Initial trials of hop greenhouse propagation

Transferring tissue cultured plants to the greenhouse requires a period of acclimation or ‘hardening’, since the tissue culture environment is very protected and does not require plants to adapt to changes in humidity, light or temperature. For our initial trials of tissue culture-produced plants in greenhouse conditions, we used plantlets of Cascade and Fuggle Tetraploid. These trials are being conducted with a small number of plantlets, with the expectation that our observations can guide future, more detailed trials.

Cascade (left) and Fuggle Tetraploid (right) tissue culture plantlets at 38 days after sub-culturing. The red color of the growth media is due to its iron content.

For each variety, we transferred three tissue culture plantlets to pots, and three to a nutrient film technique (NFT) system. Plantlets were covered with Styrofoam cups to maintain a high humidity
environment. I removed the styrofoam cups after 1 day since the plants looked very healthy and seemed to have adjusted quickly to their new environment.

![Plantlets in soilless potting medium (left, center) and in the NFT system (right).](image)

Our trial NFT system is a very simple setup. It uses a 5 gallon bucket as a reservoir, a small pump to circulate the nutrient solution, guttering lined with felt as the plant supports, and opaque plastic film to cover the plant root systems. The plastic film also reduces light exposure of the nutrient solution, reducing opportunities for algal growth.
After 12 days, the potted hop plants look great. They have been watered daily and fertilized every 3-4 days with Peters Professional Peat-Lite Special (product sheet: http://everris.us.com/product-sheet/peters-professional-20-10-20-peat-lite-special-water-types-1-4-product-sheet). Our greenhouse pipes mix in at a level of 350-400 ppm nitrogen.
The plants in the NFT system are not doing so well (photos below). They are paler and smaller than the potted plants, indicating that we need to optimize the NFT nutrient levels. I’ve been using the piped-in Peters Professional Peat-Lite Special at a 1:100 dilution, which has been successful for potato NFT systems – but hops seem hungrier! I’ll be using a higher level when I next switch the nutrient solution in a couple of days, and testing the EC and pH more frequently.
I’ve been checking root growth on the NFT-grown plants (above). Ultimately I am hoping they will produce rhizomes that can be harvested for propagation.

Updates to follow! Let us know if you have suggestions or resources to share.