the margins erose-hyaline or ciliolate, the basal $^1/_2$–$^2/_3$ portion scarious; innermost phyllaries very slender. **Receptacle** alveolate with sharp teeth. **Ray florets** (20)25–35, the corollas lavender to deep purple (rarely white), 10–15 mm long, glabrous or nearly so. **Disk florets** 30–40 (or more), the corollas narrowly funnelform to nearly tubular, 4.5–6 mm long, glabrous or nearly so, the limb weakly delimited, deep yellow before anthesis aging to reddish purple, the lobe/limb fraction 0.18–0.2, the tube ca half as long as the limb. **Pappus** simple, the bristles somewhat shorter than the disk corolla, tawny or commonly rose-tinged, soft, slender, and attenuate. **Achenes** fusiform or obovoid, often slightly falcate, 2–2.5 mm long, 0.5–0.8 mm across, dull purple at maturity or brown when weathered, strigillose or sericeous, with 7–10(11) straw-colored ribs. $2n = 10, 20$.

Late August–October. Dry sandy, loamy, or rocky soils in mostly open habitats: dunes, hill prairies, open-wooded bluffs, and sandstone or calcareous cliffs. Locally abundant in uplands associated with larger rivers. The range of the species extends from PA south to AL, west to w. ND, s.e. CO, n.e. NM, and n.e. TX.

Most if not all the plants in Illinois belong in typical var. *oblongifolius* [including *Aster oblongifolius* var. *angustatus* Shinners (1941)—Gleason 1952; Gleason and Cronquist 1963; Steyermark 1963]. Occasional plants seem to verge toward the southwestern var. *rigidulus* A. Gray [*A. Kumleini* (sic) Fries ex A. Gray (1884), pro syn.], which is distinct by being comparatively low-stemmed with numerous firm, relatively small leaves and by having a notably fastigiate branching habit.

16. *Aster ontarionis* Wieg.
Ontario Aster



Herbaceous, with a creeping horizontal rhizome system. **New shoots** initiated at the tips of stoloniform rhizomes, the plants forming colonies but the connecting strands short-lived and mostly disintegrating after one or two seasons. **Stems** single (rarely 2 or 3) at any point of emergence, 40–120 cm tall, erect, with ascending or divaricate branches from near or below the middle and also in midsummer with short secondary shoots composed of smaller leaves plus a few heads arising from the leaf axils, the indument villous or hirsute, uniformly distributed on the branches, often in decurrent lines in the middle portion of the stem, the lower portion glabrescent. **Leaves** polymorphic; vernal rosette leaves with spatulate to oblanceolate-obovate blades, sometimes purplish below, minutely puberulent or rarely glabrous on both surfaces, the apex acute to rounded, the margins crenate-serrate, abruptly narrowed to a winged, ciliate, somewhat sheathing subpetiolar base; principal cauline leaves usually persistent throughout the flowering period, sessile or subsessile, oblanceolate or elliptic-lanceolate, 2–8(12) cm long and 0.5–3.5 cm wide, gradually reduced in size upward on the stem, with several pairs of anastomosing secondary nerves, and with a weakly expressed reticulum of tertiary veins with oblong areolae, scabrellous above, softly (often minutely) puberulent over the entire lower surface, and sometimes densely villous along the midrib below, the apex acute or acuminate to short-attenuate, usually callus-pointed, the margins crenate-serrate and ciliolate, the base cuneate and somewhat decurrent; rameal leaves similar in contour and vestiture but entire and notably unequal in size, those subtending the

head 1–few, linear-lanceolate, 1–3 mm long, flexible, not phyllarylike. **Capitulescence** an often ample, diffuse or elongate panicle above the middle of the stem, the head-bearing branchlets ascending or spreading but not strongly arching and typically not racemiform. **Flowering heads** 0.8–1.5 cm in diameter when the rays are fully extended, often crowded but typically not secund, subsessile or on peduncles 0.2–1(2) cm in length. **Involucre** campanulate (turbinate when pressed and dried), 3–4.5(5) mm high, the phyllaries imbricated in 3–5 series. **Phyllaries** appressed or somewhat spreading, strongly graduated, the outer ones 1–2 mm long, less than half as long as the inner, slenderly linear, the median ones somewhat expanded toward the tip, the green areoles linear-oblanceolate, often extending to the base, both surfaces slightly puberulent, the apex acute or acuminate and callus-pointed, the margins irregularly ciliolate, hyaline, and with a scarious rim extending to the tip; innermost phyllaries glabrous, very slender and attenuate. **Receptacle** alveolate with sharp teeth. **Ray florets** 15–25, the corollas 4–8 mm long, white, glabrous or nearly so. **Disk florets** 12–20 (or more), the corollas funnelform, (2.5)3–4.5 mm long, glabrous, the limb strongly flared, cream-colored or light yellow before anthesis turning magenta or purple, the lobes long and reflexed, the lobe/limb fraction 0.5–0.6, the slender tube slightly shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, whitish, soft, slender, and attenuate. **Achenes** oblong-obovoid, plump or slightly compressed, 1.2–1.8(2) mm long, 0.4–0.6 mm across, gray, strigillose, and often puncticulate (caused by the pustulate trichome bases), with 3–5 ribs. $2n = 32$. [*A. missouriensis* Britton in Britton & Brown non (Nutt.) Kuntze, including var. *thyrsoides* (A. Gray) Wieg.—Deam 1940. *A. lateriflorus* var. *hirsuticaulis* misapplied, not of (Lindley) Porter—Pepoon 1927, at least in part. *A. pantotrichus* S.F. Blake (see Shinners 1949)—G.N. Jones 1945.]

September–October. Moist ground habitats: river bottoms, creek margins, bogs, and marshes, frequently in wooded areas. Common throughout the state. The species range extends in the East from s.w. PQ, s.w. ON, and NY south to AL, and at the western limit from MN and n.e. SD through e. NE and s.e. KS to e. TX and n. LA.

Some of the specimens examined suggest intergradation with other species that share the basic chromosome number of $x = 8$, e.g., *Aster fragilis*, *A. lanceolatus*, and *A. lateriflorus*. A considerable number of herbarium specimens have been misidentified as *A. lateriflorus*. If rhizomes are lacking, the two species are sometimes not readily distinguishable.

17. *Aster oolentangiensis* Riddell
Sky-blue Aster, Azure Aster

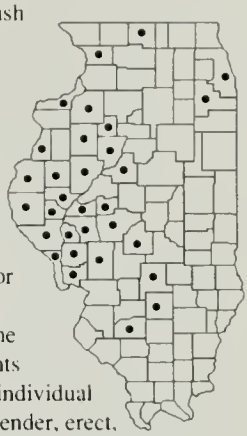
Herbaceous, with short horizontal rhizomes or a branched-caudiciform system. **New shoots** arising at the base of old stems or from rhizome branches, the plants forming scattered individual clumps. **Stems** 1–several, erect, (30)60–100 cm tall, typically with stiff, ascending branches above the middle, nearly glabrous or with hispidulous lines in the leaf axils and along decurrent leaf bases, the head-bearing branchlets slightly ridged, often uniformly scabrous-puberulent. **Leaves** polymorphic, the basal and lower cauline ones petiolate, commonly persistent throughout the flowering period; blades of basal rosette and larger cauline leaves ovate to ovate-lanceolate, 4–15(18) cm long and 1–4(6) cm wide, with 2–several pairs of anastomosing secondary nerves, and a reticulum of tertiary veins with more or less isodiametric areolae, the upper surface scabrous, the lower softly hirsute, the apex acute to acuminate, the margins subentire to shallowly serrate, the base rounded, cordate, or truncate, the petioles twice as long (or more) as the blades, slightly winged, ciliate, dilated toward the sheathing base; leaves of the midstem subpetiolate or sessile, ovate-lanceolate (in Illinois plants), gradually or somewhat abruptly reduced, acute or attenuate, and callus-pointed, the margins entire and scabrous, the base cuneate and somewhat decurrent; rameal leaves abruptly reduced in size, linear-lanceolate or subulate, appressed or closely ascending, those of the peduncles bracteiform, densely spaced, 1.5–3(4) mm long, scabrous-margined, intergrading with the phyllaries. **Capitulescence** typically a narrow thyrsiform panicle in the upper

1/4–1/2 portion of the stem, the branches ascending, sometimes racemiform. **Flowering heads** 1.5–2 cm in diameter when the rays are fully extended, sometimes secund, the peduncles variable in length to 6 cm, densely bracteate. **Involucre** cylindric to campanulate (often turbinate when pressed and dried), 5–7 mm high, the phyllaries imbricated in 4 or 5(6) series. **Phyllaries** strongly graduated, appressed or those of the outer series slightly spreading, glabrous, the outer ones 1.5–2 mm long, less than half as long as the inner, linear-lanceolate to subulate, the median and inner ones linear or often slightly expanded toward the apex, the apical green areoles rhombic, usually shorter than the indurate, scarious basal portion of the phyllaries, the apex sharply acute, acuminate, or obtuse, and mucronulate, the margins erose-hyaline and somewhat ciliolate. **Receptacle** alveolate with sharp teeth. **Ray florets** (12)15–20, the corollas 8–12(14) mm long, commonly blue or violet-purple (rarely white), glabrous. **Disk florets** 15–25 (or more), the corollas narrowly funnelform, 4–4.5 mm long, glabrous, the limb light yellow turning deep purple after anthesis, the lobe/limb fraction 0.2–0.25, the tube considerably shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, cream-colored or slightly rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, somewhat compressed, 1.8–2 mm long and less than 1 mm across, dull purple, or straw-colored with purple streaks, glabrous or nearly so, with 4 or 5 ribs. $2n = 32$; reported chromosome counts of $2n = 36$ (under the name *A. azureus*) are probably in error (A. G. Jones 1977). [*A. azureus* Lindley in Hooker—most authors prior to this publication (see A.G. Jones 1983).]

August–October. Dry sandy, loamy, or rocky soils in relatively open or unshaded situations: prairie remnants, open woods, bluffs, dunes, and barrens. Locally common throughout the state. The species range extends from s. ON and w. NY west to MN and e. SD and south through the central states to n.c. FL, LA, and n. TX.

Plants in Illinois belong in typical var. *oolentangiensis* (cf. A.G. Jones 1983). There is some suggestion of intergradation with and gene flow from other species that share the basic chromosome number of $x = 8$, e.g., *Aster drummondii* and *A. laevis*.

