



# HOW TO GROW YOUR OWN HOPS

**Growing your own hops** is an easy and fun experience that anyone can do. Even if you do not plan on brewing with the hops, it is still rewarding and can be beautifully implemented in landscaping or as a natural fence or sun shade. But for home brewers, it does not get much better than brewing a wet hop beer from your own hops grown in your backyard. An average hop plant will produce about 1-2.5 pounds of dried hops, which is definitely good for a couple batches of your own fresh hop harvest ale every year!

## THE BASICS

The hop plant (*humulus lupulus*) is a vigorous perennial that stores its energy and spreads from the root stock or rhizomes. It sends out climbing bines, which are distinct from vines because hops do not have suckers or tendrils to climb, and grows in a clockwise motion as it follows the sun daily. These bines can grow up to 25-30 feet in a single year, but most commercial hop farmers use trellises that are 18 feet high. There are many different varieties of hops, both privately owned trademarked varieties and publicly available USDA varieties. Only the USDA public varieties are available for growing at home, but luckily these public varieties include the most popular hops like Cascade, Centennial, Chinook and even the newer all-star Cashmere.

## THE PLANNING

The first step in growing your own hops is the planning and research stage. Hops are hardy and will thrive in almost any temperate climate, but if your desire is to maximize yield and quality there are a couple key points to keep in mind. The most important thing that hops need is sun. Lots of sun. This means at least 6-8 hours of direct sunlight per day. Hops are also photosensitive, so they use daylight length to determine when to start fruiting.

Once you have a nice, sunny spot picked out, remember the vertical height requirement. Now home gardeners do not need to grow hops to the full 20 feet, but 6 feet of vertical growth should be considered the minimum. There are various ways to get hops to grow horizontally, like along a fence or pergola, but since the bines are mechanical climbers they would require daily training to keep them from growing horizontally instead of vertically.



Make sure to pick a location that has well-draining soil and do not plant directly next to a structure like house or garage because hops can damage structures both above and below the soil. Ease of harvest is another key component to keep in mind. Hops are traditionally grown on twine so that the bine can be cut at the top and bottom and brought in from the field for processing. Most homegrown hops are harvested by hand, so you can either climb a ladder and pick them right off the bine, or hack them down and pick the bine clean on the ground.

Picking the right hop variety for your growing region will also help have a successful harvest. Cascade is widely considered the easiest to grow and will thrive in almost any climate. For climates that are more humid, picking a mold and mildew resistant variety like Mt. Hood will ensure success. For the best resources on your local growing region please contact your state university or area Master Gardners Program.

High winds have the potential to damage mature hop cones, so try not to plant them in a terribly windy area.

## THE PREPARATION

Putting in a new hop trellis is as easy as digging two holes and dropping in the poles. Cementing them in place is not required, unless you plan on going higher than 15 feet or live in a windy area. Coconut fiber twine is preferred by farmers due to its strength and hairiness, which gives the prickly bines something to hold onto and not slip down. The twine is typically staked at the middle into the ground next to the base of the hop plant with both ends tied to the top line in a “V formation”. Three bines will grow comfortably per twine and total bines per plant should not exceed nine. Consider building your trellis with a winch connected to the top line (typically wire) to raise and lower it to make preparation and harvesting even easier.



Hop plants grow like weeds in a wide range of soil types and the main three nutrients they require are NPK (Nitrogen, Phosphorus, and Potassium). Nitrogen is the priority during the vegetative growth phase and the phosphorus and potassium help with terpene and oil production in the cones. Hops will grow in any soil with a pH of 6.0-8.0, but they prefer to be right around neutral 7.0. The roots do not enjoy wet feet, so additional soil amendments might be required in dense clay type soils to get proper drainage. Mixing in compost or other organic material is a great way to amend heavy clay soils.



If you are planting directly in the ground, dig down about 8-12 inches to loosen the soil and create a 3 inch mound over the surface. The mound will help the root crown grow down (as it avoids direct air contact) instead of sprawling out horizontally if buried below the surface. This helps to corral the hops since they are such voracious growers and will constantly spread and gobble up any land they can.

Note about planting in pots or container: The best container for growing hops not directly in the ground is in a fabric air pot (5 Gallon size is large enough to start). Hop roots can break through ceramic pots, raised beds, and even cement, but they will naturally avoid direct air exposure. Fabric smart pots are also inexpensive and easier to move.





## NOT QUITE READY TO PLANT?

Mother Nature does not always take our plans into account, so if you already have rhizomes in hand but your local climate is not quite ready to plant yet there are a couple of options. If you keep the rhizomes cold, dark, and moist they will happily hibernate for months. So toss them in your fridge until you are ready to plant outside, but be sure to keep their bag open so there is good airflow and do not soak them in water as that will cause them to start rotting. They might start to slowly start pushing out eyes (little white nubs) that will eventually grow into the bines once they are planted. You might also notice that rhizomes stored like this will develop a fine white mold (usually on the cut ends first), this is perfectly normal and is usually a sign of a healthy rhizome. Black mold or rhizomes that become slimy to the touch are not healthy and is usually caused by too much water in the bag. If this occurs, cut off the moldy portion, discard, and allow the rest of the rhizome to dry out a bit.

