

PALE PURPLE CONEFLOWER

Echinacea pallida (Nutt.) Nutt.

Plant Symbol = ECPA

Contributed by: USDA NRCS Manhattan Plant
Materials Center



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Alternate Names

pale Echinacea or pale coneflower

Uses

The uses are numerous for this classic forb species. *Medicinal:* Native Americans used this species long before the white European settlers arrived on America's shore. A number of Native American Nations, including Blackfoot, Choctaw, Comanche, Dakota, Lakota, and Sioux, used various *Echinacea* preparations for a variety of purposes (Flannery, 1999). European settlers learned of native botanical species from their indigenous teachers, soon bringing *Echinacea* into the colonial pharmacopoeia (Barrett, 2003). The first historical recordings of *Echinacea* were found in the *Flora Virginica* (1762) by Clayton and *Materia Medica Americana* (1787) by Schopf (Flannery, 1999). Currently, extracts and whole plant products made from *Echinacea* species comprise one of the largest sectors of the several billion dollar herbal medicine market in North America and Europe. Annual sales of *Echinacea* products have been estimated at \$300 million in the U.S. alone (Brevoort, 1998). *Echinacea* is used most widely as prevention or treatment of the common cold, with the proposed mechanism of action relating to its reported ability to stimulate the immune system (Barrett,

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2003). Birt *et al* (2008) reported that the analysis of polar fractions of *Echinacea* extracts showed the presence of antiviral activity, with evidence suggesting that phenolic compounds other than the known HIV inhibitor, cichoric acid, may be involved.

Forage value: Pale coneflower is eaten by all livestock classes and it decreases under grazing pressure. The plants have high nutritive content, especially early in the spring.

Wildlife: Leaves were eaten by harvest mice and deer mice in captivity, but cotton rats and prairie voles would not consume the leaves (Menhusen, 1963). Shirley (1994) indicated that hummingbirds were attracted to the flowers and goldfinches and other birds ate the seeds.

Landscaping: Schramm (1992) listed the ornamental characteristics of this plant as very high and the flowering as showy. It is characterized as the dominant landscape element when blooming. The heads remain in bloom for several weeks from late May to early July. Pale coneflower can be used as cut flowers and the brown, rounded, spiny heads can also provide attractive accents to dried arrangements. Kindscher (1992) indicated that the *Echinacea* species ornamental possibilities have not been fully explored.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: A member of the sunflower or composite family (Asteraceae). Pale coneflower is a native, perennial forb with a large (2.54 centimeter) (cm) chocolate brown to black taproot with few to little branching that will penetrate into the soil for 2 to 3 meters (m) (Weaver, 1958). The stems (1.2 m) are erect, one to several, simple to rarely branched with most of the leaves being basal in nature. The leaves are alternate, simple, rough on both surfaces, and up to 25 cm in length and 2.5 to 4.0 cm in width. Basal leaves have entire margins, are three nerved and petiolate, upper leaves are reduced in size with sessile attachment to the stem. Inflorescence is a head that is solitary at the top of the stem. Pale pink, drooping petal-like ray florets surround the domed, reddish-brown center of disk florets that are rough and

prickly to the touch. The pale coneflower blooms in late spring to mid summer. The fruits are small (4-5 millimeter) (mm) elongated, tan achenes that develop in the seed head. The achenes may remain in the heads for many weeks after they mature. The name "*Echinacea*" (from Greek) means hedgehog comparing the spiny animal to the sharp spiny bracts of the inflorescence. "Pale" and *pallida* generally refer to the coloration of the ray flowers.

Distribution: For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. Pale coneflower is found in the eastern ¼ of Kansas, west to Cowley and Butler Counties. The species range extends from Indiana and Wisconsin southwest to Arkansas and northern Texas.