18. *Aster parviceps* (Burgess in Britton & Brown) Mack. & Bush
Small-headed Aster



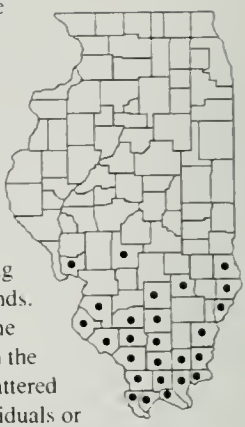
Short-lived herbaceous perennial with a caudiciform rhizome. **New shoots** originating at the base of old stems or often from root sprouts produced in autumn of the previous season, the plants forming small scattered individual clumps. **Stems** 1–few, slender, erect, 20–70(90) cm tall, with ascending branches in the upper 1/3–1/2 portion, variably pilose to hirsute, the indument uniformly distributed or sometimes in decurrent lines from the leaf bases, the lower stem glabrescent. **Leaves** polymorphic, the basal and larger ones commonly withered and deciduous at flowering time; basal rosette leaves subpetiolate, oblanceolate or spatulate, 1–4 cm long and 3–7 mm wide, with weakly expressed anastomosing secondary nerves, glabrous or sparsely pubescent, and often purplish on the lower surface, the apex obtuse and bristle-tipped, the base sheathing; cauline leaves sessile, often with clusters of smaller leaves in the axils, those of the midstem linear-oblanceolate to lanceolate, 4–8 cm long and 2–5 mm wide, thinly pilose above, puberulent to hirsute below or sometimes nearly glabrous, the apex acute to attenuate and usually armed with a hyaline bristle, the margins entire or shallowly serrate, ciliolate; rameal leaves copious, mostly subulate and spinulose, those of the peduncles bracteiform, appressed or ascending, 2–4 mm long, scabrous-margined, intergrading with the phyllaries. **Capitulescence** a narrow panicle, with a pyramidal or flat top, in the upper 1/4–1/2 portion of the stem, the branches ascending or sometimes arching, typically racemiform. **Flowering heads** small, 7–10 mm in diameter when the rays are fully extended, secund, the peduncles densely bracteate, 0.3–2(4) cm long. **Involucre** cylindric to narrowly campanulate (turbinate when pressed and dried), 3–4.5 mm high, the phyllaries imbricated in 3–5 series. **Phyllaries** graduated, appressed when fresh, glabrous, the apical green areoles lance-rhombic; outer phyllaries subulate, 1.5–2 mm long, ca half

as long as the inner; median and inner phyllaries linear-lanceolate, attenuate or acuminate with marginally inrolled spinulose tips, the margins erose-hyaline and commonly slightly ciliolate, the basal $^1/_2$–$^3/_4$ portion scarious. **Receptacle** alveolate with sharp teeth. **Ray florets** 10–16(18), the corollas ca 5 mm long, white, glabrous. **Disk florets** 8–10(15), the corollas narrowly funnelform, (2)2.5–3 mm long, glabrous, the limb light yellow turning purple after anthesis, the lobe/limb fraction 0.25, the tube shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, white, soft, slender, and attenuate. **Achenes** oblong, plump, 0.8–1.5 mm long and 0.4–0.6 mm across, whitish or gray, puberulent, obscurely 2–4 ribbed. $2n = 16, 32$. [*A. tenuifolius* misapplied, not of L.—Mead 1846. *A. pilosus* Willd. subsp. *parviceps* (Burgess in Britton & Brown) A.G. Jones (1984).]

August–October. Sandy or loamy soils in mostly unshaded habitats: barrens, hill prairies, rarely in somewhat disturbed ground that still supports prairie vegetation. Not common; mostly occurring in the western half of the state but also recorded from Cook and Will counties. As delimited herein [i.e., not including *Aster depauperatus* (Porter) Fern.], the species range extends from IA and IL south to MO, n. AR, and s.e. KS, with one station recorded from n.e. OK.

Aster parviceps is very closely related to *A. pilosus* and was originally described as a variety of that species (under the name *A. ericoides parviceps* Burgess in Britton & Brown). For the time being and pending further study, I have reversed my decision (1984) to combine the two species, mainly because their habitats and reproductive vigor are strikingly different. Furthermore, there seems to be a difference in the predominant ploidy levels. Based on $x = 8$ chromosomes, plants of *A. parviceps* are recorded as being mostly diploid or sometimes tetraploid (Semple and Chmielewski 1985), whereas those of *A. pilosus* are generally hexaploid, at least in my experience.

19. ***Aster patens*** Aiton
Spreading Aster. Late Purple Aster



Herbaceous, with a branched-caudiciform, often tangled or sometimes cormoid rhizome system, but also producing stoloniform rhizome strands. **New shoots** initiated at the base of old stems or from the rhizomes, resulting in scattered 1–several stemmed individuals or small patches. **Stems** erect, brittle, often stout, 50–100(120) cm tall, with stiff divaricate or ascending branches above the middle, the indument uniformly distributed around the stem, variously scabrous-hirsute to cinereous-puberulent, or villous on the branches and peduncles. **Leaves** polymorphic, the basal and lower cauline ones withered and deciduous at flowering time; basal rosette leaves spatulate, rugose, with 1–4 pairs of arching and anastomosing secondary nerves, variously scabrous-hirsute, the apex acute to rounded, the margins entire or often with a few teeth, the narrowed subpetiolar base winged and sheathing; principal cauline leaves ovate-lanceolate to oblanceolate, rarely spatulate, often constricted above the strongly auriculate-clasping base, 2–6(10) cm long and 1–2(2.5) cm wide, grayish green, rugulose on both surfaces, with usually pinnate and anastomosing secondary nerves, and a reticulum of tertiary veins with isodiametric areolae, variously pubescent, more densely so along the midrib below, the apex acute or obtuse and with a short mucro, the margins entire or appearing minutely denticulate from the pulvinate bases of coarse scabrous cilia; rameal leaves abruptly reduced in size, those of the peduncles bracteiform, 1–3(5) mm long, appressed or sometimes squarrose, intergrading with the phyllaries. **Capitulescence** an open, divaricately branched panicle. **Flowering heads** 2–3.5 cm in diameter when the rays are fully extended, not crowded and not secund, typically at the ends of stiffly ascending or spreading, densely bracteate peduncles 2–10(15) cm in length. **Involucre** campanulate to turbinate, 5–8(10) mm high, the phyllaries imbricated in

5–8 series. **Phyllaries** strongly graduated, linear to ovate-lanceolate, appressed or often slightly recurved-spreading, strigillose or cinereous-puberulent on the abaxial surface and near the tip on the adaxial surface, the apical portion also frequently invested with both sessile and short-stipitate glands; outer phyllaries 1.5–2.5 mm, the inner (4)6–7 mm long; median phyllaries acute or acuminate to obtuse, the chlorophyllous areoles grayish green, rhombic-oblanceolate, poorly delimited in the apical (1/4)1/3–1/2 portion, mostly shorter than the scarious basal portion. **Receptacle** shallowly alveolate with sharp or rounded teeth. **Ray florets** (12)15–25 (or more), the corollas typically blue or deep purple (rarely white), 10–15(17) mm long, glabrous or with a few scattered trichomes. **Disk florets** 20–50, the corollas narrowly funnelform, 4.5–6 mm long, glabrous or nearly so, the limb light yellow turning purple after anthesis, the lobe/limb fraction 0.18–0.2, the tube shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla or slightly shorter, tawny, soft, and attenuate. **Achenes** oblong-obovoid or fusiform, plump, 2.5–3.5 mm long and 0.8–1.2 mm across, dull purple or brown, sericeous or strigillose, with 7–10 ribs. $2n = 10$, 20 (Illinois plants). Including *A. patentissimus* Lindley in Hooker (see R.L. Jones 1983).

September–October. Dry sandy or rocky soils; edges of Ozarkian forest lands, open-wooded bluffs, sandstone and limestone ridges; also in disturbed soils of clearings and old fields. Occasional in the southern one-third of the state, north to Jersey, Montgomery, and Crawford counties. The range of the species extends from New England to n. FL, west to s. IL, s. and c. MO, s.e. KS, and the eastern half of OK and TX.

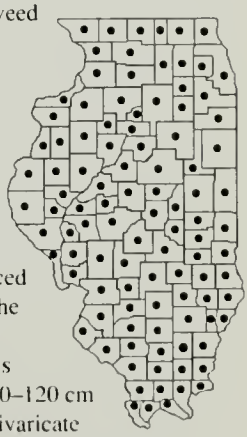
Two sympatric varieties have been recorded from Illinois with approximately equal frequency, var. *patens* and var. *patentissimus* (Lindley in Hooker) Torrey & Gray. The taxa intergrade freely but may be distinguished as follows:

1. Involucre 8–10 mm high, broadly campanulate or turbinate; median phyllaries ovate-lanceolate, 1.2–1.5 mm in width, obtuse, appressed, copiously cinereous-strigillose on the back, not conspicuously glandular, or toward the apex with minute sessile glands that are obscured by the indument .... var. *patentissimus*

1. Involucre usually less than 8 mm high, slenderly campanulate or turbinate; median phyllaries linear-lanceolate, mostly less than 1.2 mm in width, acute or acuminate, somewhat recurved-spreading, sparsely strigillose on the back mainly along the midrib, conspicuously glandular with both sessile and short-stipitate glands ....var. *patens*

The var. *patentissimus* was originally described (as *Aster patentissimus*) from a Missouri collection and is, according to Steyermark (1963), the more common form of *A. patens* in the Ozarks. Plants of typical var. *patens* are more prevalent to the east. Occasional herbarium collections seem to verge morphologically toward the small-leaved and slender-stemmed southern var. *gracilis* Hooker. However, plants of the latter variety are largely diploid [$2n = 2x = 10$], and that ploidy level has not been recorded for Illinois collections (A.G. Jones 1980b; R.L. Jones 1983). Specimens forming the basis for records from the Chicago region (Higley and Raddin 1891; Pepoon 1927), including *A. patens* [var.] *phlogifolius* sensu Higley &Raddin and Pepoon non (Muhl. ex Willd.) Nees, do not belong in this species.

20. *Aster pilosus* Willd.
Hairy Aster, Frost-weed Aster



Herbaceous, with a caudiciform rhizome. **New shoots** arising at the base of old stems or from root sprouts produced in the previous season, the plants forming scattered individual clumps. **Stems** 1–several, stout, erect, 30–120 cm tall, with ascending or divaricate branches from near or below the middle, variously pilose to hirsute, the indument in decurrent lines from the nodes or often uniformly distributed, sometimes the stems glabrous or nearly so. **Leaves** polymorphic, the basal and larger cauline ones commonly withered and deciduous at flowering time; rosette leaves

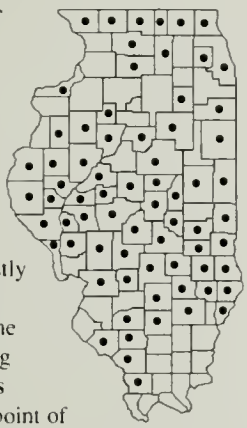
spatulate, the blade 1–6 cm long and 0.5–1.5 cm wide, abruptly narrowed to a winged subpetiolar portion, with 1 or 2 pairs of secondary nerves arching toward the apex, glabrous, or the lower surface thinly pilose along the midrib and often purplish, the apex rounded or obtuse, the margins softly ciliate or scabrous and often shallowly serrate, the base sheathing; cauline leaves sessile or subsessile, often with clusters of smaller leaves in the axils, the principal ones elliptic-oblanceolate to linear-lanceolate, 4–12 cm long and 0.5–2.5 cm wide, gradually reduced in size upward on the stem, with a prominent midrib and 1–several pairs of anastomosing secondary nerves, glabrous to variously pilose or hirsute (more so along the nerves below), the apex attenuate and usually armed with a hyaline spinule, the margins serrate or often entire, softly ciliate, the base cuneate, somewhat sheathing and decurrent; rameal leaves copious, subulate, those of the peduncles bracteiform, often densely spaced, appressed to ascending or sometimes spreading, 3–6(10) mm long, ciliolate, more or less intergrading with the phyllaries. **Capitulescence** an ample, leafy, usually diffuse paniele, the branches commonly racemiform. **Flowering heads** 1.5–2(2.5) cm in diameter when the rays are fully extended, often crowded and secund, subsessile, or on densely bracteate peduncles 0.5–3(5) cm in length. **Involucre** campanulate or broadly urceolate (i.e., somewhat constricted below the slightly recurved phyllary tips), 3.5–5(6) mm high, the phyllaries imbricated in 4 or 5 series. **Phyllaries** commonly at least somewhat graduated (rarely subequal in length), appressed or slightly spreading, glabrous except for a few marginal cilia near the apex; outer phyllaries subulate, 2–3(4) mm long, sometimes largely herbaceous, the median and inner ones linear-oblanceolate, 3–5(5.5) mm long, with broadly rhombic to lance-rhombic green areoles in the apical $^1/_4$–$^1/_2$ portion, the scarious basal portion somewhat indurate and rounded on the back, the apex with sharply acute or marginally inrolled acuminate tips, spinulose, the margins erose-hyaline. **Receptacle** shallowly alveolate with sharp teeth. **Ray florets** 15–30, the corollas 7–9(10) mm long, white (rarely pink), glabrous. **Disk florets** 30–40 (or more), the corollas narrowly funnelform, (3)3.5–4.5 mm long, glabrous or nearly so, the limb cream-colored or light yellow turning lavender or reddish purple after anthesis, the lobe/limb fraction 0.25–0.3, the tube much shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, white, soft, slender, and attenuate. **Achenes** oblong, plump, 1–1.5 mm long and 0.5–0.7 mm across, whitish or gray, minutely puberulent, and obscurely 2–4 ribbed. $2n = 32, 40$ (rarely), 48 (mostly). Including *A. pringlei* (A. Gray) Britton in Britton & Brown. [*A. ericoides* misapplied, not of L.—Brendel 1887; Higley and Raddin 1891; Pepoon 1927; Benke 1928; Kibbe 1952, in part. *A. villosus* Michaux non Thunb. *A. ericoides* var. *villosus* (Michaux) Torrey & Gray—Higley and Raddin 1891; Pepoon 1927; Benke 1928. *A. polyphyllus* Willd. non Moench—Higley and Raddin 1891; Pepoon 1927.]

