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**A Student's View of the Flowerbulb Research Program at Cornell University
By Martijn Verlouw, Creil**

Coming from a farm growing tulips and potatoes, and enjoying the work very much, it was logical to go to the Middelbaar Agrarisch Onderwijs. After the MBO I went to work and to Brazil for 4 months. After learning quite a lot there I decided to go on with my study. I went to the Hogerberoepsonderwijs and did Bedrijfskunde and Agribusiness. After 6 months there, I found out that it just wasn't for me. I wanted to work, but in a way I could still learn as much as possible, in a different way than in school. I finished my first year and then went to Clusius College for 1 day a week learning about the growing and forcing of flower bulbs and bulb flowers.

At Clusius I heard of the Cornell Flowerbulb Research Program in the US. As I was always looking for something in another country, I replied immediately. A few weeks later, I was talking with Prof. Bill Miller from the research program and Ruud Westerbeek, Chairman of the Research Committee of the KBGGBB

It was a bit strange, I didn't really know what I had to do there, I didn't know anything about research, and, well, Bill Miller was a bit strange, too. He knew some Dutch words and it sounds very strange if he says them. But it sounded like interesting work, they guaranteed me that I would have a good time, learn a lot, and that 9 months would go quickly, even without soccer and going out with my friends. Well, they were right.

After my arrival in Ithaca, NY, I moved into my apartment and it was good and the people here were nice. I was waiting for the bulbs to be delivered so I could start. They came in mid-September and then the real work started: there were tulips, daffodils, hyacinths, crocus, alliums, and lots of other special bulbs. Bill showed me the first experiment sheets and it was with replicates and treatments and sets. Per experiment with multiple cultivars, treatments, cold weeks, glasshouse dates and pre-cooling dates. Imagine how a sheet looks like then.

We started with a few experiments, but ended up with maybe 20 or 25 or so. Research is really different from production, but as the fall went on, the objectives became clearer. Bill Miller gave me full responsibility and really involved me in all the projects. During all the planting and counting of the different bulbs, cultivars and experiments we also did some work with ethylene sensitivity and ethylene production of *Fusarium*-infected tulip bulbs. This was really interesting.

I met lots of people in the beginning, the people who work there and the graduate students who also work for Dr. Miller. I went on a field trip to Maryland, Delaware and Pennsylvania, and saw some cities in the US and Canada.

Being located on the Cornell University is also great, there are thousands of students there and the campus is beautiful with a great history, and there are, luckily, some bars there also.

In the winter the real work starts. I knew it was going to be busy, but it turned out to be crazy. Research gives so much work, it was measuring of every pot and stem, taking pictures, and writing down the data. In meanwhile keeping track of the treatments that needed to be done and what needed to go into the greenhouse, especially with tulips, hyacinths and narcissi. It was a lot of work, but you learn so much from it. Beside all this, Bill's Ph.D. student, Susan Liou, had many experiments here and there was also interesting work being done with growth regulators in lily, and experiments with other plants such as ornithogalum and freesia.

After taking data, many tulips were cut and bunched and were sold or given away. People on campus were really excited about this. "It's beautiful" and "it's amazing" were common reactions. It means our tulips are a great product! But, the quality of cut tulips that I saw in American supermarkets was to cry about. Most of the supermarkets treat them bad, and that's also for the tulips, daffodils and hyacinths on pots. They just dry out and after that they let them stand there for several more days before throwing them out.

I had help from several of Dr. Miller's undergraduate students. Amy Bestic helped me continuously and other students for half a day or couple of hours a day. It was very helpful and fun, and a great way to meet people to hang out with.

It was very, very cold in the winter, I remember a night of -26 Celsius with a lot of wind, so it felt like minus 45 or 50C. And we had a lot of snow. The good part is that there's also an indoor soccer rink here, so that went on.

In March we had a meeting with the North American Flowerbulb Wholesalers' Association (NAFWA) and the research committee. That was very interesting, to talk with the American importers and the exporters. Even people who take care of the shipping and the handling of the containers on the airport were there. That's really interesting, and I learned a lot.

After most of the forcing bulbs were done in the greenhouse, I started to help Amy Bestic a lot. She is in charge of the of the outdoor annual and perennial work that's done here.

Bill Miller's side of the story!
By Bill Miller.Cornell University

I was very pleased when Martijn volunteered to write a short story about this experiences working in the Flowerbulb Research Program at Cornell. We have thoroughly enjoyed having Martijn with us this year. He has been a great asset to the program, and became totally involved with it. Martijn was always a hard worker, and took great pride in his part of the program. He was also able to teach us a thing or two about flowerbulbs.

