



Hops: Organic Production

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By George Kuepper
Updated by
Katherine L. Adam
NCAT Agriculture
Specialist
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Organic Farming, Organic Certification, and the National Organic Program

Organic farmers rely heavily on crop rotations, crop residues, animal manures, legumes, green manures, composts, and mineral-bearing rock powders to feed the soil and supply plant nutrients. Insects, weeds, and other pests are managed by mechanical cultivation and cultural, biological, and biorational controls. Synthetic pesticides, growth regulators, and conventional fertilizers are prohibited. See the publication *NCAT's Organic Crops Workbook* and publications in ATTRA's Organic Series at www.attra.ncat.org.

While in the past the center of U.S. hops production was in the Pacific Northwest, mainly under contract with a few major breweries, now dried hops are easily imported from around the world to supply an essential ingredient to emerging U.S. microbreweries. However, the price is high, and so is the organic premium. If U.S. production costs work out, a new niche market for organic hops could make U.S. farmers competitive with those in New Zealand. China is also starting to produce organic hops.

Hops were first planted in the U.S. in 1629.(1) U.S. hops production was at 1.5 million pounds by the mid-1800s. Due to powdery mildew and other diseases, hops production moved westward during the 1920s. Currently, most hops are grown on the Pacific Coast, where disease pressure is less than in the humid eastern U.S.



Hops. Photo by Marlon Bruin, www.sxc.hu.

Culture

The hop of commerce is the female flower, commonly called a cone. Hops are produced on climbing vines from female rhizomes planted one to a hill, with four to six vines per plant. Vines are trained on almost vertical strings to a flat overhead trellis. Trellis pole supports need to be at least 12 feet above the ground and no more than 25 feet apart. Hop hills should be about 2 feet apart, allowing 10 hills (of the same variety) per set of poles. Careful choice of location of the hops vineyard will shelter vines from prevailing winds.(2)

To produce hops in the proportions common for brewing beer, growers should plan



In states where hops are commonly grown, the local Extension Service may be able to provide information on planting dates and varieties to select.

on growing roughly twice as many hills of aromatic hops (3 to 5% bitterness) as of bittering hops (above 11% bitterness), making sure to leave enough space between varieties so that it is easy to keep the different types of hops separate at harvest. About four hills (plants) of aromatic hops and two hills of bittering hops are needed for every hundred gallons of beer. Each of the four to six vines arising from a hill produces four to six ounces of dried hops.(3)

Hops can generally be well nourished with abundant applications of composted manure, accompanied by roughly one handful each of bonemeal and wood ash per hill. Unlike many crops, hops tend to produce better in soil with a relatively high proportion of phosphorus and potassium to nitrogen. Put another way, boosting nitrogen fertility does not tend to increase yields. Hops also respond well to small amounts of boron—a small pinch of borax per hill should be quite adequate.(3)

Hops are vegetatively propagated from root cuttings, and there are both male and female plants. Since only female flowers are used in brewing, and hop seeds are a problem for brewers, make sure to obtain only female rhizomes for planting. Normally, hops are planted at about the same time as early peas, and can tolerate freezes down to 20° F with a good straw mulch.

Many growers of hops experience difficulties with downy mildew and *Verticillium* wilt. Both are fungal diseases that can be kept in check with sulfur-based fungicides. Downy mildew, especially, can spread quite quickly, so plants should be monitored regularly all season long. Cut off any infected parts, if possible, placing them in a tightly closed plastic bag for off-site disposal, rather than composting. Some growers prune off the lower two feet or so of leaves to impede mildew infections by improving ventilation near the soil. Wide spacing of the hop hills also reduces the chances of serious infection, because the better ventilation reduces humidity levels in the immediate plant environment.

Aphids are probably the most common insect pest. These are usually controlled by

natural predators, but if aphids get out of hand, the population can be set back with an insecticidal soap spray. Applications of neem will also control aphids, as well as spider mites. Mites may be a problem, especially in hot, dry weather. There are some natural enemies of mites, but the most effective non-chemical control is a good cold rain or a heavy hosing with cold water. Adequate irrigation in dry periods will also reduce mite damage by decreasing water stress on the plants.

The biggest challenge may be finding a source of organic hop rhizomes of the preferred varieties. Local brewing clubs may know of a source. A company that offers female hop rhizomes on the Internet is Brew Organic, of Santa Cruz, California.(4) Planting stock is certified organic by CCOF. Brewing networks mention Germany and Canada as preferred sources for planting stock.

In states where hops are commonly grown, the local Extension Service may be able to provide information on planting dates, varieties to select, etc. In the past, Washington State Extension has offered publications on growing hops, including crop budgets and irrigation information.

