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RESEARCH NEWSLETTER

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

New international Lists of Names available
Standard nomenclature of woody plants and perennials 2005-2010

The two internationally recognized Lists of Names – of Woody Plants and of Perennials – are for quickly looking up the preferred name and correct way of writing a plant's name. Since they first appeared, these Lists have earned the respect of botanists and the nursery trade. This multilingual edition follows international rules for plant nomenclature. It will help satisfy the huge demand for international uniformity in the use of plant names.
A new edition of the Lists of Names appears every five years.

International recognition
Edited under the supervision of the European Nursery stock Association (ENA).
Edited, supplemented and supported by ENA's "European Plant Names Working Group".
Perennial list recognised as standard by the "Internationale Stauden Union" (ISU) and Perennial Plant Association (PPA) of North America.

New edition with 60,000 names
The new editions contain almost 60,000 preferable names, synonyms and trade names of over 30,000 woody nursery plants (fruit included) and 18,500 herbaceous perennials available in Europe and largely also in the USA.
Compared to the last 2000-edition:
±4,500 preferred botanical names of herbaceous perennials and 13,000 of woody plants (including 3400 new fruit names and 800 conifers) have been added.
Many new subtropical and Eastern European products are included. Over 3000 synonyms and trade names of woodplants and 600 of perennials have been added.

Availability
The lists are available at different points of sale in Europe and United States. The lists of names of woody plants costs €26,- and the list of names of perennials costs €20,-.
When ordering directly via PPO the lists can also be sent by mail, with an extra charge for postage and handling. For information about mail delivery please visit www.ppo.wur.nl or www.internationalplantnames.com.

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Many Cultivars of Cutflower Hybrid Lilies Make GREAT Garden Plants

William B. Miller, Cornell University

Lilies are very popular garden plants, and indeed are one of the most important plants in the traditional perennial border. Hybrid lilies have a wide range of colors and flowering times (mid to late season), plant appearance (narrow leaved asiatics vs. the elegant foliage of oriental hybrids) and fragrance (faint fragrance of many LA's vs. the heavy scent of most orientals).
Conventional wisdom is that lilies are very difficult garden plants. Stories of the need to excellent drainage (true) and poor winter hardiness (seemingly not true) may have reduced their appeal to many gardeners.

As part of our on-going research on Flowerbulbs at Cornell, each year we evaluate a number of hybrid lily cultivars for use as pot plants (generally with the use of growth regulators). We hate to throw bulbs away, so each year we plant some of these lilies into our perennial plant trials at Cornell University.

We were interested in seeing whether these cultivars were winter hardy, whether they survived and thrived in a low maintenance setting, whether they had any unusual disease or insect problems, and what was their overall garden potential.

Procedure
Table 1 shows the cultivars and size of bulb planted several years ago. Frozen-stored bulbs (lifted in Holland 7-8 months earlier) were planted in mid-June about 6" (15 cm) deep into tilled loamy soil. After planting, the plots received about 1-2" (2-3 cm) of a medium to coarse grind wood-chip mulch. While soil tests were not conducted, the soil is reasonably fertile, and supports excellent growth of a wide range of perennials. Yearly, we applied a complete fertilizer to the soil, at a standard recommended rate, and plants were irrigated as needed during the growing season.

Basic Recommendations for Garden Lilies
Soil and planting. Most garden lilies prefer well-drained (this is essential), organic soil with a slightly acidic pH around 6.5. As per most bulbs, plant them at a depth of 3 times their height, that is, for most lilies, a hole of 6-8 inches (15-20 cm) is good. Incorporation of a phosphorous-containing fertilizer is helpful for root growth, but in a rich soil, it is not strictly necessary. It is always advisable to conduct a soil test through a good garden center or local cooperative extension office, and the interpretation of this test should be done locally as well.

As a child, I read gardening publications from the North American Lily Society warning all who attempted to grow lilies to provide extra drainage by mixing in sand, compost, grit, or whatever would work to increase drainage around the bulbs. Gardeners with clay soils would be well-advised to take extra steps to improve drainage in their lily bed, as poor drainage is the fastest way to kill lilies I can think of.

Sun exposure. Most lilies require full sun, especially in northern climates. Light afternoon shade is beneficial to protect plants from the scorching afternoon sun, and somewhat more shade is advisable as one moves further south.

