

# HOW TO GROW HOPS

*By Heidi Oran*

**Across Canada, several small-scale growers are trying their hand at growing hops. The small but growing trend follows the recent increase in demand for local and sustainable agriculture, combined with a spike in hop prices in 2007.<sup>1</sup>**

“There is no formal training program in hops production in Canada, and very few growers. All the current commercial hops growers are new and small-scale, so there’s a lot everyone needs to learn,” says Rebecca Kneen, owner of Left Fields Farm and Crannóg Ales, Canada’s only certified organic farmhouse brewery.

## The plant

The hop plant (*Humulus lupulus*) is a member of the Hemp family and a distant relative of both cannabis and nettles. It is a perennial with a permanent rootstock called the crown. In good conditions, the crown can live for over 25 years. Each spring, several shoots grow vertically from the crown and can grow more than 30 feet (9 m) in a single season. Although often referred to as vines, the shoots are technically ‘bines,’ which have stout stems with stiff hairs to aid in climbing.

Mature hops are quite hardy plants and grow well in Zone 4, although many varieties require a minimum of 120 frost-free days. At the end of the growing season, thick applications of well-rotted compost or mulch, such as leaves or hay, will help protect the crown through the winter.

Side shoots fill out the bines once they have completed their vertical rise, and these shoots provide support for the flowers. Although both male and female plants can be cultivated, the female plant produces the desirable flowers or cones used for both brewing and natural health.

The female fruiting body is made up of several petal-like structures called bracts. As the cones ripen, the bases of these bracts bear glands that are filled with a yellow resinous substance known as lupulin.

The resin contains the alpha acids and hop oils—the compounds that determine how much bitterness and flavour is available to the brewer. The amount of alpha acids contained in the lupulin can vary greatly by variety. Hundreds of varieties exist and more than fifty are commonly used for brewing. Depending on variety, a mature plant will produce hundreds of cones in a season and can provide over two pounds (0.9 kg) of wet (i.e. fresh) hops.



*Whole hop cone.*

## Propagation

The most common method of propagating new plants is to dig up the crown early in the spring and harvest rhizomes from the rootstalk. A mature crown will send out dozens of shoots below the ground, many with buds that will produce new bines if replanted. Rhizomes should only be cut from mature crowns (at least three years old) that are well established and in full production. They can survive for several weeks if kept moist and cold before transplanting.

Most of the new plants’ energy will be put toward establishing the crown, and, for this reason, growth above ground may be limited during the first year. As well, flowering may be sporadic and limited, and varietal characteristics do not become consistent until the plants are well established and mature.

Located in Sorrento, B.C., Left Fields ([www.leftfieldstore.crannogales.com](http://www.leftfieldstore.crannogales.com)) is a source of both certified organic and non-organic rhizomes, and offers bulk discount pricing to new growers. Freshops ([www.freshops.com](http://www.freshops.com)) in Oregon supplies non-organic rhizomes to both small-scale and commercial growers in the United States and Canada.

## Soil requirements

Hops require fertile, well drained soil. While becoming established, the crown requires frequent watering but cannot tolerate excessive moisture or pooling. Commercial growers often use drip irrigation.

Throughout the life of the plant, nutrients can be provided by adding compost and growing legume cover crops. Many growers plant clover or other green manures between rows to minimize weed competition and provide nitrogen, an important consideration. According to James Altweis, Director and Horticulturalist of Gorst Valley Hops in Wisconsin, “The biggest issue for organic production is nitrogen.” He adds, “Hops require up to 200 lbs./ac. (224 kg/ha) of nitrogen in a very short window [about six weeks].”

### A history of hops

Hops were introduced to Canada in the late 1600s, as French colonial administrator Jean Talon settled into New France.<sup>2</sup> In the late 1800s, hops began appearing regularly in agricultural history records, with B.C.’s Fraser Valley and Ontario’s Prince Edward County eventually becoming key hop producing regions in North America.<sup>3</sup> However, by the mid-1970s, both regions had succumbed to the centralization of the industry in Washington and Oregon, and Canada now produces a tiny fraction of world production.<sup>4</sup>



*Trellised young hop plants at Left Fields.*

## Growing methods

Backyard gardeners may use a single-pole system or tent-style trellis in which a single twelve-foot (3.7-m) post is strung with several strands of twine staked four or five feet (1.2–1.5 m) out from the post in a circular pattern. The resulting plant sculpture will resemble a large tepee or tent.

