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RESEARCH NEWSLETTER

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Spitting in Hyacinths

Many are familiar with the unusual problem of "spitting" in hyacinths. Spitting is a cultivar specific problem (mostly with blue cultivars), whereby the entire flower bud and stem below it become physically detached from the top of the base plate inside the bulb. The result is that the bud is carried upwards as the leaves grow. The bud stops enlarging quickly, due to the lack of water. Eventually, as the bud continues to lose water, it is noticeable as a loose bud, that can be plucked out of the leaf sheath.

One piece of conventional wisdom is that abrupt temperature changes coming out of the cooler are largely responsible for this problem. In 2005, we did experiments on this (with 17/18 'Blue Eyes'), and had treatments where plants were exposed to temperatures as high as 30C for two days immediately after coming out of the cooler. The result? No bud spitting at all, in three trials, and, so far in 2006, the results are looking the same. While this does not tell us what *causes* the problem, it highlights the fact that, almost certainly, multiple factors enter into the problem and it is not as simple as avoiding high temperatures coming out of the cooler. Additional trials are underway in 2006.

Saving energy and maintaining tulip bulb quality with a new ethylene sensor

By Henk Gude

In 2005 an ethylene sensor for the use in tulip storage rooms was introduced in the market. Until then measuring ethylene with a handy device had been impossible. The MACView ethylene analyzer, produced by Hatech (www.etheen.com) was tested by Applied Plant Research (PPO) at an export company and at a company specialized in the storage and preparation of tulip bulbs. The sensor was able to measure very low ethylene levels in an accurate and reliable manner. By linking the ethylene signal to the climate computer of the storage rooms the amount of ventilation could be reduced (automatically) by approximately 50% on an average without exceeding the critical level of ethylene (0.1 ppm). As a result the weight loss of the bulbs was markedly reduced and large amounts of energy were saved. Next shipping season the ethylene sensor will be tested in sea containers.

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Using Alcohol to Reduce Growth of Paperwhite Narcissus

By William B. Miller, Cornell University

The paperwhite narcissus is a popular bulb for indoor forcing in the winter months. Unlike most other daffodils, paperwhites (*Narcissus tazetta)* do not require a cold period. They are simply planted in pots with soil, or even more commonly, in dishes or bowls with gravel, marbles or other decorative material. With a little water, they rapidly form roots, grow leaves and shoots. The white, fragrant flowers usually open up within 2-3 weeks of planting.

A common problem with paperwhites, however, is that they often grow too tall and flop over. To this end, an inquiry from the *New York Times* in January 2005 prompted us to investigate the possibility of using dilute alcohol as a growth retardant in paperwhite narcissus. A *Times* reader wrote to the garden editor, stating they "kept hearing that adding gin to paperwhites…would keep them from growing tall and floppy…". The reader claimed to have tried this, with success, and wondered whether an "essential oil" in the gin might be responsible. The purpose of the research presented here was to demonstrate the feasibility of using of ethanol as a growth retardant on paperwhite narcissus. Rather than gin and similar other products, we initially focused on ethanol (the active ingredient in consumed alcoholic beverages) to establish the lack of an effect of "essential oils", then conducted an experiment using different consumer-available ethanol sources to broadly demonstrate the utility of this technique.

Bottom line: Properly used, alcohol can be used by homeowners to produce paperwhites that are 1/3 to ½ shorter, with equal sized flowers that last as long as normal.

What to do

We suggest planting your paperwhite bulbs in stones, gravel, marbles, glass beads, etc. as usual. Add water as you normally would, then wait about 7-10 days until the roots are growing, and the shoot is green and growing about 2-3" above the top of the bulb. At this point, pour off the water and replace it with a solution of 4 to 5% alcohol, made from just about any "hard" liquor. You can do the calculations to figure the dilution, but, as an example, to get a 4% solution from a 40% distilled spirit (e.g., gin, vodka, whiskey, rum, tequila), you add 1 part of the booze to 9 parts of water. This is a 9-fold dilution yielding 4% alcohol. 1 part gin to 7 parts water leads to a 5% solution.

Then, simply use this solution, instead of water, for further irrigation (watering) of the bulbs. It's as simple as that. The result will be a plant that is 1/3 shorter, but with flowers just as large, fragrant, and long-lasting as usual. But, the plant will be nicely proportioned and won't need support stakes, wires, or other gizmos to keep it upright. You will see results within just a few days. You can have some fun by doing a simple experiment having one bowl of bulbs given normal water and the other given the alcohol. You will see a dramatic difference, as shown in the picture.

This could be a neat activity to further engage kids (and parents) with flowerbulbs. I also can imagine an almost unlimited array of advertising and cross promotional activities, unique dry sale kits, etc. The possibilities are endless with this one.

Very recently, we have done studies looking at alcohol in soil. The bottom line here is that the effect is very similar….alcohol can also be used for homeowners who prefer to grow paperwhites in soil, rather than water culture.

