



RESEARCH NEWSLETTER



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Lily Perennializing in Ithaca, Louisiana and Holland

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Cornell University, Louisiana State University, and PPO Lisse

In May 2006, we published a newsletter (number 10) where we first reported on our experiences with multi-year flowering of a variety of "cut flower" hybrid lilies at Cornell's outdoor trialing site, Bluegrass Lane, in Ithaca NY. In 2002-2003, we planted a range of LA, Asiatic and Oriental hybrid lilies to investigate perennialization. While not a formal trial, the 2006 newsletter showed that a range of hybrids, primarily bred for cut flower use, performed very well in outdoor garden situations in upstate New York (USDA zone 5).

We therefore became more interested in expanding this project, and ultimately a formal project was initiated in late spring, 2007. In addition to ongoing funding from Anthos, the Dutch PT provided funding for the non-Ithaca locations and we are grateful for their support.

What We Did

Lily bulbs (cultivars listed in Table 1) were sent to each site in late spring 2007, and planted into outdoor trial beds in full sun. At each site, soil was tilled and a slow release bulb fertilizer (Bulb Booster or similar) was added at the recommended rate.

Table 1. Lily cultivar used in the trials.

Cultivar	Type	Size
Brunello	Asiatic	10/12
Gironde	Asiatic	10/12
Navona	Asiatic	10/12
Ceb Dazzle	LA	11/12
Ercolano	LA	12/14
Menorca	LA	12/14
Red Alert	LA	12/14
Royal Trinity	LA	13/14
Samur	LA	12/14
White Heaven	longiflorum	12/14
Casa Blanca	Oriental	14/16
Cobra	Oriental	12/14
Helvetia	Oriental	14/16
Sorbonne	Oriental	12/14
Star Gazer	Oriental	12/14
Conca d'Or	OT	14/16
Yelloween	OT	14/16



Fifteen bulbs were planted in a 3 x 5 grid, with approximately 8" space between each bulb. There were two replications (plots) of 15 bulbs per cultivar. Planting depth was approximately 6" (15 cm) deep to the bottom of the bulb. After planting, plots were covered with 2-3 inches of organic mulch. Normal cultivation and maintenance was then done for the duration of the project (flowering in 2007, 2008 and 2009). In Holland, regular applications of insecticide were necessary for control of lily beetle.

Data were taken on the dates of first and last flower and flower duration was calculated. Data on plant height at full flower (soil level to top of flowers), number of flowers per stem and number of stems per plot were recorded. Numerous photographs were collected.

The sites used spanned a range of climate zones in North America, and are described below. More information on climate zones in the US can be found at <http://www.usna.usda.gov/Hardzone/ushzmap.html>

Cornell University, Ithaca NY. USDA winter hardiness climate zone 5a/b (-10 to -20F, -23 to -29C). Ithaca's growing season can be from warm and humid to cool and cold.

Louisiana State University (LSU), Baton Rouge, LA. Winter hardiness climate zone 8b (15 to 20F, -7 to -9C). Baton Rouge's growing season has long, lingering springs, with occasional warm days even in winter. Summers are very hot and very humid. Shorter summer days, compared to the northern sites.

PPO, Lisse, The Netherlands. Winter hardiness climate zone 8 (minimum average temperatures of -7 to -12C, or 10 to 20F). Lisse's spring and summer weather ranges from very pleasant to cold, wet and windy. Very long day lengths in summer, due to its northern location.

Cornell Research and Education Center, Riverhead, Long Island, NY. Winter hardiness climate zone 7a (0 to 5F, -15 to -18C). Long Island growing conditions are warm and humid, with lots of wind.

University of Guelph, Guelph, Ontario, Canada. Winter hardiness climate zone 5a/b (-10 to -20F, -23 to -29C). The Guelph growing season is very similar to Ithaca.