Commercial growers use a trellising system that spaces posts 18-foot (5.5-m) in height in rows approximately every 50 feet (15 m), with rows spaced anywhere from five to ten feet (1.5–3 m) apart. The spacing depends on the size of equipment used for mow-

ing, tilling and harvesting between rows. The infrastructure is tied together with strong wire, often aircraft cable, and stabilized by angling the outermost posts and staking them with guy wires. Conventional growers use pressure-treated posts, while organic growers need to find a quality source of rot-resistant timber. Red and white cedar are popular choices, but growers should plan (and budget for) the occasional replacement of posts.

## The growing season

Plant rhizomes in the spring as early as the soil can be worked. A 2-ft. (0.6-m) diameter hole should be worked and hilled with light soil and plenty of compost. The rhizomes can be planted horizontally or vertically (depending on shape), with the newly formed buds pointing upwards. If the buds have begun to grow before planting, they will resemble a translucent bean sprout and will gain colour (and chlorophyll) once the plant is exposed to the sun. In this



*Rebecca Kneen examines a hop cone.*

case, most of the sprout should be buried, with the tip of the sprout protruding through the soil.

Newly planted rhizomes require frequent watering and are often started with drip irrigation. Top-dressing with mulch will help retain water.

With mature plants, many growers prune off the first spring shoots to develop stronger bines

and potentially delay premature flowering. In most cases, a first-year rhizome will only support the growth of two bines, while third and fourth year plants may have four to six bines.

Once the plants reach 2–3 feet (0.6–1 m) in height, growers train the bines by wrapping the plant clockwise around the twine. Many organic growers use coir (coconut)

twine, which will not stretch, is compostable and can be grown sustainably. Once the plants are established, it's recommended to monitor the hops regularly to ensure pests, diseases and other problems are kept at bay. Nutrient shortages can be detected early through browning or yellowing leaves and stunted growth of the bines.

## **Disease and pest management**

As the summer progresses, and as side shoots begin to develop, the plant may remain damp if not properly spaced, particularly in wet years. This is often an invitation to fungal infections. Verticillium wilt, downy mildew and powdery mildew are all fungal diseases which can have devastating effects on a hopyard if left untreated. The symptoms of the three diseases vary from a white powdery substance on the leaves caused by powdery mildew, to yellowing and/or browning of the leaves on plants infected by verticillium wilt.

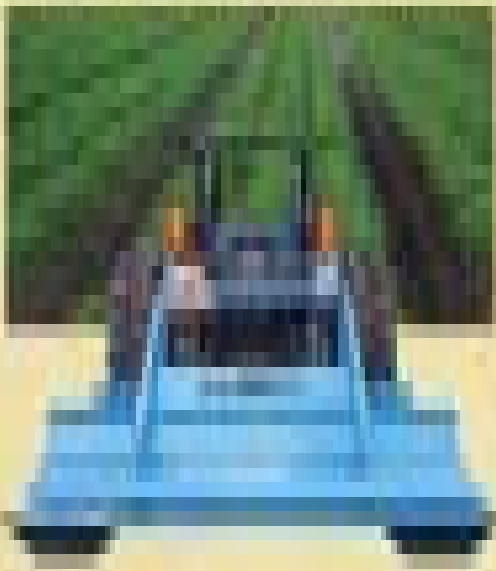
Prevention is the most effective form of disease management, and maintaining a high level of sanitation at all times is essential. It is important to remove and burn infected bines, leaves and crowns before diseases spread to surrounding plants.

At Crannóg Ales in Sorrento, B.C., cover crops are planted to support populations of predatory insects and the hops are interplanted with flowers, including cosmos, tansy, phacelia and other insectary plants. Rebecca Kneen



*A cluster of Mt. Hood hops on the vine.*

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*Predatory insects, such as this ladybug larva, consume the aphid larvae before irreversible damage is done to the hop leaf.*

says that if they do have infestations of pests (and aphids have been their primary problem), they “look to predatory insects to help control the problem.” Ladybugs, in particular, consume the aphid larvae before irreversible damage is done. Pruning the plants and improving soil life help prevent problems.<sup>5</sup>

### Harvesting hops

As cones mature, their colour changes to a paler shade of green and they feel ‘papery’ when squeezed between the fingers. As the lupulin glands fill with the aromatic resin, the entire hopyard will overwhelm the olfactory system, and the experienced grower will learn to harvest when the aroma is at its peak. This usually occurs between mid-August and mid-September.

