



Bader Beer
& Wine Supply

711 Grand Blvd., Vancouver, WA.98661

360-750-1551 1-800-596-3610

baderbrewing.com steve@baderbrewing.com

Growing Your Own Hops

Courtesy of Hopunion, Yakima, Washington

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Background Info

What are hop rhizomes? Hop rhizomes are small roots that are cut from the main root system of a mature female hop plant. And a hop plant is a perennial plant that produces little cones or flowers called hops, which are one of the main ingredients in brewing beer. In the springtime, after the rhizomes are planted, the bines (hop vines) of a new hop plant begin to grow. Hop vines are capable of growing up to 12 inches a day under ideal conditions. However, most grow approximately 2 feet per week. The bines grow vertically winding around their support system in a clockwise direction following the sun. In June as the plant reaches its maximum height, which could be anywhere from 15-25 feet, it will begin to grow sidearms. The sidearms will then bear the hop cones. When this happens, it is known as flowering. In order for flowering to occur, the weather must be frost free for about 120 days, the plant must have ample moisture, and there must be plenty of long length sunlight.

Getting Started

The first year you plant your rhizomes, it is wise to plant 2 rhizomes of the same variety together. This gives your plant a better chance of surviving. Plan to plant in the spring after the frost is gone, but no later than May. Create an area that is free of weeds and close to a support system, such as a fence or pole. Keep in mind; hops grow the best in between the latitudes of 34-50 degrees, and a sandy well-drained soil with a PH of 6-7.5 is ideal for growing hops, should you want to test your soil. You can apply a fertilizer in the springtime, like in May, one that is rich in phosphate, nitrogen, and potassium. Then apply again in July.

Plant the rhizomes vertical with the buds pointing upwards. If you can't tell which way the buds are pointing, you can place the rhizome horizontally. You will need to plant so that 1 inch of soil is covering the top of the rhizome, whichever way you do plant it. If you are planting several plants, you can space them 3 feet apart on all sides if they are the same cultivar, 5-7 feet apart if they are different cultivars. Make sure to keep some kind of marking, like variety pegs, on which cultivar is which. Keep the new plants watered frequently, but don't over water. Over watering is one of the biggest and most common problems when growing new hops. Too much water can cause the roots to rot. So water real heavily one day, let the water soak in, hold off on

watering for a couple days, then give it frequent light waterings. Even though hops are pretty resilient, keep the area clear of other foliage and weeds to reduce the risk of disease.

The first vines that begin to grow may be subject to frost bite. Commercially, all new vines if they come up too early, like in February, will be cut. Then new ones that come up later will be used instead. Don't be afraid to cut the first vines that come up, if they are at risk for getting frost bite. When your plant reaches about 1 foot tall, you will need to begin training the vines on some kind of a coarse cord like baling twine. Begin with training 2-3 vines, leaving the other vines left down. Should something happen to the ones you train, you will then have these to use as a backup. The vines will grow upward and clockwise around the cord. Remember hop plants grow quickly, so be prepared. As the season progresses, you can then cut off the extra vines.

If you are planting in a pot, you can use a 55 gallon barrel, like a wine or whisky barrel. Remember though that planting in a barrel leaves the roots more exposed, as opposed to them being protected underground. Use your judgment. If it is too hot outside, move the plant into the shade before the roots get too hot. If it is too cold, move the plant indoors before the roots freeze.

Mid-Season

As your hop plant grows to its ultimate height, typically at the end of June, the beginning decrease in sunlight will cause the sidearms to shoot out from the vines, and the plant will stop its vegetative stage (vertical growth stage). The sidearms will then begin to produce hop cones. This is known as the flowering stage, when horizontal growth begins. Make sure to keep the sidearms from tangling up during this time and clear away foliage, weeds, and branches from the bottom 2-3 feet of the plant. Weeds promote moisture, a cover for insects, and fungal disease, so by removing this, chance of disease is reduced and also will improve air circulation for the plant.

