

Grow Your Own Hops

Author: Joe and Dennis Fisher

Grow Your Own Hops

Nothing says “a homebrewer lives here” like a glorious tangle of hop vines growing up the side of your house. Hop plants are easy to grow, hard to kill, come back year after year, and with little care produce bountiful harvests of that most important of all flowers, the hop. Hops are also easy to propagate, meaning you can share them with your homebrewer friends, trade varieties and start new hopyards. Truly a large-scale plant, they produce big roots, big vines, big leaves and big bags full of spicy cones for your homebrewing pleasure.

Hops have been used as medicinal and flavoring herbs for thousands of years, and cultivated for at least a thousand. They grow worldwide, and will flourish just about anywhere in the United States, though today most are grown in the vast commercial hopyards of the Pacific Northwest. If you have a little space and the desire to do it, you can grow, pick, dry and store all the hops you need to brew beer. Why grow your own? Well, it’s fun. And using homegrown hops will improve the quality of your homebrew by giving you access to the freshest, best hops available.

You’ll save money by using your own hops instead of buying them. The plants are vigorous, beautiful and can be trained to provide privacy, shade or to cover fences or outbuildings. Even if you don’t brew with them, a trellis full of aromatic hops will impress your guests with your enthusiasm for and knowledge of beer.

First, a bit of biology

The hop plant (*Humulus lupulus*) is a vining perennial that arises from a fleshy underground rootstock or “rhizome.” The vine (also called a bine, the botanical term for a spiny tendril) grows rapidly, and during the height of the season can grow up to a foot per day, topping out at a height of 30 or 40 feet. The hop cones are borne on lateral shoots that arise from the same nodes as the plants’ leaves. Hop plants can tolerate dry, sandy soil or even clay, but will not produce well under such conditions. Hops prefer a rich, moist soil in full sun.

Hop plants are either male or female. Only the female vines produce the familiar hop cones (or strobiles) that are used in brewing. Males are easily identified when they blossom, because their blooms are small, five-petaled flowers. Any males that appear in your hop yard should be uprooted and returned to the supplier (male plants also pollinate the cone and lead to seeded hops, which are unwanted by most brewers for a variety of reasons).

Selecting hop varieties

Ideally, the hop varieties that you plant should be well adapted to your climate and soil, so they will grow vigorously and produce abundantly. One way to find out which varieties will work for you is to talk with other growers or inquire at your local homebrew store. Your cooperative extension, university, or local seed company may also be able to help. If you have a variety that you like to brew with and just want to plant it, go right ahead! You'll know in a season or so if it's right for your region (for a rundown on hop varieties and characteristics, see the chart on page 29). You'll notice that we don't use exact alpha-acid percentages in the chart.

That's because alpha-acid content depends on growing conditions such as soil chemistry, moisture, sunlight and latitude. Also, homegrown hops tend to be more bitter and aromatic than those bought in a homebrew store, simply because they are that much fresher.

You can order rhizomes through your local brewstore or directly from a supplier (see "Ordering Rhizomes," page 33). Start with just a few varieties; for instance, you could pick an all-purpose workhorse like Cascade and an early German type like Perle. Both of these are hardy cultivars that will do well just about anywhere and will give you some interesting options for brewing. With Chinook and Willamette you would have four varieties offering a good cross-section of bittering and aromatic types.

Some cultivars are more challenging. Our friend Brad Hunter, who grows a lot of hops at his farm in Appleton, Maine, has this to say about these "advanced" types: "I would steer clear of the 'noble' types and all the Hallertau 'sisters,' like Crystal and Mount Hood, until you have established your hardy all-purpose yard and have the freedom to experiment."

Joel Balano-Stott, at the Purple Foot in Waldoboro, Maine, says that he usually gets his hops in March or April, and he only orders varieties that have been popular in the past, such as Cascade, Goldings and Fuggles. If you want a particular variety it's best to order ahead. Early March is a good time to put in your order. "Hop suppliers have a short window of harvest," says Joel. "They need to get the rhizomes out of the ground before they start to grow, and with hops, once the frost is off, the shoots start growing." His rhizomes usually cost between \$2.50 and \$4.50 each, and that's about average. Joel grows his own Cascade rhizomes for sale.

When your rhizomes arrive, take a good look at them. They should be in good condition, firm, with no signs of disease. If they appear dry, flabby, shriveled or otherwise unhealthy, send them back. You can store your hops in the fridge until ready to plant.