Maintenance. After plants flower, remove spent blooms to reduce disease infection. The tops of the plants (with the bud stems) can be cut off, if desired, then plants should be allowed to continue growing to build up the underground bulb. Stems can be removed when they are substantially yellow…often 4-6 weeks after flowering for asiatics, and usually until frost for orientals (at least in Zone 5, such at Ithaca NY).

Normal garden fertilization, either through generous compost additional, or with a chemical fertilizer are needed to maintain healthy growth over the years.

Division. The Table nearby indicates differences in side shoot production (multiplication) between the cultivars. Although we nave not divided any of these lilies, it would stand to reason that those with heavy side shoot growth will need division and thinning more often than cultivars with no side shoots. Division would be best done in the early fall, when soil temperatures are still warm enough to allow the divided and replanted bulbs to establish themselves before winter.

Results and Observations, 3rd Year

In general, the vigor, health, attractiveness and landscape attributes of these plants are excellent. Although formal measurements were not taken in the first two years, it was clear by the third year that the plants were getting bigger and better each year. In fact, people familiar with these cultivars from greenhouse forcing might not even recognize them. Thicker stems, darker colored (almost black, in some cases) stems, and incredible bud counts are all seen with this range of cultivars. Below are some specific observations on each cultivar in the third year.

Vivaldi (14/16 cm). Vigorous plants. Plants have a little bit of leaf spotting, but this is not a serious problem.

Alliance (14/16 cm). Not as vigorous as 'Helvetia', 'Star Gazer', or 'Muscadet'. There was some purpling of some of the upper leaf edges.

Table 1. Cultivars and sizes planted in mid-June in Ithaca NY, and their basic characteristics the third year after planting.

Cultivars:	Size(cm)	No. Buds year 3	Side shoots?	Year 3 height (cm)	
Asiatic hybrids					
Amarone	14/16		9-nov	Many	100
Colosseo	dec-14		dec-15	Some	140
Gironde	14/16		15-25	Many	100
Tresor	14/16		13-15	Some	115
Vivaldi	14/16		15-18	Many	85
LA-hybrids					
Ceb. Dazzle	14/16		15-22	Many	125
Fangio	14/16		dec-17	Some	135
Samur	14/16		okt-13	Some	95
Oriental hybrids					
Black Beauty	---	many	No	60-80	
Helvetia	14/16		---	No	90
Muscadet	14/16		okt-13	No	80
Star Gazer	dec-14		7-aug	No	60
Star Gazer	14/16		9-okt	No	70
Star Gazer	16/18		10-dec	No	80
Tom Pouce	14/16		6-aug	No	65-85
Species					
Lilium henryi	---	Many	Some	50-80	
Lilium matragon -	---	Many	None	---	
Lilium pardelinum	---	Many	Some	60	

Samur (14/16 cm). Good quality leaves, very few leaf spots on them. Stems very strong.

'Samur' LA-hybrid lily, bud stage, Ithaca NY. Image 2808.

The number of flowers per stem was sometimes reduced on the last planting date (week 30). The cultivars that were affected by at least 1 less flower per stem were 'Fangio', 'Farolito', 'Gironde', 'Golden Tycoon', 'Laguna', 'Rodolfa', 'Stargazer', and 'Val di Sole.'

Overall, most of the cultivars performed well as late-season, field-grown cut flowers. However, there were some that performed poorly. Surprisingly, 'Star Gazer', which is one of the most popular cut flower lilies in the U.S., produced shorter stems as the planting date was delayed, and its flower numbers also decreased significantly with the later planting dates. If 'Star Gazer' is to be planted, it should be planted early for September flowering. 'Conca d'Or' and 'Tiara' did not produce many flowers per stem at any planting date and 'Farolito', 'Muscadet', 'Rodolfa', 'Royal Fantasy', and 'Tiara' were very short cultivars.

Some of the best cultivars with good flower stem length and strength, nice flower bud number per stem, and overall performance of 4.5 or higher were: 'Acapulco', Algarve', 'Castello', 'Ceb Dazzle', 'Conca d'or', 'Fangio', 'Laguna', 'Red Alert', 'Royal Fantasy', 'Royal Trinity', 'Samur', 'Sorpressa', 'Springfield', 'Stanza Zanlanza', 'Starfighter', 'Tresor', 'Triumphator Zanlophato', and 'Val di Sole'.

'Dazzle' hybrid lily in outdoor cut flower experiments on Long Island, New York.

Table 1. List of lily cultivars tested as field-grown cut flowers in 2005.

