

A Grower's Guide

Evening Primrose

Oenothera biennis

The name evening primrose refers to the habit of the plant to open its flowers only in the evening. The light yellow color of the flowers is similar to, but should not be confused with the European primrose, *Primula spp.* The Lakota called the plant “rattle weed,” and the Potawatomi name was “yellow top.” The plant forms a rosette and tall, flowering stalk and should not be confused with other plants with the common name primrose. The oil from the seed is the most common medicinal product, which is a good source of gamma-linolenic acid, but the leaves and roots were also used by Native Americans.



Family: *Oenagracea*

Life cycle: Herbaceous biennial (Zone 3)

Native: Great Plains and eastern North America. Naturalized throughout most of Europe and parts of Asia.

Height: 2 to 6 feet

Sun: Full sun optimal, will tolerate partial shade.

Soil: Does best on well-drained soil, but will tolerate some wet soils. Can be grown with low fertility, but will do better with some compost and/or mulch.

Water: Low to moderate

Flowers: Bright yellow flowers with four petals that bloom at dusk each day and fade by mid-morning the following day. Begins blooming mid-summer of the second year of growth, but a few will bloom in late summer of the first year.

Propagation: Seeds should be stratified for three to four weeks to improve germi-

nation, then sow directly outdoors or in seedling flats for transplants. Seed is extremely small, so controlling the seeding rate would be difficult outdoors. Seed also can be saved from your own plants, and this plant will reseed if seed is not harvested. Space plants at least 12 inches in the row, with 2 to 3 feet between rows.

Pests: No major insect or disease pests were observed in our field trials, though the plants appeared to lack winter hardiness and/or succumb to root diseases between the first and second year.

Harvesting: The flowering tops are clipped in the early flowering stage. Seed is harvested at full maturity.

Parts used: Seed and/or aboveground herb.

Used as: Oil extracted from seed, herb used as infusion (tea), tincture, syrup.

Medicinal benefits: The gamma-linolenic acid in the oil has anti-inflammatory and cell membrane stabilizing activity.

The oil may be beneficial to neural development in breastfed infants. Capsules of evening primrose oil have been approved in Germany for atopic eczema. Approved in Britain for treatment of atopic eczema, premenstrual syndrome and prostatitis. One precaution listed in the *Physicians Desk Reference for Herbal Medications* is that the oil has the potential to reduce the seizure threshold in patients with seizure disorders or those being treated with drugs that reduce the seizure threshold. Native Americans used root tea for obesity, bowel pains. Poulitced root was used for piles and bruises and rubbed on muscles to give athletes strength.

Market potential: Unknown. The seed is extracted for oil, but we don't know if there is a market for U.S.-grown seed. Seed products, but not raw seed, were found in herb catalog sources. There appears to be a small market for the aboveground portion of primrose, with prices ranging from \$7.50 to \$34.96 per pound (lb) dry weight.

Summary of field trial data: This plant had few insect or disease pests in its first year of growth and scored 4.2 vigor rating on a 5-point scale. A few plants bloomed the first year, which would have produced a seed crop. However, no plants survived at our three sites the second year, and a few plants in a demonstration garden survived, but suffered from a root disease. We don't know if our seed source lacked winter hardiness or if root disease will be

problematic for Kansas growers in general. We did not harvest the crop for seed the first year, so we can't recommend it as a crop for Kansas. In future trials, we should see if enough seed is produced in the first year to make this a commercial crop. There appears to be a small market for the aboveground portion of primrose, though there is little information in the research literature on medicinal use of this part of the plant.

K-State Field Trial Data 2000-2002 *Oenothera biennis*

				Average	Comments
Age of plants in years	1	2	3		
Number of test sites¹	3	3	0		
Survival rate (%)	74.7	0.0		—	
Vigor rating²	4.2	—	—	4.2	
Height (cm)	47.3	—	—	47.3	
Dry weight herb (g/plant)	147.5	—	—	—	
Dry weight root (g/plant)	11.5	—	—	—	
Maturity rating³	2.6	—	—	2.6	
Insect damage rating⁴	0.7	—	—	0.7	
Disease rating⁵	0.7	—	—	0.7	
Estimated planting density (number of plants/A)	14,520	—	—	—	Assumed 1- by 1-ft. spacing.
Plant density⁶	10,846	—	—	—	
kg/A dry weight (g/plant x plant number) – tops	1,560	—	—	—	
Estimated marketable yield (dry weight lbs/A) – tops	3,524	—	—	—	
Yield x ½ of low price¹	\$13,215	—	—	—	
Yield x ½ of high price¹	\$61,600	—	—	—	

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. Because there were four plots, this 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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