Postharvest Growth Control of Tête-à-Tête

Even though Tête-à-Tête is a “dwarf” daffodil, its post-harvest growth (while flowering) is excessive and it is desirable to reduce this growth. To this end, we have trialed Bonzi or Piccolo (paclobutrazol), Sumagic (uniconazole), and TopFlor (fluprimidol) as possible plant growth regulators (PGRs) for Tête-à-Tête. Throughout these studies, when applied at similar economic rates (e.g., at similar PGR material cost per pot or per bulb), paclobutrazol (Bonzi or Piccolo) have consistently been more effective than Sumagic (uniconazole). We have also seen excellent results with TopFlor, but this chemical is currently under development and not yet on the market. Dipping bulbs for 120 minutes into 50-100 ppm paclobutrazol (Bonzi or Piccolo) with bulb cooling durations of 14-15 weeks has been effective.

With longer cooling durations (later forcing), we have found somewhat higher concentrations are needed (e.g., 100-150 ppm). These treatments have little to no effect on the height of the plants when they are brought out of the cooler, thus are of no value in preventing “cooler stretch”. Furthermore, they usually have relatively little effect during forcing in the greenhouse. They do, however, exert a powerful effect in the postharvest phase, and typically reduce elongation by 15-30%, as can be seen in the photos below. More details on this can be seen on the 2004 CD, and in an upcoming newsletter.

Shelf-life of flowerbulbs and perennials increases dramatically in Modified Atmosphere Packages

Researchers Henk Gude and Marga Dijkema at PPO Lisse have been working on Modified Atmosphere Packaging (MAP) during the past 2 years. A MAP package is a consumer package consisting of a film with a low permeability for oxygen and carbon dioxide. The respiration of the product inside the package causes the oxygen level to reduce to such levels that sprout development is minimized. An additional advantage of the film is that it is virtually impermeable to water, thus preventing drying out of the product. Since plant respiration is the crucial process in creating a certain oxygen level the researchers have measured the respiration of different bulbs and perennials at different temperatures. Especially the increase in respiration upon transfer of the plants from low storage temperatures to retail temperatures was given much attention. Based on these measurements films with specific oxygen permeabilities were produced by a manufacturer of these films. Preliminary tests with bulbs and perennials in these films revealed that the shelf-life of perennials increased from 3 weeks in traditional packages to 8 to 9 weeks in MAP packages, in some cases even without any filling material. It is likely that the MAP-packages will be improved even further. Other aspects of this research project are the type of filling material and the development of a so called (MAP) transit-bag for the storage and transport of larger quantities of product.

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Past, Current, and Future Research Results of the Flowerbulb Research Program

By Bill Miller, Cornell University

Each year, the Flowerbulb Research Program at Cornell University publishes a CD with a full reporting of experiments, data, and observations from past years’ research activities. In 2003, we began publication of the Research Newsletter as an additional means of communicating activities and findings of the research program to the industry.

In this Newsletter, I will highlight a number of research topics on which we are currently working, a couple that have finished, and a few that are just beginning. By no means is this a complete list of our activities! Ideas for research originate from many sources, including the Research Committee, from Cornell faculty, staff, and students, from growers and users of flowerbulbs in North America, and from North American bulb importers and distributors. Readers wanting more details are first referred to the annual CD, and also to our website at www.flowerbulbs.cornell.edu. You may always feel free to contact me at Cornell University. My email is wbm8@cornell.edu, and I welcome any and all comments, including suggestions for additional research problems and topics.

Growth Regulators and Hybrid Lilies

In a continuing program, each year we evaluate a number of cultivars of hybrid lilies for response to plant growth regulators (PGRs) with the objective of tailoring them for growth in pots. In the long term, there is no doubt that continued development of genetically dwarf cultivars needing no PGRs is the best solution, and there are certainly some suitable cultivars available. On the other hand, there is great deal of industry interest in this kind of work, and in using the kinds of cultivars available in the cut assortment. In the annual CD, a full report can be found, with cultivar forcing characteristics, and suggestions as to kind and rate of growth regulator to be used. The photo gives an idea of the possibilities that can be obtained.

Effect of pre-plant bulb dips on size 14/16 ‘Algarve’ LA hybrid lily. 2004. Treatments are (L to R): Control, Bonzi at 50, 100, 200, or 300 ppm, Sumagic at 2.5, 5, 7.5 or 10 ppm, and TopFlor at 10 or 50 ppm, given as a 1 minute dip.

Our effort in this area has mainly been geared towards bulb dips into the PGRs (Bonzi or Piccolo [paclobutrazol], Sumagic [uniconazole], or, experimentally, TopFlor [fluprimidol]). The results can be summarized as follows:

- Most lily cultivars can be easily dwarfed by economical rates of PGRs
- Cultivar differences exist, however, and must be accounted for
- Effective PGR treatments typically have no effect on forcing time or flower size In a typical commercial setting, the PGR dip solution keeps effectiveness for a long time. For example, at least 55 14/16 cm bulbs can be dipped into a liter of solution without reducing the effectiveness of the solution.

Fascination in Lilies

One of the early success stories of the program was our work on the hormonal formulation, Fascination, on Easter and hybrid lilies. Fascination is a legally available (Valent, USA) mixture of benzyladenine (BA) and gibberellic acid GA3. It is also available to apple growers as Promalin. In lilies, the gibberellin component of Fascination has specific effects on buds and bud color, then held 7 days in a low-light, 20C postharvest room. L to R: Control, 50, 100, 200, 400 ppm Bonzi, given as 10 minute pre-plant dip.

Effect of pre-plant bulb dips on size 14/16 ‘Algarve’ LA hybrid lily. 2004. Treatments are (L to R): Control, Bonzi at 50, 100, 200, or 300 ppm, Sumagic at 2.5, 5, 7.5 or 10 ppm, and TopFlor at 10 or 50 ppm, given as a 1 minute dip.

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green and in many cases, totally eliminating leaf yellowing that might occur in the greenhouse (especially for Easter lilies), or after postharvest cold storage (all lilies). Fascination is also highly effective in prolonging flower life of most lilies, in many cases by 25-30%. Growers forcing oriental hybrid lilies in pots are now commonly spraying their crops with 25-50 ppm GAs (from Fascination) within 2 weeks of flowers opening. Such a treatment will allow the grower to cold-store the plant at 5°C for up to 10-14 days, without leaf yellowing or flower drop. Flowers will continue to open and with good color. While growers should always be advised to cold-store hybrid lilies for as short a time as possible, Fascination has proven to be an excellent tool to improve plant quality in an increasingly tough marketplace.

Fascination in Tulips? The above results for Fascination and lilies may be only the beginning for the potential of this chemical for flower bulbs! In 2004, Martijn Verlouw, our Dutch student intern for the year, became interested in Fascination, and conducted an experiment with two species tulips. The results were quite stunning. It was clear that the Fascination sprays dramatically increased the flower life for both cultivars, as shown in the photo. There did not appear to be any effect of the gibberellin in terms of stretching the upper internode.