Another option is to pot the rhizomes up inside and get them going before they go in the ground. In room temperature soil with a little moisture it will probably only take a week or so before shoots start to show, so they will probably be happy inside for a month at most. The first bines that shoot up are commonly referred to as “Bull Bines” because they are big, vigorous growers,

but they tend to have lower fruit yields. That is why the bull bines are typically cut back after a while to incentivize second growth. The second growth bines are the ones that are trained up and allowed to fruit. So the timing might work well to allow the bull bines to get going inside, but when it is transferred to the ground they can be cut back. If you do plan on starting them inside, they will require a grow light or at least 6 hours of direct natural sunlight to make sure that they have enough energy to properly grow.

When is a good time to plant outside? In the Yakima Valley farmers start digging, moving, and planting after the ground thaws (usually in March), but many areas should wait until April after the risk of snow and hard frosts has passed. The ideal planting time can vary from year to year, so consult the Farmer’s Almanac or just use your best intuition.



## THE PLANTING

Commercial hop farmers traditionally plant three to five rhizomes in each mound just to make sure that every mound has at least one winner. When planting on a smaller scale, quality can trump quantity. Inspect your rhizome for sprouts or eyes. These are the little baby bines and they will be white or purple to start, but they will darken to green and sprout leaves as they mature in the presence of light. Some rhizomes will only have one bine to start while others can push out more than six. Feel free to cut your rhizome into different sections as long as each one has at least one healthy bine showing. After a year or two, additional rhizome cuttings can be taken off the established plant to plant in a new area or share with a friend.

Bury the rhizome in the mound right at or slightly above ground level. The rhizome should be at a slight angle or parallel to the surface and rotated so that the majority of the eyes are pointed up. If the eyes are pointed down they will eventually find their way to the surface, but they will expend a bunch of energy in the process and might have stunted growth. Loosely pat the soil down so that there are no pockets of air and water well. If the rhizome sits in too much water at this stage it might rot. So make sure the soil is draining well between waterings (every couple days or so, but go by touch and not sight). It is alright if they dry out between waterings so overwatering is probably more of a risk than under watering at this stage.

There should be at least three feet between hop mounds so that they do not crowd their neighbors. It is best to keep varieties separate, but they do not need to be quarantined from each other.

**Culinary Note:** Traditionally the first tender shoots every year are cut to be eaten and are often pickled or cooked like asparagus. The bines turn fibrous very quickly, so only eat the most tender shoots. You can also cover the bines with a fabric to block out the light, which will keep the bines light white and more tender.

## THE TRAINING

It will not take long for the bines to break through the soil and start reaching for the sky. Each bine can grow as much as six inches in a single day, so before you know it you will need to start training them. Commercial farmers cut back the first bull bines and once the second-growth bines reach six inches above the ground it is time to start training them.

Pick the healthiest shoots (about three per twine, cutting back all others) and wrap each bine clockwise around the twine. Mature bines can be quite prickly and they will notoriously cut exposed skin, so be careful when handling. Additional training might be required over the next couple days, but before long the bines will understand and keep climbing up on their own. Hops are mechanical climbers, so their heads will follow the sun, which is why they climb clockwise. It is also important to note that if a bine's head is damaged or broken off, that entire bine will die. So be careful when training and maintaining.

## THE MAINTENANCE



Hops do not require a lot of maintenance day to day. Once they get established keep the leaves trimmed on the lower foot or two to prevent diseases or molds and mildews. Some farmers will spread elemental sulfur on the dirt and lower leaves to a similar affect. Spider mites are one of the more worrisome pests for hops, but they can usually be dealt with by spraying with neem oil or sulfur. Fine, white webs on the underside of leaves are the major sign of mites.

Aphids are much easier to detect and are straightforward to deal with. Ladybugs love to feast on aphids with the ladybug larvae actually being the most effective stage for aphid eating. If ladybugs are not enough, a soap and water mixture applied directly to the aphids will work after a couple applications. However this method can potentially harm helpful bugs like ladybugs.

Depending on your growing region, mildews are potentially the biggest threat to your hops. Powdery Mildew is the biggest danger on the east coast and can be identified by white powdery patches on the leaves to start. Powdery Mildew usually displays early in the growing season (May or June) and can prevent the healthy growth and development of the hop cones. The best treatment for Powdery Mildew is prevention, because once a hop plant is infected there are very few remedies. Sulphur-based fungicides are sometimes successful if applied early enough in the fungus' life cycle. Once the spore-bearing burrs have

started forming, the only course of action is to burn the infected plants, well away from other plants as the spores can still spread on the wind. The best preventative measures are: proper spacing between plants to allow adequate airflow and sunshine, pruning the lower foot or two of leaves so that the mildew spores are not splashed up from the dirt, and proper training so that the bines do not get bunched up and create pockets of moisture. Healthy plants are also less susceptible to the spores so feed them well and keep them properly maintained for best results.

