

Timing Tools for Hybrid Lilies, May 2016

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Objectives:

With the explosion of lily cultivars and the need to accurately control flowering date to meet market demands, we initiated a research project to develop user friendly tools to help forcers monitor, control, and time the moment of flowering for a wide range of hybrid lilies. This program is ongoing and as of spring 2016, more than 50 cultivars of Asiatic, LA, oriental and OT-hybrid lilies have been evaluated.

What we did:

Briefly, we grew plants at a common initial temperature until buds were long enough to measure without damaging them. Then, plants were moved to 4 or 5 different greenhouses and grown at temperatures between about 13 and 22C. We carefully monitored air temperature, bud length (measured 3 times per week), and dates of bud opening. The data obtained allowed the development of models relating bud length and the number of days to open at different temperatures. We are grateful to Anthos (Hillegom, The Netherlands) and The Fred Gloeckner Foundation for financial support and Anthos, The Fred C Gloeckner company, Zabo Plant and Flamingo USA for providing bulbs for the work.

Results:

Results are given in the following table. Cultivars are listed alphabetically. From the table, one can see that a 4 cm long bud of 'Fangio' can be made to open in about 22 to 12 days if forced at 14 to 24 C average daily temperature. Conversely, a 4 cm bud of the pot oriental Sunny Borneo will take 47-25 days at these same temperatures. For all cultivars, if a specific sized bud must be opened in a specific number of days, this table can help the forcer to choose the appropriate forcing temperature to do this.

Comments are welcome! Please contact Bill Miller at wbm8@cornell.edu

Predicted days to open for buds of varying sizes, at different temperatures, for 51 hybrid lily cultivars (March 2016).

Bud length cm (inches)	Temperature, C (F)	Acapulco (O)	Acoustic (O)	After Eight (O)	Amateras (LA)	Asterian (O)	Bellonica (O)	Ceb. Dazzle (LA)	Cold Play (O)
2 (0.8)	14 (57)	48.5	71.6	67.2	41.0	65.3	69.6	46.1	95.4
2 (0.8)	16 (61)	43.0	61.1	55.7	31.5	52.9	55.3	36.5	72.7
2 (0.8)	18 (64.5)	37.9	52.2	46.4	25.6	43.7	44.5	29.3	56.1
2 (0.8)	20 (68)	33.1	44.6	39.4	23.2	37.7	37.1	24.5	45.6
2 (0.8)	22 (71.5)	28.6	38.6	34.5	24.3	35.1	33.1	22.0	41.2
2 (0.8)	24 (75)	24.4	34.0	31.9	29.1	35.7	32.6	21.8	42.8
4 (1.6)	14 (57)	29.3	49.3	40.6	22.2	45.9	40.4	26.7	75.1
4 (1.6)	16 (61)	27.4	41.9	34.2	19.0	37.3	32.9	21.3	54.7
4 (1.6)	18 (64.5)	25.0	35.5	29.0	16.3	31.1	26.9	17.3	40.1
4 (1.6)	20 (68)	22.2	30.2	25.0	14.0	27.3	22.3	14.6	31.2
4 (1.6)	22 (71.5)	18.8	25.9	22.0	12.2	25.8	19.4	13.4	28.0
4 (1.6)	24 (75)	14.9	22.8	20.2	10.7	26.7	17.9	13.5	30.6
6 (2.4)	14 (57)	15.0	30.4	21.6	9.5	30.1	19.3	13.2	54.1
6 (2.4)	16 (61)	15.6	26.0	19.0	10.2	24.7	16.4	10.7	38.2
6 (2.4)	18 (64.5)	15.1	22.1	16.6	9.6	20.9	13.8	8.8	26.7
6 (2.4)	20 (68)	13.7	18.8	14.6	7.7	18.7	11.5	7.7	19.6
6 (2.4)	22 (71.5)	11.3	16.0	12.8	4.5	18.1	9.5	7.2	16.9
6 (2.4)	24 (75)	7.9	13.7	11.4	0.1	19.0	7.7	7.4	18.7
8 (3.1)	14 (57)	5.7	14.9	9.6		17.8	6.1	5.5	32.4
8 (3.1)	16 (61)	7.5	13.6	9.1		15.0	5.9	4.6	23.1
8 (3.1)	18 (64.5)	8.2	12.1	8.4		13.1	5.4	4.0	15.8
8 (3.1)	20 (68)	7.7	10.4	7.6		12.0	4.6	3.6	10.8
8 (3.1)	22 (71.5)	6.1	8.7	6.6		11.8	3.4	3.4	7.9
8 (3.1)	24 (75)	3.3	6.8	5.4		12.5	1.9	3.5	7.1
10 (3.9)	14 (57)			3.3		9.2		3.7	10.0
10 (3.9)	16 (61)			3.5		8.3		3.1	9.3
10 (3.9)	18 (64.5)			3.4		7.6		2.7	7.6
10 (3.9)	20 (68)			3.2		7.2		2.3	4.7
10 (3.9)	22 (71.5)			2.7		7.1		2.0	0.8
10 (3.9)	24 (75)			2.1		7.2		1.8	
12 (4.7)						4.1			
12 (4.7)						4.4			
12 (4.7)						4.5			
12 (4.7)						4.3			
12 (4.7)						3.8			
12 (4.7)						3.2			