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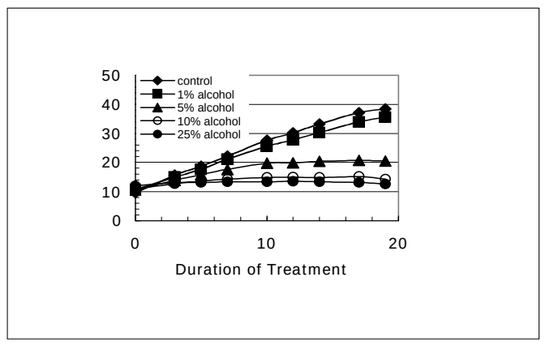
A few other thoughts

- Do not use beer or wine, as the sugars in them will cause major problems with the plants
- As with humans, paperwhites can also suffer alcohol overdoses! We suggest 4-5% alcohol as the normal and safe range. If plants are given much more than 10% alcohol, growth problems will start, and 25% alcohol is dramatically toxic. So, moderation is the key!
- It is not strictly necessary pour off the water after the plants are rooted (as we suggest above). You can just as well add a 4-5% alcohol without pouring the water off. The result, though, will be a lower than optimal alcohol concentration around the roots, and, ultimately, growth will not be reduced as much as you expect. The reason to pour off the water is to simply maximize the alcohol level around the roots.
- Basically, the higher the alcohol concentration (within reason), the shorter the plants. So it is not critical whether you use 4, 5, or 6% alcohol. Just stay well below 10%, where growth problems become noticeable.
- If you do not have alcohol for consumption in your household (???), rubbing alcohol (isopropyl alcohol) works just as well. Since this is usually 70% alcohol when purchased, a dilution of 1 part rubbing alcohol to 10 or 11 parts water is appropriate.
- Is this unique to paperwhites? Probably not, and Cornell research is underway to look the effects of ethanol on amaryllis and other bulbous crops.
- Why does this happen? We are currently working on this, but we feel it is simply "water stress", where the alcohol makes it more difficult for the plant to absorb water. The plant suffers a slight lack of water, enough to reduce leaf and stem growth, but not enough to affect flower size or flower longevity.

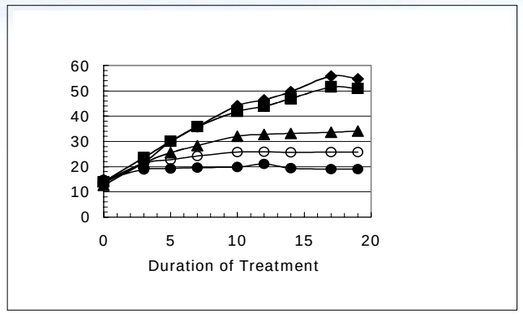
I thank Erin Finan (Cornell '05, horticulture undergrad) who worked on this as a senior project, and to Leslie Land of the New York Times who first posed the question "Does gin affect paperwhites?" to me in early 2005. Jan Doornbosch of International Bulb Co. in New Jersey graciously supplied bulbs, and Group 1 of Anthos' Royal Duthch Trade Association for Flowerbulbs and Nursey Stock, Hillegom, The Netherlands, provided financial support for this work.

The effect of alcohol (ethanol) on growth of 'Ziva' paperwhite narcissus. Left: Untreated plant, growing in pebbles with water. Right: Plant in pebbles, grown with 5% alcohol instead of water.

Appearance of roots of 'Ziva' paperwhites at flowering. Left to right: Control, 1, 5, 10, 25% ethanol.



Growth of 'Ziva' paperwhite leaves over time, as influenced by 0 (water control) to 25% ethanol.



Growth of 'Ziva' paperwhite stems over time, as influenced by 0 (water control) to 25% ethanol.

TopFlor, a New Growth Regulator, Registered in the US

By Bill Miller

In early January 2006, the SePRO company announced US Federal registration of the plant growth regulator (PGR) TopFlor, with the active ingredient fluprimidol. The active ingredient has been available in the US for many years under the name Cutlass (for tree growth regulation) and in Europe, as a greenhouse crop product. In Cornell trials, TopFlor has been shown effective as a growth regulator in a variety of bulb crops, and with a variety of application methods (spray, drench, pre-plant dip).

Research-based information on details of use of this product on bulbs continues to be generated and communicated by Cornell and other institutions such as North Carolina State University. Initial examples of the efficacy of this product can be found this product can be found on the 2004 research CD.

Hyacinth Height Control: Avoiding Floppy Stems

By Bill Miller

One of the ongoing issues for pot hyacinth growers in North America is "floppy stems", where the heavy flower causes the stem to flop over while in full bloom. Obviously cultivars differ in "floppiness", and production schedules (such as avoiding excessive cold weeks), and probably the cooler environment (too warm, or soil too wet) also exacerbate the issue. If you are selling hyacinths with floppy stems, the only option is to stake them, a very costly proposition.

Historically, the main chemical method of height control has been the ethylene-releasing chemical, ethephon, sold to greenhouses as Florel (or, potentially, Ethrel, with the same active ingredient, but at a different concentration). Gus DeHertogh did many research trials, leading to specific Florel usage, based on cultivar and time of year. This information is available in the extensive cultivar tables presented in the Holland Bulb Forcer's Guide in the "Hyacinth" section.

With hyacinths the bottom line is that Florel is applied as a foliar spray within a few days of housing the plants, in any case, not after the first flowers are fully colored. Spray concentrations range from 500 to 2,000 ppm, applied once or, with certain vigorous cultivars, two times. The effect of Florel is to reduce cell elongation and increase cell thickening. The whole-plant result is shorter, and usually slightly thicker, stems.

There are potential problems with Florel on hyacinths. If sprayed too late (after the first flower is fully colored), Florel can cause early flower senescence (death). Florel should be sprayed in the morning, so that the leaves stay wet for a fairly long period, allowing the chemical to be absorbed. Sprays late in the day should be avoided, due to obvious concern about foliar or flower bud diseases (*Botrytis*).

Florel is not the only PGR useful on hyacinths. Cornell work over the past few years has indicated the potential for Bonzi/Piccolo and Sumagic as hyacinth bulb dips. The recent registration of TopFlor (flurprimidol) by SePRO (see story nearby) should be very helpful with this problem in the future.

Ultimately, the best approach would be for growers to schedule plant and cool dates based on market window, so that excessive cold weeks are avoided. This is an area where individual export companies can provide additional customer support as a means of market differentiation.