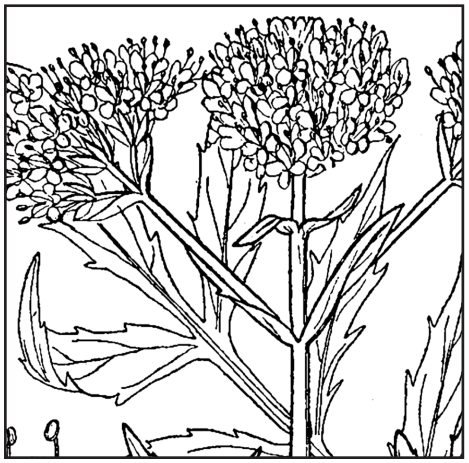
K-STATE Research and Extension: MF-2632

A Grower's Guide

Valerian

Valeriana officinalis



Most commercial valerian is from a plant that is native to Europe, but a related species, *V. sitchensis*, is native to the western United States, and has higher levels of valepotriates and stronger medicinal activity. However, this plant should be cultivated, not wild harvested, and is entering the market now in small quantities. Valerian tincture was used in WWI and WWII to treat shell shock, nervousness and stress. Valerian root has a very strong odor that attracts cats similar to catnip. According to folklore, in 18th century apothecaries, the quality of valerian root was determined by the way in which cats reacted to it.

Family: *Valerianaceae*

Life cycle: Herbaceous perennial (Zone 3)

Native: Europe, Western Asia. Naturalized in northeastern North America where it is found in ditches, damp meadows, marshy thickets and near stream banks.

Height: 4 to 5 feet (in bloom)

Sun: Prefers partial shade. Tolerates full sun and shade.

Soil: Prefers a nutrient-rich, high humus soil with pH 6 to 7. High phosphorus requirement.

Water: Moderate to heavy. Grows along ditches, rivers and damp woods. Can grow in soil too wet for other species.

Flowers: Fragrant white or slightly pink flowers in a dense head of several stalked clusters. Blooms in late spring and early summer.

Propagation: No treatment needed for seed germination. Seed directly in the field in early spring or start indoors to transplant in late spring. Press into soil, do not cover. Needs light to germinate. Optimum germination temperature is 68°F. Germination occurs in seven to 14 days with a rate of 60 to 70 percent. Space 12 to 24 inches apart. Seed will lose viability after the first year, so do not save old seed. Fresh seed reported by Frontier only 30 percent viable. Another option is to take root divisions in fall or spring. Recommended seeding rate is 2 lb/A.

Pests: Trials in Iowa reported some foliage diseases: powdery mildew (*Erysiphe polygani*) and peronospora (*Peronospora valerianae*). Other diseases encountered included adema, root rot and white mold. In our field trials, first year plants appeared quite healthy, but during the second year, the foliage appeared stunted, purple and yellow, and a root rot – possibly sclerotinia – was identified on some plants.

Harvesting: Harvest the root in the fall of the first or second year. Two references suggested harvesting in the second year, but another reference reported that the roots will deteriorate in quality by the fall of the second year so harvest accordingly. Use a needle-nose spade and dig when the soil is moist but not wet. Good weed control is recommended for optimizing crop yield. Cut tops before harvest for easier digging. Carefully dry root with circulating air at temperatures lower than 40°C (110°F). These are somewhat fibrous roots and difficult to wash.

Parts used: Root, fresh or dried.

Used as: Infusion (tea), decoction, expressed juice from fresh plants, tincture. Oil is used in flavoring, pharmaceutical and fragrance industry.

Medicinal benefits: Valerian is used as a strong sedative and pain reliever. It is approved for use in Europe to treat nervousness and insomnia, and many research studies support its effectiveness. Also used

to treat hypochondria, nervous headaches, irritability, mild spasmodic affections, depression, despondency, as well as insomnia. Warning: Do not use in large doses over a long time period. Side effects include headache and palpitations. It is not recommended that valerian be combined with other central nervous system depressants or with alcohol.

Market potential: High. This is one of the top-selling sedatives in Europe, and is still growing in popularity in the United States. There are growers producing this herb on a large scale. Prices range from $2.95 to $31.65.