August–October. Disturbed ground in mostly unshaded habitats: roadsides, railroad rights-of-way, open woods, and pastures. Very common, weedy, recorded from every county. The range extends from s. PQ and s. ON south to GA and n. FL and at the western limit from e. SD through e. NE, e. KS, and e. OK to LA.

Several varieties of *Aster pilosus* recognized in widely circulated floristic manuals (e.g., Deam 1940; Fernald 1950; Gleason 1952; Gleason and Cronquist 1963; Steyermark 1963; and Cronquist 1980) occur in Illinois: 1) var. *pilosus*, 2) var. *platyphyllus* (Torrey & Gray) S.F. Blake [*A. ericoides* var. *platyphyllus* Torrey & Gray—Pepoon 1927], 3) var. *demotus* S.F. Blake, and 4) var. *pringlei* (A. Gray) S.F. Blake [*A. ericoides* var. *pringlei* A. Gray (1884). *A. pringlei*—Jones and Fuller 1955; G.N. Jones 1963; Mohlenbrock 1986]. The type collection for *A. pilosus* (*sensu stricto*, i.e., for var. *pilosus*) is from Illinois (Jones and Hiepko 1981); it was originally named by Michaux and is also the type for *A. villosus* (Jones and Lowry 1986). The relatively broad-leaved, densely villous to pilose plants of var. *platyphyllus* (accepted by Deam 1940; Dobbs 1963; Steyermark 1963) can be, in my opinion, produced under the influence of certain environmental conditions. For the most part, they fit quite well in typical var. *pilosus*, a view also taken by others (A. Gray 1884; Gleason 1952; Gleason and Cronquist 1963; Cronquist 1980). Recent studies suggest that vars. *pringlei* and *demotus* perhaps should be combined under the former name (Semple and Chmielewski 1985; see also Mohlenbrock 1975). My own observations tend to support this concept (including here also *A. polyphyllus*). The variety is characterized as being nearly glabrous and having relatively

narrow leaves; these plants are fairly common throughout the state. When taken in the narrow sense, however, var. *pringlei* is restricted in Illinois to Lake County (Swink 1974; Mohlenbrock and Ladd 1978; Swink and Wilhelm 1979). A great deal of intergradation between the above varieties can be found in herbarium specimens and observed in the field. I have not attempted, therefore, to elaborate on keys in the literature dealing with varieties of this variable species (see Deam 1940; Fernald 1950; Gleason 1952; Gleason and Cronquist 1963; Steyermark 1963; and Cronquist 1980).

21. ***Aster praealtus*** Poir.
Willow-leaved Aster,
Willow Aster



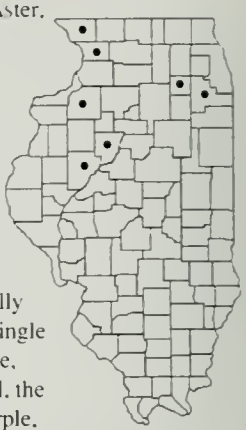
Herbaceous, with a strongly creeping rhizome system, the connecting strands often persistent for several seasons. **New shoots** mostly originating at the tips of fleshy stoloniform rhizome strands, the plants forming extensive colonies. **Stems** commonly single at any point of emergence, stout, erect, sometimes slightly reddish or glaucous, (40)60–150 cm tall, with ascending branches above the middle, variously hispidulous to hirsute, the indument in decurrent lines from the nodes or sometimes uniformly distributed around the stem, especially on the branchlets, the lower stem portion glabrescent. **Leaves** polymorphic, the basal and lower cauline ones commonly withered and deciduous at flowering time; basal rosette leaves fleshy, spatulate, 4–7 cm long and 1–2.5 cm wide, deep green above and often purplish below, with several pairs of anastomosing secondary nerves, minutely scabrous above, glabrous below, the apex rounded, the margins entire or shallowly serrate, ciliate on the narrowed subpetiolar portion, the base dilated and sheathing; principal cauline leaves firm, sessile, elliptic to linear-lanceolate, 4–12(15) cm long and 0.3–1.5 cm wide, gradually reduced in size upward on the stem, rugulose, with indistinct secondary nerves but a conspicuous reticulum of brownish tertiary veins (notable on the lower surface), enclosing isodiametric areolae, the upper surface commonly scabrous at least near the margins, sometimes strongly so, rarely glabrous, the lower surface mostly glabrous (in Illinois plants) or sometimes puberulent, the apex acute to attenuate with a sharp callus point, the margins frequently inrolled, entire or shallowly serrate, and scabrous, the base gradually tapered, often slightly rounded, decurrent; leaves of the upper stem and branches usually with clusters of smaller leaves (plus a few heads) in the axils, therefore numerous and notably unequal in size, oval to linear-lanceolate, acute or obtuse, callus-pointed, scabrous-margined; leaves of the peduncles relatively few, similar in contour, ascending or recurved-spreading, (2)4–10 mm long, flexible, not intergrading with the phyllaries but often closely subtending the head. **Capitulescence** a mostly ample, leafy, slenderly thyrsiform or broadly diffuse panicle in the terminal ¼–½ stem portion, the head-bearing branchlets rarely racemiform. **Flowering heads** 1.5–2(2.5) cm in diameter when the rays are fully extended, usually not secund, on peduncles 0.3–2 cm (or more) in length. **Involucre** campanulate, (4)5–7(8) mm high, the phyllaries imbricated in 4 or 5(6) series. **Phyllaries** appressed or with slightly recurved tips, at least somewhat or often strongly graduated, the outer ones 2–3(3.5) mm, the inner (4)5–6.5 mm long; outer and median phyllaries oblanceolate, somewhat constricted above a slightly dilated base, the green areoles oblanceolate or lance-rhombic, or sometimes the outer phyllaries largely herbaceous, the abaxial surface glabrous, the adaxial surface sparsely puberulent, the apex acute to acuminate and often with a reddish callus point, the margins ciliolate, erose-hyaline, and with a narrow scarious rim extending nearly to the tip, the basal ½–¾ portion scarious; innermost phyllaries very slender, linear, with linear-oblanceolate, light green areoles, the apex acuminate or attenuate. **Receptacle** alveolate with sharp teeth. **Ray florets** (15)20–30 (or more), the corollas 7–10(12) mm long, typically lavender to rose-purple (rarely white), glabrous. **Disk florets** 25–35 (or more), the corollas tubular or narrowly funnelform, 4–6.5 mm long, the limb cream-colored or light yellow turning purple after anthesis, the lobe/limb fraction 0.18–0.2, the tube much shorter than the limb. **Pappus** simple, the bristles often slightly longer

than the disk corolla, whitish, soft, slender, and attenuate. **Achenes** oblong-obovoid, plump or slightly compressed, 1.5–2 mm long and 0.5–0.8 mm across, purple, or straw-colored with purple streaks, thinly strigillose, with 4 or 5 ribs. $2n$ = 32. Including *A. subasper* Lindley in Hooker (see Wiegand 1933). [*A. salicifolius* Aiton and sensu auct. non Lam.—Brendel 1887; Higley and Raddin 1891; Pepoon 1927; G.N. Jones 1945, 1950; Fell 1955. *A. carneus* misapplied, not of Nees—Mead 1846, and many herbarium sheets so labelled.]

September–October. Low moist or swampy ground; woods, thickets, meadows, banks of streams and rivers, ditch margins, and lakeshores. Common throughout the state. The range of the species extends in the eastern half from ON, MI, and PA to n. FL and in the western half from s. MB through ND, SD, NE, and OK to TX and n. Mexico.

The plants are variable, but attempts to distinguish the varieties that have been described (Wiegand 1933) are not very successful. The reason is a high degree of morphological intergradation and an apparent lack of convincing geographic range separation. The majority of Illinois collections can be identified with typical var. *praealtus* [including var. *angustior* Wieg., pro parte (and in the sense of some authors and collectors)—Deam 1940; Steyermark 1963]. The var. *subasper* (Lindley in Hooker) Wieg., originally described (as *Aster subasper*) from the St. Louis area, has been recognized by several authors (Deam 1940; Steyermark 1963; Swink 1974; Swink and Wilhelm 1979). Plants of this variety are fairly common; they are more readily identifiable by their copiously scabrous leaves and stems than by the characters used to define the taxon in the keys of Deam (1940) and Steyermark (1963), namely cauline leaves that are relatively short and elliptic, and rameal leaves that are mostly oval and obtuse. Good evidence exists of occasional hybridization and intergradation with *A. lanceolatus* [e.g., *V. H. Chase 137* (F) from Stark Co., *Evers 109660* (ILLS) from Johnson Co., *A.G. Jones 4616* (ILL) from De Witt Co.] and with *A. puniceus* var. *firmus* (Nees) Torrey & Gray [e.g., *Winterringer 16261* (ISM) from Cook Co., *Wolf 170* (F) from Fulton Co., *Wade & Wade 2383* (F) from Ogle Co., and others].

22. *Aster prenanthoides* Muhl. ex Willd.
Crooked-stemmed Aster,
Crooked Aster

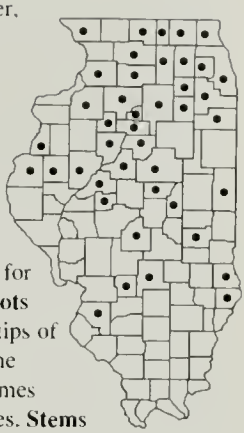


Herbaceous, with a creeping rhizome system. **New shoots** produced at the tips of stoloniform rhizome strands, the plants typically colonial. **Stems** mostly single at any point of emergence, erect, (40)60–120 cm tall, the older ones often dark purple, branched near or commonly above the middle, the branches zigzag, somewhat angled in cross section from decurrent leaf bases, villous or hirsute in decurrent lines, the indument sometimes uniformly distributed on the peduncles, the lower portion of the stem glabrescent or glabrous. **Leaves** polymorphic, those of the basal rosettes subpetiolate, the blades obovate to oblanceolate, 1.5–7 cm long and 1–2 cm wide, with several pairs of anastomosing secondary nerves, scabrellous above or glabrous on both surfaces, acute or obtuse, crenate to crenate-serrate, abruptly narrowed to a slender or slightly winged petiolelike portion, with long marginal cilia and an often reddish, dilated, sheathing base; principal cauline leaves mostly persistent throughout the flowering period, subsessile or sessile, oblanceolate in outline but abruptly and strongly contracted near or below the middle, 8–16(20) cm long and 1.5–5.5 cm wide, gradually reduced in size upward on the stem, the blades with 6–10 (or more) pairs of anastomosing secondary nerves; nerves in the wider, apical portion pinnate, those in the narrower, basal portion running parallel to the midrib, the reticulum of tertiary veins weakly expressed with irregular areolae, the upper surface scabrellous, the lower minutely strigillose or glabrous but commonly hispidulous or villous along the midrib, the apex long-acuminate with a callus point, the margins sharply serrate, with callus-pointed teeth on the wider blade portion but commonly entire on the narrowed portion, the base dilated and strongly auriculate-clasping, the midrib extended on the stem as a decurrent ridge;

