

# Growing hops at home

## Expanded notes on a talk to the Northern Craft Brewers

Given by Ian Priddey on 28 October 2017

### History

Grown commercially in England since the 1520s. Various Goldings varieties emerged from about 1790 onwards. Fuggles originated about 1861 and was introduced in 1875. Research and development of new varieties by Wye College in Kent dates from 1894.

Personally I have been growing hops, Wye Eastwell Goldings and Cascade for 30 years in both Worcestershire and West Yorkshire, more recently adding a Fuggles. Despite growing them close to the northern limit of their growth, in only one year in Yorkshire did I have a near total crop failure, due to a very wet and windy September that resulted in the cones going mouldy before they ripened.

### Botany

Hops grow from a perennial rootstock that dies back in the autumn and produces new shoots in the spring. Roots will go down 5 feet and laterally spread to a diameter of 6 - 8 feet. The stem or "bine" rotates clockwise and may grow to 25 - 30 feet.

Hop plants are dioecious, that is there are separate male and female plants. Only the female produces cones. Pollination by a male is said to stimulate rapid cone development which is advantageous when growing hops at more northern latitudes; however this is disputed by some and I have not had any obvious problem without a male to pollinate my female plants. Whether my harvesting would have been earlier with a male present I can't say. Unfertilized cones are smaller, denser and may ripen later, thus more chance of them being damaged by late summer wind and rain. Having said that I have only lost a crop in one year out of 22 growing in the West Yorkshire Pennine hills. Assuming there are no male hop plants near where you live you could try to source a male plant if you wish, but seeded hops give no advantage in the brewery.

Temperature is the most critical factor to how fast the bine grows each day and Derek noted growth also happened overnight, not just during the day. Weather conditions will affect the quality of the hop but has little influence on when the crop is ripe and ready for picking, which is more dependent on the variety, with different varieties maturing at different times.

If not completely cut off at harvest as happens commercially with the traditional tall growing varieties, the bine ripens off in October and dies down early November, largely related to the shortening length of daylight.

## **Soil and climate**

Hops will grow in poor soils but the yield will be poor. Good drainage is needed as the roots do not like being waterlogged. A degree of moving water, e.g. draining down a hillside will be tolerated, but stagnant water with dissolved oxygen becoming depleted may kill the rootstock. Regarding pH levels, a roughly neutral soil is preferable and if the pH falls below 6.5 the acidic soil will limit yields, so a little lime can be applied, but don't overdo this as high pH will limit the uptake of some nutrients.

During the March to August growing season hops need 12 inches of rainfall, preferably evenly distributed. Water is especially important in July and August when the cones are developing in order to achieve a good yield. Established plants growing in good soil will rarely require watering unless the weather is very hot and dry. Any watering should be occasional and significant; perhaps at least 5 gallons per plant over a 4 foot diameter circle. Rainfall does not seem to affect the % of alpha acid, but lack of sun and warmth may result in a lower amount of AA. A predominantly sunny and dry September is ideal prior to picking, which depending on variety is likely to be around late September in the north.

Hop plants benefit from the application of well rotted manure and/or compost to the soil. This can be done from winter to spring, but with heavier winter rain fall in recent years I would rather apply manure in March. Not applying manure is likely to reduce the longevity of the rootstocks. A lack of nutrients will reduce the yield (although not the quality of the hops.) A general purpose fertilizer like fish, blood and bone can be applied at the start of the growing season. I would suggest not applying fertilizers with nitrogen after June, but some growers think later additions of nitrogen do increase yields. Hops have a high need for potash and extra potash can be applied early June. A little wood ash if available can be used (I use ash from the wood burning stove but only from good wood – not chipboard or any wood that has paint or preservatives on it). Alternatively when dry, water with some high potash tomato fertilizer.