Cultivar	Type of Lily
Acapulco	Oriental
Algarve	LA-hybrid
Brindisi	LA-hybrid
Castello	Asiatic
Ceb Dazzle	LA-hybrid
Conca D'or	Oriental
Fangio	LA-hybrid
Farolito	Oriental
Gironde	Asiatic
Golden Tycoon	LA-hybrid
Helvetia	Oriental
Laguna	Oriental
Monte Negro	Asiatic
Muscadet	Oriental
Red Alert	LA-hybrid
Rodolfa	Oriental
Royal Fantasy	LA-hybrid
Royal Trinity	LA-hybrid
Samur	LA-hybrid
Sorpressa	Asiatic
Springfield	Asiatic
Stanza Zanlanza	LA-hybrid
Star Gazer	Oriental
Star Gazer	Oriental
Starfighter	Oriental
Tiara	Oriental
Tresor	Oriental
Triumphator Zanlophato	LA-hybrid
Val di Sole	Asiatic

'Monte Negro' hybrid lily in outdoor cut flower experiments on Long Island, New York.

To fully exploit such a concept, we will ultimately need more information about bulb storage, health and quality. Given our current techniques, there is a limit on how long a tulip bulb may be held in warm storage before cooling. Diseases and loss of rooting and overall vigor take their toll. Possibly, information learned from the explosion in hydroponic tulip production can be adapted, but it is likely other research will need to be conducted at PPO or Cornell to fully solve the problems. One can imagine an important role for 1-MCP (Ethylbloc in the US) for longer storage outside of the EU.

Example of rooting room stage for bulbous plants grown in cell-packs, for eventual commercial landscape or garden use. Image 4540.

Examples of crocus, in cell packs, ready for spring sale, and direct planting into the outdoor landscape.

Field-Grown Lilies for Late Season Cut Flowers: A Preliminary report

By Dr. Mark Bridgen, Cornell University

During summer 2005, an experiment was conducted at Cornell University's Long Island Horticultural Research & Extension Center in Riverhead, NY with field-grown lilies. The objectives were to develop a protocol to produce field-grown cut flowers for the late summer/early fall market on Long Island, and to evaluate the performance of several different cultivars as cut flowers.

In February 2005, lily bulbs were received in Ithaca, NY and held frozen at -1C. There were 29 cultivars, representing a range of Asiatic, LA-Hybrid, and Oriental lilies (Table 1). The bulbs remained frozen until weeks 26, 28, or 30, when they were removed from the freezer, and planted in outdoor research fields on Long Island. There were 18 bulbs per each cultivar for each date. The bulbs were planted at 12 x 24 in spacing. At the time of flower, data on stem length and the number of flower buds per stem were collected. In addition, the stems flowers were each assigned a subjective ranking from 1 (poorest quality) to 5 (best quality).

One observation that was noticed with 12 cultivars was that the later that a bulb was planted, the longer it took that plant to flower. With some cultivars, there was little difference in the days to flower (DTF) due to planting dates. The cultivars which had fairly constant DTF were 'Brindisi', 'Fangio', 'Farolito', 'Golden Tycoon', 'Helvetia', 'Monte Negro', 'Muscadet', 'Red Alert', 'Rodolfa', 'Royal Fantasy', 'Royal Trinity', 'Springfield', 'Star Gazer' (16/18 bulbs only), 'Starfighter', 'Tresor', 'Triumphator Zanlophato', and 'Val di Sole'.
It is important to know the cultivars that are being grown. Most cultivars showed no differences in stem length over the three different planting dates. However, 'Acapulco' had longer stems as the planting date was extended and 'Farolito', 'Rodolfa', 'Samur', Stanza Zanlanza', and 'Star Gazer' had shorter stems as the planting date was extended.

'Samur' flowers from the same plot. Third year flowering, Ithaca NY. Image 1635.

Gironde (14/16 cm). Leaves when plants were budded were rounded, cupped. Very strong and sturdy plants. Many side shoots with 6-10 buds each. Excellent leaves, light green.

Tresor (14/16 cm). Very sturdy stems "like Redwood trees". Stems dark, but not in the area immediately around the buds. Good leaves.

Close-up of 'Tresor', in the third flowering season. Note stem diameter, sturdiness, and bud count. Image 2818.

'Tresor' flowers, Ithaca NY trial garden. Image 1637.

Amarone (14/16 cm). Noticably thinner stems than 'Tresor', 'Gironde', and 'Samur'. Dark stems all the way up. Top leaves edged bronze (perhaps due to recent cool weather?).

