

EASTERN PURPLE CONEFLOWER

Echinacea purpurea (L.)

Moench.

plant symbol = ECPU

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Alternative Names

echinacea, snakeroot, Kansas snakeroot, narrow-leaved purple coneflower, scurvy root, Indian head, comb flower, black susans, and hedge hog

Uses

Ethnobotanic: Purple coneflower (*Echinacea purpurea*) was and still is a widely used medicinal plant of the Plains Indians. It was used as a painkiller and for a variety of ailments, including toothache, coughs, colds, sore throats, and snake bite (Kindscher 1992). The Choctaw use purple coneflower as a cough medicine and gastro-intestinal aid (Moerman

1986). The Delaware used an infusion of coneflower root for gonorrhoea and found it to be highly effective.

The purple coneflower was the only native prairie plant popularized as a medicine by folk practitioners and doctors. It was used extensively as a folk remedy (Kindscher 1992). Purple coneflower root was used by early settlers as an aid in nearly every kind of sickness. If a cow or a horse did not eat well, people administered *Echinacea* in its feed.

Echinacea is widely used as an herbal remedy today. A purple coneflower product containing the juice of the fresh aerial parts of *Echinacea purpurea* was found to make mouse cells 50-80 percent resistant to influenza, herpes, and vesicular stomatitis viruses. This product was available in Germany in 1978 (Wacker and Hilbig 1978). Perhaps the most important finding so far is the discovery of immunostimulatory properties in *Echinacea purpurea* and *E. angustifolia* (Wagner and Proksch 1985, Wagner et al. 1985). Stimulation of the immune system appears to be strongly influenced by dose level. Recent pharmacological studies indicate that a 10-mg/kg daily dose of the polysaccharide over a ten-day period is effective as an immuno-stimulant. Increases in the daily dosage beyond this level, however, resulted in "markedly decreased pharmacological activity" (Wagner and Proksch 1985, Wagner et al. 1985). Other research has shown that the purple coneflower produces an anti-inflammatory effect and has therapeutic value in urology, gynecology, internal medicine, and dermatology (Wagner and Proksch 1985).

Ornamental: The purple coneflower is often grown simply for its ornamental value, especially for its showy flowers. The best possibility for obtaining a new cultivar is in the hybrids between *Echinacea purpurea* and *E. angustifolia* var. *angustifolia*, whose progeny are compact, rounded, and bushy plants about two feet in diameter (McGregor 1968).

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Sunflower Family (Asteraceae). *Echinacea purpurea* is a perennial herb 1.5-6 dm (0.5-2 ft) tall, with a woody rhizome or tough caudex. The plant

has one to several rough-hairy stems, mostly unbranched. Basal and lower cauline leaf blades are ovate to ovate-lanceolate with serrate edges, up to 2 dm long and 1.5 dm wide, and slightly heart-shaped at the base. Cauline leaves are similar but become smaller as they extend up the stem. The flowers are in heads like sunflowers with the disk up to 3.5 cm across. The drooping ray florets have ligules 3-8 cm long, and are reddish-purple, lavender, or rarely pink. The disk florets are 4.5-5.5 mm long, and are situated among stiff bracts. Flowers bloom from June to August. Pollen grains are yellow. Fruits are small, dark, 4-angled achenes.

Distribution

The purple coneflower grows in rocky prairie sites in open, wooded regions. *Echinacea purpurea* extends eastward through the Great Plains bioregion from northeast Texas, Missouri, and Michigan. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment

Native *Echinacea* species are dwindling in the wild from loss of habitat and over-harvesting. *E. purpurea* is not as threatened as *E. angustifolia*. In the wild, *E. purpurea* grows sporadically along waterways, with a few scattered individuals. Plant densities are too low for efficient harvest for commercial purposes. *E. purpurea* is the most widely adaptable species for cultivation. It is cold and heat hardy, easy to grow, and boasts high yields. Bioactive constituents of *E. purpurea* compare favorably with *E. angustifolia*, although there are proportional differences. *E. angustifolia* has more of the alkylamides, while *E. purpurea* has more of the equally immune enhancing caffeic acid derivatives. They are both effective medicines. A combination of both probably affords the most broad-spectrum immune-enhancing effect. Historically, *E. purpurea* was rarely utilized by pharmaceutical companies.

It takes three to four years for roots to reach harvestable size (Foster 1991). Yields for cultivated, dried roots of three-year-old *Echinacea purpurea* grown at Trout Lake, Washington, were 131 kg/ha (1,200 lbs/acre) (Foster 1991). According to Richo Cech (1995), a mature two-year old *E. purpurea* plant yields 2.25 pounds of fresh flowering aerial portions and 0.5 pounds of fresh root per plant.