Predicted days to open for buds of varying sizes, at different temperatures, for 51 hybrid lily cultivars (March 2016).

Bud length (inches)	cm	Temperature, C (F)	Cystal Blanca (O)	Curie (O)	Entertain e (O)	Eyeliner (O)	Fangio (LA)	Fine Romance (O)	Firebolt (O)	First Romance (O)
2 (0.8)		14 (57)	71.4	75.8	62.1	41.9	38.1	51.6	65.9	63.7
2 (0.8)		16 (61)	58.6	61.1	50.8	34.2	31.4	38.9	52.5	52.3
2 (0.8)		18 (64.5)	48.6	50.3	41.7	28.6	26.3	30.2	43.3	43.7
2 (0.8)		20 (68)	41.6	43.4	34.8	25.1	22.8	25.5	38.3	37.7
2 (0.8)		22 (71.5)	37.4	40.3	30.0	23.7	20.8	24.9	37.4	34.5
2 (0.8)		24 (75)	36.2	41.1	27.4	24.4	20.5	28.3	40.7	34.0
4 (1.6)		14 (57)	46.5	50.2	35.6	26.4	22.5	29.6	46.8	39.4
4 (1.6)		16 (61)	38.6	40.3	29.3	20.9	18.8	23.4	37.1	33.6
4 (1.6)		18 (64.5)	32.5	33.2	24.2	17.2	15.9	18.8	30.5	28.8
4 (1.6)		20 (68)	28.2	28.8	20.2	15.2	13.9	15.9	27.2	25.0
4 (1.6)		22 (71.5)	25.7	27.1	17.4	14.9	12.9	14.6	26.9	22.2
4 (1.6)		24 (75)	24.9	28.1	15.9	16.5	12.7	15.1	29.9	20.4
6 (2.4)		14 (57)	27.3	30.2	17.0	15.0	11.6	14.7	31.2	21.7
6 (2.4)		16 (61)	23.1	24.1	14.2	11.3	9.8	12.3	24.6	19.6
6 (2.4)		18 (64.5)	19.9	19.9	11.9	9.0	8.5	10.3	20.2	17.4
6 (2.4)		20 (68)	17.6	17.4	10.1	8.0	7.6	8.8	18.1	15.2
6 (2.4)		22 (71.5)	16.3	16.7	8.7	8.4	7.1	7.7	18.3	12.9
6 (2.4)		24 (75)	16.0	17.8	7.8	10.0	7.1	6.9	20.7	10.5
8 (3.1)		14 (57)	13.6	7.2	6.3	7.6	5.2	6.7	19.1	10.5
8 (3.1)		16 (61)	12.0	26.6	5.6	5.5	4.6	5.7	15.0	10.2
8 (3.1)		18 (64.5)	10.7	13.9	5.0	4.1	4.1	4.9	12.4	9.4
8 (3.1)		20 (68)	9.9	12.8	4.4	3.6	3.8	4.4	11.2	8.2
8 (3.1)		22 (71.5)	9.4	12.7	3.9	3.9	3.6	4.0	11.5	6.5
8 (3.1)		24 (75)	9.4	13.6	3.3	5.0	3.6	3.8	13.3	4.3
10 (3.9)		14 (57)	5.6	7.4	3.5	4.2	3.4	5.7	10.6	5.8
10 (3.9)		16 (61)	5.3	5.9	3.5	3.2	3.1	3.6	8.4	5.4
10 (3.9)		18 (64.5)	5.1	4.9	3.4	2.5	2.8	2.5	6.9	4.8
10 (3.9)		20 (68)	5.0	4.4	3.2	1.9	2.6		6.3	4.0
10 (3.9)		22 (71.5)	5.0	4.5	2.8	1.6	2.4		6.5	3.0
10 (3.9)		24 (75)	5.0	5.2	2.4	1.5	2.2		7.5	1.8
12 (4.7)			3.2						5.7	
12 (4.7)			3.1						4.7	
12 (4.7)			3.0						4.0	
12 (4.7)			3.0						3.5	
12 (4.7)			2.9						3.3	
12 (4.7)			2.9						3.3	