rameal leaves similar in most aspects but often only slightly contracted near the middle, glabrous or nearly so, the margins less sharply toothed or often entire, the base sessile and clasping; leaves of the peduncles relatively few, lanceolate, 3–12 mm long, not intergrading with the phyllaries. **Capitulescence** a broad, flat- or round-topped, dichotomously branched panicle in the upper $^1/_4$–$^1/_2$ portion of the stem, the branches slender, sometimes purplish. **Flowering heads** (1.8)2–2.5 cm in diameter when the rays are fully extended, not crowded and not secund, on slender peduncles 1–4 cm in length. **Involucre** campanulate or hemispheric, 5–6 mm high, the phyllaries imbricated in 4 or 5(6) series. **Phyllaries** often only slightly graduated, flexible, with recurved or sometimes reflexed tips, the outer ones mostly lanceolate and slightly constricted near the middle, 2.5–4 mm long, the inner and median ones linear-oblanceolate, 4–5 mm long, the green areoles linear-oblanceolate, or sometimes the outer phyllaries largely herbaceous, the abaxial surface glabrous, the adaxial surface slightly puberulent, the apex acute and callus-pointed, the margins irregularly ciliolate, erose-hyaline, and with a narrow scarious rim extending nearly to the tip, the basal $^1/_3$–$^1/_2$ portion scarious. **Receptacle** alveolate with blunt teeth. **Ray florets** 18–25 (or more), the corollas 10–15 mm long, typically lavender or bluish (rarely white), glabrous. **Disk florets** 20–25 (or more), the corollas funnelform, (3.5)4–5 mm long, often thinly puberulent near the throat, the limb cream-colored or light yellow turning purple after anthesis at least in the lobes, the lobe/limb fraction 0.2–0.25, the tube slightly shorter than the limb. **Pappus** simple, the bristles as long as or slightly shorter than the disk corolla, somewhat discolored, soft, slender, and attenuate. **Achenes** cylindric-oblanceolate or obovoid, slightly compressed, 2–3(3.5) mm long and 0.5–0.8 mm across, dull purple or straw-colored, thinly strigillose, 4- or 5-ribbed. $2n = 32$ (mostly), 48.

Late August–October. Moist or swampy ground; woods, thickets, meadows, seeps, and stream banks. Occasional, recorded by me from only seven counties in Illinois, much more common to the east. The range of the species extends from s. ON, NY, and PA south to NC and TN and west to MN and IA.

23. ***Aster puniceus*** L.
Purple-stemmed Aster,
Red-stemmed Aster,
Swamp Aster



Herbaceous, with a horizontal, short or often strongly creeping rhizome system, the connecting strands persistent for several seasons. **New shoots** mostly originating at the tips of fleshy stoloniform rhizome strands, the plants sometimes forming extensive colonies. **Stems** mostly single at any point of emergence, stout, erect, commonly purplish or maroon-colored, 50–150(180) cm tall, with ascending or divaricate branches in the upper half, variously hirsute to hispidulous (or both) in decurrent lines from the nodes, or the indument nearly uniformly distributed around the stem, the basal portion sometimes coarsely hispid. **Leaves** polymorphic, the basal and lower cauline ones commonly withered and deciduous at flowering time, but the head-bearing branchlets often very leafy (var. *firmus*); basal rosette leaves spatulate or oblanceolate, 3–10 cm (or more) long and 0.3–2 cm (or more) wide, dark green and somewhat rugulose above, often purplish below, the venation and vestiture similar to that of the principal leaves, the apex acute to rounded, the margins remotely crenate-serrate to subentire, the lower subpetiolar portion of the blade winged, dilated, and sheathing at the base; principal cauline leaves variable, firm, sessile, (6)10–15(20) cm long and (1)2–5 cm wide, gradually reduced in size upward on the stem, with several pairs of pinnate and anastomosing secondary nerves, and a reticulum of tertiary veins with isodiametric or oblong areolae, the upper surface scabrous or glabrous, often glossy (resulting from the presence of bulliform epidermal cells), the lower surface glabrous or minutely strigillose and often with scabrous, hispidulous, or villous indument along the midrib, the apex acute, acuminate, or attenuate, with a callus point, the margins shallowly serrate to subentire, the base typically clasping, often strongly auricled in the lower leaves, sometimes merely rounded and decurrent in those higher up

on the stem; rameal leaves often numerous, elliptic-lanceolate to linear-lanceolate, gradually reduced, acute to attenuate, callus-pointed, the vestiture similar to that of the larger leaves, the margins subentire to entire and often inrolled, the midrib and larger nerves commonly extending downward on the stem as decurrent or almost winged ridges; leaves of the peduncles relatively few, 0.5–2 cm long, flexible, somewhat constricted above a dilated base, often closely subtending the head and appearing to be a part of the involucre, but rarely bracteiform. **Capitulescence** an often ample, leafy, broad, round- or flat-topped, more or less dichotomously branched panicle in the upper ¼–½ stem portion, the branches ascending or divaricate. **Flowering heads** 1.5–3.5(4) cm in diameter when the rays are fully extended, typically not secund, subsessile and overtopped by the subtending rameal leaves, or often on densely hirsute to villous peduncles 0.2–3 cm (or more) in length. **Involucre** campanulate, (6)8–12(15) mm high, the phyllaries imbricated in 4–6 series. **Phyllaries** typically not or only somewhat graduated, 6–10(15) mm long, flexible, leaflike, the outer ones often appreciably longer than the inner and largely herbaceous; phyllaries of the 2nd and 3rd series inward lanceolate to linear-oblanceolate, often spreading or reflexed, somewhat constricted above a slightly dilated base, glabrous (rarely slightly scabrous) on the abaxial surface and thinly puberulent on the adaxial surface, the apex attenuate or acute to obtuse (depending on the variety), and callus-pointed, the margins irregularly ciliolate or lanate, the scarious basal portion typically much smaller than the green portion and often indurate or slightly keeled; innermost phyllaries very slender, linear, with linear-oblanceolate, light green areoles in the apical ½–⅔ portion, the margins erose-hyaline and with a scarious rim. **Receptacle** alveolate with sharp teeth. **Ray florets** 20–40 (or more), the corollas 12–18(20) mm long, lavender to deep bluish purple (rarely white), glabrous or slightly puberulent on the throat and tube. **Disk florets** (20)30–50 (or more), the corollas narrowly funnelform, abruptly dilated at the throat, (4.5)5–6 mm long, glabrous or with a few trichomes, the limb cream-colored or yellow turning pink or purple after anthesis, the lobe/limb fraction 0.2–0.3, the tube shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, whitish or slightly discolored, soft, slender, and attenuate. **Achenes** oblong or oblanceolate in contour, often somewhat falcate, plump or slightly compressed, (2)2.5–3.5(4) mm long and 1 mm or less across, purple at maturity or brown when weathered, thinly puberulent or glabrescent, 4- or 5-ribbed. $2n = 16$ (typically), 32. Including *A. firmus* Nees and *A. lucidulus* (A. Gray) Wieg. (see A.G. Jones 1984, 1987). [*A. novi-belgii* misapplied, not of L.—Brendel 1887; Higley and Raddin 1891; Mohlenbrock 1975, 1986. *A. longifolius* misapplied, not of Lam.—Pepoon 1927; Fell 1955; Jones and Fuller 1955. *A. patens* misapplied, not of Aiton—Higley and Raddin 1891; Pepoon 1927.]

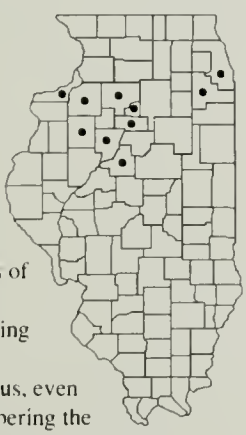
(Late August) September–October. Low moist or swampy ground; woods, thickets, meadows, banks of streams and rivers, ditch margins, and lakeshores. Common in the northern two-thirds of the state, extending south to St. Clair, Bond, Fayette, and Lawrence counties. The range of the species (*sensu lato*) extends in the East from NF and LB south to FL, and in the West from SK and AB to ND, with a few scattered records from SD, e. NE, IA, MO, and from Van Zandt and Smith counties in n.e. TX.

The plants are extremely variable, but two morphologically well-delimited varieties can be distinguished in Illinois: var. *puniceus* [including f. *demissus* (Lindley) Fern.—Dobbs 1963] and var. *firmus* (Nees) Torrey & Gray [*Aster firmus*—Mohlenbrock 1986. *A. puniceus* var. *lucidulus* A. Gray—Higley and Raddin 1891; Pepoon 1927; Mohlenbrock 1975. *A. lucidulus*—Deam 1940; G.N. Jones 1945, 1950, 1963; Gleason 1952; Jones and Fuller 1955; Gleason and Cronquist 1963; and others. *A. puniceus* subsp. *firmus* (Nees) A.G. Jones (1984)]:

1. Stems nearly glabrous or glabrescent in the lower half, hirsute or sparsely hispidulous in lines in the upper portion; lower leaf surface glabrous or sparsely scabrous along the midrib; phyllary tips short-attenuate or often acute to obtuse; rhizomes with strongly creeping stoloniform strands ..... var. *firmus*
1. Stems hispidulous over the entire length, the indument at least in part uniformly distributed around the stem; lower leaf surface minutely strigillose, the midrib hispidulous or densely hirsute to villous; phyllary tips generally long-attenuate; rhizomes with short, thick, fleshy strands..... var. *puniceus*

The ranges of these two varieties in Illinois are overlapping, but plants of var. *firmus* seem to be more common than those of var. *puniceus*. Attempts to separate the two taxa at the level of species have been frustrated because of a high degree of intergradation and inconstancy in the character states. There is also evidence of intergradation between *Aster puniceus* and such other members of the $x = 8$ chromosome number assemblage as *A. lanceolatus* [e.g., *Bebb s.n.* (F 17355) from Winnebago Co. and *Wade & Wade 1744* (ISM) from Ogle Co.], *A. lateriflorus* (see Steyermark 1963), and *A. praealtus* [e.g., *Smith 667* and *683* (F) from Cook or Du Page Co. and *Shildneck 11617* (ILL) from Fayette Co.]. Illinois specimens that have been labelled *A. longifolius* belong mostly in *A. puniceus* var. *firmus*. Although G.N. Jones (1950, 1963) in his keys treated *A. longifolius* in accordance with Lamarck's type and circumscription, the species probably does not get into Illinois. The collections cited by Pepoon (1927) for *A. patens* [*Raddin* (F) and *Umbach* (F)] belong in *A. puniceus* var. *firmus*, not in *A. laevis* as suggested by Swink and Wilhelm (1979).

