

A Grower's Guide

Purple Coneflower

Echinacea purpurea

Purple coneflower (*E. purpurea*) is the domesticated cousin of *E. angustifolia* and *E. pallida*. It is native to North America, but hails from the more humid regions of the southeast and Appalachia. Garden cultivars range from the intensely pink/purple “Blaze” to a pure white-flowered “White Swan.” This plant is rare in the wild, and should not be wildcrafted. Research shows that garden and wild varieties have medicinal properties, so this can be a dual purpose crop because the flowers are also in demand in the floral industry and local flower markets.



Family: *Asteraceae*

Life cycle: Herbaceous perennial (Zone 3)

Native: North America

Height: 3 to 4 feet

Sun: Full sun to partial shade

Soil: Fairly rich soil

Water: Moderate. Can tolerate some drought, but responds to irrigation.

Flowering: Pink/purple flowers bloom from mid- to late summer

Propagation: Sow seed directly in the field in spring, or sow seed indoors in very early spring and transplant to the field in late spring. No seed treatment is required for this *Echinacea*. In gardens, the plants reseed prolifically and daughter plants can be transplanted each year.

Harvesting: Roots are harvested in the fall or spring of the second or third year. Roots are fibrous and are fairly easy to harvest, but washing is more difficult than

with the taprooted species. Harvest the aerial parts, flowers and seed from the second season on while in full flower. Use needle nose spade to dig roots.

Mechanization is possible using a chisel plow, lister or modified potato digger to expose the root, then remove and clean roots by hand. Seed crops are possible, but echinaceas can hybridize for up to a mile, so grow only one species if you are saving seed to sell. Harvest seed once the heads are partially dry and thresh by hand or mechanically. If seed is difficult to get out, freeze and thaw several times to loosen the seed in the head.

Parts used: Tops, leaves, and roots, fresh or dried. The highest concentration of active ingredient is in the roots and flower buds.

Used as: Infusion (tea), tincture, juice and capsules. Found in many other products.

Medicinal benefits: Approved by physicians in Europe for common cold, cough, bronchitis, fevers, colds, urinary tract

infections, mouth and pharynx inflammation, infection and for wounds and burns. Several clinical trials have demonstrated the efficacy of *E. purpurea* in activating T-cells (immune system cells) and promoting wound healing. Historically used for everything from saddle sores to snakebite, and also to heal brown recluse spider bites.

Market potential: Moderate to very high. Prices for tops range from \$14 to \$54.40 per pound (lb) dry weight, and for roots \$12 to \$ 65.60 per lb dry weight *Echinacea* is the top-selling herb in the United States.

Summary of field trial data: Seeds were easy to germinate and seedlings for transplant were easy to grow in the greenhouse. Transplanting was fairly successful, and nearly 90 percent survived the first growing season. However, this plant appears to be highly susceptible to the disease aster yellows, which is a mycoplasma-like organism. The disease is spread by leafhoppers, and there are no

known organic controls for this pest. The disease doesn't always kill the plant, but symptoms include light-green leaves and stems, multiple seedheads, distorted or stunted growth, short internodes and stems and low vigor. Some symptoms were visible by the end of the first growing season and by the end of the second growing season 90 to 100 percent of plants appeared to be infected (data not shown). Survival was reduced to less than 50 percent and the vigor rating dropped from more than 3.0 in the first year, to less than 3.0 (below average) in years two and three. It might be possible to harvest some of the plant for the market – especially the root – but data on whether efficacy is

affected by the disease and whether it would be ethical to market roots known to have the disease is not yet available. The plant disease would not have an effect on humans per se, but might reduce the herb's effectiveness. Another possibility is to harvest the tops the first year for market, knowing that the entire stand will be affected by the second year.

Unfortunately, this disease was observed at all locations and reported by growers from several parts of the state, so this was not an isolated outbreak. Some parts of the country are not affected by aster yellows because leafhoppers are not prevalent, so those growers have an advantage over Great Plains growers.

This crop is not commercially viable on a large scale as an organic crop in Kansas because of disease control problems. There is some potential for small scale or local markets for this crop. Root weights per plant were as high with *E. purpurea* as with *E. pallida*, though *E. pallida* and *E. angustifolia* seem to be less susceptible to aster yellows (see *E. angustifolia* and *E. pallida* fact sheet MF-2620 for details).

