

Herb production workshop Monday 28th April 2008

In a recent edition of the Farmers Guardian hydroponics was noted as one of the tools that horticulturalists should embrace in order to meet the challenges of rising demand for food. Hydroponic growing can be adapted to suit many crops, including herbs and salad crops.

To help potential growers understand the processes, benefits and drawbacks of hydroponic systems, CALU arranged a workshop at a hydroponic unit on Anglesey.

LOCATION & SITE

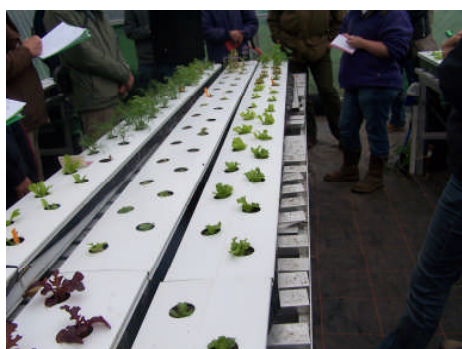
The event took place at Herbs from Wales, a 4ha smallholding on Anglesey run by husband and wife team Rowena and Philip Mansfield. The couple have been producing herbs on the holding for 20 years. They diversified into hydroponic (and other novel) production techniques over the last three years.

The production units comprise: a “hydrodome” (a polytunnel mainly for demonstration purposes), and 5 smaller polytunnels, partially netted. There is also a Portacabin with an office and kitchen to process the herbs to produce balms, ointments and tinctures; a small outdoor selling area for pot plants as well as an indoor sales area for Rowena’s remedies.

The power for the hydrodome’s six pumps, two fans and a heater comes from an on-site wind turbine and solar panel.

HYDROPONIC UNITS

The first unit visited was a hydroponic unit using the Nutrient Film Technique (NFT). The basic components of the system are a water reservoir, a pump, and the beds that the plants are planted in. Other pieces of equipment include oxygenators, a pH meter, a thermometer and a nutrient monitor.



Lettuces in NFT beds

Monitoring the temperature within the polytunnel is essential as temperatures can exceed 38°C in the summer. At these temperatures, water in the reservoir tanks and flowing through the system becomes warmed, decreasing its oxygen content. The water in the reservoirs should, ideally, be kept below 21°C. Nutrient levels are monitored using an electrical conductivity meter and aerators are used to keep the oxygen levels in the water up.

A range of systems were shown in the polytunnel. Some consisted of wide channels filled with expanded clay balls (which allow more space for root growth), others were containers filled with vermiculite. The main production system uses long narrow tubes with holes down the length.



Rockwool blocks

Crops with similar requirements can be grown in the same channel. At Herbs from Wales, a range of salad leaves are grown together, but blueberries, for example, (which need high acidity) are kept completely separate.

Monitoring and balancing nutrient supply is a critical part of hydroponic production systems. Within the reservoirs nutrients are added to suit the crops and their stages of growth. At Herbs from Wales, standard hydroponic pre-mixed nutrient solutions are used (available e.g. from Growth Technology (Ionic) or Advanced Nutrients (Iguana)). The main feed for lettuce type crops (i.e. leafy) are 'Grow' feeds. These contain more nitrogen than potassium and phosphorus. For flowers and fruiting plants 'Bloom' feed is used - this contains more potassium and phosphorus than nitrogen.

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The pH in the beds will also vary according to the crops, the salad crops will be around 6.5-7 where as the blueberry crops will be running at a lower pH. The pH level, nutrient level and temperature are checked three times a day.

The pumps need constant monitoring as they only have an average life span of 3 years. Philip advises growers to keep some backup pumps to ensure a constantly running system in case a pump breaks.

Before planting into the hydroponic system the seeds are planted into a 4cm square rock wool block. The block is then placed in the open bed or under a cover in the long beds.

Some herbs are more suited to hydroponic growing than others; caraway, thyme, oregano and lemon balm all grow really well. However, the roots of some herbs like mint, chives and lemon balm can take over and can cause damage and blockages to the structures. Sage is one of the herbs that does not thrive in the hydroponic system.

Rowena and Philip have also had success growing legumes. However these do require a higher level of feed compared to the salad and herb crops. Pak Choi is a popular crop that can grow from seed to harvestable crop in less than 40days. Lettuces average around 35days, although this does depend upon the variety.

The system is not just limited to soft crops: leeks, onions, brassicas, strawberries, flowers, carrots, beetroot and radishes can all be grown. The only limitation is the size of the posts available and the space to grow them. Most of the larger crops at this site were grown in buckets filled with perlite. Perlite is used because it is inert and so is less likely to build up nutrients. Other materials such as crushed glass have also been used. After the crop has been harvested the growing media can be cleaned and reused an almost limitless number of times.

FLOATING BED SYSTEM

Another system being trialled at the site is a floating bed system. It is a similar system to NFT however the plants are suspended above the water level with only some of the roots in the re-circulating water. There needs to be some of the plant roots (approx. 2 cm) above the water level to prevent them from rotting and allow some air roots to grow resulting in vigorous plant growth.



Floating bed prototype

AQUAPONICS

A small aquaponic set up can also be seen at the Mansfields' property. Fish are used in aquaponics to enrich the water with nutrients. The waste from the fish is then fed to plants. Inputs for this system are for the fish feed but there is no need for additional plant fertilizer. There are also two products as outputs: the fish and the plants.

AEROPONICS



Small-scale aeroponic trial

An aeroponics unit is also used at the Herbs from Wales site. Aeroponics is a system designed to feed the plants by nutrient particles sprayed around the roots of the plants. This is still under trial, but the results are so far very positive with salad crops and Philip is planning on developing a larger unit.

STERILIZATION AND CLEANING

Perlite can be bleached to remove potential diseases before being reused. The clay balls are washed with clear water and the NFT systems are pumped through with bleach for 2 following days to avoid potential infestation.

PROCESSING HERBS

The second part of the event looked at techniques for adding value to the herbs – particularly the production of herbal teas, tinctures, ointments and toiletries.

To dry the herbs grown on site Rowena uses a commercial dehydrator. The herbs need to be dried at a very low temperature to avoid ‘cooking’ them. Drying on a smaller scale can also be done in warm places with some air circulation. Once dry the herbs can be shredded in a food processor and put into packets or airtight containers for storage. The sell by date for this kind of product is 2 years, provided they are stored in a cool, dark place. Any herbs which are to be used in products that will be ingested must be dried in a controlled environment (e.g. they cannot be dried by the traditional method of hanging upside down in a barn).

Some of the herbs dried in this way are sold simply as dried herbs. Others are made into herbal teabags. Rowena sources her empty teabags from the USA.

Producing tinctures requires a bit more preparation. The herbs are put into a large jar and ethanol is added. A licence (from HM Revenue & Excise) is required to use the ethanol. The herb-alcohol combination is then turned daily until the required strength is achieved. The herb is then pressed and the resulting liquor stored in dark bottles. The tinctures only smell like alcohol. For use, a couple of drops of the tincture are dissolved in hot water – the heat evaporates off the alcohol.

Rowena stressed the importance of maintaining comprehensive records, careful product labelling, and maintaining a clean working environment at all times. Premises used for the production of food stuffs needs to be approved by the Local Authority.

As there is a lot of daily work to be done on site, the Mansfield’s do not have the time to sell their products at farmers and speciality markets. Most of the products are sold via the internet or via local tourist shops.

For further information please contact CALU or email Rowena directly: Rowena@herbsfromwales.co.uk.