Martijn was the 5th Dutch student was have has since the program began in 1998. The others were Dirk Warmerdam (Noordwijkerhout), Jeffrey Wagemaker (Hoogkarspel), Peter Heemskerk (Noordwijkerhout) and Rob de Groot (Lutjebroek). Each of these students brought their own personality to the program, and helped the program grow and develop as a result of their input.

For those of you who don't know about the program, I provide a short synopsis of the history, and our main areas of work below. We hope this article will stimulate awareness of the program. We also hope that when representatives of the Research Committee call looking for only 1 or 2 crates of a new cultivar for the program, you would be willing to help out.

Background and Goals of the Flowerbulb Research Program at Cornell University

History

The Flowerbulb Research Program was started at Cornell in July, 1998 when I moved to Cornell to assume leadership. A portion of the program is a cooperative effort of Cornell University and the KBGGB. Historically, the Bond has funded research in the United States. My background is in Easter lily production (*Lilium longiflorum*) in northern California, where my family produced lily bulbs and forces a range of potted greenhouse crops.

Purpose and Goals

The major purpose of the program is to conduct research aimed at developing a better understanding of the physiology, growth, development, and horticultural use of Flowerbulbs, bulb flowers, and perennial plants. The main goal is to provide information to the sector to promote greater use and appreciation of flowerbulbs by consumers at all levels. We work in 3 major areas:

- greenhouse horticulture (forcing)
- postharvest physiology and handling of bulbs and bulb flowers
- use and/or adaptation of flowerbulbs in the landscape

Our forcing work revolves around developing best techniques and procedures for forcing in North America. For example, we test a selected number of newer tulip cultivars (generally with at least 1 ha in production) for optimum cold requirement and for determining the correct rate of plant growth retardant (PGR) for use on pots. Much of the

US tulip market is in pot plants, and our work with growth regulators (Bonzi, Sumagic, and TopFlor) is unique in bulb research.

We also do a large trial each year on PGRs on lilies. Again, many lilies are grown as pots in North America, and growers there are interested in “squashing” cut cultivars down to the right size for a 15-cm pot. We have also in the last few years worked on the upper leaf “scorch” that is common on many oriental hybrid lily cultivars. We found this to be calcium deficiency, and found that air blowing directly on the top of the plant from about 25-50 days after planting can almost eliminate the problem, even on larger-size ‘Star Gazer’ and ‘Acapulco’ bulbs.

In the area of postharvest handling, we have developed techniques to reduce leaf yellowing and browning as a result of cold-storage of hybrid lilies. Many lilies in North America are forced for a specific holiday. If the crop comes in too early, growers much store them at 4-5C for up to two weeks to hold them for sale. Our work resulted in a commercial product, Fascination, which can be applied as a spray to lilies, where it keeps leaves green and also increases flower life by about 25%. For this use, the main active ingredient in Fascination is gibberellin 4+7.

While in Ithaca, Martijn became interested in *Fusarium* and ethylene in tulip bulbs. He infected many tulip cultivars with *Fusarium* and measured the ethylene that was produced. Some cultivars hardly produced any ethylene, while others produced huge amounts. We have also done some trials with 1-MCP (EthylBloc, Smart Fresh, Fresh Start) to gain experience with this future anti-ethylene technology for tulips.

With perennials, we have worked on washing (for export to the US) and have found that the washing process does not harm the plant in any way. This has been an important finding for exporters when quality problems arise in America. It highlights the responsibility of the US grower to also handle the product carefully and correctly.

Finally, we have just finished a 4-year trial on perennializing bulbs in three climate zones in the US: Ithaca, NY (zone 5, northern cold), Long Island (zone 6, northern mild), and Clemson, SC (zone 7, southern hot). These studies were done with 200 cultivars of tulips, narcissus, hyacinth and special bulbs. New studies on perennializing in combination with perennial plants will begin soon.

Results of these and other trials are published in Research Newsletter of the KBGBB, and many are available on the Cornell Website at www.hort.cornell.edu. We also have a web camera in the glasshouse, which you can log onto 24-hours a day. The address for the camera <http://www.hort.cornell.edu/departement/faculty/wmiller/tulip-cam/index.html>



Martijn always looks forward to the day “The Bible” arrives in the mail!!



Martijn Verlouw discussing results of tulip experiments with Jan van den Hoek and Frans Roozen during the annual research committee meeting in Ithaca while Vincent Klijvenhoeven looks on.



Martijn caught in a typical pose at the NAFWA meeting in Ithaca in March. (note the Heineken).



Many poinsettias (*Euphorbia*) are grown in the us for Christmas. Martijn, Q Pennings and Amy Bestic, Cornell Horticulture students enjoy a moment during a class tour to a local greenhouse.



Toward the end of his stay, Martijn developed an interest in perennials. Here is a very small view of the perennial trials at Cornell.