Propagation from Cuttings

Purple coneflower can be propagated by division of the crowns. This technique results in stronger plants initially and eliminates the tedious nurturing and tending of the slow-growing seedlings (Kindscher

1992). Harvest roots when plants are dormant, when leaves begin to turn brown. Wash roots and remove most for use. Then carefully divide the crown by hand to make one to five "plantlets." Replant the divisions as soon as possible. It is important that they don't dry out, so if replanting is delayed a couple of hours, dip the plants briefly in water and keep them in a sealed plastic bag in a cool, shady place until you are ready to replant them. When replanting, ensure that the remaining fine roots are well spread out in the planting hole and the soil is pressed firmly around the plant. These plantlets can be grown in flats in the greenhouse during the winter to re-establish their root systems, then replanted in the field the following spring for another round of production.

Seed Propagation

- *Echinacea purpurea* seed is easy to germinate. The following information is provided by Richo Cech (1995).
- The seed can be spring-planted without cold, or cold stratification, to germinate.
- Propagation is easily done in flats, which are sown with approximately ¼ ounce of seed per flat, evenly sprinkled on the surface and covered with about ¼ inch of potting soil.
- The flats are left outdoors through the winter and watered if necessary.
- A light screen over the flats will diminish the severity of heavy rain and snow, and will also keep out cats.
- Spring germination can be greatly enhanced by bringing the flat of cold-conditioned seed into the greenhouse, whereupon rapid germination may be expected.
- Once the second set of true leaves appears, the seedlings are put into pots or are spaced at approximately two inch centers in another deep flat. Seedlings must be carefully weeded and watered.
- In late spring or early summer, the hardy seedlings, now with a four-to-six inch root system, may be transplanted into the field or garden one or two feet apart.
- Regular spacing with one foot between the plants and two feet between the rows will result in approximately 21, 800 plants per acre. A generous two-foot spacing with three feet between the rows will result in approximately 7,500 plants per acre.
- Timely watering during dry periods greatly increases the size of this plant. A sparing side dressing of organic compost, usually in the mid-spring, will assist this sometimes slow-growing

herbaceous perennial in outranking competitive weeds.

An ounce of well-cleaned *E. purpurea* seed contains approximately 6,000 seeds. A pound contains around 96,000 seeds. Given a normal spacing of one foot between the plants and two feet between the rows, an acre would contain 21,800 plants. Given a 68% germination rate, a pound of good seed could produce three acres of plants. This same acre, dormant harvested for the roots at the end of the second year of growth, would produce (at 1/2 lb. per root) 10,900 lbs of fresh root.

Harvesting and Processing the Seed

- Seed can be harvested during the fall of the second year. Harvest the seed in autumn when seeds are ripe, before the fall rains set in. Seed should be from the largest and most vital plants.
- Stop watering when the seeds begin to mature – excessive watering at this stage is not needed and it may damage the seed crop.
- Snip the cone-heads off and put them in buckets. If the seed is still a little green, dry the cone-heads in the sun.
- Separate the seed from the chaffy debris. It is important to break up the cone-heads without damaging the seed. Run the seed through a hammer mill or compost chopper at low RPM through a one-inch screen. Then pass the seed and chaff through a ¼ inch stationary screen. Shake the remaining seed and chaff through a screen that is too small for the seed to pass. What you have left is the seed with only the chaff that is the same size as the seed.
- Lay out a flannel sheet and pour a cupful of the seed/chaff along the edge. Lift the top edge of the sheet and roll the seed to the other end where your partner is waiting to carefully funnel the seed into a bowl.
- Make sure the seed is thoroughly dry. Store in plastic bags in a cool, dry, and dark place. Plastic bags allow the seed to respire, while glass does not. Seed thus stored remains viable for about three years.

Management

Herbivores, such as insects and deer, are not a problem with *Echinacea*. Gophers and moles can be a problem as they eat the roots. Goldfinches love the *Echinacea* seed crop and can clear out all the seed in a few days.

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

ECPU is widely available through most nurseries and seed companies. Please check the Vendor Database, expected to be on-line through the PLANTS Web site in 2001 by clicking on Plant Materials.

Cultivars: King, Sombrero, Alba, Bright Star Leuchste, Crimson Star, Magnus, Ovation, Springbrook's Crimson Star, Talent, Thompson and Morgan Hybrids, White Flower Farm Strain, White Lustre, and White Swan.

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