Grower Summary 2

CP 085

Securing skills and expertise in crop light responses for UK protected horticulture, with specific reference to exploitation of LED technology (EMT/AHDB Horticulture/HTA Fellowship)

Annual 2014

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Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

Further information

If you would like a copy of this report, please email the AHDB Horticulture office (hort.info.@ahdb.org.uk), quoting your AHDB Horticulture number, alternatively contact AHDB Horticulture at the address below.

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Project Number:	CP 085
Project Title:	Securing skills and expertise in crop light responses for UK protected horticulture, with specific reference to exploitation of LED technology (EMT/AHDB Horticulture/HTA Fellowship)
Project Leader:	Dr G M McPherson, STC
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GROWER SUMMARY 2

Influence of far-red light on the morphology and development of a range of herb species.

Headline

Far-red light induces plant stretching, leaf curling and flowering. The magnitude of these responses differs between species.

Background

Poor light levels can prompt both stretching and flowering in plants. This shade-avoidance response is induced by low intensities of blue and red light and relatively high intensities of far-red light. In general, blue and red light causes plants to remain compact, while far-red light causes plants to stretch and flower. While these general rules can be applied to most plant species, the relative magnitude of the responses varies considerably. With LED lighting it is possible to carefully manipulate the quality of light that plants are exposed to and, in doing so, we can examine the diversity and magnitude of plant responses to light. Herb crops come from an extensive range of habitats and plant lineages and would be expected to show a wide range of responses to light. A thorough understanding of light responses within this group would help to grow better plants and classify plants with regard to their lighting requirements.

This small scale trial was aimed at examining the influence of far-red LED on herb plant morphology. The focus of the work was to make qualitative assessments of the diversity of plant light responses to help focus more refined future research projects and ensure the correct parameters are measured. The results will also function as a range-finding exercise for light recipe development.

Summary

Far-red light caused an increase in internode length and plant height in most species. The exception to this was Sage, in which internode lengths were equal for plants grown with and without far-red light. The greatest response to far-red light was observed in Dill. Dill plants grown with far-red light were three times taller than those grown without far-red light. The morphology of the far-red grown plants was extremely stretched and flowering occurred. Dill plants grown without far-red remained extremely compact. Bronze fennel plants were next most sensitive to far-red light; stems were 4.7 times longer but the plants did not flower when grown with far-red light than without far red. The bronze fennel plants did not flower during this experiment. Mint and Thyme showed moderate responses to far-red light, with increases in plant height or internode length of 1.2–1.8 times those of plants grown without far-red light.

Leaf morphology responses to far-red varied between species. Thyme demonstrated leaf curling and the mint leaves became curled and blistered in appearance. Sage leaves became narrower but demonstrated no curling. The leaves of the Dill and Bronze fennel plants became more feathery in appearance.

Financial Benefits

It is too early in this program to assess the potential financial aspects of the results.

Action Points

Further work is required to refine light recipes to enhance the different aspects of herb crops. The results from this experiment will feed into and guide the experiments planned in the AHDB Horticulture CP125 research project. These experiments will further our understanding of plant responses to different red:far-red ratios provided by LEDs.

Further work is required to understand how the red:far-red ratio of light provided by LEDs compares to the red:far-red ratio of other lighting systems with regards to plant morphology and development.