Habitat: Pale purple coneflower is found in dry and mesic prairies and along roadsides. Pale purple coneflower performs well on various soil types from sandy to clay, it prefers well drained upland soils in full sun. It grows best on acid to neutral soils with a pH of 4.5 to 7.5 in a sunny location. Weaver and Fitzpatrick (1934) found this species in 66 % of the upland prairies they studied, but less than 25 % of the low land prairies. Weaver (1968) indicated that pale coneflower was the ninth most important prairie forb.

Adaptation

Pale purple coneflower is adapted to dry and mesic prairies and a variety of soil types. It can stand some acidic soils (pH=4.5) and due to its long tap root can with stand prolonged drought.

Establishment

Seed of pale purple coneflower can be planted dormant in the fall (November to December) in an unstratified condition. Spring plantings should use stratified seed of this species. Kindscher (1992) recommended moist stratification of 2 to 4 months and Shirley (1994) recommended 90 days. Seeds should be barely covered with soil (3 mm) when planted and must be carefully weeded and watered as seedlings since they have low seedling vigor initially (Kinscher, 1992). A firm, weed free seed bed should be prepared prior to planting the pale coneflower. Pale purple coneflower has approximately 233,688 seeds per kilogram (kg). Seeding rate for seed production should be 20 to 30 seeds per 30 cm of row at .9 m between rows. For a prairie restoration pale coneflower would be a very small component of the mixture with 36 pure live seeds (PLS) per meter square. No fertilization should be used during the establishment year unless the soil test shows deficiency of phosphorus (>15 ppm) or potassium

(>90 ppm). Normally no nitrogen will be used during the establishment year because that will encourage weed competition.

Management

Weed competition can be reduced by mowing over the height of the pale purple coneflower seedlings and by cultivating between rows. Remove dead plant materials in the spring by shredding or burning residue. Burning needs to be accomplished prior to the plants breaking dormancy. Without moist stratification pretreatment, few fresh seeds will germinate.

Pests and Potential Problems

This species has been grown at the Elsberry Plant Materials Center for several years and during that time period there were no apparent pests or other potential problems. All *Echinacea* species are known to hybridize, so proper isolation should be maintained between related species to prevent hybrid seed production (McGregor, 1968).

Environmental Concerns

Rock (1972) and Shirley (1994) indicated that pale coneflower is an aggressive plant and needs competition to limit its spread. The plant does tend to lodge without support from surrounding vegetation. Native prairie grasses work well, providing support and contrast for the plant during flowering.

Seeds and Plant Production

Seed is harvested by hand or combine mid August. Seed should be dried initially and then processed using a three or four screen cleaner. Seed can be cleaned to a purity of 80 % without too much trouble. The germination, as mentioned previously, is rather discouraging without moist stratification. However, studies with the application of ethephon improved germination of *E. pallida* seed lots regardless of seed source. The increase in germination by ethephon in eight seed lots was statistically significant when compared to nontreated control seeds (Sari et al. 2001). Romero et al. (2005) found that seeds of *Echinacea pallida* and two other *Echinacea* species had significantly higher percentage and rate of germination under cold moist stratification under 16-24 h of light for four weeks than those seed germinated in the dark. Smith-Jochum and Albrecht (1987) found in field planting that fall sown seed had higher overall seedling emergence than did spring sown seed. They also reported that germination in the greenhouse appears to occur at a higher rate than in the field. A preliminary result indicated that better establishment and survival of *Echinacea* species occurred by transplants rather than direct seeding in

the field (Smith-Jochum and Albrecht, 1987). Greenhouse propagation requires seed pretreatment of wet stratification for 12 weeks at 40degrees F. Seed should be sown at 3mm depth in greenhouse flats two months before last frost free date. This species needs light to germinate, but covering the seed to 3mm depth does not inhibit germination. Transplants should be hardened off prior to planting in soil after all danger of frost has passed (Houseal, 2008). Pale coneflower can be easily divided in the spring (Shirley, 1994 and Rock, 1972). Kindscher (1992) indicated that the *Echinacea* crowns can be divided into separate plantlets in the fall and then grown in greenhouse flats to produce root systems for out planting in the spring. Harbage (2001) found that micropropagation of three *Echinacea* species resulted in abundant shoot production in cultures, but that subsequent root production was only successful with *E. purpurea*.