Planning the hopyard

The hop garden, or hopyard, should be situated in a place with good air circulation, rich, well-drained soil, and as much direct sunlight as possible. While hops don't seem to mind poor ground, they will establish more quickly and produce more bountifully in good loam. If your only available soil is less than choice, you can always build it up with lots of compost and manure. Acidic soils will need lime, since hops like a pH of around 6 to 6.5. A soil test will tell you exactly what your pH is and what amendments you may need to add. Kits are unreliable, but will probably tell you something useful about your pH. Professional soil tests from universities, cooperative extensions or private labs are much better.

The sunlight factor is more critical. Hops will thrive in partial shade, but like sun for fast growth and good flower production. In the summer our hopyards get direct sun from about eight in the morning until five in the afternoon. Try for at least six hours of direct sunlight a day, and more than that if possible.

When siting the hopyard, think about vertical space. Hops are big, space-hungry plants that like to climb. You can restrict their growth by pruning if you need to, but they won't produce as well.

Our favorite place to site a hopyard is against the south-facing wall of a two- or three-story house. This provides a protective wall to the north, with plenty of sun and space to grow. With adequate moisture and food, this situation is ideal for fast hop growth.

You can also grow hops over fences, up pillars or flagpoles, over stone walls or arbors, and up trees. They won't be as easy to manage or pick, but they will grow and produce, if not as abundantly as on a trellis. If you are looking for a fast-growing ornamental vine, hops are a good choice.

Planting your rhizomes

Once the site is chosen, it's time to prepare the soil. If you can start a season in advance, that's great; if not, don't worry. Hops are essentially big weeds. They will probably thrive where you put them. Ideally, you can rototill or dig a bed about 4 feet wide by 3 feet for each hop hill. If you do this the year before, you can plant a cover crop like buckwheat, clover or rye grass to smother weeds and improve the soil. Perennial weeds will be your worst enemy in the hop bed, and if you can suppress them before you plant your hops you will be ahead of the game. Till again in late summer and plant winter rye. If you till this under in the spring just before planting, you will have a beautiful hop bed.

We realize you'll probably wait until just before planting to till or dig. No problem. Just use plenty of mulch to keep the weeds down, and let the hops

do the rest. Straw mulch is best, but hay works well, too. You'll get grass weeds but they will be easy to pull from the loose, protected soil under the mulch.

We like to plant hops as early as the soil can be worked, which is usually May or June around here (we live in Maine). Hops can actually be planted just about anytime, but an early planting is necessary if you want a crop the first year.

Dig a generous hole for each hop hill, and space the hills three feet apart. You can put some gravel in the bottom in wet soils to improve drainage (hops love gravel). Pour a couple of gallons of water in the hole. Refill the hole with a mixture of compost and topsoil. We like to add about a handful each of azomite, rock phosphate, greensand and bloodmeal to each hill as soil amendments. We bury a tomato cage in each hole to tie trellis strings to. The hops will grow around the cage and hold it tightly. It doesn't matter how much of the cage is above the ground, as long as you have something to tie to. But at least a foot should be buried to provide a strong anchor. (An average tomato cage is 2.5 feet high, so leave 8 inches above ground. The cages can also be cut down if they are too big.) A stake will also work, or a big earth staple made of heavy wire bent in a U shape.

Now take out your rhizomes. Notice that there probably are some green bumps or sprouts along one side — this is the top of the rhizome and should face up. The bottom side will probably have some rootlets attached. Most growers recommend planting two rhizomes of the same variety per hill. Place the rhizomes in the hole and heap an inch or two of soil over it, allowing the sprouts, if any, to show. Water the hill and stand back. If you've already pre-soaked the hole, you won't need much at this point — just enough to firm the soil and eliminate airholes. Later on, when the plant starts to grow, you will need more, especially in a dry season and if the soil is at all sandy.

We mark each hill with an oak stake with the variety name painted on it. It's easy to lose track of your varieties, and once lost it's almost impossible to tell them apart. Make a map of your hopyard and put a copy in your computer, just in case.

GROW HOPS IN SMALL SPACES

You may have seen hops growing in barrels in front of a microbrewery or homebrew store. It's easy to grow hops this way, and yields will be good if you remember a few rules.

The most important rule is that the plants still need plenty of sunlight. Also, both overwatering and underwatering should be avoided. Hops need to be fed well to grow well — especially in a pot, where they are entirely dependent on you for nutrients.