If you notice that the leaves are pale yellow or brown around the edges it can signify a nutritional deficiency or imbalance, but frequently in residential areas this can be the result of sprayed weed killers like Roundup causing accidental contamination and cramping the hops style. Yellow leaves can also be caused by rain runoff from concrete patios and driveways, which washes caustic lye into the soil.

## WATERING

A proper watering schedule with a drip system that waters right at the base of the plant will ensure a healthy plant throughout the growing season. Hops do require a good amount of water once they get going and are far from drought-resistant. The drip system is preferred because it waters without splashing and spraying the leaves and will cut down on disease and mold exposure. Flood irrigation is still commonly practiced in European countries, but water conservation is a major issue in the Yakima Valley so drip irrigation here is the standard. Water schedule will depend heavily on your local climate and soil profile, but in general during peak summer hops should be watered every day or every other. Watering in the morning, before the sun is high in the sky, is also ideal as it will ensure that as little water evaporates as possible.

### A NOTE ON HOP SEX

Hop plants are gendered, with only the females producing fruit. Hop plants are also able to change gender from year to year or even within the same season. Gender switching is largely caused by environmental stresses and can even cause plants to present hermaphrodites with both female cones and male flowers. Commercial farmers rigorously patrol for male plants (commonly called stags) as their pollen will fertilize the female cones and produce seeds. Commercial hops are always tested for seed and stem content and if the seed percentage goes above 3% it can result in lower prices for the farmer and a nock to their reputation. On the homegrown scale seeds are not as much of an issue, but if your plant transitions fully to male it is best to rip it out and replant. Hermaphrodite hops are mostly impotent so there is not a risk to producing seeds, but the fruit yield will be lower on a hermaphrodite plant as it is spending energy to produce both male and female parts.

## HARVESTING

When to harvest your hops is a tricky topic and most commercial farmers have their own special ways to determine when to harvest. In general each variety has its own harvest window; Centennial tends to be one of the first to ripen and depending on the growing season they can be ready towards the end of August. But the majority of varieties peak around the second or third week of September and very few are still in the ground come October. Not only does the variety determine when it is best to harvest, but it also determines how long you have to harvest. This is commonly referred to as the harvest window and some varieties like Columbus have a notoriously short harvest window that only lasts a day or two.



The most important thing to look at to determine proper harvest date is the lupulin glands. The lupulin glands run along the middle of the hop cone and vary from light yellow to brown in color depending on maturity. Ideally, hops will be picked when the lupulin glands are fully matured (bright orange) and not overly ripe as they will tend to have unpleasant aromas of onion and garlic if left to hang too long. Starting in the beginning of August you can start pulling off a couple cones, cut them in half with a razor blade and watch the color, shape, and aroma change even day to day. If you have access to a microscope that will give you an even better idea of the ripeness of the lupulin glands as they will start out perfectly round, but start looking more like a raindrop as they ripen.

Some seasoned farmers squeeze the cones and are able to tell maturity based on feel. The young cones will feel waxy and squishy, while mature cones will feel more papery and springy. The most important thing to keep in mind for harvesting is that if you like the way it smells, then you will probably still like it after you brew with it. Keep track from year to year on when you harvest and it will help you to really dial in the ideal harvest date.

When it is time for you harvest, it is important to dress appropriately by not having exposed skin on your arms. Bines can be a bit mean and are notorious for cutting or scraping skin. Eye protection and leather gloves are also a good idea when harvesting. Depending on your growing setup, hack the hops just above the ground and cut the tops from the wire so you can lay the bine down on a table or the ground. It will take awhile to pick all the cones by hand, but the only other alternative is to put in a million dollar picker, which your neighbors might not like too much.

Once the cones are all picked you can brew with them wet, but you must use them within 24 hours or you risk them getting slimy as they start to decompose. If you are not able to use them immediately you are able to dry them out and then store them in the freezer. Commercial kilns use high powered heaters and fans to achieve the goal of less than 10% moisture by weight. And even then it still takes 6-8 hours to properly dry them out. At home, spread the cones out on a screen or breathable fabric so that fans can blow air both under and over the layer. Airflow and temperature can be increased to decrease drying time, but it will still probably take at least 6 hours and be sure to toss or mixup the cones so they dry out evenly. Food dehydrators are also an option, but tend to not dry many hops at once. Once the cones are properly dried it is best to vacuum seal them before tossing them in the freezer.

Hops do not require any care or maintenance over the winter as long as they are cut down to the ground.



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