



RESEARCH NEWSLETTER



This Flower Bulb Research Program Newsletter is published by Anthos, Royal Dutch Trade Association for Nurserystock and Flowerbulbs in cooperation with Dr. Bill Miller of Cornell University.

Newsletter Nr. 34

Bare Root Hostas Are The Way to Go!

By Bill Miller
Cornell University

In the trade, perennials are mainly propagated from seed, cuttings or division. (Techniques such as tissue culture are really an adaptation of cuttings or division). Growers have the choice of purchasing actively growing plugs or liners, dormant liners, or bare root divisions. The divisions may be domestically produced, or, the focus of this work, as imported bare root divisions (specifically, from The Netherlands).

Bare roots are an important part of the perennial market, and imported, washed bare roots remain a viable player in the trade. Over the years, the Flower Bulb Research Program has done a number of studies with perennials that have addressed specific and important questions in the industry. Perhaps most important was our early work looking at the effect of washing in the Netherlands, and whether or not washing affected regrowth rate and quality.

The results of that work were published in one of the first Research Newsletters (no. 2, in fact), and can be found at <http://www.flowerbulbs.cornell.edu/newsletter/No. 2 Perennial Regrowth.pdf>

A very important finding of this early work was that the washing process (required by USDA-APHIS to minimize entry of pests and pathogens into the US) does not cause any injury to the bare roots. On a variety of plants, washing 0 to 8 times had no effect on rooting speed and root growth at all.




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Secondly, almost as a side project, we showed that a more likely cause of variable growth and slow regrowth of imported bare root perennials was planting depth. Simple message: Deep planting is BAD. This finding contradicted most of the printed cultural guidelines at the time, most of which recommended planting the crowns 1.5-2.5 inches below the soil surface. In fact, the best and most uniform regrowth comes when the crown is planted at the soil surface, in fact, so that the eyes are basically at the soil level once watered in and settled. Growth is much faster and better, as seen in the above newsletter. In fact we developed a pictorial guide about the benefits of “Planting High”, which can be downloaded at [http://www.flowerbulbs.cornell.edu/newsletter/No. 2a Planting Perennials High.pdf](http://www.flowerbulbs.cornell.edu/newsletter/No.2aPlantingPerennialsHigh.pdf)

Presently many nursery growers are interested in relative performance of bare roots versus domestic (North American) grown plugs or liners. Some people swear by liners, others by bare roots. In 2014, we decided to investigate growth of Dutch bare roots versus domestic liners for a number of *Hosta* cultivars.

What we did

Bare roots and dormant liners were received in mid-spring from a commercial source in late spring 2014. The liners were domestically grown and were the same cultivar as the imported, bare root material. Most liners were 36 cells per tray, the bare roots were (“No. 1 divisions”), that is, standard commercial imported material. We planted the material into “3 qt. gallon” black plastic nursery cans using Lambert LM-111 planting mix, which is a fairly coarse, well drained peat and vermiculite-based mix that we have found to be an excellent all purpose mix in our work.

Plants were planted in early April about the same time and grown outdoors in prevailing weather conditions. Final observations were made in early July.

One liner or one bare root was used per pot. Liners were planted at the same depth as in the tray, bare roots were planted so the crown was at the soil surface after irrigation, following our “planting high” protocol. Plants received normal commercial care (mainly, liquid fertilization twice a week at 150 ppm N). No pest control was necessary on any plant. We used 10 replicates (liners or bare roots) per species.

Cultivars used were as follows: *Hosta* ‘Blue Angel’, *Hosta* ‘Blue Mouse Ears’, *Hosta* ‘Earth Angel’ and *Hosta* ‘Rainforest Sunrise’

What we Found

The growth differences were very significant between the liners and bare roots. Growth at the end of the experiment can be seen in the photos for the entire group of plants (outside) or a side-view of representative plants against the black backdrop. It is clear from these results that bare roots provide a superior product, faster, than with liners.

One cultivar, ‘Rainforest Sunrise’ showed less difference between bare root or liners, but close inspection of the photos shows the bare root plants have more leaves and are somewhat fuller.

Overall, we can conclude that bare roots are invariably a superior starting material for *Hosta* than liners.



Hosta 'Blue Angel'. Left: Liner (plug), Right: bare root. Image 1258 and 1247.

Hosta 'Blue Mouse Ears'. Left: Liner (plug), Right: bare root. Image 1259 and 1248.



Hosta 'Earth Angel'. Left: Liner (plug), Right: bare root. Images 1266 and 1254.

Hosta 'Rainforest Sunrise'. Left: Liner (plug), Right: bare root. Images 1269 and 1256.

Tantalizing New Height Control Possibility for Tulips

by **Bill Miller**

In the picture below, you can see our 2014-2015 intern, Tim Klaver (Spanbroek) holding two pots of ‘Spryng’ tulip. These plants were grown in the greenhouse, and treated near first bud color. After treatment, they were placed in a dark cooler for 2 weeks at 2C. After this cold period, they were put into a low light growth chamber at 20C and 12 hours day and 12 hours night, to simulate an indoor environment. The picture was taken after a week in the growth chamber.

You can clearly see the plant on the left has long top internodes, is too tall and is flopping over. The plant on the right, which was sprayed with Collate (ethephon) is short and compact, and, especially, has very short top internode growth. And, this is after two weeks in a cooler after forcing!

We are very excited with this result and will be aggressively pursuing additional research in this area in the coming year. Not only is the growth controlled, the treatment was a spray, which as all growers know, is much easier and less labor intensive than the usual drenches we use on tulips.