As the hop cones grow bigger, keep a close eye on their color and texture. They should be a yellowish green to light green and should feel light and dry, if they are ready to be picked. You can also compress some of the hop cones in your hands. If they stay compressed, they are still not ready. The lupulin, which is the yellow powder in the center of the cone, should make your hands feel sticky, and if your hops are ready, your hands will take up the aroma from the lupulin. If the hops are not yet ready to be harvested, the cones will appear too green and will feel damp in your hand. But keep watch, because harvesting too early or too late will affect the quality of your hops. Low alpha hops, or aroma hops, will typically be ready to harvest sooner than bittering hops, ones with higher alphas. However, if you are using the plant for decorative purposes, cut it down a little earlier while the cones are more green.

Harvest Time!

When you decide to harvest your crop of hops, which will typically be in late August or September, cut the training string at the top and let the vines lay down on the ground. As it dries, the sap from the vines will go back down into the rootstock for winter storage. You can then pick off the hop cones and prepare to dry them. Cut the lower vines at about 2 feet from the ground. Leave the bottom growth that occurs afterwards to help with reinforcing the plant for next year, making it tougher and hardier. Keep in mind, you may notice the first year that the plant may look a little thin, but the following year it will yield more hops, as the plant will have a more developed root system.

Drying

You can dry your hops by using a food dehydrator. The hops will need to dry for several hours. Check on the hops to see if they are dry every so often. You can tell if they are dry by opening a cone up. Remember, they may feel dry on the outside, but it can take a while for them to dry thoroughly in the center. Also, bittering hops take a little longer to dry than aroma hops. To determine if they are dry enough, pull the cone open. If the petals break off easily from the stem, the hops are dry enough to be put to use, or put into a plastic bag to be used later. If the petals are still sticking to the stem, and the stem seems somewhat lithe and moist, leave the hops to dry longer. Try not to over dry the hops however to the point where the petals and stem shatter in your hand when you open up the cone. The alpha may begin to burn as a result of over drying, so check them regularly.

If you don't have access to a food dehydrator, you can dry them in an oven slowly on a very low temperature. You can also pick the cones and set them outside to dry on a screen, but keep the cones out of direct sunlight. Air circulation and drying them slow are very essential when drying hops. They should feel papery when dry, but don't dry them so long they turn brown. Also, it's important that only dry cones go into plastic bags for storage. Wet cones will turn to mush if stored in a plastic bag. If you are using your cones to brew, you will have to use your best guess as to what the alpha may be. But that's what it's all about, "trial and error." The brew will tell you how accurate your guess was. A little reminder is that if you use a lot of nitrogen when your plant is growing, it will grow better, but a lower alpha will result. You can get your hops analyzed to get a specific alpha acid, but it can be expensive. Below we have given you an approximate alpha acid based on commercial growing.

Remember, upon receiving your hop rhizomes, keep them in a plastic bag with holes punched in it, rhizomes keeping them moist and refrigerated if you are waiting to plant them. Don't freeze them. If the ground is still too cold in May, you can plant them in a gallon pot and transplant them outside in June. Keep in mind that different cultivars of hops grow better in different climates. Here is a list of which do better where:

Cascade- 4.5-7.0% alpha. Grows well in all climates. Susceptible to aphid.

Centennial- 9.5-11.5% alpha. Grows well in all climates. Susceptible to downy mildew.

Chinook- 11.0-13.0% alpha. Grows well in dry, hot climates. Great ornamental hop. Does not grow well in moist climates. Subject to spider mite.

Fuggle- 4.0-5.5% alpha. Grows well in damp climates, suffers a little in hot climates.

Glacier- 5.8% alpha. Grows well in all climates.

Golding- 4.0-5.0% alpha. Grows well in mild, moist climates, does ok in hot climates.

Hallertau- 3.5-5.5% alpha. Grows well in mild, moist climates, suffers a little in dry hot climates.

Horizon- 12.0-13.5% alpha. Grows well in all climates.

