Title Why do we treat flowers the way we do? A system analysis approach of the cut flower postharvest chain

Author U. Van Meeteren

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Abstract

Although temperature is one of the most important factors in the post-harvest chain to control quality losses of cut flowers, decisions related to temperature management are often poorly underpinned. The effects of temperature on some physiological, physical and phytopathological processes involved in quality loss are described, with special attention to rate of senescence, infection by *Botrytis cinerea* and placing flower stems in water. Senescence-temperature relations were fitted using data from a literature survey. It was obvious that sensitivity of senescence rate to temperature is rather different between flower species. Gerbera, jonquil and rose showed a maximum rate of senescence that was reached at about 20°C. Germination of *Botrytis* conidia showed an exponential relation with temperature. At 5°C it took more than 10 hrs before 50% of conidia were germinated in a nutritient solution. On rose petals it took much longer. A 2-hrs dry period during incubation of conidia inhibited germination during the subsequent period in water, indicating that previous conditions in a post-harvest chain will affect the consequence of condensation on *B*. infection. The reasoning of putting cut flower stems in water during storage and transport was questioned. When flowers are placed in water, the temperature of this water should be low. In some simulation experiments, using a preliminary model, the effect of specific temperatures in some hypothetical chains were analysed. It was shown that in short local chains the short duration of the chain is of more importance than its temperature. Because of relatively high temperatures (≥15°C) often found in these local chains, the risk of *Botrytis* at the consumer (germination of conidia at the end of the transport phase) is rather high. Therefore, a constant temperature seems to be of more importance than a low temperature. After an international distribution chain of 86 hours the expected vase life at the final consumer will be acceptable when the temperature during most of the transport links (with a long duration) is below 10°C. Especially conditions during sorting were very critical for *B*. infection. It was discussed that the outcomes of the simulations had only a limited meaning, because of simplifications in the model and the lack of sound data. Experiments about temperature effects on quality, however, could be more generally useful when they are designed with the objective to generate parameters for quality simulation models.