## **Planting**

Planting has traditionally been done between November and late March. Avoid any days when the soil is frozen or very wet. With the tendency for more milder and wetter winters I would advise aiming to plant late February to early March. The old gardeners' saying about putting a £2 plant in a £10 hole applies particularly well to hops that may grow in the same place for 10 to 20 years. Poor soil preparation may limit your yields and the lifespan of the plant.

Aim for at least 18 inches of good well drained soil. Add sharp sand and gravel if the soil has a high clay content. Break up the subsoil if compacted. The hole should be at least 9 inch square, I would go for twice that size. Incorporate plenty of well rotted manure and/or compost. If you do not have your own supply, a bag of manure can be bought at most

garden centres for around the cost of a pint in a pub. A general purpose fertilizer such as fish, blood and bone can be spread over the surface in a 3 foot diameter circle.

Think about how you are going to train the bines and if there is not a nearby trellis or equivalent you may want to hammer in a very solid stake that remains about one foot above the ground into which you can insert a hook to attach a wire. The rootstock should be planted about 1.5 to 2 inches below soil level. Straggly roots can be trimmed back with secateurs or a sharp knife, preferably sterilised first by heating; I use the burner on the gas stove but a candle would probably suffice if you cook by electric.

### **Cultural operations**

In the first year after planting train all of the bines that grow. The plant may produce a few small hops but the aim is to get the plant established for future years. From the second year onwards aim to train 2 or 3 bines per plant to the top of your supporting structure or wire. It is worth starting off by training an extra bine if growing vertically and maybe up to 6 bines if they are growing at an angle, where they are more prone to break when tied down to the wire. If growing vertically they may not need tying in after maybe a first tie to get them attached to your wire or string but whether they require any further tying is likely to depend on how sheltered a spot they are in and how much wind reaches them. Rolls of plastic coated thin wire can be bought at garden centres and cut to length.

If growing at an angle they will need tying every 9 inches or so as they will otherwise grow vertically and eventually be at risk of breaking in the wind. Some varieties seem more prone to snapping than others and it is best to do this when the weather is warm, as bines are more likely to snap if tied down when cold. When your required number has reached the top, the extra bines that have not snapped can be cut off about the end of June. Growing more bines per plant will increase your overall yield but be at the expense of smaller cones. Less sun will reach the cones and there may be a greater risk of diseases due to shade and less air circulation.

The plant will produce many more bines than are needed, especially once well established and surplus ones need to be removed. Leave until they are 6 to 9 inches tall and pull directly upwards when they should detach from the rootstock below soil level, although some may snap at soil level. Some varieties are more prone to snapping than others and it is best to allow these to grow a bit longer before removing them. Some will come with baby roots on them and these can be potted up if you want to produce another plant. The top 3 inches can be steamed and eaten if you wish, as you would with asparagus tips.

When the bines are about 6 feet tall, the lowest foot of leaves can be stripped off and this can progress gradually until by the first week of July when the lowest 4 to 5 feet can be stripped of leaves. This helps to prevent or at least limit any upward spread of Downy Mildew. By early July many roots will be near the surface so it is best to pull any weeds out

by hand or hoe carefully rather than digging the soil. Some soil can be moved from elsewhere or hoed towards the rootstock.

Side shoots or laterals will be produced from the bines and those lower down the plant can be stripped off as they grow so that the plant's energy can be concentrated on growing the bine up to its desired height. Laterals can then be allowed to grow on the top half of the bine. The bines can be grown up to about 14 to 16 feet. Whilst they will grow higher, growing a tall bine is not recommended as it may make picking more difficult and the tendency is for the plant to produce cones near the top, so a tall bine will just push the cropping area further up the bine.

Hops are prone to a number of pests and diseases but the one most likely to be encountered is aphids (greenfly), usually starting on the underside of leaves near the top of the bine, so take a regular look. The range of products available to the amateur gardener for pest control has reduced and once the cones are developing you need to think carefully about what you spray onto them. Fatty acid solutions are an alternative to insecticides and these products should be available at garden centres but a homemade version can be made by mixing half a teaspoon of washing up liquid in two pints of water and applying via a sprayer. Follow any instructions on commercial products and even with soap solutions I would not use within the last two weeks prior to picking.