24. *Aster schreberi* Nees
Schreber's Aster



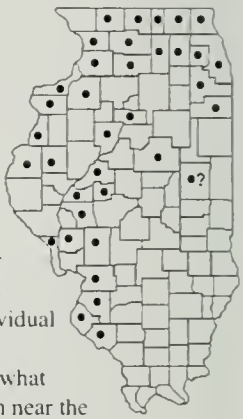
Herbaceous, with a strongly creeping horizontal rhizome system. **New shoots** arising mostly at the ends of stoloniform rhizome branches, the plants forming extensive colonies; basal rosettes typically numerous, even in midseason far outnumbering the flowering stems and often forming a dense ground cover. **Flowering stems** single at any point of emergence, erect, 30–80 cm tall, terete or, at the upper nodes, somewhat angular in cross section from decurrent nerves, the ascending or divaricate branches mostly confined to the capitulescence, the main stem sometimes reddish, glabrous, the branches sparsely scabrous or puberulent, sometimes in decurrent lines, but the indument usually uniformly distributed on the peduncles. **Leaves** polymorphic, those of the basal rosettes and the lower half of the stem petiolate; basal rosette leaves largest, the blades broadly ovate to cordate, (8)10–25 cm long and (6)8–16 cm wide, with 5–8 pairs of pinnate secondary nerves, and a weakly expressed reticulum of tertiary veins with mostly isodiametric (rarely oblong) areolae, the upper surface glabrous or thinly scabrous, the lower with a few trichomes along the nerves, the apex acuminate with a sharp mucro, the margins coarsely and often irregularly crenate-serrate, each tooth with a clear or green to purplish mucro, the base deeply cordate, the lobes sometimes overlapping or the sinuses often broad, the petioles 1–2 times as long as the blades, with slightly winged and glabrous or sparsely ciliate margins, somewhat dilated and sheathing at the base; cauline leaves gradually reduced in size upward on the stem, blades of the larger ones often nearly as wide as long, similar to the basal leaves in contour and indument except for the progressively shorter and gradually more broadly winged petioles; upper cauline leaves subpetiolate or sessile, elliptic or obovate, with a truncate or cuneate base; rameal leaves relatively few, abruptly reduced, variable in size, ovate or oval, subglabrous or the indument similar to that of the larger leaves, the apex acute or acuminate, the margins finely and sharply serrate and ciliate, the base rounded or cuneate; leaves of the peduncles 0–few, ovate-lanceolate, 2–3 mm long, flexible, attenuate, entire, ciliate, not intergrading with the phyllaries. **Capitulescence** a terminal corymbiform panicle, but often also with lateral flowering branches from the upper nodes of the main stem, the cymule-bearing branchlets stiffly divaricate or dichotomous, the peduncles (if developed) usually ascending at a wide angle, 0.3–2 cm long, slender, typically not glandular (rarely with a few stipitate glands). **Flowering heads** variable, 2–2.5 cm in diameter when the rays are fully extended, sometimes crowded and sessile in the individual cymules. **Involucre** campanulate (turbinate when pressed), 5–7 mm high, the phyllaries imbricated in 4 or 5 series. **Phyllaries** strongly graduated, appressed when fresh (loosely spreading in fruiting heads and when pressed and dried), those of the outer 2 series oblong-ovate, 1–2(2.5) mm long, glabrous or slightly puberulent on the back, not glandular (rarely with a few minute glands at the tips), the green areoles oblong to oblanceolate (rarely

extending to the base as a broad band), the margins usually densely lanate and with a scarious rim, the basal (1/5)1/2–2/3 portion of the phyllaries scarious, indurate, and keeled or rounded on the back; phyllaries of the inner 2 series linear-lanceolate, 4.5–6(7) mm long, glabrous, largely scarious or only the midrib green, the apex often reddish. **Receptacle** alveolate with sharp teeth. **Ray florets** 6–8(12), the corollas (8)10–12(15) mm long, white or cream-colored, glabrous. **Disk florets** 15–25 (or more), the corollas funnelform, (5)5.5–7 mm long, glabrous, or thinly puberulent on the slender, tubular portion of the limb, the limb strongly flared ca 1.5 mm above the point of insertion of the filaments, cream-colored or light yellow aging to purple, the lobes reflexed, the fraction of lobe/expanded limb portion 0.4–0.5, the apparent tube (i.e., including the tubular limb portion) distinctly longer than the expanded limb portion. **Pappus** tawny, the bristles in 2 series, those of the inner series about as long as the disk corolla, firm, with a clavellately expanded apex, those of the outer somewhat shorter, more slender, and attenuate. **Achenes** slenderly fusiform, 3–5 mm long and 1–1.2 mm across, dull purple or light chocolate brown, glabrous or with a few scattered trichomes near the top, with (7)8–10 thick (sometimes double-stranded) straw-colored ribs. $2n = 54$. Including *A. chasei* G.N. Jones in Jones & Fuller (1955).

Late July–September. Mesic but usually well-drained loamy or gravelly soil in wooded areas: plants in Illinois found mostly on north-facing slopes of ravines or along streams and rivers ca 30–60 m (or more) above the water level. Occasional in the northern one-third of the state, south to Tazewell County and west to Rock Island, Henry, and Knox counties. Illinois (and Wisconsin) records represent the western outpost of this species, disjunct by ca 450 km from the nearest populations to the east. The species range extends from ME west through s.e. ON to s.e. WI and south through PA, WV, and s.e. OH to VA, e. KY, e. TN, and n. AL.

Aster schreberi has been included in the Illinois list of threatened species, but the plants are of rather common occurrence in the piedmont and mountain woods of the eastern and southeastern states. I have so far been unsuccessful in a search for consistent characters whereby the midwestern populations [sometimes treated as *Aster chasei*—G.N. Jones 1963] can be distinguished from those to the east, at least at the varietal level. The plants also share the same hexaploid chromosome number of $2n (= 6x) = 54$.

25. *Aster sericeus* Vent.
Silky Aster



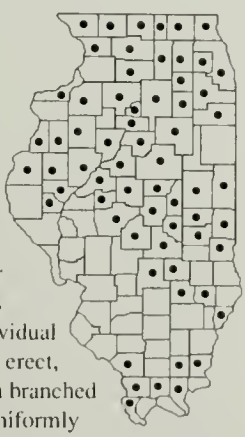
Herbaceous, with a cormoid-caudiciform rhizome system that turns woody with age. **New shoots** initiated at or near the base of old stems resulting in scattered individual clumps. **Stems** 1–several, slender, erect, wiry, somewhat fastigiately branched from near the middle, 20–70 cm tall, aging to light brown, glabrous in the lower half, thinly soft-pubescent in the middle portion, and sericeous-strigose in the branchlets. **Leaves** relatively uniform, sessile, entire, appressed sericeous to densely silvery-silky on both surfaces including the margins, the basal and lower cauline ones often withered and deciduous at flowering time; basal rosette leaves oblanceolate or spatulate, with 1 or 2 pairs of secondary nerves arching forward from the base in alignment with the margins, the surfaces less copiously pubescent than those of the cauline leaves, the apex acute, the base sheathing; principal cauline leaves slightly or gradually reduced upward on the stem, oblong to linear-lanceolate, 1.5–3(5) cm long and 4–10 mm wide, the apex mucronulate, the base rounded but not clasping; rameal leaves similar in contour and vestiture, flexible, acute, spinulose-mucronulate, those of the peduncles crowded, 4–8(10) mm long, intergrading with the phyllaries. **Capitulescence** an open, somewhat fastigiately branched panicle in the upper 1/2–2/3 portion of the stem, the branchlets often arching. **Flowering heads** 2–3 cm in diameter when the rays are fully extended, usually not crowded and not secund, subsessile or on peduncles 0.5–3(5) cm in length. **Involucre** cylindric to narrowly campanulate, 5–8(10) mm high, the phyllaries imbricated in 3–5(6) series. **Phyllaries** graduated or sometimes subequal, spreading or squarrose to reflexed, sericeous on both surfaces, including the scarious basal portion and the margins; outer phyllaries

(4)5–6 mm long, often largely herbaceous, ovate, acute, mucronulate, the median ones 6–8(10) mm long, ovate-lanceolate, acuminate or attenuate, green in the expanded apical $^1/_2$–$^2/_3$ portion, the abruptly narrowed basal portion scarious, indurate, and rounded on the back; innermost phyllaries very slender, attenuate, often reddish at the base. **Receptacle** strongly alveolate with sharp teeth. **Ray florets** (10)15–25, the corollas 12–15(18) mm long, deep purple (rarely white), with a few trichomes near the throat. **Disk florets** 20–30 (or more), the corollas narrowly funnelform, (5)6–7 mm long, thinly puberulent on the tube and throat, the limb bright yellow turning reddish purple after anthesis, the lobe/limb fraction 0.18–0.2, the tube much shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, discolored or tawny, relatively firm, attenuate. **Achenes** fusiform, plumpish, 2–3 mm long and 0.7–1 mm across, purple at maturity or brown when weathered, glabrous, prominently 7–10 ribbed. $2n = 10$.

Late August–October. Dry sandy, loamy, or rocky soils in unshaded situations: sand barrens, dunes, hill prairies, and open-wooded bluffs. Local, mostly in the northern half of the state, but extending southward along the Mississippi River to Randolph County. The range of the species extends from s. ON and MI to TN, and in the West through the eastern half of the Great Plains from s.e. MB to TX.

Illinois plants belong in var. *sericeus*.

26. *Aster shortii* Lindley in Hooker
Short's Aster



Herbaceous, with branched-caudiciform or short horizontal rhizomes that turn woody with age. **New shoots** initiated at or near the base of old stems resulting in scattered individual clumps. **Stems** 1–several, erect, (40)80–120 cm tall, much branched and bushy, densely and uniformly soft-hirtellous on the upper stem and in the branches, the indument in decurrent lines farther down, or the stem glabrescent in the lower portion. **Leaves** polymorphic, the basal and principal cauline ones petiolate; leaves of new shoots and of the vernal rosettes with the blades mostly ovate, 1–6 cm long and 1–3.5 cm wide, dark green above, purplish below at least during the cool season, with 1 or 2 pairs of anastomosing secondary nerves curving forward from the base and additional pinnate nerves emanating from the midrib, the apex acute or obtuse, the margins crenate, the base cordate or rarely truncate; petioles twice as long as the blades, slender, not at all or only narrowly winged, often densely pilose or hirsute; principal cauline leaves largely persistent throughout the flowering period, regularly spaced, the internodes 2–3(4) cm long, the blades ovate to lanceolate, sometimes falcate, 5–10(15) cm long and 2–7 cm wide, often conspicuously rugulose, with several pairs of pinnate and anastomosing secondary nerves, and a reticulum of tertiary veins with more or less isodiametric areolae, the upper surface glabrous, or slightly scabrous along the midrib, the lower surface copiously hirtellous or hirsute, the apex acute to attenuate or acuminate and with a sharp callus point, the margins mostly entire and scabrous, or shallowly crenate-serrate in the lower leaves, the base cordate, truncate, or rounded, sometimes oblique, the petioles half as long as the blades or less, slender, not sheathing or clasping; rameal leaves more or less abruptly reduced in size, lanceolate to ovate, entire, sessile, or sometimes with short petioles, densely hirtellous, acute or obtuse with a sharp, often purple callus point; leaves of the peduncles minute, bracteiform, 1–1.5 mm long, intergrading with the phyllaries. **Capitulescence** an ample, diffuse, broad-topped panicle, the head-bearing branchlets often arching. **Flowering heads** 1.5–2.5 cm in diameter when the rays are fully extended, usually not crowded and not secund, the peduncles densely bracteate, 0.2–3(5) cm long, hirtellous. **Involucre** campanulate (or hemispherical when pressed and dried), 4.5–6 mm high, the phyllaries imbricated in 5 or 6 series. **Phyllaries** appressed when fresh, strongly graduated, the outer triangular or lanceolate, 1–1.5 mm long, the inner linear-lanceolate, 4–5.5 mm long, puberulent on both surfaces, the green areoles oblanceolate to rhombic in the apical $^1/_6$–$^1/_4(^1/_2)$ portion, usually much shorter than the scarious basal portion (rarely the outer phyllaries with a green band to the base), the apex acute or

acuminate, the margins erose-hyaline and irregularly ciliolate. **Receptacle** alveolate with sharp teeth. **Ray florets** (15)18–25, the corollas 10–15 mm long, typically deep blue or purple, glabrous. **Disk florets** 20–25 (or more), the corollas funnelform, 5–6 mm long, glabrous or nearly so, the limb abruptly dilated at the throat, light yellow turning reddish purple after anthesis, the lobe/limb fraction 0.18–0.2, the tube shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, tawny or rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, somewhat compressed, 2.5–3 mm long and ca 1 mm across, dull purple at maturity or brown when weathered, glabrous, with 4 or 5 ribs. $2n = 16$; reported chromosome counts of $2n = 18$ are probably in error (A.G. Jones 1977).

September–October. Well-drained soils: edges of upland woods, thickets, wooded river banks, and open-wooded slopes. Common nearly throughout the state.The species range extends from s. ON, w. PA, and n.w. MD, south to GA, n. FL, and AL, west to e. MN and e. IA with scattered records from AR (but apparently none from MO).