Predicted days to open for buds of varying sizes, at different temperatures, for 51 hybrid lily cultivars (March 2016).

Bud length cm (inches)	Temperature, C (F)	Golden							
		Romance (O)	Gluhwein (O)	Litouwen (LA)	Love Story (O)	Maru (O)	Mona Lisa (O)	Pavia (O)	Pirandello (LA)
2 (0.8)	14 (57)	66.9	61.0	44.4	74.3	97.5	46.8	45.5	31.6
2 (0.8)	16 (61)	55.2	49.2	36.8	60.7	76.1	39.0	37.3	25.3
2 (0.8)	18 (64.5)	46.4	39.8	31.0	50.2	59.9	32.7	30.7	20.5
2 (0.8)	20 (68)	40.5	32.9	26.8	42.8	48.8	27.8	25.8	17.1
2 (0.8)	22 (71.5)	37.5	28.5	24.4	38.5	43.0	24.3	22.6	15.3
2 (0.8)	24 (75)	37.3	26.5	23.7	37.2	42.3	22.3	21.1	15.0
4 (1.6)	14 (57)	48.0	42.7	28.0	52.1	66.3	26.6	25.8	22.2
4 (1.6)	16 (61)	39.8	34.3	23.3	43.0	51.5	22.5	21.8	17.8
4 (1.6)	18 (64.5)	33.5	27.7	19.6	36.0	40.2	19.3	18.6	14.4
4 (1.6)	20 (68)	29.1	22.9	16.9	31.0	32.6	16.7	16.1	12.1
4 (1.6)	22 (71.5)	26.6	19.8	15.2	28.0	28.6	14.9	14.4	10.7
4 (1.6)	24 (75)	25.9	18.5	14.5	27.1	28.2	13.8	13.4	10.3
6 (2.4)	14 (57)	32.4	27.8	15.8	33.9	40.5	12.8	12.2	14.5
6 (2.4)	16 (61)	27.1	22.3	13.3	28.5	31.6	11.4	10.9	11.7
6 (2.4)	18 (64.5)	22.9	18.0	11.2	24.3	24.7	10.1	9.9	9.5
6 (2.4)	20 (68)	19.7	14.8	9.6	21.2	19.8	9.1	8.9	7.9
6 (2.4)	22 (71.5)	17.7	12.9	8.4	19.3	16.8	8.4	8.2	6.9
6 (2.4)	24 (75)	16.7	12.1	7.7	18.7	15.9	7.8	7.6	6.5
8 (3.1)	14 (57)	20.2	16.3	7.7	19.8	19.9	5.3	4.7	8.5
8 (3.1)	16 (61)	17.1	13.1	6.7	17.2	16.5	5.2	4.7	6.9
8 (3.1)	18 (64.5)	14.5	10.6	5.7	15.1	13.3	5.0	4.5	5.7
8 (3.1)	20 (68)	12.4	8.7	4.9	13.5	10.4	4.7	4.3	4.8
8 (3.1)	22 (71.5)	10.8	7.6	4.1	12.4	7.8	4.5	4.0	4.1
8 (3.1)	24 (75)	9.7	7.2	3.4	11.8	5.4	4.2	3.6	3.8
10 (3.9)	14 (57)	11.3	8.1	3.8	9.8		3.4	3.3	4.2
10 (3.9)	16 (61)	9.8	6.6	3.6	9.1		3.3	3.0	3.5
10 (3.9)	18 (64.5)	8.4	5.5	3.2	8.5		3.1	2.6	3.0
10 (3.9)	20 (68)	7.1	4.6	2.7	7.8		2.9	2.2	2.6
10 (3.9)	22 (71.5)	6.0	4.1	2.2	7.2		2.7	1.8	2.3
10 (3.9)	24 (75)	4.9	3.9	1.6	6.6		2.5	1.4	2.2
12 (4.7)		5.9	3.4		3.9				
12 (4.7)		5.3	3.0		4.3				
12 (4.7)		4.7	2.7		4.4				
12 (4.7)		3.9	2.5		4.2				
12 (4.7)		3.1	2.2		3.8				
12 (4.7)		2.2	2.0		3.0				