The used half whiskey barrels that you can find in garden centers are ideal for hop growing. Drill a dozen or so half-inch holes in the bottom. Put two inches of crushed rock in the barrel for drainage. Then fill the barrel with a good quality potting soil mixed with compost and soil amendments (see the section on planting). Plant your hop rhizomes just as if you were putting them in the ground. You can trellis your hops many different ways — for instance, if you are growing on a covered porch, you can train it up the posts and along the eaves. If you live in an area with hard freezes in wintertime, move the pot to a sheltered area or indoors after the vines die back in the fall.

Trellising the vines

The typical “straight pole” hop trellis was designed for commercial harvesting. We don’t really like these for the home hopyard, since they tend to be enormous and awkward, and unless they are really well-supported it’s unsafe to put a ladder against them. We have one that’s 12 feet high and 70 feet long, not exactly a size suitable to the backyard. We made ours just strong enough to hold the hop vines and pick from a three-legged apple ladder. A better choice might be the old fashioned “tent pole.” This is just a wooden pole (for instance a beech, spruce or cedar sapling) about 2 to 3 inches wide at the butt and 10 to 15 feet long. Stick them in the ground upright, one or two per hill, and let the hops climb. At harvest time just cut the vines, uproot the pole, and lay it on the ground for picking. People have been growing hops this way for hundreds of years, and it works well. Commercial hopyards all used poles before the industry was mechanized.

You can also string a trellis wire between trees or buildings. Make sure the connections are strong because the wire will have to hold a lot of weight and stand up to the wind. Use turnbuckles to tighten the wire. The trellis strings can be looped over the wire. The wire should be at least 10 feet tall (higher is better), but the higher you go, the more trouble you may have getting the vines down at harvest time.

If you decide to grow hops against your house or other building, trellising is a snap. This is really the best option for the home hopyard, and the masses of foliage growing vertically up your house will amaze your neighbors and impress your friends. Just hammer a big staple in the overhang of your roof, above each hill. A trellis string is tied to one side of the tomato cage, looped through the staple and then tied to the opposite side of the cage, forming an inverted V. The hop vines will grow up each side of the V and meet at the roofline.

We use untreated jute twine, as heavy as we can get. If it is untreated and too light it will degrade and break. Treated twine will last all season, but we don’t use it. Cotton string, lightweight nylon or other synthetic line will also work. Trellis wire, the same kind grapes are grown on, is great but it’s an expensive alternative.

Training the vines

The hop shoots will emerge a few weeks after planting and will start hunting around for something to climb. If your trellis strings or hop poles are already in place, the shoots will often find them by themselves. If not, you can help them by gently twisting the vines around the support. Hops grow clockwise, so train them in that direction and the small spines on the shoots will help them grab and hold. We like to train three vigorous shoots per string or pole and cut the rest back.

We usually mulch our hops to control weeds and to keep the soil from drying out. Once the shoots have appeared, you can heap mulch over the whole bed. As this breaks down it will feed the soil and you can keep adding more. A good weed-controlling combination is a couple inches of dry leaves covered by six inches of straw or hay.

Through early summer, hop growth accelerates. The plants will usually overtop their supports in a few weeks (unless they are very tall) and start to fan out at the top, looking for something else to climb. They may double back or grow out into another vine or try to climb your roof. At the same time the side shoots will be developing along the length of the vines, where the flower will soon appear.

Tending your hops

Hops don't require much care. You should keep an eye on the side shoots to make sure they don't attack a neighboring vine. If the vines become intertwined it makes picking more difficult and it's hard to tell the varieties apart. We rarely prune our vines, except to discourage too many shoots or to remove diseased foliage. When pruning, use a sharp knife and make a clean cut.

Watering in the morning is good practice; when you do this, avoid splashing soil on your bottom leaves. You can prune the first three feet of leaves, especially if these have already turned yellow.

Homegrown hops aren't bothered much by disease. Still, it's smart to know what symptoms to look for. Downy mildew is the most notable hops disease in the United States. It only effects hop plants, and may not be found in all areas. It appears first in early spring, when the shoots emerge. Affected shoots will appear silvery-black and stunted. Remove and burn any affected plants. Downy mildew also can be controlled with a copperbased fungicide such as Kocide 2000. Since the mildew spores need water to germinate, it's a good idea to avoid wetting the foliage when watering. Removing the leaves along the first few feet of vine can also prevent infection.

