



NOT YOUR USUAL GARDEN CROP

Hops production can be in landscapes or big enough to supply small, local brewers

Brian Lee

If you enjoy beer, you have hops (*Humulus lupulus*) to thank for making your favorite beer so tasty.

The dried flowers are a main ingredient in beer along with grain, water, and yeast. Hops is a widely grown perennial plant with a very specialized purpose in beer production: different hops varieties are either used for bittering or flavoring in the beer production process. Hops plants can be grown about everywhere in the United States, and they do rather well in Wyoming.

The plant is particularly easy to grow on a small scale – the most labor-intensive part of growing hops is harvest, as plucking the hops flowers off of the vine is very time consuming. Hops plants are typically started from a rhizome buried a few inches deep in well-drained soil. The rhizome will typically produce numerous viable shoots that should be trimmed back to allow only one or two to grow. This trimming will reduce competition on the vine between shoots and allow for a better yield of hops flowers per vine.

The crop requires ample nutrients and water during its growth period. Hops vines can grow up to a foot per day in the middle of summer with the proper nutrients and water. Using a drip system to irrigate is advised.

Much of the first year the plants will put large amounts of energy into root production, but they will still produce hop flowers. The following years' hops flower production should increase. Hops plants can grow up to 15 years with proper care without re-planting.

Hops are susceptible to multiple types of mildew and root rot, so having well-drained soils is imperative. Aphids and spider mites can harm hops crops. Vigilant inspection is important to regularly look for pests and to control them in a timely manner.

Need Your Support

A proper trellis system is very important. Hops plants can grow up to 20 feet tall, so they need adequate support. Trellising ensures hops leaves receive plenty of sunshine, maintains the quality of flowers, and makes harvesting more efficient.

The most common trellis system is a conventional set-up wherein hops are planted in a straight line. Large posts that suspend a cable or rope system can be set in intervals down the row, and each plant should have a rope or twine connecting to the suspended trellis system. They'll grow up the rope or twine. Recommended spacing is 4 to 5 feet in the row and between rows so roots have plenty of room to grow, although this space can be decreased with proper water and nutrient management.

Larger hops production systems have up to an 8-foot space between rows to allow equipment (mowers, etc.) to pass.

A flagpole trellis design can be the easiest to assemble and can be ornamental in nature. This design requires a single pole set; the hop rhizomes are planted in a circle around the center pole. Rope can be then run to the top of the center pole, creating somewhat of a Christmas tree form. Similar spacing as the conventional design should be followed.

Commercial growers utilize a similar design to the conventional design, but the vines are trained in a V-shape across rows. This allows the maximum sunlight penetration to leaves and also lowers the entire structure somewhat for easier access. A 1-acre hops yard can contain up to 80 support poles. The rule-of-thumb is, the more the better as there can be over 1,200-plus plants in a 1-acre yard.

Varieties have Specific Acid Ranges

A healthy, full-grown hops plant can produce up to 2 pounds of dry hops flowers in a season. Hops flowers are harvested at specific maturities to ensure acid levels in flowers are consistent with brewing standards. Each variety has a specific range of alpha and beta acid levels to be correct for brewing. Testing for these acid levels can be done by KAR laboratories (<http://www.karlabs.com/hops.htm>). Hops flowers need to be either air dried or mechanically dried and packaged after harvest. A home brewer might use 2 to 4 ounces of dried hops for a 5-gallon batch of beer.

Since a 1-acre hops yard can contain 1,200 or more plants, densely planted yards can produce up to 2,600 lbs. of dry hops per acre. Full cost of establishing a high-density hops plantation can cost between \$7,000 and \$10,000 per acre depending on materials, hops varieties, and number of hops planted.

USAhops.org estimates that, for a 1-acre plot with 4,000 plants established that produce 2,600 lbs., the break-even cost would be \$3.18/lb., assuming each vine would produce .65 lbs./vine.

Like other agricultural crops, there is a density dilemma. For example, establish more plants on an acre and possibly have lower yields due to resource competition, or plant fewer



A small-scale trellis for hops

and try to maximize pounds per vine? The 2013 U.S average price for all hops was around \$3.50/lb. Additional market and hops production information is at USAhops.org.

Hops will grow well in many parts of Wyoming and could be profitable on a large scale, but hops farming is highly mechanically specialized, and little research has been conducted in Wyoming.

Large producers tend to have hundreds of acres devoted to production and special equipment for harvest, flower separation from the vines, drying, and packaging; however, hops are excellent for small, personal use or possible sale to local homebrew stores. Hops also have value if you are a home brewer or are looking for landscaping ideas (shade/privacy).

*We'll make no jokes about beer and any personal research of the subject. **Brian Lee** is a research scientist at the University of Wyoming James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle. He can be reached at (307) 837-2000 or at blee@uwyo.edu.*