Plants in Illinois belong in var. *shortii*, including f. *gronemanii* Benke, described as a plant with rose-red rays from a collection made near Elgin, Kane County [*Benke 4872* (F)]. There is evidence of occasional hybridization and intergradation with *Aster anomalus* and *A. urophyllus* [e.g., *Fell 53-1005* (ILL) from De Kalb Co. and *Winterringer 14794* (ISM) from Jersey Co.], and with other related species.

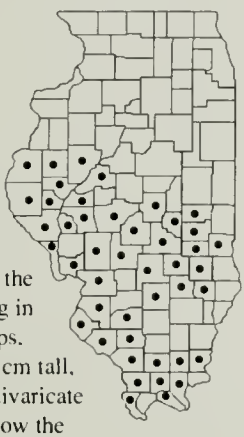
27. Aster tataricus L.f.
Tartarian Aster

Herbaceous, with a branched cormoid-caudiciform rhizome system but also producing short, fleshy, stoloniform rhizome strands. **New shoots** arising from nodes and tips of rhizomes and also from many winter buds just below the base of old stems, the plants aggressively spreading by vegetative reproduction. **Stems** 1–several, stout, erect, 80–150 cm tall, somewhat angled and ridged from decurrent leaf bases, branched only in the capitulescence, uniformly hirtellous or scabrous with antrorsely hooked trichomes. **Leaves** polymorphic, the basal ones most prominent forming convoluted clusters rather than rosettes, very coarse, 3–4 times as large as the largest cauline leaves, the blades oblanceolate, 10–30 cm long and 5–10 cm wide, strongly rugose, with 6–12 pairs of pinnate and anastomosing secondary nerves, the upper surface minutely scabrous, the lower surface densely scabrous or puberulent especially along the nerves, the apex acute, obtuse, or rounded, and mucronate, the margins crisp, crenate-serrate, each tooth with a conspicuous mucro, the base of blades gradually tapered, the petioles winged, 10–40 cm long, as long as the blades or longer, sheathing at the base; cauline leaves gradually reduced upward on the stem, (8)10–15(18) cm long and 2–5 cm wide, relatively densely spaced with internodes 2–4 cm long, the lower leaves oblanceolate and subpetiolate, the upper lanceolate and sessile, similar to the basal leaves in surface, venation, and indument, the apex acute or acuminate and mucronulate, the margins serrate or entire, densely ciliolate, the base cuneate, sheathing, and decurrent; rameal leaves abruptly much reduced in size, lanceolate, 0.5–1 cm long, puberulent, acute or attenuate and mucronulate, those of the peduncles few, bracteiform but flexible, not phyllarylike. **Capitulescence** an elongate or broad-topped panicle in the upper $^1/_5$–$^1/_3$ of the stem, the terminal branchlets short with few-headed corymbiform clusters. **Flowering heads** 2–2.5(3) cm in diameter when the rays are fully extended, sessile in the axils of subtending leaves or on puberulent and somewhat ridged peduncles 0.5–1.5(2.5) cm long. **Involucre** campanulate or hemispherical, 6.5–8(10) mm high, the phyllaries imbricated in 5 or 6 series. **Phyllaries** appressed or somewhat spreading, graduated, those of the outer series triangular or lanceolate, 3–4 mm long, those of the inner series linear-lanceolate, 6–8 mm long, glabrous or minutely puberulent, with green bands along the midrib to the base, or the outer phyllaries sometimes largely herbaceous, the apex acute in those of the outer 2 series, attenuate in those farther inward, the margins entire or erose-hyaline and with a red rim. **Receptacle** alveolate with sharp teeth. **Ray florets** 15–18(20), the corollas 10–15(18) mm long, lavender, glabrous. **Disk florets** 20–30 (or more), the corollas funnelform, (4.5)5–6 mm long, glabrous or with a few trichomes at the throat, the limb abruptly dilated, light yellow turning lavender after anthesis at least in the

lobes, the lobe/limb fraction 0.2, the lobes notably recurved, the slender tube slightly shorter than the limb. **Style branches** somewhat atypical for the genus in having acutish rather than attenuate sterile appendages. **Pappus** simple, the bristles shorter than the disk corolla, white or cream-colored, soft, slender, and attenuate. **Achenes** obconic-obovoid, slightly compressed or plump, 1.5–2 mm long and ca 1 mm across, light brown, thinly strigillose, with 4 or 5(6) ribs. $2n = 54$.

October. Disturbed ground: roadsides, thickets, and waste places. Occasionally escaped from cultivation. Introduced from n.e. Asia. Recorded by me from Champaign, Montgomery, Sangamon, St. Clair, and Vermilion counties.

28. *Aster turbinellus* Lindley in Hooker



Herbaceous, with stout, branched, caudiciform rhizomes that turn woody with age. **New shoots** initiated at or near the base of old stems resulting in scattered individual clumps. **Stems** 1–several, 50–100 cm tall, with many ascending or divaricate branches from near or below the middle, glabrous or hirtellous in thin decurrent lines. **Leaves** polymorphic, notably variable in size, the lower ones soon withered and deciduous; basal rosette and lower cauline leaves subpetiolate, the blades oblong-oblanceolate, glabrous, the apex acute, obtuse, or rounded, the margins shallowly crenate and ciliolate, the subpetiolar portion coarsely ciliate, winged, and slightly dilated toward a sheathing base; principal leaves gradually reduced upward on the stem, sessile, firm, linear-oblanceolate to elliptic-lanceolate, gradually tapered at both ends, 4–12 cm long and 0.5–2 cm wide, with a prominent midrib and weakly expressed anastomosing secondary nerves, the upper surface glabrous, the lower surface scabrous only along the midrib, the apex acute with a sharp callus point, the margins mostly entire, ciliolate, the base cuneate or rounded and hugging the axillary branchlets; rameal leaves similar in contour, those of the peduncles often densely spaced, bracteiform, appressed or ascending, oblong to subulate, 1.5–4 mm long, continuous with the phyllaries but distinct in having a pointed apex with a brown or purple mucro. **Capitulescence** an open, broad, round-topped panicle. **Flowering heads** 2–3 cm in diameter when the rays are fully extended, not crowded and not secund, usually at the ends of wiry, ascending or divaricate, few- to many-bracted peduncles (1)4–10(25) cm in length (rarely sessile). **Involucre** slenderly campanulate or turbinate, 7–12 mm high, the phyllaries imbricated in 6–9 series, inserted on a prominent obconical rachis 2–4 mm in height. **Phyllaries** strongly graduated, appressed or somewhat spreading, indurate, rounded on the back or slightly keeled, the green areoles well delimited, oblong to rhombic-oblanceolate, centered in the apical $^1/_3$–$^1/_2$ portion, usually much shorter than the scarious basal portion, the apex obtuse, rounded, or almost truncate, sparsely lanate, including the top (areolar) portion of the adaxial surface, the margins with a comparatively broad scarious rim extending to the tip; outer (lowermost) phyllaries ovate, 1.5 mm long, the median and inner ones linear, to 7 mm long. **Receptacle** alveolate with sharp teeth. **Ray florets** 15–20, the corollas 10–15 mm long, blue or purple, glabrous. **Disk florets** 15–20 (or more), the corollas narrowly funnelform, 4.5–6(7) mm long, glabrous, the limb yellow turning purple after anthesis at least in the lobes, the lobe/limb fraction 0.18, the tube sightly shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla, tawny or somewhat rose-tinged, comparatively firm, attenuate. **Achenes** oblong in contour, somewhat compressed, (1.8)2–2.8 mm long and ca 1 mm across, light brown or gray, puberulent or minutely strigillose, often puncticulate, with 3–5 ribs. $2n = 96$, sometimes with additional B-chromosomes.

Late August–October. Dry loamy or rocky soils: edges of upland woods, open-wooded slopes and bluffs, and also in somewhat disturbed ground of pastures and roadsides. Local, mostly in the southern half of the state, north to Macon, Fulton, and McDonough counties. Records from Illinois represent the northern and northeastern limits for the species. The range extends southward to n. LA and westward through s. MO and AR to e. NE, s.e. KS, and e. OK.

29. *Aster umbellatus* Miller
Flat-top Aster

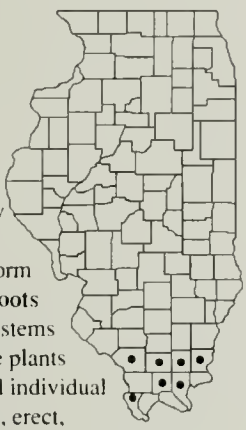
Herbaceous, with a creeping horizontal rhizome system. **New shoots** initiated at intervals along or at the ends of stoloniform rhizome strands resulting in colonial stands; autumnal rosettes lacking. **Stems** mostly single at any point of emergence, erect, 50–150 cm tall, usually unbranched below the capitulescence, glabrous in the lower portion, commonly puberulent with antrorsely hooked trichomes above, the branches somewhat winged or ridged from decurrent leaf bases. **Leaves** (except the lowermost) more or less uniform in contour, sessile or subpetiolate, those of the midstem ovate to elliptic-lanceolate, 4–12 cm long and 1–3(4) cm wide, with a prominent midrib that is abaxially keeled in the basal or subpetiolar portion and with 6–8 pairs of pinnate and anastomosing secondary nerves, as well as a conspicuous reticulum of tertiary veins with isodiametric areolae, the upper surface dark green, glabrous or minutely scabrous, the lower surface bluish green, scabrous-puberulent, at least along the midrib and major nerves, the apex acuminate, the margins entire, scabrous, the base cuneate and decurrent; lower cauline leaves smaller, often spatulate, those near ground level bracteiform; rameal leaves relatively few, much reduced in size but otherwise resembling the larger leaves except for the few small, subulate, puberulent bracts subtending the head. **Capitulescence** flat- or round-topped, each individual cluster corymbiform. **Flowering heads** 1–1.5(2) cm in diameter when the rays are fully extended, often crowded, subsessile, or on slender puberulent peduncles 0.2–2.5 cm in length. **Involucre** campanulate or turbinate, 3.5–4.5(5) mm high, the phyllaries imbricated in 4 or 5 series. **Phyllaries** strongly graduated, the outer ones 1–2 mm long, the inner 3–4(6) times as long, more or less appressed at flowering time but widely spreading in fruiting heads, puberulent or glabrous on the back; outer (lowermost) phyllaries subulate, the median and inner ones oblong to linear-lanceolate, the green areoles forming broad bands to the base as an extension of the midrib, the apex acute to obtuse or sometimes rounded, the margins erose-hyaline and irregularly ciliolate. **Receptacle** alveolate with long sharp teeth. **Ray florets** (2)6–15 (or more), the corollas 8–10 mm long, often with a few trichomes on the slender tube, the rays whitish, comparatively broad, 2–3 mm wide. **Disk florets** (8)12–20, the corollas funnelform, 4–7 mm long, thinly puberulent on the tube, the limb partway slenderly tubular, abruptly flared ca 1 mm above the point of insertion of the filaments, cream-colored turning purple after anthesis, the lobes relatively long and reflexed, the fraction of lobe/expanded limb portion 0.6–0.7, the apparent tube (i.e., including the tubular limb portion) distinctly longer than the expanded limb portion. **Pappus** "double" (according to literature references) but actually composed of 3 series of bristles, whitish or somewhat discolored; bristles of the inner series about as long as the disk corolla, firm, clavellately expanded toward an acute apex, those of the middle series slightly shorter, tapered toward an attenuate apex, and those of the outer series minute, 1 mm long or less, slender, and attenuate. **Achenes** obovate to oblanceolate in contour, compressed, 2.5–3.5 mm long and 1–1.2 mm across, light brown, sparsely puberulent (Illinois plants) or sometimes glabrous, with 5 or 6 prominent, glossy, golden-brown ribs. $2n = 18$. Including *A. pubentior* Cronquist (1947). [*Doellingeria umbellata* (Miller) Nees; *A. infirmus* misapplied, not of Michaux—Brendel 1887.]