Riverbanks Zoo, Columbia, SC. Winter hardiness climate zone 7b/8a (5 to 15F, -9.5 to -15C). Spring and summer seasonal weather is very similar to those in Louisiana.

Within this newsletter, we will focus on three of the sites, Cornell (Ithaca, NY), LSU (Baton Rouge, LA) and the PPO (Lisse, The Netherlands).

Results

Flowering time. Cultivars are sorted by flower date (Table 2). For these dates, we averaged the dates of first flower for years 2 and 3 of the study (2008 and 2009) because 2007 numbers were skewed due to variable planting dates per location. It is expected that typical annual flower dates could be plus or minus about 7-10 days from these values. Due to its warmer climate, LSU had the earliest flowering dates and earlier growth in the spring. The earliest lily ('Red Alert') was in flower on 26 April, with 'Royal Trinity' following on 2 May. Holland was next, with these cultivars flowering on 16 June, 2 weeks later (ca. July 1) in Ithaca. Flower times averaged within cultivar groups (Asiatic, LA and Oriental hybrids) are given in Table 3.

Cultivars had a similar order of flowering per location (eg. Yelloween-Sorbonne-Cobra-Star Gazer-Casa Blanca-Helvetia for Ithaca and Holland), but some) e.g. Conca 'd Or) were erratic. Averaged together, the three Asiatic hybrid cultivars were in flower for 20 days at each location (Table 3).

Cornell		LSU		Holland	
Flower date	Cultivar	Flower date	Cultivar	Flower date	Cultivar
29-jun	Red Alert (LA)	26-apr	Red Alert (LA)	15-jun	Brunello (A)
29-jun	Ercolano (LA)	2-May	Royal Trinity (LA)	16-jun	Red Alert (LA)
30-jun	Brunello (A)	5-May	Gironde (A) (with Admire)	16-jun	Royal Trinity (LA)
1-jul	Menorca (LA)	8-May	Menorca (LA)	17-jun	Menorca (LA)
1-jul	Royal Trinity (LA)	8-May	Brunello (A)	18-jun	Samur (LA)
3-jul	Samur (LA)	12-May	White Heaven (L)	21-jun	Ercolano (LA)
5-jul	Gironde (A) (no Admire)	13-May	Ercolano (LA)	22-jun	Navona (A)
5-jul	Navona (A)	14-May	Ceb Dazzle (LA)	24-jun	Gironde (A) (with Admire)
6-jul	Gironde (A) (with Admire)	15-May	Navona (A)	26-jun	Ceb Dazzle (LA)
7-jul	Ceb Dazzle (LA)	20-May	Samur (LA)	7-jul	Yelloween (OT)
10-jul	Conca 'd Or (OT)	3-jun	Yelloween (OT)	8-jul	Sorbonne (O)
19-jul	Yelloween (OT)	10-jun	Conca 'd Or (OT)	9-jul	Cobra (O)
20-jul	White Heaven (L)	no flowers	Sorbonne (O)	13-jul	White Heaven (L)
22-jul	Sorbonne (O)	no flowers	Cobra (O)	15-jul	Star Gazer (O)
24-jul	Cobra (O)	no flowers	Star Gazer (O)	22-jul	Casa Blanca (O)
27-jul	Star Gazer (O)	no flowers	Casa Blanca (O)	22-jul	Helvetia (O)
1-aug	Casa Blanca (O)	no flowers	Helvetia (O)	23-jul	Conca 'd Or (OT)
1-aug	Helvetia (O)				

For the LA's, flower duration averaged 21, 23, and 29 days for Ithaca, Holland and LSU, respectively. Oriental hybrid cultivars had significantly shorter flower duration, averaging 15 and 17 days in Ithaca and Holland, respectively.


A very notable finding was that Oriental hybrid cultivars failed to emerge and grow in year 2 at LSU. Those cultivars with some "other blood" (eg 'Conca'd Or' and 'Yelloween') did persist and flower at LSU (see below).

Number of stems per plot.