Once the hops have been picked and the bines die back they can be cut off just above soil level with a sharp knife – sterilise before use and in-between individual plants. The remaining growth is best taken to the local authority recycling facility as composting it risks contaminating the compost with any disease present. The plants can then be “dressed” or cut back below soil level. This can be done from anytime between November and early April when the soil is reasonably dry and not frozen, but with warmer winters I prefer to do this in November rather than risk new growth starting before the job has been done. Early dressing is said to promote early and strong growth, although late dressing in March will give a slightly higher yield, however if left until April yields will drop, possibly substantially by mid April.

Failure to undertake the dressing operation will result in the rootstock enlarging and producing vast numbers of spindly bines in future years. Take a trowel or short handled hoe and dig a small circular trench about a foot from the remaining bines. If there are runners (not roots) growing outwards, pull these up and cut back close to the rootstock. Gently remove the soil away from the rootstock to expose the crown of the rootstock and base of the bines. Holding the bine and gently rocking it helps locate where it emerges from the rootstock. It should then be cut with a sharp sterilised knife to within a quarter to half inch of the rootstock, leaving at least two pairs of buds. Once complete the soil can be raked back over the rootstock. Add a little bone meal if you wish. If there is not a post supporting the wire to mark the position of the plant, it may be worth marking its location with a couple of canes.

## **Harvesting and drying**

The plant will start to produce what are fairly insignificant looking flowers in late July, depending on variety. They then gradually form into small cones and enlarge before ripening mid to late September. To tell if they are ready for picking the cone should look closed, rustle if gently rubbed on a dry day, detach easily from the bine if gently pulled, have a yellowish-green colour and a good aroma when rubbed between your hands.

Commercially the entire bine of traditional tall varieties will be cut and taken to the picking shed. However this reduces the yield the next year by up to 12%, so home growers should pick individual cones off the bine without cutting it if possible, even if that means pulling it down a bit. Involve family and friends – and have a home brew!

Initially they will have a water content of 75 to 83% of their weight and this needs to be reduced to below 12%. Another guide is to dry them down to 20% of their original weight. A good plan is lay the hops out onto newspaper in a garage or shed, turning them and replacing the newspaper with dry ones twice a day for a day or two. This will allow you to judge if there are many greenfly present and allow some of them and any larger insects to hopefully wander off. I have previously built a homemade kiln with a wooden box with traditional light bulbs at the base as a heat source; however I now just allow them to air dry on newspaper for about 5 days in a warm airy place, but not in bright light or direct sun. Drying them in the oven is risky and risks over drying - or even a fire! Over drying will reduce the alpha acid content but under drying risks them deteriorating and going brown to black, or even mouldy.

Heat, oxygen and light all promote the deterioration of dried hops. Foil bags with air extracted like most suppliers use is ideal but probably not an option for most home growers. I pack mine into plastic freezer bags, compress them as much as possible to exclude air then tie them. I then put them into a second bag before putting them in the fridge overnight (to allow any moisture to even out) and then into a freezer. Label with the year and variety. Cold storage will reduce deterioration but not prevent it. Deterioration will vary according to variety as some store better than others even under ideal conditions.

**Note:** one inch = 25mm and one foot = 30cm (approximately) for those of you who have gone entirely metric.

**Acknowledgement:** My thanks to Ali and Richard Capper of Stocks Farm, Worcestershire for reading the draft of these notes and commenting on them from the perspective of commercial hop growers. Ali is the Chairman of Wye Hops and a Director of the British Hop Association, who has taken a lead on promoting British hops. Stocks Farm sell hops direct from the farm to home brewers. See: [www.stocksfarm.net](http://www.stocksfarm.net) There is also a link there to a good article by Ali called: What's New with British Hops?