(Late July) August–September (early October). Low, damp, mostly open ground: swamps, seep areas, thickets near streams and rivers, and clearings in woods. Occasional in the northern half of the state, south to Menard and Cass counties. The range of the species extends from NF south to GA, n. FL, LA, s. AR, and e. TX, west to e. AB, SK, and ND, with a few stations in IA, NE, and s. OK.

Based solely on geographic considerations, plants of Illinois would be placed in var. *pubens* A. Gray (cf. Fernald 1950) or, at the rank of species, in *Aster pubentior* (cf. Gleason 1952; Gleason and Cronquist 1963). Too much variability is evident in the specimens examined, however, to permit a clear separation of this variant from var. *umbellatus*. Gray (1884) distinguished plants of var. *pubens* merely by

more copious pubescence on the lower leaf surface. Cronquist (1947), in his argument for species rank, considered additional characteristics, e.g., puberulent phyllaries and smaller heads (12–22 florets) compared with glabrous phyllaries and larger heads (23–54 florets) in *A. umbellatus* var. *umbellatus*. In applying these criteria, however, one may find that both taxa occur side by side in northern Illinois. I do not, therefore, recognize any varieties of this species for the flora of Illinois.

30. *Aster undulatus* L.
Wavy-leaved Aster



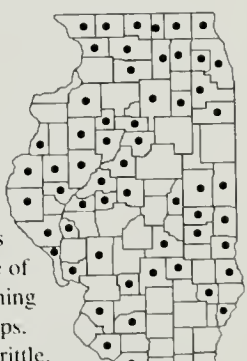
Herbaceous, with branched caudiciform rhizomes that turn woody with age but also sometimes with short stoloniform rhizome strands. **New shoots** arising at the base of old stems or from the rhizomes, the plants usually forming scattered individual clumps. **Stems** 1–several, erect, 40–120 cm tall, with ascending or divaricate branches above the middle, densely and uniformly hirtellous or villous on the upper stem portion and in the branches, somewhat pubescent in lines or glabrescent in the lower stem portion. **Leaves** polymorphic, the basal and lower cauline ones petiolate, those higher up on the stem subsessile or sessile and strongly clasping; upper surface of the blade mostly scabrous to hirsute (rarely glabrous), the lower surface hirtellous or loosely villous; leaves of new shoots and of the vernal rosettes with ovate-oblong to suborbiculate blades 1–6 cm long and 1–4 cm wide, purplish below, with two or more pairs of somewhat arching and anastomosing secondary nerves, the apex obtuse or rounded, the margins shallowly crenate-serrate to subentire, the base cordate or truncate to rounded, sometimes oblique, the petioles usually purplish, hirsute or pilose, winged, dilated, and sheathing at the base; principal cauline leaves variable in shape and size, gradually reduced upward on the stem, the lower ones petiolate, those higher up sessile and often constricted near or below the middle, the blades ovate to lanceolate in outline, 3–12(14) cm long and (1)2–5 cm wide, the secondary venation mostly obscured by indument, the apex acute to attenuate or acuminate and callus-pointed, the margins crenate-serrate or entire, and scabrous, the petioles progressively shorter and more broadly winged upward on the stem, conspicuously dilated toward the auriculate or cordate, clasping base; rameal leaves more or less abruptly reduced in size, oblong or lanceolate to linear-lanceolate, acute to attenuate, mucronulate, subentire to entire, sessile, slightly clasping or sheathing; leaves of the peduncles often numerous, firm, bracteiform, 2–3 mm long, appressed or ascending, intergrading with the phyllaries. **Capitulescence** paniculiform, often notably overtopping the leafy stem portion but also sometimes with branches arising from nodes near the middle of the stem, the ultimate head-bearing branchlets ascending or divaricate, often racemiform. **Flowering heads** 1.2–1.5(2) cm in diameter when the rays are fully extended, usually not crowded but sometimes secund, the peduncles 0.3–3(5) cm long, often densely bracteate, hirtellous. **Involucre** campanulate or hemispherical, 4–6(7) mm high, the phyllaries imbricated in 4 or 5(6) series. **Phyllaries** strongly graduated, appressed, or those of the outer series spreading, lanceolate, 1.5–2.5 mm long, the inner ones linear-oblanceolate, 4–5(6) mm long, puberulent on the abaxial surface and also thinly so on the adaxial surface, the green areoles rhombic or oblanceolate, the apex sharply acute, attenuate, or acuminate with somewhat inrolled margins, often mucronulate, the margins erose-hyaline, irregularly ciliolate, and with a scarious rim to near the tip, the basal $^1/_2$–$^2/_3$ portion scarious, or sometimes the midrib green to the base. **Receptacle** alveolate with mostly rounded teeth. **Ray florets** (12)15–25, the corollas 8–12 mm long, purple or blue, glabrous or nearly so. **Disk florets** 15–25, the corollas narrowly funnelform, (4)5–6 mm long, glabrous or with a few trichomes near the throat, the limb abruptly dilated at the throat, cream-colored or light yellow turning purple after anthesis, the lobe/limb fraction 0.2–0.25, the tube shorter than the limb. **Pappus** simple, the bristles about as long as the disk corolla or slightly shorter, cream-colored or slightly rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, somewhat compressed, 2.5–3(3.5) mm long and 1.2–1.5 mm across, dull purple or light brown, sparsely puberulent at least

toward the top, with 4 or 5 straw-colored ribs. $2n = 32$; reported chromosome counts of $2n = 18$ and 36 are probably in error (A.G. Jones 1977, 1980b).

August–October. Dry or well-drained soils: loamy or rocky slopes at forest edges and open-wooded bluffs underlain by sandstone or limestone. Uncommon, restricted to the southern tip of the state; records from Jackson and Alexander counties mark the western limit for this extremely variable species. The range extends from NS and ME to c. FL, west to s. ON(?), OH, through s. IN, s. IL, and TN to c. MS and s.e. LA.

Aster undulatus has been included in the Illinois list of threatened species but is one of the more common asters in the mountains and woodlands to the east and southeast of our state. Although several varieties have been described, I am unable to assign Illinois populations to any of them. Even though the plants seem to differ somewhat from the type specimen of *A. undulatus*, I am treating them at this time *sensu lato* or as belonging in var. *undulatus*. There is evidence of occasional hybridization and intergradation with such closely related species as *A. drummondii* [e.g., *A.G. Jones 4089* (ILL) from Gallatin Co.] and *A. oolentangiensis* [e.g., *K. Wilson 3164* (ISM) from Pope Co.]. Collections that form the basis for *A. undulatus* sensu Mead (1846); Higley and Raddin (1891); Pepoon (1927); Kibbe (1952); and Dobbs (1963) non L. do not belong in this species.

31. *Aster urophyllus* Lindley in DC.



Herbaceous, with a stout caudiciform rhizome system lacking stoloniform strands. **New shoots** arising at or near the base of old stems, the plants forming scattered individual clumps. **Stems** 1–several, erect, brittle, 40–120 cm tall, with stiffly ascending, somewhat ridged branches from above the middle, sparsely puberulent in the upper portion and in the branches, the indument usually in decurrent lines (rarely uniformly distributed around the stem), the lower stem portion glabrescent or glabrous. **Leaves** polymorphic, the basal and larger cauline ones petiolate, those of the upper stem subsessile to sessile; leaves of new shoots and of the vernal rosettes with ovate or lanceolate blades 4–12 cm long and 2–5 cm wide, nearly glabrous, or often minutely scabrous above and thinly pubescent below, the secondary venation weakly expressed, the apex acute to acuminate, the margins shallowly crenate-serrate, the base cordate or truncate to rounded, the petioles 5–15 cm long, slender or narrowly winged, dilated, and sheathing at the base; principal cauline leaves gradually reduced in size upward on the stem, the blades ovate to lanceolate, 5–12 cm long and 2–5 cm wide, similar to the basal leaves in venation and vestiture, the apex acuminate to attenuate with a sharp, often purple callus point, the margins crenate-serrate to subentire, the base truncate or rounded, the petioles progressively shorter and more broadly winged upward on the stem, slightly sheathing; rameal leaves abruptly reduced in size, lanceolate to linear-lanceolate, glabrous or nearly so, attenuate and callus-pointed, entire, scabrous-margined, cuneate and slightly decurrent; leaves of the peduncles bracteiform, linear or subulate, 2–4 mm long, mostly ascending (rarely spreading to recurved), intergrading with the phyllaries. **Capitulescence** typically a dense, narrow, ovoid or pyramidal panicle in the upper $^1/_4$–$^1/_3(^1/_2)$ portion of the stem, commonly overtopping the leafy portion, the head-bearing branchlets stiffly ascending, often racemiform. **Flowering heads** 1–1.2(1.5) cm in diameter when the rays are fully extended, usually crowded and sometimes secund, subsessile or on often densely bracteate, puberulent peduncles 0.3–2 cm long. **Involucre** cylindrical or turbinate, 4.5–6(7) mm high, the phyllaries imbricated in 4 or 5 series. **Phyllaries** appressed or somewhat recurved-spreading, graduated, the outer subulate, 2–3 mm long, the inner linear-lanceolate, 5–6(7) mm long, glabrous, scarious over most of the surface area, the light green areoles very slender, linear to linear-oblanceolate, the apex long-attenuate, terminating in an often recurved, spinulose mucro, the margins erose-hyaline and irregularly ciliolate. **Receptacle** alveolate with sharp teeth. **Ray florets** (8)10–12(14), the corollas 6–8(10) mm long, typically white (rarely lavender), sparsely

puberulent on the tube and throat. **Disk florets** 10–15, the corollas funnelform, abruptly dilated, (3.5)4–5 mm long, glabrous or with a few trichomes near the throat, the limb cream-colored turning pinkish after anthesis, the lobe/limb fraction 0.2–0.25, the tube much shorter than the limb. **Pappus** simple, the bristles shorter than the disk corolla, whitish or slightly discolored to rose-tinged, soft, slender, and attenuate. **Achenes** oblong-obovoid, somewhat compressed, 1.8–2.5 mm long and ca 1 mm across, dull purple or brown, glabrous, with 4 or 5 ribs. $2n = 16$. [*A. sagittifolius* sensu auct. (pro parte) non Wedem. ex Willd. (see A.G. Jones 1980b; Jones and Hiepko 1981). *A. hirtellus* Lindley in DC. *A.sagittifolius* var. *hirtellus* (Lindley in DC.) Burgess in Britton & Brown f. *hirtellus* (Lindley in DC.) Shinners (1941)—Steyermark 1963. *A. sagittifolius* var. *urophyllus* (Lindley in DC.) Burgess in Britton & Brown—Deam 1940. *A. cordifolius* var. *moratus* sensu Fern. (1950) non (Shinners) Shinners.]

August–October. Loamy or rocky soils in dry or mesic situations: woodland edges, open upland woods, and thickets, also in disturbed ground of pastures, roadsides, and railroad rights-of-way. Common throughout much of the state. The range extends in the East from s.e. Canada and ME south to GA, AL, and n. FL, and in the West from MN through IA, MO, and s.e. NE to s.e. KS, with scattered stations recorded from AR and MS.

