

(photosynthetic photon flux: PPF). Lighting from the each LED was applied to plants during the all over the night time. The light intensity in overnight lighting were high ($50 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$: PPF) or low ($10 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$: PPF) levels around the plant top. We also set the control treatment without over night lighting treatment. Plant shape was affected by light quality of LED, especially in 'Oobashungiku' and 'Tyubashungiku'. In those cultivars, the main shoot elongation was promoted by overnight lighting from far-red and blue LED. Shoot fresh weights of edible chrysanthemum under over night lighting were 22% and 17% higher in blue and green LED treatments respectively, compared with the control treatment. On the other hand, a shoot fresh weight was inhibited by far-red LED treatment. The number of leaves under red and blue LED treatments became around 20-35% higher in 'Oobashungiku' and 'Tyubashungiku' than control treatment, but not in 'Kabubarityuyoushungiku'. The ascorbic acid content in far-red LED treatment with high light intensity level tended to increase up to about 60% higher level than control treatment in 'Oobashungiku' and 'Tyubashungiku'.

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Weed Control by Herbicides and their Combinations in Carrot Crop

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Under Lithuanian climatic conditions at the beginning of vegetation carrots (*Daucus sativus* Röhl.) grow slowly and completely can't compete with weeds, which quickly germinate and grow in the crop. The most effective method of weed destroying under the conditions of intensive agriculture is herbicides applying. There aren't many herbicides registered in Lithuania and suitable for carrot crop, therefore there is constantly looked for new, more effective and less noxious, herbicides, which could be enough efficacy in low dosage. In 2008–2009 at the Institute of Horticulture, Lithuanian Research Centre for Agriculture and Forestry, field trials were carried out in carrot crop to investigate herbicides acolonifen, metribuzin and their combinations. The applied herbicides and their combination efficiently reduced the total amount of weeds in carrot crop. The least efficient was combination of metribuzin ($0.35 \text{ l}\cdot\text{ha}^{-1}$) sprayed after sowing and in addition metribuzin ($0.35 \text{ l}\cdot\text{ha}^{-1}$) sprayed at carrot 2 leaves stage. After the application the amount of weeds reduced by 84 %. The efficiency of acolonifen was very similar when it was sprayed ($2.5 \text{ l}\cdot\text{ha}^{-1}$) after sowing – the amount of weeds was reduced by 85.8%. The highest amount of weeds was killed when combination of acolonifen sprayed ($1.5 \text{ l}\cdot\text{ha}^{-1}$) after sowing and metribuzin ($0.35 \text{ l}\cdot\text{ha}^{-1}$) sprayed at carrot 2 leaves stage. Weeds were reduced by 91%. The results of field trials indicated that broadleaved weeds except *Solanum nigrum* L. were very well controlled by acolonifen, metribuzin and their combinations.

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Influence of Young Leaves on Melon Fruit Quality

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The goal of present work was evaluate the influence of young leaves of the cantaloupe melon plants on the quality of fruits. The experiment was carried out at farm of Norfruit Company, in Mossoró, RN, Brazil. The pruning (treatments) were 100%, 50% and 0% (control) of young leaves out of primary branch, seven days before harvesting. The fruits were harvested to 71 days after the sowing, followed commercial calendar of the company. The fruits were weighted and soluble solid contents (SSC) determined. Then, the fruits were dried until reached constant weight, when dry weight (DWF) was measured. Other portions of fruits was homogenized in blender and filtered in nylon. The juice obtained was diluted and filtered for quantification of sugars for liquid chromatography (HPLC). The DWF was reduced for pruning in $\pm 30\%$, while the fresh weight

was reduced by $\pm 10\%$. The SSC of control fruits was 10 °Brix, 32.8% upper the fruits the treatment with 50% and 22.1% the fruits of treatments with 100% of pruning. This reduction in the SSC is due to reduction in sucrose content, main component of soluble solid, that was $\pm 70\%$ less in the fruits of plants that had received pruning. In the other hand, the glucose contents had practically twice and fructose content increased in 30% in the fruits of plants that had received pruning. The differences among the prunings had been minimal. So, it is observed that branches (and consequently the leaves) formed in the end melon cycle are important for the quality of the fruits, even though in the last week before the harvest, when inputs (water and nutrients) for culture is neglected in the commercial orchards.

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Evidence that Mechanical Stress Leads to Stem Cavities in Broccoli

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The development of hollow stem in broccoli is not understood, and previous workers have suggested this disorder arises from either a boron deficiency or excessive growth rates. We provide evidence that stem cavities can arise from mechanical tissue stress generated by differential strain across the upper stem tissues during inflorescence development. Stem cavities were observed to occur as radial longitudinal fractures in the upper stem after inflorescence development had begun, and under ESEM, both cell separation and fracture were observed. Central pith tissue in this region exhibited limited extensibility while that of the vascular and cortex regions showed considerable extensibility. In contrast, central pith tissues in the lower stem were extensible, declining in magnitude towards the outer stem tissues. Central pith tissue was also weaker in the upper stem, having lower tensile strength and breaking strain (ϵ). Circumferential tension was measured as a gap index, and high levels of strain energy were observed stored in the vascular cortex region of the middle and upper stems. The orientation of the major axes of the stem cavities were consistently perpendicular to that of the widest dimension of the elliptical stem when viewed in cross section, suggesting that radial anisodynamous stresses may be operating across the various stem tissues. It is thus proposed that anisodynamous stresses generated by greater growth in the outer regions of the stem places the less extensible central pith tissues under mechanical stress that exceeds its threshold for breaking strain. The succeeding tissue failure results in a radial longitudinal fissure that propagates throughout the parenchymous pith tissue until this energy is dissipated or resisted by other tissues. This mechanical tissue strain hypothesis provides an explanation for the timing and location of hollow stem in broccoli that occurs at the top of the stem during early inflorescence development.

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Placed Nitrogen Starter Fertiliser Strategy for Field Grown Iceberg Lettuce (*Lactuca sativa* L.)

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This study is based on two field trials and a MSc study performed in climate chambers using iceberg lettuce (*Lactuca sativa* L.) as model crop. A randomised fertiliser experiment in four blocks with two consecutive iceberg lettuce crops was performed on sandy soil in western Sweden in the county of Halland. A smaller demonstration plot was studied in a commercial iceberg lettuce field on clay soil in southern Sweden in the county of Skåne. Both trials were based on results obtained from similar field trials the previous season. Levels, distribution, total amounts and methods of nitrogen fertiliser application (placed close to the plant at planting or broadcast) were compared. The climate chamber study