Fifteen bulbs were planted per plot. The number of stems per plot each year, per location are shown in Table 4. One can define "successful perennialization" in many ways, but it would seem that successful flowering of more than 10-12 (of 15) bulbs would be successful by nearly any measure. Except for oriental hybrids at LSU, all cultivars perennialized very well in all locations.

Table 3. Dates of first and last flower and flower duration summarized by cultivar group, for each site (Cornell in Ithaca NY, LSU, and Lisse, The Netherlands. These data are for years 2 and 3 (2008 and 2009) of the study. Data for year 1 were not included as they do not represent "normal" flower times due to differences in planting date per location.

Type	Place	Date of first flower, by group	Date of last flower by group	Days in flower by group
Asiatic	LSU	9-May	5-jun	20
Asiatic	Holland	20-jun	10-jul	20
Asiatic	Cornell	3-jul	23-jul	20
LA	LSU	2-May	4-jun	29
LA	Holland	16-jun	10-jul	23
LA	Cornell	30-jun	20-jul	21
Oriental	Holland	10-jul	27-jul	17
Oriental	Cornell	23-jul	7-aug	15



The weakest cultivar, overall, was the Oriental hybrid 'Cobra', which failed to persist at LSU, and only yielded 11.5 stems at Cornell. The LSU data reflect the many side shoots that begin to appear by year 3.

Plant height.

Cultivars grew differently depending on location. In many cases, cultivars in Holland were smaller in year 3 compared with year 2. This may be due to overall environmental conditions, nutrition, or other factors we cannot account for. In LSU, plants seemed to grow to maximum height by year two, and were either the same height or slightly smaller in year 3. In Ithaca, plants continued vigorous growth and were invariably larger in year 3 vs. year 2.

Number of flowers per stem.

Flower number is one of the most important aspect in the evaluation. The most notable finding was the poor persistence of Oriental hybrids in the southern location, with zero flowers. However, the other groups fared very well. In year 3, cultivars generally had the greatest number of flowers in Ithaca, with 'Brunello', 'Ceb. Dazzle' and 'Royal Trinity' having 18 or more flowers. With the exception of the Orientals, plants grown in Holland generally had fewer flowers compared with the Ithaca and LSU sites. Even so, between years 2 and 3, many cultivars seemed to show a slight decline in flower numbers at the LSU site e.g., 17 vs. 11 flowers for 'Menorca', 7 vs. 5 for 'Navona', 21 vs. 16 for 'Red Alert'. Whether this is a real trend, or a single year aberration can only be determined by a longer trialing period.

Conclusions

In this trial, we had excellent results for Asiatics, LAs and Orientals in Ithaca and Holland. Excellent results were also found for Asiatic and LA hybrid at LSU, however, Orientals failed to emerge in years 2 and 3. The cold requirement for longiflorums and Asiatic hybrid cultivars is quite short, approximately 6 weeks at 4-7C. This duration of cold is readily available in many southern locations. For Orientals, the basic cold re-

quirement is longer (at least 8 weeks), and possibly lower. Perhaps this helps account for the poor performance of the southern Orientals.

Another possibility is their longer growing period, which takes them into the intense heat and humidity of the southern summer, which undoubtedly weakens the plant. It is notable that the OT cultivar 'Yelloween' that appears to have more longiflorum blood performed well at LSU.

This study indicates there is excellent potential for a wide range of Asiatic and LA hybrid cultivars in southern locations, with climates similar to southern Louisiana. Thus, the Gulf States, through the Carolinas should have great potential for growing lilies in the landscape. Oriental cultivars should be used with caution, but members of the OT group seem to be worthy of further trialing and evaluation in the south.

Data and information on results from the other sites in the study will be posted on our website (www.flowerbulbs.cornell.edu) when they become available.

Acknowledgments

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Table 4. Number of stems per plot, flowers per stem, and plant height at flowering, per cultivar, location and year.

