

Pre-harvest relative humidity influences water balance components of cut roses during the post-harvest life

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Introduction

Long-term high relative air humidity (RH > 85%) during cultivation reduces the vase life of cut rose, but the magnitude of such effect is cultivar dependent (Mortensen and Gislerød, 2005).

Aim

In-depth analysis of the water balance components during the vase life of contrasting cut rose cultivars grown under high RH.

Material and methods

PRE-HARVEST (cultivation):

Four treatments, combination of

- Two contrasting cut rose cultivars 'Frisco' (tolerant) and 'Prophyta' (sensitive);
- Two RH levels Moderate (60%) and high (90%) RH.

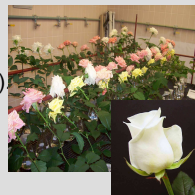


POST-HARVEST (vase life trial):

8 stems/ treatment, harvested at commercial stage (2), cut under water at a disinfected internode and placed in sterilized solution (pH=3)

Evaluations (24h basis) during vase life:

- Transpiration rate, water uptake rate, fresh weight and flower opening.



Results

Vase life

- Prevention of air emboli at the cut surface and serious suppression of bacterial growth resulted in a very long vase life (19 to 30 d);
- High RH during cultivation significantly decreased the vase life in both cultivars (stronger effect in the sensitive one, 11 d vs. 6 d).

Transpiration rate profiles

High RH during growth increased the transpiration rate during post-harvest, but this effect was more pronounced in the sensitive cultivar (264% increase in 'Prophyta' vs. 148% in 'Frisco' as compared to moderate RH).

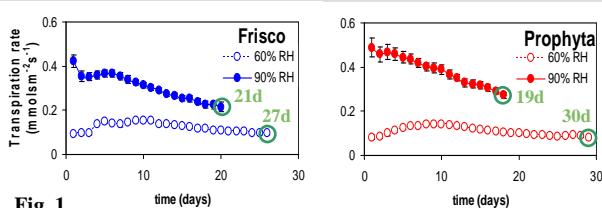


Fig. 1

Water uptake rate profiles

Water uptake rate followed the transpiration rate profiles. However, in the sensitive cultivar (Prophyta) the water uptake increase at high RH (251%; Fig. 2) was lower than the increase in water loss (264%; Fig. 1). For the tolerant cultivar this increase was comparable (148 vs. 145%).

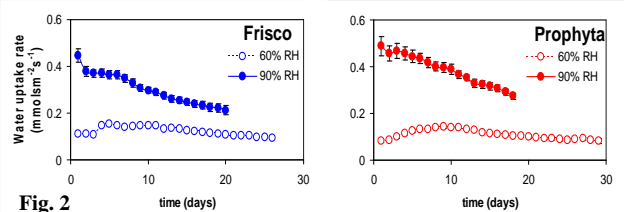


Fig. 2

Fresh weight dynamics

After an increase in the first week (which corresponds to the flower bud opening) high RH resulted in a stronger decrease of the relative fresh weight in the later stages of vase life in the sensitive cultivar, while in the tolerant only a minor effect was observed.

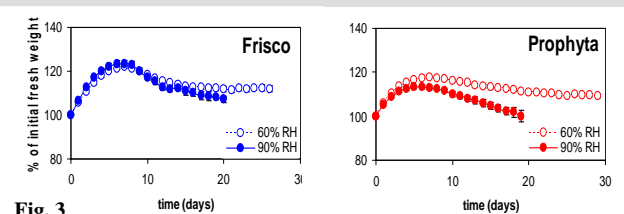


Fig. 3

Flower opening

- Flower opening rate during post-harvest was not affected by RH level during growth;
- Less flower stems opened completely (i.e. visible heart) after cultivation at high RH (66% as compared to moderate RH).

Conclusions

- 1) Prevention of air emboli and bacterial growth results in a long vase life (about 3 weeks), also in flower stems grown at high RH;
- 2) Cultivars tolerant to high RH during cultivation (Frisco) have a better control over water loss during post-harvest life (more responsive stomata);
- 3) Water uptake increased significantly in roses grown at high RH, but this did not fully compensate the higher water loss in the sensitive cultivar (Prophyta);
- 4) FW dynamics in the later stages of vase life give a good indication about the cultivar sensitivity to high RH.

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