K-State Field Trial Data 2000-2002 *Echinacea purpurea*

				Average	Comments
Age of plants in years	1	2	3		
Number of test sites¹	5	2	2		
Survival rate (%)	89.8	48.0	44.5	60.8	
Vigor rating²	3.2	2.7	2.9	2.9	
Height (cm)	39.8	56.0	58.5	51.4	
Dry weight herb (g/plant)	41.7	88.4	95.3	—	
Dry weight root (g/plant)	6.0	26.1	59.3	—	
Maturity rating³	3.2	4.9	4.9	4.3	
Insect damage rating⁴	1.0	2.1	1.8	1.6	
Disease rating⁵	0.9	4.6	3.8	3.1	Aster yellows is a significant problem.
Estimated planting density (number of plants/A)	21,780	21,780	21,780	—	1- by 2-ft. row spacing.
Plant density⁶	19,558	10,454	9,692	—	
kg/A dry weight (g/plant x plant number) – tops	816	924	924	—	
kg/A dry weight (g/plant x plant number) – roots	117	273	575	—	First-year roots too small to sell.
Estimated marketable yield (dry weight lbs/A) – tops	1,796	2,036	2,036	—	
Estimated marketable yield (dry weight lbs/A) – roots	257	601	1,266	—	
Yield x ½ of low price¹ – tops	\$12,572	\$14,252	\$14,252	—	
Yield x ½ of high price¹ – tops	\$48,851	\$55,379	\$55,379	—	
Yield x ½ of low price¹ – roots	\$1,544	\$3,606	\$7,596	—	
Yield x ½ of high price¹ – roots	\$8,430	\$19,713	\$41,525	—	

¹ See "How Data Were Collected," on page 3.

² Vigor rating (1=very poor, 3=slightly above average, 5=very good, well adapted)

³ Maturity rating (1=vegetative, 2=early bud, 3=early flower, 4=full flower, 5=seed production, 6=senescence)

⁴ Insect damage rating (scale of 0 to 5; 0=no damage and 5=severe damage)

⁵ Disease rating (scale of 0 to 5 with 0=no damage and 5=severe damage)

⁶ Calculated as starting plant density x survival rate.

How Data Were Collected

The plants described in this fact sheet were grown in K-State test plots in Hays, Colby, Wichita, or Olathe, Kan. Generally, four replications of each species were included at a site. Not all species were screened at each site or each year. The number of locations is noted in the table. Depending on the location and year, either five or 10 plants per plot were established in each of the replications. Details can be found at www.oznet.ksu.edu/ksherbs. Plants were grown from seed in the greenhouse and transplanted in the field in May or June.

All plants at each location were used to determine survival percentage, vigor rating, insect damage rating, and disease rating as described above. Three plants per plot were measured for height, and only one plant per plot was harvested to measure yield each year. Cultivating four plots allowed us to estimate yield from four plants at each location per year.

Plants were dried, and top and root weights recorded in grams. Grams per plant were converted to kilograms per acre (kg/A) and pounds per acre (lb/A) to estimate field-scale yield. The population density used to calculate field yields was the optimal population density (determined by the average size of the plants) times the actual percentage survival as measured in the field. There was generally some loss due to transplant shock and, for some species, significant winter loss as well.

Plant spacing recommendations on each fact sheet are for spacing within a row. Distance between rows will depend on the particular farming operation and equipment used. The minimum row spacing will be the same as the plant spacing recommendation. For example, if the recommendation is to set plants 12 inches apart, rows should be a minimum of 12 inches apart as well. However, if cultivator or root-harvesting equipment is on 5-foot centers, plant rows 5 feet apart to facilitate cultivating and harvesting. Adjust estimated plant density per acre on the worksheets to estimate gross yield and net income.

Prices were taken from Appendix B of K-State Research and Extension publication S-144 *Farming a Few Acres of Herbs: An Herb Growers Handbook*. To calculate a rough gross income potential for each herb, estimated yield was multiplied by the lowest and the highest retail price, divided by two. This is a rough estimate of wholesale price. Actual prices would be determined based on a contract obtained from a buyer.

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