No. of flowers per stem				Plant height at flowering (cm)				No. of stems per plot			
				<i>Brunello</i> (Asiatic hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	1.5	2.6	3.0	2007	46	44	35	2007	15	---	15
2008	9.0	12.6	5.0	2008	82	63	50	2008	15	14	16.5
2009	18.0	9.8	4.8	2009	129	68	48	2009	15	19	16.5
				<i>Casa Blanca</i> (Oriental hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	2.0	2.6	2.5	2007	45	28	44	2007	14.5	---	16
2008	3.5	---	2.5	2008	79	---	50	2008	14.5	---	16.5
2009	9.0	---	3.7	2009	93	---	55	2009	15	---	18
				<i>Ceb Dazzle</i> (LA-hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	2.5	2.1	3.5	2007	61	46	35	2007	15	---	16
2008	9.5	22.1	5.0	2008	112	90	60	2008	15	15.5	16.5
2009	18.5	22.3	6.8	2009	138	107	58	2009	15	25.5	16.5
				<i>Cobra</i> (Oriental hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	3.0	1.6	3.5	2007	53	32	45	2007	15	---	16
2008	3.5	---	3.3	2008	82	---	70	2008	12.5	---	12.5
2009	7.5	---	1.8	2009	91	---	45	2009	11.5	---	12.5
				<i>Conca 'd Or</i> (Oriental trumpet)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	1.5	1.1	1.3	2007	42	35	40	2007	15	---	16
2008	4.5	10.0	2.1	2008	84	73	53	2008	15	14	16.5
2009	10.5	5.2	5.1	2009	127	81	75	2009	15.5	6	16
				<i>Ercolano</i> (LA-hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	3.0	2.9	3.0	2007	60	52	45	2007	16	---	15.5
2008	10.5	21.3	6.0	2008	93	94	70	2008	15	14.5	13.5
2009	11.5	16.0	5.8	2009	100	113	60	2009	---	47	24
				<i>Gironde</i> (with Admire) (Asiatic hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	4.0	3.2	4.0	2007	48	46	35	2007	15	---	15.5
2008	8.5	9.3	5.0	2008	94	90	60	2008	15	16.5	17.5
2009	10.5	11.7	7.5	2009	101	95	55	2009	15	25	18
				<i>Gironde</i> (no Admire) (Asiatic hybrid)							
Comell				Comell				Comell			
2007	3.5			2007	47			2007	15		
2008	9.5			2008	85			2008	15		
2009	11.5			2009	100			2009	17.5		
				<i>Helvetia</i> (Oriental hybrid)							
Comell		LSU	Holland	Comell		LSU	Holland	Comell		LSU	Holland
2007	3.5	2.4	3.0	2007	56	32	35	2007	14.5	---	16
2008	3.0	---	2.1	2008	64	---	40	2008	15	---	16.5
2009	9.0	---	3.0	2009	79	---	33	2009	13	---	17

