

# *Echinacea angustifolia* DC.; *E. pallida* (Nutt.) Nutt.

**Standardized Common Name:** *Echinacea angustifolia*; *Echinacea pallida*

**Other Common Names:** Purple Coneflower, Snakeroot; Kansas Snakeroot, Narrow-leaved Purple Coneflower (*E. angustifolia*); Pale Purple Coneflower (*E. pallida*)

**Family:** Asteraceae (Compositae)

**Description:** Perennial herb, branched or unbranched, stems pubescent at least above with erect jointed hairs. Leaves alternate, petiolate below, sessile above, narrowly lanceolate to lanceolate or elliptical, the lower leaves 1–3(–4) cm broad; margins entire, pubescent; main veins 3 or 5, nearly parallel, unbranched; upper surface pubescent with erect jointed hairs. Inflorescence a capitulum (head), terminal, with receptacle nearly flat when young, conical to spherical at maturity, 15–30(–45) mm high; involucral bracts (phyllaries) usually in 2–3 series; receptacular bracts (paleae) usually longer than disk florets, with rigid awns. Ray florets ligulate, in 1 series, pale purple to pink or whitish, reflexed or spreading, usually sterile, pubescent, with toothed apex. Disk florets tubular; corollas 6–10 mm long, with bulbous base and 5 lobes, usually purplish; stamens 5; ovary 1, style 2-branched. Fruit a cypsela (achene with attached pappus), (2–)3–4(–6) mm long; those from disk florets quadrangular with pappus of 4 teeth or 1 large tooth; those from ray florets triangular, asymmetrical, usually with pappus of 3 teeth.

*Echinacea angustifolia* is on average a smaller plant than *E. pallida*, but the two species [or varieties] are most easily distinguished during flowering:

	<b><i>E. angustifolia</i></b>	<b><i>E. pallida</i></b>
<b>Plant height</b>	10–50 (rarely to 75) cm	40–90(–110) cm
<b>Leaf length</b>	Basal leaves (5–)8–12(–27) cm, stem leaves (4–)7–10(–15) cm	Basal leaves (10–)13–20(–35) cm, stem leaves 9–15(–25) cm
<b>Ray florets</b>	2–4 cm long, often spreading	4–9 cm long, strongly reflexed toward stem
<b>Disk floret pollen</b>	Lemon yellow	Usually white, rarely lemon yellow (or both types on a single head)

**Taxonomy:** As usually defined, the genus *Echinacea* includes nine species of North American herbs. The most recent taxonomic treatment reduces these to only four. *Echinacea angustifolia* is treated as a variety of *E. pallida*, namely *E. pallida* var. *angustifolia* (DC.) Cronq. Although these two plants are extremely similar and are capable of interbreeding freely, the argument that they should be treated as belonging to a single species that would also include the former *E. sanguinea* Nutt., *E. simulata* McGregor and *E. tennesseensis* (Beadle) J. K. Small has not yet been widely accepted. Hybridization is common in *Echinacea*; *E. pallida* var. *pallida* may itself have originated as a tetraploid hybrid of two other species. Older literature often places the species of *Echinacea* in the genera *Rudbeckia* or *Brauneria* (the former being a related genus, and the latter being a superfluous synonym for *Echinacea*).

**Parts in Commerce:** Root with rhizome (aboveground parts could also be used)

**Identification:** *Echinacea angustifolia* and *E. pallida* have mostly identical root morphology:

- Cylindrical or gradually tapering, sometimes branching, sometimes spirally twisted
- Root 4–10 mm in diameter, uppermost (rhizome) portion to 15 mm
- More or less cylindrical when fresh; with deep longitudinal wrinkles when dried
- Pale brown, reddish to grayish or yellowish
- Fracture short and fibrous when dry; dried roots exposed to air may become tough and somewhat flexible
- In cross-section, shows thin brownish cork; thin cortex (to ca. 1 mm thick); cambial line; large xylem region, radially striated, with narrow strands of pale yellowish xylem separated by broader dark parenchyma rays (under high magnification of cut moist surfaces, discrete clusters of cells containing blackish pigment may appear elongated and fibrous)
- Rhizome cross-section similar, with circular, pale yellow to whitish pith at center
- Odor weak, aromatic, characteristic
- Taste weak, initially sweet, then bitter

*Echinacea angustifolia* produces a distinct tingling sensation when chewed due to the presence of alkylamides, which *E. pallida* does not. The cortex may be thicker in *E. pallida* (to 1.6 mm or so) and the dark pigmentation of the rays may be less distinct or absent in some material. Resin canals are present in both the cortex and xylem of *E. pallida*, versus the cortex alone of *E. angustifolia*. These canals are up to 0.15 mm in diameter, large enough to be seen in hand sections using a light microscope or when carefully cut segments of undried roots are examined with a dissecting microscope.

