University of California
Agriculture and Natural Resources

UCCE Master Gardener Program
San Luis Obispo County

HOPS IN THE HOME GARDEN

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Photo credit: UCANR

Hops in the Home Garden

Hop (Humulus lupulus) is a perennial deciduous climbing plant grown for its cone shaped flowers which are used in beer brewing. The Pacific Northwest leads the country in the commercial production of hops with 99% of the country's hops grown in Washington, Idaho and Oregon. 53,000 acres of hops were harvested nationwide in 2017 (USDA) with only 130 acres from California. There is renewed interest in hop farming in California due to the current popularity of local craft beer and hoppy beer varieties.

The Hop Plant

The hop plant is technically a bine not a vine since it climbs with the aid of stiff hooked hairs on its stem. It is dioecious, meaning it has separate male and female plants. Only the mature flowers or cones from the female plant contain lupulin glands with the acids valued in beer brewing. Male plants are not necessary for cone production in female plants. They can grow 4-10 inches/day, up to 18-25 feet in a season. The plants have a pine-like aroma and can live 20 to 35 years.

Varieties

There are hundreds of hop varieties worldwide. Hops are classified as bittering, aromatic or landscape varieties. Choose the cultivar based on its intended use.

Bittering hops have higher levels of alpha acids imparting bitterness to the beer. Bittering cultivars include: Chinook, Columbus, Nugget, Sorace Ace.

Aromatic hops give beers their unique aroma and flavor. Examples include: Cascade, Centennial, Fuggle, Mt Hood, Willamette.

Ornamental hops, like Comet Bianca, have richly colored foliage.

Hops vary in their aromatics based on their growing environment. They also vary in disease resistance. USDA has a detailed list of hop varieties and their characteristics. Fuggle, Cascade, Nugget and Sorace Aece are better suited to areas of fog and wind.

Site Selection

Pick a location that allows for 10-20 feet vertical growth, full sun (12 hours), south facing with good air circulation and low wind. Well-draining soil, sandy or silt loam are best.

Planting

Hops can be planted as rhizomes or potted plants.
Rhizomes: plant 3-6 rhizomes horizontally, 2-4 inches deep with shoots pointing upward. Place these clumps 3- 5 feet apart (5 feet if different varieties). Cover with soil, compost and mulch.
Plants: Similar to vegetable plants, plant after danger of hard frost and after hardening off outdoors. Space plants 2-3 feet apart.

Support
Allow room for a 20-30-foot bine. Plants will need a support structure. Commercial bines are trained onto twine hung from cables attached to 18-foot poles spaced about 12 feet apart- but homeowners can use shorter 14-foot trellis or poles.

Be creative with string, wire, fencing or netting; run string from roof of house or flagpole to stakes in ground; or use a tall long fence; arbor or trellis. Run bines vertical for 8-10 feet then horizontal for another 8-10 feet.

As shoots grow, train them onto the support by winding them clockwise around string or the support. Bines are brittle on cool cloudy days. Wear gloves and long-sleeved shirt as the bines can cause skin irritation.

Growing and Care

1st year: Focus on root development; don't prune. Expect few cones.

2nd year to maturity: Prune first spring shoots back to ground when 2 feet tall to encourage robust growth. Once shoots regrow 1-2 feet, pick 2-4 bines, pruning out all other suckers and bines. Set up 2 strings per plant. Train 2 bines per string wrapping in clockwise direction with 3 trainings 15 days apart. Overcrowding of unpruned bines encourages disease.

Once bines reach 20 feet, side branches appear, and cones develop on these shoots.

Fertilize: use urea or 16-16-16 fertilizer: at first sprout- 3 weeks later and mid-summer or every two weeks from April through mid-July.

Irrigation: Proper irrigation is critical during first year. Plants like consistent irrigation, moist but not continually wet soil. It is ok for soil to dry out slightly between waterings. During hot summers, actively growing mature plants may need up to 6 gallons of water per day.

Pests and Disease

Aphids- small green or black insects cause crinkled leaves and produce sticky honeydew on which black sooty mold can grow. Spray plants in morning with strong stream of water from hose to dislodge insects or use insecticidal soap.

Powdery mildew: Prevent by improving air circulation around bines and never apply overhead water. Prune leaves from lower 1-3 feet of plant after training, remove diseased leaves and selecting resistant plants (Cascade and Crystal) to minimize disease occurrence.

Harvesting

Hops are harvested from the mid-August through September but the exact timing for harvesting hops is something of an art. Prime harvest period is a window of 7-10 days. It is better err on the side of picking over-ripe rather than under-ripe.

Signs of Ripe Cones: Sample cones from upper part of plant.

- Ripe cones will be dry, papery, springy, sticky with an aroma of cut grass or onions when rolled between hands. The lupulin should be golden yellow with a pleasant aroma.

- Immature cones are soft with pale yellow lupin having a vegetative aroma. The cone will stay compressed when squeezed.

- Over-ripe cones have orange lupulin with a rancid odor.

The first year, handpick to avoid disturbing the roots and do not cut down the bines until they die off in the winter. On mature plants, pick cones by hand or cut entire bine 2-3 feet above ground then harvest cones.

Expect 1-2 lbs. of cones per mature plant.

Drying and Storage

Hops can be used fresh for brewing wet-hopped beer or, more commonly, dried for later use. More hops are needed to make wet hopped beer.

Drying hops should not last more than three days and not exceed 140 degrees F. The quality of the hops decreases at higher temperatures.

Dry using a food dehydrator, a well-ventilated oven at less than 140 degrees F or spread cones on a screen in a warm, dark, dry location with a fan for air circulation.

To determine if cones are adequately dry, try to break the central stem of the hop. It should snap in half and the yellow lupulin powder should easily fall from the cone. If it is not properly dried, it can mold in storage. Divide hops into 1-2-ounce portions in plastic bags or jars, remove most of air or vacuum seal then freeze.

References:

Getty, B, Townsend, S, Detweiler A.J. *Growing Hops in the Home Garden*. Oregon State University. 2015 https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9115.pdf

Growing Hops in Sonoma County-Again. Hops. UCCE Sonoma County. http://cesonoma.ucanr.edu/SpecialtyCrops/Hops/

Morehead, Gordon and Vossen, Paul. *Hop Culture in California*. UCCE http://cesonoma.ucanr.edu/files/27166.pdf

Owen, Clark, Drost, Dan. *Hops in the Garden.* Home Gardening. Utah State University Cooperative Extension. 2010. https://digitalcommons.usu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1258&context=extension_curall

Hop Cultivar Descriptions. USDA https://www.ars.usda.gov/pacific-west-area/corvallis-or/forage-seed-and-cereal-research/people/john-henning/cultindex/