Muscadet (14/16 cm). Leaves show typical interveinal yellowing (as with iron deficiency chlorosis). No leaf spotting. Stems sturdy, light green. No side shoots.

'Muscadet' plants in third flowering year, Ithaca NY (zone 5). Image 1768.

Stargazer (12/14, 14/16, and 16/18 cm). Some of the plants showed upper leaf necrosis (ULN), as is commonly seen in greenhouse-grown plants (from large bulbs). Foliage was a bit rough, bronzy, but generally dark green. In the first two years, there were noticeable differences in growth between the three sizes, but not by the third year.

'Star Gazer' plants, third year flowering in Zone 5, Ithaca NY. Image 1898.

View of 'Star Gazer' flower density from above plot. Image 1899.

Ceb. Dazzle (14/16 cm). Excellent plant vigor. Main plants with 15+ buds. Many side shoots present, each with 4-6 flower buds each. Leaves light green. Stems dark-striped.

Helvetia (14/16 cm). Has the best quality oriental leaves of the group. Very strong, green stems. No side shoots.

Fangio (14/16 cm). The tallest of all the cultivars grown. Lower stems bronzy-colored. Leaves medium green, excellent quality. There was a moderate number of side shoots.

Colosseo (12/14 cm). A striking plant when grown outdoors. Very dark, almost black stems, throughout the whole length, including the bud stems (pedicels). This characgteristic is related to light and cool temperatures, and is a characteristic that could be selected for in "garden" lilies. Nearly as tall as 'Fangio'. Leaves of good quality, with just a few spots. Plants has a moderate number of side shoots.

Plot of 'Colosseo' Asiatic hybrid lily in Ithaca NY. Just before flowering. Image 2845.

'Colosseo', Ithaca NY, full flower. Note dark stems, and contrast with the flowers. Image 1472.

Tom Pouce (14/16 cm). Enormously thick stems, and very sturdy plants. No side shoots.

Conclusions and Future Work. Clearly, there is enormous potential here for using these lilies in the garden. If one holds the view that "dry sale cultivars are for dry sales", and "forcing cultivars do not make good garden plants", the results presented here should be enough to make you re-examine this belief. We will continue to collect data and make observations on these plants, and welcome exporters and industry persons in New York during the spring, summer and fall seasons to stop by for a tour of these and the ca. 800 other perennials we are growing for classroom and research use at Cornell.

Exploiting New Gardening Trends and the "New Consumer"

William B. Miller, Cornell University

What do we know about "the consumer" in North America? Quite a lot, actually. Data on consumer behavior and floral purchases have been collected for years by the American Floral Endowment, and numerous studies are conducted on a regular basis by many groups including a recent survey on summer bulbs per request of Anthos.

One trend in the industry is the development of bulbous products that are more "consumer friendly". Perhaps the first such product I saw was in the spring of 1982, during a Cornell field trip when I was in graduate school. We were visiting Ivy Acres on Long Island and Jack van de Wetering was growing and marketing bulbs (tulips, muscari, daffodils) in cell packs, as with a bedding plant. What a concept! His view was that people don't like to wait 4-6 months after planting bulbs to see the result in the spring. The "consumer" wants instant gratification, and many think they are willing to pay for it.

Growers in North America are increasingly trying to adapt this concept in different ways, one of the most recent being "spring planting" of spring-flowering bulbs. Essentially, starting cooling "late" and holding bulbs dry until late January to early March, planting into pots, trays, or cell pack units, giving additional cooling for root development, then selling the units as sprouted, growing plants the consumer can enjoy on their patios very soon after purchase. It is perhaps a simplification to compare it to 5-degree tulips, or even to hydroponic tulips, but the basic concept is the same: store dry, begin cooling later than standard forcing, (according to the schedule), plant, give some more cold to root, then grow or ship soon thereafter. When done correctly, a young, vigorous product, ready to plant into the garden, or for use on the patio is the result.

Already there are more and more North American growers growing bulbs in this way. In principle, the end product to the consumer is in principle the same as in the early 1980's, but there are specific grower benefits, the most notable one being that growers can use their coolers twice. The cooler is first used for standard forcing of early and Valentine's Day crops, then after being emptied for Valentines Day, it can be filled again for the "late planted" crop. This also allows growers to service markets from the south (early and mid-season) to north (mid- and late season) with non-greenhouse grown, outdoor-oriented product for patio and landscape use.