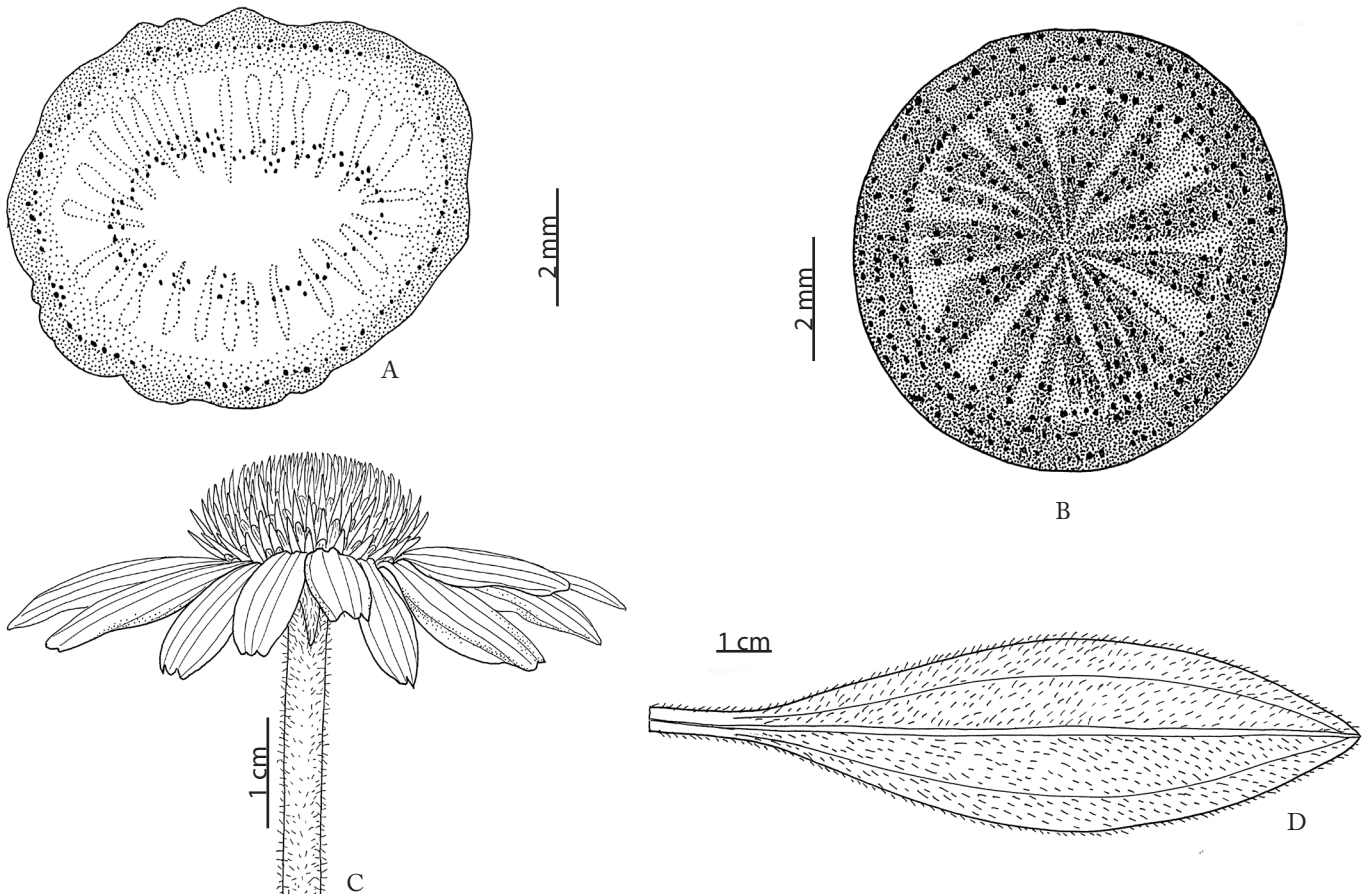
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**Figure 22:** a, *Echinacea pallida* root cross section; b–d, *E. angustifolia* root cross-section, head, and leaf.