Powdery mildew wiped out the hop industry in the eastern United States in the early 19th century. It appears as white, furry spots on either side of the

leaves which soon spread to cover the entire leaf. Remove and burn any affected leaves. Powdery mildew can be controlled with a sulfur-based fungicide. Both of these diseases tend to be worse during rainy summers.

Although homegrown hops are generally vigorous and can tolerate certain amount of insect damage, insect pests can be a problem. Japanese beetles are especially voracious and difficult to control. A labor-intensive but effective control for these bugs is hand-picking in the early morning. Beneficial nematodes watered into the soil can control this beetle's larvae and keep their numbers low. Another problem pest is a specialized caterpillar called the hop merchant, larvae of the Question Mark butterfly. One or two sprayings a year with Bt will completely control this pest.

Hops also can be plagued by aphids and spider mites. Joel at the Purple Foot suggests cutting off the lower three feet of leaves to discourage aphids. Unfortunately, they are hard to get rid of once you've got them. Aphids tend to attack water-stressed and otherwise weak plants. Keeping plants well-watered will help. It's also not a complete disaster if you get a few aphids on your hops. You can winnow them off the cones pretty easily.

We've never had much trouble with spider mites — they are usually more of a problem with indoor plants, greenhouses and commercial hopyards. Cuke beetles are only a problem west of the Rockies; covering the young shoots with spun-bonded row cover should keep them off until the vines are big enough to fend for themselves.

In the first year especially, hops need plenty of water. Try not to splash soil up onto the leaves, since this encourages disease. One or two deep waterings per week is better than several shallow waterings. At mid-season (around July in the Northeast) you will start to notice yellow leaves at the base of the plants. This is a common condition that can be helped by feeding and spraying the lower leaves with compost tea. Some growers advocate pruning off the vines' lower leaves for the first two feet or so.

To make compost tea for disease control, you need a well-aerated mixture with not too many nutrients in it. Put some compost in an old sock (for instance) and dangle it in a five-gallon bucket of water. Slosh it around a couple times a day to get some air into it, and after a week you can apply it. Dilute by 1/2 with water and apply with a hand sprayer or backpack sprayer. The disease-fighting agents are the microbes growing in the solution. Don't get the spray on any cones.

Hops really appreciate additional feeding at blossoming time. At about midseason, tiny burrs will begin to form on the side shoots. These are potential hop cones. When they form, feed each hop hill a few shovelful of compost or rotted manure.

Picking your hops

Ready-to-pick hops are aromatic and feel slightly dry and springy to the touch. They will be full of yellow lupulin powder, which you can see by pulling a flower open. Most flowers of a given variety will mature around the same time, so you can pick them all at once. Don't let them go too long after maturity, because they will start to turn brown and lose quality.

The best way to pick hops is on the ground. Cut the string or pull the pole and lower carefully. The hop vines will be heavy, so you may want to use a line and a pulley to bring them down.

Picking is a two-handed job. Hold the cluster with one hand, and strip off the flowers with the other. We usually pick into paper bags, labeled to keep varieties separate.

Post-harvest maintenance

Once the hop cones have been picked, the vines should be cut off about three feet from the ground. Then allow the vines to die back. You need to do this to avoid shocking the plants too much and weakening them as they go into winter.

After the first hard frosts in autumn, cut the hop vines a few inches from the crown. Feed the hop hills generously with compost or well-rotted manure, and renew their mulch.

Spring care of mature hills just involves "root pruning" to control plant sprawl. Pull back the mulch and cut around the hills with a spade or garden knife about two feet out from the crown. Pull up any rhizomes you cut off. This will contain the plant in the bed and keep it from taking over your garden or lawn. The cut-off rhizomes can be potted and given to friends or transplanted to start new hopyards. Remember to label them! Root pruning is done once a year, in early spring, before the plants really start growing.

Drying your hops

If you have a hot, dry, dark attic or other space with good airflow, then you can dry your hops on window screens or even in paper bags. We've done this successfully many times, but not everyone has access to a good drying room. The next best choice for small amounts of hops is a food dryer set to low. If you expect a large harvest, think about building an oast, or hop dryer. This can be a large box with sliding screens or drawers with a hair dryer for forced hot air. Plans for oasts appear in our book, "The Homebrewer's Garden" (Storey Books, 1998) or you can find them on the Web.

However you dry your hops, they need to dry quickly to avoid molding or browning. Don't pile them too high — a few inches at most. Hops are dry when they feel light and crinkly without any detectable moisture content. After drying, a first-year hop harvest should yield a few ounces per hill.