No. of flowers per stem				Plant height at flowering (cm)				No. of stems per plot			
				<i>Menorca</i> (LA-hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	4.5	3.7	3.8	2007	64	58	50	2007	14.5	---	16.5
2008	10.5	17.2	6.3	2008	104	102	65	2008	14.5	15.5	18.5
2009	12.5	11.2	8.5	2009	135	108	70	2009	18.5	41.5	19
				<i>Navona</i> (Asiatic hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	3.5	4.3	3.3	2007	42	36	29	2007	14	---	16
2008	8.0	7.2	4.8	2008	76	49	55	2008	13.5	9.5	16
2009	10.0	5.2	5.0	2009	88	51	40	2009	12.5	11	17.5
				<i>Red Alert</i> (LA-hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	3.0	3.0	4.0	2007	58	43	48	2007	15	---	16
2008	5.5	20.6	5.3	2008	83	71	70	2008	11.5	16	16
2009	10.5	15.6	4.7	2009	105	94	63	2009	11	47	16
				<i>Royal Trinity</i> (LA-hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	2.5	1.9	3.0	2007	58	49	50	2007	15	---	16
2008	14.0	27.1	11.5	2008	115	106	70	2008	13.5	15	16
2009	20.5	18.2	10.5	2009	131	105	65	2009	15	29	19
				<i>Samur</i> (LA-hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	4.0	4.3	4.0	2007	67	55	53	2007	15	---	15.5
2008	10.0	16.4	5.5	2008	112	84	80	2008	15	15	15
2009	12.0	4.9	6.3	2009	121	75	75	2009	20.5	12	17
				<i>Sorbonne</i> (Oriental hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	2.0	2.0	2.8	2007	55	44	42	2007	14.5	---	15.5
2008	5.0	---	2.5	2008	84	---	55	2008	14.5	---	15
2009	11.0	---	3.3	2009	96	---	63	2009	13	---	15.5
				<i>Star Gazer</i> (Oriental hybrid)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	2.0	2.5	2.8	2007	39	31	38	2007	15	---	20.5
2008	3.5	---	2.5	2008	67	---	48	2008	13.5	---	19
2009	11.0	---	1.8	2009	91	---	40	2009	12	---	20.5
				<i>White Heaven</i> (longiflorum)							
	Cornell	LSU	LSU		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	1.0	1.5	1.5	2007	47	50	33	2007	14.5	---	16
2008	3.0	9.0	2.9	2008	93	92	50	2008	14.5	17	16
2009	4.0	6.6	3.0	2009	97	146	50	2009	18	59	18
				<i>Yelloween</i> (Oriental trumpet)							
	Cornell	LSU	Holland		Cornell	LSU	Holland		Cornell	LSU	Holland
2007	2.5	1.9	2.5	2007	51	53	45	2007	15	---	16
2008	6.0	6.5	3.0	2008	94	92	70	2008	15	14.5	15.5
2009	11.5	5.4	4.6	2009	118	93	80	2009	13	20.5	15.5

Ercolano, LA-hybrid, Cornell. Showing overall year to year growth of this cultivar.



Year 1



Year 2



Year 3



Brunello Cornell Year 3



Brunello LSU Year 3



Brunello Holland Year 3



Red Alert Cornell Year 3



Red Alert LSU Year 3



Red Alert Holland Year 3



Royal Trinity Cornell Year 3



Royal Trinity LSU Year 3



Royal Trinity Holland Year 3

Cornell Flowerbulb Website is Extensively Updated:
flowerbulbs.cornell.edu

In mid March 2010, Cornell unveiled a new website to better communicate the findings from the Flower Bulb Research Program. The address, flowerbulbs.cornell.edu is the same as the previous website but the look and content has been totally revamped, updated and expanded. With lots of input from the Research Committee, and especially Marcel Pennings, the site contains many links to easily find information useful for exporters and forcers alike. For example, data and information on the nearly 60 pot tulip cultivars we have evaluated for cold weeks and PGR use is available at the click of a mouse. There is also an extensive listing of lilies, and required PGRs for tailoring cultivars for pot forcing. All 22 Research Newsletters (to date) can be found as well. These newsletters have a wealth of topics from landscape trials, to controlling upper leaf necrosis on oriental hybrids by Florel sprays. Other links take you to topics such as the Bulb Labyrinth, to a website we developed to feature Bulb and Perennial combinations, our Bluegrass Lane annuals trialing program, and our perennials trials site. These links should all prove useful to flowerbulb professionals, and their forcing and drysale customers alike.

The site will continue to be updated as we move forward. Send any questions or comments to me at wbm8@cornell.edu



White Heaven Holland Year 3



Casa Blanca Cornell Year 3



White Heaven LSU Year 3



Casa Blanca Holland Year 3



White Heaven Cornell Year 3

NOTE: there is no picture for LSU as all plants were dead.