Image 2973

50th Anniversary of the Flower Bulb Research Program

by **Bill Miller**

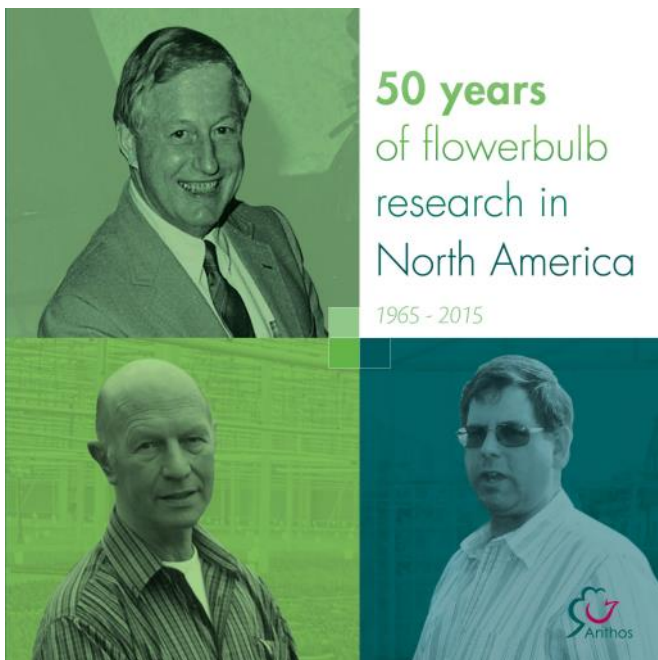
On April 23-24 in Holland, we celebrated the 50th anniversary of the Flower Bulb Research Program. I will take this opportunity to congratulate and thank Anthos for its stewardship of this program from the initial days at Michigan State (1965) and NC State (1978-1996), and finally at Cornell (1998-present). In 50 years the program has generated untold publications, grower presentations, and reams of information useful to North American growers and their exporter suppliers. It has enriched North American growers who have ongoing access to non-biased and local information on an internationally traded commodity. In fact, results from this program are used by growers and forcers around the world. Dozens of undergraduate and graduate students have learned about, studied, and worked with flower bulbs, to say nothing of the nearly 60 Dutch interns and students who have participated in the program over the last 50 years. I am sure I can speak for Gus de Hertogh and state that we both have been blessed to be associated with the program, all the members of the Research Committee and the dedicated staff at Anthos.

The first part of the 50th anniversary celebration was a mini-symposium held in Lisse at the Keukenhof Castle, specifically in the former stables. It was a spectacular day and a beautiful venue. Some 100 people attended to hear a lecture by Gus reviewing the genesis, early moments and growth of the program from 1960 to 1996. I was up next, reviewing our activities at Cornell, including forcing and dry sale work we’ve done since 1998. Ernst van den Ende from Wageningen University Research then gave an overview of current funding and horticulture research in Holland.

Our website (www.flowerbulbs.cornell.edu) has a prominent link to a pdf of the retrospective book (http://www.flowerbulbs.cornell.edu/trade_articles/Anthos_50%20jaar.pdf) that was written for this anniversary by Arie Dwarswaard of Bloembollensvisie.

The following day Group 1 exporters, spouses, former interns and supporters of the program congregated at the Breakers Beach House at Huis ter Duin in Noordwijk for an absolutely stunning late afternoon reception on the deck and a marvelous meal.

While we were all pleased to be together, talking and meeting new and old friends, I think everyone felt the absence of Jan van den Hoek, who really was the longest serving person with the program, from the first days at Michigan State to his passing in 2011. We miss you Jan.



Bill Miller gives Dutch Lily Days Research Presentation at van den Bos

For the past three years, Bill Miller has presented an update on ongoing lily research within the Flower Bulb Research Program. These have been given at Exporter's facilities, and have been an

excellent addition to the complete Dutch Lily Days program. The first was at Zabo Plant in 2013, then Onings in 2014. This year the lecture was hosted by van den Bos. Dr. Miller and Anthos are grateful to the companies who have provided venues for these lectures.

This year's presentation at van den Bos was similar to those in the past. More than 30 people were present and discussed and debated topics as diverse as crop timing ("bud sticks" for hybrid cultivars), upper leaf necrosis (calcium deficiency) in oriental hybrids, postharvest physiology and handling for both pots and cuts (especially the importance of GA₄₊₇-containing products) and the excellence of many "cut flower" cultivars (especially LA and OT hybrids as landscape plants in a wide range of North American climates. This year's presentation was especially interactive with a vocal and passionate group of California lily forcers participating in the discussion.

Information relating to these topics can be found at our website, flowerbulbs.cornell.edu in the "Research Newsletters" section. Specific links are given below:

- **Postharvest handling:**
<http://www.flowerbulbs.cornell.edu/newsletter/32%20Lily%20postharvest%20May%202014.pdf>
- <http://www.flowerbulbs.cornell.edu/newsletter/No%20%2023%20Lily%20perennializing.pdf>

Lily performance in the landscape:

- <http://www.flowerbulbs.cornell.edu/newsletter/No%20%2023%20Lily%20perennializing.pdf>

Upper leaf necrosis:

- <http://www.flowerbulbs.cornell.edu/newsletter/No.%206%20ULN%20Apr2005%202.pdf>
- <http://www.flowerbulbs.cornell.edu/newsletter/No.%205%20ULN%20Apr2005%201.pdf>
- <http://www.flowerbulbs.cornell.edu/newsletter/No.%2012%202007%20Feb%20FloreI%20on%20oriental.pdf>

A couple of photos of the event are nearby.



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