GROWTH REGULATION OF ORNAMENTALS IN EUROPE – FOCUS ON ALTERNATIVE METHODS

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In Europe the largest amount of pesticides used in horticulture is for chemical growth regulation in ornamental plant production. The intensive use of chemical growth retardants is of environmental concern. In recent years, restrictions on the use of chemical PGRs have been introduced in Europe, and reflect a need for developing efficient non-chemical methods for plant growth regulation. Experiments with a range of genetically and ecologically widely differing plant species have shown that chemical growth regulation can be significantly reduced by using a low phosphorus (P) buffer technique (Compalox®-P) as a single factor or combined with drought stress or reduced nitrogen (N) availability. In some plant species chemical growth regulation can be completely avoided by using the low P buffer technique, whereas in other species combinations with other alternative methods or reduced amounts of chemical growth regulators are needed to obtain sufficient growth regulation. Results from 94 tests using the Compalox®-P buffer technique are available in a low P database (*http://www.agrsci.org/ahp/cwh*).

In a study with Hibiscus rosa-sinensis drought stress was applied as cyclic drought, alternating between container capacity and drought to visible wilt (-650 to –800 hPa as measured with tensiometers placed in the growth substrate). Also in this study we used the Compalox®-P buffer technique to maintain a predetermined and stable P concentration in the growth substrate (Hansen & Nielsen, 2001). Reduced N was either provided as a constant low N fertigation or as a dynamic supply where N availability varied throughout production according to the plant demand. Drought stress as a single factor reduced plant height by 30%, and low P by 15% when compared with the control. Combining reduced P with drought resulted in an additive growth regulating effect (36% reduction). Continuous low N availability reduced plant height by 20%, but resulted in severe N deficiency symptoms. There was no clear growth regulating effect of dynamic N availability. The desired plant height was obtained by a combination of drought stress and reduced amounts (17%) and applications (3 compared with 7) of the chemical growth regulator Cycocel (Hansen & Petersen, 2004; Hansen & Petersen, 2005).

Post-production evaluations showed that chemically growth regulated plants had by far the highest percentage of damaged and wilted flower buds throughout the post-production evaluation compared with plants from all other treatments (Figure 1). Besides the growth regulation effects, reduced P in particularly, but also reduced N availability during production also improved the post-production quality by significantly reducing the number of senescent flower buds compared with chemically growth-regulated plants (Figure 1). Several cycles of drought did not influence post-production stress tolerance.

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Improving plant tolerance to post-production stress by delaying floral senescence and reducing root dieback (Hansen & Nielsen, 2001; Hansen & Petersen, 2004) may have considerable importance to the horticultural industry and to the consumer, since most cultivated flowering plants have inadequate keeping quality when growth regulated chemically. The presentation at the PGRSA meeting 2005 provides you with an update on promising alternative methods for plant growth regulation, the potential benefits of using these methods for growth regulation, and what attempts were made in Europe to implement the results to the horticultural industry.

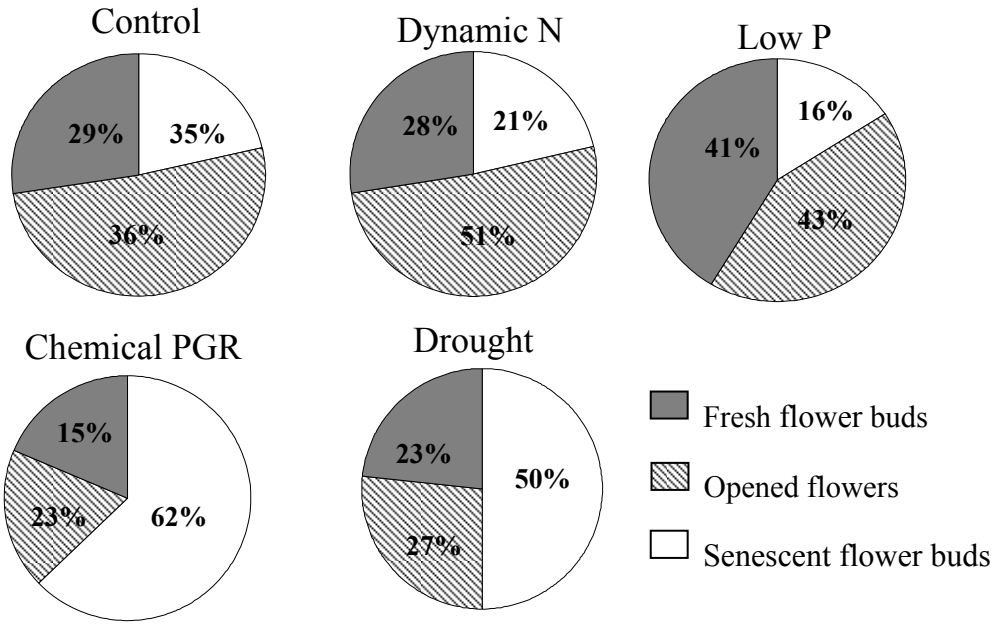

Figure 1. Post-production evaluations showed that chemically growth regulated plants had the highest percentage of senescent flower buds throughout the 28 days post-production evaluation in interior room compared with control plants (not growth regulated) and with plants grown at reduced nutrient availability.

LITERATURE CITED

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For more information about the Compalox®-P buffer technique, please see *http://www.martinswerk.de* and *http://www.agrsci.org/ahp/cwh*