Storing your hops

Dry hops can be stored in gallon-size freezer bags in a freezer, where they will keep well for a year or more. A bag will hold about an ounce of loose hops. Place the hops in the bag, press lightly to expel as much air as possible, and seal. Make sure to label different varieties and date each bag.

Using your hops!

Most people who grow their own hops prefer to use them only for aromatics, dry hopping or flavoring, since their delicate aromas are destroyed by a full bittering boil. This is an option if you don't have a big harvest and want to find the highest and best use for it. But if your harvest is large and you're growing high alpha-acid varieties, you'll want to know how to bitter with them.

Aroma hops can be used 1-1 in recipes, but bittering hops should be used with a little more caution — maybe cut down the amount a little. You can't really know how strong your hops are until you try them. It may require some experimentation to find exactly the right proportions, but starting with a small amount will guarantee that you never overhop a batch. Brewing with undried hops is a bad idea; they contribute a grassy, unpleasant flavor and very little bitterness or aroma. Why pamper your hops all season and then neglect to dry them?

These two recipes work very well with homegrown hops, added in the secondary for dry-hopping (we've noted in the recipes which hop additions should be homegrown). If you don't have a big harvest, this is a great way to use your small stash. You can also use your own hops late in the boil, for flavor and aromatics. Of course, if you have plenty of your own high-alpha hops to spare, go ahead and use them for bittering, too.

Keep in mind that the alpha-acid content will vary. Also, homegrown hops may be more bitter and aromatic than storebought hops (they're often fresher). If you substitute storebought hops, consider using a bit more than these recipes recommend.

Hop Til You Drop California Common Beer

five gallons, all-grain; OG = 1.053; FG = 1.015; IBU = 59

Though not super hoppy, California Common is a style that shows off the aromatic power of homegrown hops very nicely.

Ingredients

- 6 lbs. Klages malt
- 1 lb. Vienna malt
- 3/4 lb. crystal malt (60° Lovibond)
- 1 lb. toasted pale malt
- 15 AAU of Northern Brewer hops (2 ounces of 7.5% alpha acid)
- 3 AAUs Cascade hops (0.50 ounce of 6% alpha acid)
- 3 AAUs Cascade hops (0.50 ounce of 6% alpha acid)
- Wyeast 2112 (California Lager)
- 0.50 ounce Willamette hops (homegrown)
- 3/4 cup corn sugar for priming

Step by Step

Toast pale malt for 10 minutes at 350° F. Cool and crush. Add malts to 3 gallons 130° F water, stabilize at 122° F and hold for 30 minutes. Add 1.5 gallons 180° F water, stabilize at 158° F and hold for 60 minutes. Raise to 170° F. Sparge with 4.5 gallons of 170° F water. Collect 6 gallons runoff. Add Northern Brewer and boil 60 minutes. Add Cascade, boil 20 minutes. Turn off heat, add Cascade and steep 5 minutes. Strain out hops, cool to 68° F, and pitch yeast.

Ferment at ale temperatures (65° to 70° F). Rack to secondary and add homegrown Willamette dry hops for 5 to 10 days. Bottle when fermentation is complete.

Orthognathous Kölsch

five gallons, extract with grains; OG = 1.042; FG = 1.014; IBU = 47

Ingredients

- 0.5 lbs. cara-pils malt
- 0.25 lbs. wheat malt
- 3.3 lbs. Northwest gold malt extract syrup
- 2.2 lbs. Premier pale unhopped malt extract
- 4.5 AAU of Hallertau hops (1 oz. of 4.5% alpha acid)
- 0.5 oz. Hallertau dry hops (homegrown)
- Wyeast 2565 (Kölsch)
- 2/3 cup corn sugar for priming

Step by step

Crush the cara-pils and wheat malt. Add the crushed malt to 1.5 gallons cold water and bring to a slow boil over 30 minutes. Sparge with 0.5 gallon boiling water. Add the extracts and return to a boil.

Add Hallertau. Boil 45 minutes. Strain out hops. Top up to 5 gallons with chilled water; pitch yeast when cool. Ferment at ale temperatures (65° to 70° F). When primary fermentation slows, add homegrown Hallertau dry hops for 5 to 10 days. Lager 6 to 8 weeks at 40° to 50° F before bottling.

Joe and Dennis Fisher are the authors of "The Homebrewer's Garden" (Storey Books, 1998). They live in Maine.