Large-scale producers use specialized equipment to harvest hop cones. For backyard gardeners, the assistance of family and friends may be all that is needed.

Once picked, the hops need to be immediately cured or dried, usually in custom-made ‘oasts’ or drying vessels, which can consist of several trays of loosely spread hops suspended over a heated blower. The dry air circulates through the trays of wet hops until the moisture content is reduced to approximately 10%. The hops must then be cooled immediately and packaged, or further processed into pellets, the standard among large brewers and many microbreweries.

## Marketing

The decision of how to market your hops will be largely determined by the dynamics of your local economy. Thanks to the craft-brewing revolution of the 1990s, there are plenty of micro-breweries throughout the country, and many are excited about the prospect of locally grown ingredients.

Hugh Brown, owner/operator of Heritage Hill Organics ([www.heritagehillorganics.com](http://www.heritagehillorganics.com)) near Barrie, Ontario, says there is a resounding interest in Ontario hops growing amongst craft brewers.

“When the 2006 hops shortage affected the small brewers’ access to quality aroma hop varieties, they started thinking about self-sufficiency...it’s sort of like the 100-mile diet for beer,” Hugh says. Heritage Hill Organics partnered with Duggan’s Brewery of Toronto for the 2010 hops harvest and the yield went straight into Duggan’s brew kettle. “No one’s going to get rich here,” says Hugh, making reference to the price of hops dropping from \$35/lb. during the shortage to as low as \$4/lb., “It’s about building relationships.”

The key to providing a successful crop locally is understanding the expectations of the purchaser, including preferred varieties, whole hops vs. pelletized, and packaging. Building strong relationships is critical to ensuring that the value-added benefits of local and organically-grown products are passed through to the purchase price and that the organic farmer is paid fairly. Also, growers need the foresight and planning capacity to deliver their product in a manner that is acceptable in their particular market.

“Some small growers think they can show up at a brewery with a sac full of damp flowers and the brewer will buy them. This is not the case,” says James Altweis, of Gorst Valley Hops in Wisconsin. “Microbrewers require their hops to be pelletized, chemically analyzed and vacuum sealed in barrier bags. We’ve spent a considerable amount of resources developing small scale processing operations to meet the brewers’ needs and expectations. Without this sort of service, the market percentage shrinks to about five percent who are willing to use dry whole flowers. Less than one percent will use fresh wet flowers.”

Although small scale hop producers consider the brewing industry to be their primary market, the demand for hops for natural health products has grown. Hops have long been known for their soothing, and calming effect on the body and the mind. According to Kim Corrigan-Oliver, a certified nutritional practitioner, “Hops are full of minerals and vitamins as well as a wide range of phytochemicals... New discoveries occur daily regarding phytochemicals and the health benefits they provide.” The dried cones can be steeped to create a calming tea, which is often prescribed to treat insomnia.

## Conclusion

Whether you are driven by the prospect of local economies and sustainability, or simply thinking of ways to diversify a small farm operation, hops may be a crop that fits nicely into your repertoire. There are many factors to consider before making the decision to produce commercially. Glen Fuller of Rising Sun Farms

in Colorado is one of five certified organic growers in the United States with 7.5 acres (3 ha) under production. He sums up his experience over the last two years with the following.

“Establishment costs are high and you need specialized harvest equipment. Anyone interested in this hop growing adventure should expect no return for three years; it will be four in my case as we had a hail storm June 12th that cut production by eighty percent. It takes a lot of dedication to this crop to make it work. There is really no way to cut corners.”

## Endnotes

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*Heidi Oran owns Slow Acres Organics, a small-scale diversified farm located in Peterborough, Ontario. The farm started a test plot of hops in 2009 and hope to have their first commercial harvest in 2012.*

*Photo credits: John R.K. Davis (ladybug larva) and Crannóg Ales (all others)*