A recent publication (2000) listed preferred hops varieties (by quantity of production) for Washington, Oregon, and Idaho.(5) This listing, along with one for the Northeast (7) and an alphabetical list of varieties for California (2), appears on the chart below.

Recent research

A 1998 Sustainable Agriculture Research and Education grant supported a field trial of 15 different varieties of hops grown under organic management at Jeffrey Klein's farm, Westerlo, New York. The trial was successful, and Klein quickly sold his first year's harvest to home brewers and to a producer of homeopathic medicine. Experimenting with 12-foot trellises of fresh-cut white oak (instead of the traditional 20-foot used utility poles that cannot be employed in organic production), Klein grew 130 vines on one-quarter acre. Each vine produced four to

Hops varieties

Washington	Oregon	Idaho	California	Northeast
Nugget	Nugget	Zeus	Brewer's Gold (home garden)	Cascade
Galena	Willamette	Galena	Bullion (bittering)	Tettnang (most used, by weight)
Zeus	Perle	Cluster	Cascade (aromatic)	Hallertau
Willamette	Mt. Hood	Willamette	Centennial (bittering)	Saaz
Millennium	Golding	Mt. Hood	Chinook (bittering)	Willamette
Cascade	Fuggle		Hallertauer (aromatic)	E. Kent Goldings
	Tettnanger		Hersbrucker (aromatic)	Fuggle
			Fuggle	Perle
			Mt. Hood (aromatic)	Northern Brewer
			Nugget (bittering)	Centennial
			Old Early Cluster	
			Old English Cluster	
			Perle (all purpose)	
			Tettnang/Tettnanger (aromatic, spicy)	
			Willamette (all purpose)	

six ounces of dried hops. The going retail price for organic hops is now \$9 per ounce (representing an organic premium of \$7). Dried hops can be frozen and stored. More information is available from Klein or from Northeast SARE.(6)

Cornell/Northeast Hop Alliance survey (2002)

Cornell's Community, Food, and Agriculture Program, along with the Northeast Hop Alliance (see **Resources**, below) published results in 2003 of a 2002 survey of more than 400 microbreweries, brewpubs, and regional breweries. There was a good response rate, predominantly from brewpubs and microbreweries. Three-quarters of the respondents reported using **pelletized hops**; however, a few microbreweries and brewpubs still use some fresh or whole hops. Brewpubs use more pounds of hops per barrel of beer than do microbreweries. A majority of the breweries said they would pay a premium of between 5 and 10% for

regional hops. (Determination of market potential for organic hops in the Northeast, where organics is very popular, was not included in this survey.)(7)

References

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- 2) Morehead, Gordon W. 1996. Hop culture in California. *Small Farm News*. May-June. p. 3-4.
- 3) Beach, D. 2000. *Homegrown Hops*. 2nd edition, Reveille Farm, Junction City, OR. Available from Amazon.com.
- 4) Brew Organic
325A River Street
Santa Cruz, CA 95060
800-768-4409

831-454-9665

www.breworganic.com

- 5) Kneen, Rebecca. 2003. Small scale and organic hops production. Kneen, Left Fields, British Columbia.
www.crannogales.com/manual%20final.pdf
- 6) SARE. 1998. Reports from the field—Hop to it: A field trial of organic hops. 2 p.
www.uvm.edu/~nesare/reports_hops.html
- 7) Hilchey, Duncan. 2003. CFAP research update: Northeastern breweries express interest in regionally grown hops. Community, Food, and Agriculture Program News [Cornell University]. Fall. p. 4–5.

Resources

Organization

Northeast Hop Alliance
Larry Fisher, President
P.O. Box 176
Munnsville, NY 13409
315-495-2451
info@northeasthopalliance.org
www.northeasthopalliance.org

The Northeast Hop Alliance was organized in 2003.

Publications

- Carter, P.R., et al. 1990. Hop. Alternative Field Crops Manual. University of Minnesota Extension, University of Wisconsin—Madison. 6 p.
- Fisher, Joe, and Dennis Fisher. 1998. The Homebrewer's Garden. Storey Books, Pownal, UT. 188 p.
- Perry, Leonard P. 1991. Growing hops in New England. 2 p.
www.uvm.edu/~pass/perry/hopsne.html
- Staff. 2000. Hop to it: A field trial of organic hops. Innovations in Sustainable Agriculture. Spring. p. 6–7.

Washington State University Extension Publications

- EB1134—Cost of Establishing and Producing Hops Under Drip Irrigation in the Yakima Valley (\$2.00)
- FG0011—Fertilizer Guide: Irrigated Hops for Central Washington.

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Paul Williams, Editor
Robyn Metzger, Production

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