Summary of field trial data: Though literature values suggest potentially high yields with this crop, ranging from 1,500 to 2,500 lbs/A dry weight to 5 tons/A, and few pests, our experience in the field was quite different. First-year plant survival and vigor was relatively good, but observations in the spring and fall of the second year found plants that barely emerged from winter dormancy, showed severe discoloration, deformed leaves and failed to produce much the second year. In the field, this affected nearly all the plants, but in a garden setting, with wind breaks and more regular waterering, fewer plants were affected. Field sites for year one plants included Wichita, Hays, Olathe and Colby, with the first three trials taking place in 2001, and the Colby trial in 2002. Yields varied a lot, ranging from root dry weight yield of only 3.4 and 2.0 g/plant at Wichita and Hays, and 31.5 an 37.5 g/plant at Olathe and Colby, respectively. Though Olathe was not irrigated and Colby was, the Olathe site apparently did better than Wichita and Hays because of the heavier soils and receiving enough rain in 2001. A second column of data is presented in the comments section of the first table, to calculate yields and net return from the average of the better performing sites. Even using only the best sites, per acre yield was only about 1,200 lbs dry weight. Better yields could perhaps have been obtained the second year, if more plants had survived.

Two valerian varieties were compared: the "standard" or common variety sold by Richters, and a named, improved variety, 'Artener auchtung.' Unfortunately, the named variety was only tested at one site, Hays, and this was one of the harsher sites for valerian, so yields were disappointing. The vigor rating and survival was better for the named variety however, so future research on this and other herbs should include as many cultivars as possible.

Future research on valerian in Kansas should also include wetter, higher fertility

K-State Field Trial Data 2000-2002 *Valeriana officinalis*

				Average	Comments
Age of plants in years	1	2	3		
Number of test sites[1]	4	2	0		
Survival rate (%)	78.0	3.7	—	—	
Vigor rating[2]	2.9	2.3	—	—	
Height (cm)	35.8	—	—	—	
Dry weight herb (g/plant)	41.0	36.0	—	—	
Dry weight root (g/plant)	18.6	33.0	—	—	Average yield of two best sites in the field trial.Year 1 data = 34.5 (Olathe and Colby)*
Maturity rating[3]	1.0	1.0	—	—	
Insect damage rating[4]	0.8	0.5	—	—	
Disease rating[5]	1.2	0.3	—	—	
Estimated planting density (number of plants/A)	21,780	21,780	—	—	21,780
Plant density[6]	16,988	806	—	—	16,988
kg/A dry weight (g/plant x plant number) – roots	316	27	—	—	586
Estimated marketable yield (dry weight lbs/A) – roots	969	59	—	—	1,291
Yield x ½ of low price[1]	$1,434	$87	–	–	$1,911
Yield x ½ of high price[1]	$15,339	$927	—	—	$20,436

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.

*Average yield over two years does not make sense with only 4% survival rate. The average of our two best locations in the fall of year 1 is presented under the comments above.

sites. Under our field conditions, each transplant receives compost. Wichita has occasional irrigation from an overhead sprinkler system, and Colby has drip irrigation. All are exposed to full sun and wind. Symptoms in second-year plants could have been due to many things or a combination of factors. We suspected winter stress (including wind desiccation of young leaves), phosphorus deficiency (leaves were quite purple), herbicide drift damage, or disease. The only stress factor we've confirmed so far is the presence of a root disease, possibly sclerotinia, from one of the plants that died in our demonstration garden, that had been growing under fairly ideal conditions.

Until we get better survival in the field, we do not recommend this as a crop in Kansas at this time, though it does make an attractive and fragrant addition to the home flower or herb garden.

K-State Field Trial Data 2000-2002 *Valerian officinalis var.* Artener auchtung

				Average	Comments
Age of plants in years	1	2	3		
Number of test sites[1]	1	1	—		
Survival rate (%)	100.0	13.0	—		
Vigor rating[2]	3.4	0.1	—		
Height (cm)	31.0	—	—		
Dry weight herb (g/plant)	21.8	—	—		Plants were too small to dig in the second year.
Dry weight root (g/plant)	4.4	—	—		
Maturity rating[3]	1.0	1.0	—		
Insect damage rating[4]	0.0	0.0	—		
Disease rating[5]	0.0	0.0	—		
Estimated planting density (number of plants/A)	21,780	—	—		
Plant density[6]	21,780	—	—		
kg/A dry weight (g/plant x plant number) – roots	96	—	—		
Estimated marketable yield (dw lbs/A) – roots	211	—	—		
Yield x ½ of low price[1]	$312	—	—		
Yield x ½ of high price[1]	$3340	—	—		

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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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