Description of *Brachyactis* Species

Brachyactis ciliata (Ledeb.) Ledeb.
Rayless Aster

Taprooted and somewhat succulent annual. **Stem** erect, 10–70 cm tall, bluish or yellowish green, often red-tinged, glabrous or with a few bristly trichomes in the leaf axils and along the decurrent leaf bases; branches mostly ascending, often from near the base. **Leaves** bluish green, with a conspicuous midrib, the secondary venation faintly expressed; basal leaves spatulate, soon withered; principal cauline leaves linear, 3–10 cm long and 0.1–0.9 cm wide, gradually reduced in size upward on the stem, sessile, with clusters of smaller leaves produced in the axils, glabrous, the apex acute to short-attenuate, the margins entire and appressed ciliate, the base slightly dilated and sheathing; rameal leaves similar in contour, those of the peduncles few. **Capitulescence** a contracted panicle, or racemiform in poorly developed plants. **Heads** several to many, short-peduncled or subsessile. **Involucre** 6–10 mm high, the phyllaries imbricated in 3 or 4 series. **Phyllaries** subequal or somewhat graduated, occasionally those of the outer series longer than those of the middle and inner series, glabrous, linear to oblanceolate, (4)5–8 mm long, the outer and median ones herbaceous except for a narrow scarious margin, the apex acute or obtuse and mucronulate. **Receptacle** flat, shallowly alveolate with rounded teeth, or merely pitted in fruiting heads. **Florets** 40–80 (or more). **Pistillate florets** fertile, in several series, usually more numerous than the disk florets, the corollas slender, tubular, with a long-exserted pink style and no stamens; rays (ligules) absent or rudimentary. **Disk florets** perfect and fertile, the corollas tubular or narrowly funnelform, 3–4.5 mm long, the limb whitish aging to pink, with 5 very short lobes, the tube slender, yellowish green, longer than the limb. **Style branches** of the disk florets with attenuate, papillate, sterile appendages that are longer than the stigmatic lines. **Pappus** very prominent, considerably overtopping the corolla, the capillary bristles numerous, in 2 or 3 series, pure white or faintly pink, subequal in length, 4–6 mm long, soft and silky, attenuate, and minutely barbellate. **Achenes** oblong-obovoid, slender, slightly compressed, 1.5–2.5 mm long and 0.4–0.5 mm across, gray or whitish, often with purple streaks, pilose or strigillose, obscurely 2–4 ribbed. $2n = 14$. Including *B. angusta* (Lindley in Hooker) Britton in Britton & Brown (see A.G. Jones 1984). [*Aster brachyactis* S.F. Blake—G.N. Jones 1945, 1950, 1963; Jones and Fuller 1955; Swink 1974; Mohlenbrock 1975, 1986; Swink and Wilhelm 1979; and others.]

August–October. Disturbed ground: waste places, roadsides and railroad tracks. Occasional, recorded from only five counties of the Chicago region; adventive from the North and the West. The species range extends from NT and James Bay, ON, east to PQ, PE, and NB, and west through the northern half of the Great Plains to n. WA; the plants were also recorded from scattered stations in s.e. WI, n. IA, w. MO, w. NE, w. KS, w. OK, and s. and e. CO.

The species was originally described (under the name *Erigeron ciliatus* Ledeb.) from collections made in Siberia. North American plants may be recognized as *Brachyactis ciliata* subsp. *angusta* (Lindley in Hooker) A.G. Jones [based on *Tripolium angustum* Lindley in Hooker. *Aster angustus* (Lindley in Hooker) Torrey & Gray non Nees—Pepoon 1927. *B. angusta*—Hill 1902]. This taxon, however, can probably not be distinguished from typical subsp. *ciliata* on any basis other than geography.

Brachyactis is a small genus of two or three species with the center of distribution probably in North America. The genus can be distinguished from *Aster* and other members of the Astereae by a combination of the following: pistillate florets that lack or have inconspicuous ray corollas, a prominent pappus that considerably overtops the disk corollas and is composed of numerous subequal bristles in several series, and the uncommon basic chromosome number of $x = 7$. Most authors retain the taxon as a section of *Aster* (cf. Houle and Brouillet 1985; Semple and Brouillet 1980a, b).

Glossary of Descriptive Terms

abaxial side of an organ away from the axis
achene dry, indehiscent, one-seeded fruit
aciculiform needle-shaped
acuminate tapering more or less abruptly to a slender sharp point, the margins somewhat curved inward
acute terminating in a sharp point at an angle of between 45° and 90°, the margins straight (see also **attenuate**)
adaxial side of an organ facing the axis
adventive introduced from an adjacent or nearby region and spreading in the new region
alveolate honeycombed
anastomosing veins (or nerves) connected by cross veins (or nerves)
anthesis flowering time, i.e., period during which pollination takes place
apex; apical tip; pertaining to the tip
areole small space clearly marked out on a surface
ascending directed upward after arising at an oblique angle or on a curve
attenuate gradually tapering to a narrow and slender tip at an angle of less than 45°, the margins more or less straight (see also **acute**)
auriculate having auricles, i.e., with ear-shaped appendages
barbellate with minute barbs
bracteate having bracts
bracteiform bractlike
bulliform appearing blistered, bubblelike
callus a hard protuberance or thickening
campanulate bell-shaped
capitulescence cluster (often a large assemblage) of flower heads (commonly synonymized with inflorescence)
caudex the usually condensed, thick, tough, persistent, largely underground base of an otherwise herbaceous stem
caudiciform stem base shaped like a caudex, i.e., condensed, thick, and tough
cauline pertaining to or arising from the stem
cespitose growing in tufts, e.g., several stems from a common base
ciliate fringed with slender trichomes (see also **fimbriate**)
ciliolate minutely ciliate, i.e., the trichomes short
cinereous with ash-colored (light gray) indument
clasping the base of a leaf or petiole nearly or completely surrounding the stem
clavellate minutely club-shaped, i.e., expanded toward the apex
cordate heart-shaped, the base with rounded lobes and a sinus
corolla perianth whorl composed of petals (united in the Asteraceae)
corymbiform shaped like a corymb, i.e., a flat-topped capitulescence with the lower (outer) branchlets and peduncles longer than the upper (inner) ones
crenate toothed with rounded teeth
cuneate wedge-shaped with the narrow end at the point of attachment
cymiform shaped like a cyme, i.e., resembling an inflorescence in which the central or terminal flower opens first
cymule a small few-flowered cyme; refers in the Asteraceae to an ultimate cluster of the cymiform capitulescence
deciduous falling off at maturity or after withering
decumbent reclining on the ground but with the tips ascending
decurrent pertaining to leaf bases or veins that continue downward from the nodes in the form of wings, ribs, or lines of indument
dichotomous forked with two nearly equal branches
dilated expanded in width or widened in diameter
disk floret flower of the central portion of a head, the corolla regular, 5-lobed
divaricate spreading at a wide angle
erose with the margin appearing eroded or gnawed
falcate sickle-shaped
fastigiate with the branches partway parallel and close together; broomlike
filament the stalk portion of a stamen that supports the anther
fimbriate fringed with coarse trichomes or processes (see also **ciliate**)
foliaceous leaflike or leafy
funnelform resembling or shaped somewhat like a funnel
fusiform spindle-shaped, swollen near the middle and tapering at both ends
glabrescent nearly glabrous or becoming glabrous

glabrous smooth, i.e., without vestiture
glandular invested with glands, i.e., with structures that produce a viscid sap
glaucous covered with a waxy, bluish bloom that often rubs off easily
habit general appearance
head capitulum = unit of capitulescence (the individual florets sessile)
hirsute having coarse or stiff, spreading or ascending trichomes
hirtellous minutely hirsute, i.e., with short, spreading trichomes
hispid having rigid spreading bristles or spinules
hispidulous minutely hispid
hyaline translucent or colorless
imbricated overlapping, i.e., shinglelike in a spiral arrangement
indument hairy covering
indurate hardened
inrolled rolled inward or downward at the edges
involucre one or more series of bracts (phyllaries) subtending the florets of a head (in the Asteraceae)
isodiametric with all the diameters of an areole about equal in length
keel; keeled a central abaxial ridge formed by the midrib of a compressed phyllary, bract, or leaf; forming a keel
lanate woolly, with long, tangled, curly trichomes
lanceolate lance-shaped; much longer than broad, widest near the base and tapering to the apex
ligule the strap-shaped limb of a ray floret in the Asteraceae
limb upper, expanded portion of a corolla (in disk florets, the portion above the zone of attachment of the filaments) as distinct from the tube portion
mucro a sharp, short, and abruptly narrowed point or protuberance
mucronate tipped with a mucro
mucronulate diminutive of mucronate
node the place on the stem where leaves are attached and branches arise
ob- Latin prefix meaning inverted, e.g., obovate = inverse of ovate
oblique slanting, not straight up, or at an angle that is not 90°
oblong at least two times longer than broad with nearly parallel sides
obtuse blunt; if sharp-pointed, with an angle of more than 90°
ovate; ovoid egg-shaped, with the broader part near the base
panicle a variously branched compound inflorescence (in the Asteraceae a compound capitulescence with pedunculate flower heads)
paniculiform resembling or shaped like a panicle
papillate nipplelike
pappus the specialized outer perianth whorl in the Asteraceae composed of bristles (in *Aster*), awns, or scales
peduncle the stalk of a head
perfect having both functional stamens and pistils
petiole; petiolate the stalk of a leaf; having a stalk
phyllary bract of the involucre
pilose invested with long, soft, slender trichomes
pinnate arising from both sides of the axis or midrib
pistillate having pistils but no functional stamens
polymorphic exhibiting several forms (morphs) of the same organ
pro parte in part
pro sp. described as a species
puberulent minutely or finely hairy
pubescence; pubescent hairiness; hairy
pulvinate swollen or cushion-shaped
punctiulate having minute colored or translucent dots
pustulate with pimplelike or blisterlike raised areas
racemiform resembling or shaped like a raceme, i.e., an elongate capitulescence or branch with pedunculate heads
rameal of or pertaining to the branches
ray floret of the outer series of florets in a head, the corolla strap-shaped (= ligulate)
receptacle the expanded end of the peduncle, i.e., the end bearing the aggregate of florets
reflexed abruptly bent or turned downward
remote distantly spaced
reticulate; reticulum interconnected like a network
rhizome an elongate, often branched underground stem, usually with minute scale leaves and rooting at or producing new shoots from the nodes

rhombic shaped like a rhombus, i.e., like an equilateral, oblique-angled parallelogram; more or less diamond-shaped

rosette a cluster of leaves with very short internodes, arranged in a compact, spiral (near-circular) series

rugose; rugulose wrinkled

scabrellous minutely scabrous

scabrous rough to the touch, the stiff trichomes pointing in one direction

scarious thin, dry, membranous, not green

secund directed to one side of the stem or branchlet

sensu auct. according to author(s)

sensu lato in a broad sense

sensu stricto in a narrow sense

sericeous silky, with appressed, soft, glossy trichomes

serrate with sharp teeth that point forward

serrulate finely serrate

sessile lacking a stalk

sheathing closely enveloping

spatulate spatula-shaped or spoon-shaped

spiciform shaped like a spike, i.e., a simple, elongate capitulescence with sessile heads

spinule; spinulose short spine; minutely spiny

squarrose having the parts recurved at the tip (mostly applied to phyllaries)

stamen pollen-bearing organ

stigmatic pertaining to the portion of the style branches receptive to pollen

stoloniform shaped like stolons (applied to long-creeping horizontal rhizomes)

striate marked with fine longitudinal lines or ridges

strigillose minutely strigose, i.e., the trichomes very short

strigose with the trichomes appressed and lined up in one direction

style the elongated part of the pistil above the ovary

subulate awl-shaped; slender, tapering to a sharp point

suffruticose plants woody only at the base and herbaceous over most of the above-ground portion

terete circular in cross section

throat expanding zone in a corolla at the junction of tube and limb

thyrsiform shaped like a thyrse, i.e., like a compact or contracted panicle

tomentose invested with short-haired, matted, woolly pubescence

trichome an epidermal structure (hair, bristle, or prickle)

truncate ending abruptly as if cut off

turbinate top-shaped, i.e., inversely conical

umbelliform resembling or shaped like an umbel, i.e., a flat-topped capitulescence in which several peduncles more or less arise from a common point

urceolate urn-shaped, e.g., a corolla that is abruptly contracted just below the mouth

vestiture any covering of the surface, i.e., indument and/or glands

villous woolly, the trichomes long, soft, and curly but not matted or tangled

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Index to Scientific Species Names, Including Synonyms

The names of accepted Illinois species are given in roman type. Bold-faced page numbers indicate species descriptions.

Index to Vernacular (Common) Names

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