Cultivars, Improved, and Selected Materials (and area of origin)

Contact your local Natural Resources Conservation Service office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture".

Northern and Southern Iowa Germplasms are source identified plant releases made in 2002 from the Elsberry Plant Materials Center. The sources of germplasm for these releases are counties in northern and southern Iowa. Central Iowa Germplasm is a 2006 release of source identified materials from central Iowa county collections. The Elsberry Plant Materials Center and the Tallgrass Prairie Center are the releasing entities for this germplasm material.

References

Barrett, B. 2003. Medicinal properties of *Echinacea*: A critical review. *Phytotherapy* 10: 66-86.

Birt, D.F., M.P. Widrlechner, C.A. LaLone, L. Wu, J. Bae, A. K.S. Solco, G.A. Kraus, P.A. Murphy, E.S. Wurtele, Q. Leng, S.C. Hebert, W.J. Maury, and J.P. Price. 2008. *Echinacea* in infection. *Am. J. Clin. Nutr.* 87(2): 488S-492S.

Brevoort, P. 1998. The Booming U.S. Botanical Market: A New Overview. *HerbalGram* 44: 33-46.

Flannery, M.A. 1999. From *Rudbeckia* to *Echinacea*: The emergence of purple cone flower in modern therapeutics. *Pharmacy in History*. 41: 52-59.

Harbage, J.F. 2001. Micropropagation of *Echinacea angustifolia*, *E. pallida*, and *E. purpurea* from stem and seed explants. *HortScience*. 36(2): 360-364.

Houseal, G. 2008. Native Seed Production Manual. University of Northern Iowa: Tallgrass Prairie Center.

Kindscher, K. 1992. Medical Wild Plants of the Prairie. University Press of Kansas, Lawrence, KS.

McGregor, R.L. 1968. The Taxonomy of the Genus *Echinacea* (compositae). The University of Kansas Science Bulletin. Volume XLVIII, No. 4.

Menhusen, B.R. 1963. An investigation on the food habits of four species of rodents in captivity. *Transactions of the Kansas Academy of Science*. 66(1); 107-112.

Rock, H.W. 1972. Prairie Propagation Handbook. Boerner Botanical gardens. Milwaukee, WI.

Romero, F.R., K. Delate, and D.J. Hannapel. 2005. The effect of seed source, light during germination, and cold-moist stratification on seed germination in three species of *Echinacea* for organic production. *HortScience*. 40(6): 1751-1754.

Sari, A.O., M.R. Morales, and J.E. Simon. 2001. Ethephon can overcome seed dormancy and improve seed germination in purple coneflower species *Echinacea angustifolia* and *E. pallida*. *HortTechnology*. 11(2): 202-205.

Schramm, P. 1992. Prairie Restoration: a twenty-five year perspective on establishment and management. *Proceedings of the Twelfth North American Prairie Conference*. Cedar Rapid, IA.

Shirley, S. 1994. Restoring the Tallgrass Prairie. University of Iowa Press. Iowa City, IA.

Smith-Jochum, C.C. and M.L. Albrecht. 1987. Field establishment of three *Echinacea* species for commercial production. *Acta Hort*. 208: 115-120.

Weaver, J.E. and T.J. Fitzpatrick. 1934. The Prairie. *Ecological Monographs* 4(2): 109-295.

Weaver, J.E. 1958. Classification of root systems of forbs of grassland and a consideration of their significance. *Ecology* 39(3): 393-401.

Weaver, J.E. 1968. *Prairie Plants and Their Environment*. University of Nebraska Press. Lincoln, NE.

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