Liberty- 3.0-5.5% alpha. Grows well in mild climates. Can grow in hot climates.

Mt. Hood- 5.0-8.0% alpha. Grows well in all climates.

Northern Brewer- 8.0%-10% alpha. Grows well in temperate climates. Suffers a little in hot climates.

Nugget- 12.0-14.0% alpha. Grows well in all climates.

Saaz- 3.5-4.5% alpha. Grows well in cooler, moist climates.

Santiam- 6.0-7.0% alpha. Grows well in a moderate climate, does ok in hot climates.

Sterling- 5.5-7.0% alpha. Grows well in a moderate climate, does ok in hot climates.

Tettnang- 4.0-5.0% alpha. Grows well in a moderate climate, suffers a little in hot climates.

Willamette- 4.0-6.0% alpha. Grows well in all climates.

Problems?

Seeing a problem with the hop plant? It could be a variety of disease. Hops are very resilient, but they are subject to a lot of viruses. Sometimes it may be difficult to determine what it is. A fairly common problem is **downy mildew**. This is a fungus that causes spikes to fail to grow in the springtime, and can occur when the weather is warm, like at about 70 degrees, moist and wet. This disease leaves infected spikes stunted and brittle, unable to grow. However, this fungus will only infect your hop plant, not other plants in the garden. If you see infected spikes, remove them immediately and bury them in the ground. The leaves of a hop plant infected with downy mildew will look malformed or curled, and will have a grayish black fungus appear on the underside of the leaves. Hop cones can become infected also if flowering occurs during warm, wet weather. The cones will turn brown, quit growing or develop improperly. A copper base product can be used to kill downy mildew. Your nursery should carry products like this. Another common disease is **powdery mildew**. This disease likes moist climates. In recent times, hops have been subjective to this fungus. It looks like a white powder all over the plant. Again, check with your nursery to get chemicals to fight this. Sulfur is of some help. **Viral disease** could cause a number of things to happen to the hop plant, depending on the environment it is in. Yellow spots may appear on the leaves, growth may be stunted, it could fail to grow upwards on its support system, or the leaves and bines could look distorted. There is no cure should this occur. These plants should be removed.

Typically all hops will eventually get viruses. Commercially, whole fields will have to be replaced with new plants due to virus and disease. Feel free to go to a nursery and ask for products to keep disease under control. But be sure to tell them though if you are planning on using the hops to brew with, so that you can get something more organic. If you are growing for ornamental purposes, use whatever you want to use. Rely on your common sense. In addition, all the roots we sell are certified, and unlikely to have a severe virus problem.

Aside from disease, problems with your hop plant could be a result of insects. Aphid and spider mite are very common. **Aphids** are little green pests. They suck juices from plants and during flowering they will enter the young hop cones, causing the cones to mold. They usually are present during rapidly cool weather. **Spider mites** are very small, have eight legs, and are a reddish color. Take a leaf and hold a hand lens up to it in order to see them and their webs, if you suspect Spider Mite. Shaking the leaf slightly will get the spider to move across the leaf. They feed off the leaves and/or hop cones by puncturing them and sucking out the plant sap. Punctures will leave a small colored spot, eventually causing the leaf to shrivel and die, and will cause hop cones to turn brown. In severe situations, the hop plant will appear red due to this. Spider Mite can be a problem during long times of hot and dry weather. You can help prevent this problem by hosing off the leaves of the plant.

Hops are subject to lots of pests and disease above and below ground. Nematodes may attack the root system. Most common are caterpillars and other common garden pests. Some insects though, such as the lady bug which eats aphid, along with wasps and others can be beneficial to the hop plant.

There are two functions for growing hops. One is for brewing purposes: the other is for beauty, looks, and shade. Try both. Have any climbing flower vines outside? Grow hops in with it. The contrasting colors will look beautiful. Grow hops along fences any way you want. Hops can be trained to grow sideways. Or you can grow a hop plant up a dead tree or around an arbor. These are just some inspiring ideas. Good luck with your growing venture.