Predicted days to open for buds of varying sizes, at different temperatures, for 51 hybrid lily cultivars (March 2016).

Bud length cm (inches)	Temperature, C (F)	Roselily Elena (O)	Royal Sunset (LA)	Samur (LA)	Santander (O)	Show- winner (O)	Siberia (O)	Sorbonne (O)	Star Gazer (O)
2 (0.8)	14 (57)	63.9	39.5	41.8	64.2	59.3	75.7	54.8	71.9
2 (0.8)	16 (61)	49.5	32.0	34.0	54.4	55.2	61.7	45.0	59.3
2 (0.8)	18 (64.5)	39.4	26.3	28.1	46.5	49.6	51.0	37.3	49.1
2 (0.8)	20 (68)	33.6	22.4	24.0	40.3	42.5	43.5	31.7	41.2
2 (0.8)	22 (71.5)	32.1	20.2	21.8	35.9	33.9	39.2	28.2	35.6
2 (0.8)	24 (75)	34.9	19.9	21.4	33.3	23.9	38.1	26.8	32.3
4 (1.6)	14 (57)	40.6	19.8	24.3	44.8	36.7	52.5	33.2	45.3
4 (1.6)	16 (61)	30.4	16.3	20.3	38.0	35.9	43.1	28.0	38.1
4 (1.6)	18 (64.5)	23.6	13.5	17.1	32.3	33.3	35.7	23.8	32.2
4 (1.6)	20 (68)	20.0	11.3	14.8	27.8	29.0	30.3	20.5	27.5
4 (1.6)	22 (71.5)	19.7	9.8	13.3	24.4	23.0	26.9	18.2	23.9
4 (1.6)	24 (75)	22.7	8.9	12.7	22.1	15.1	25.4	16.9	21.6
6 (2.4)	14 (57)	22.0	7.9	12.0	29.3	19.7	33.7	17.5	25.2
6 (2.4)	16 (61)	16.1	6.3	10.5	24.8	21.0	28.0	15.5	22.0
6 (2.4)	18 (64.5)	12.2	5.4	9.2	21.0	20.5	23.4	13.6	19.2
6 (2.4)	20 (68)	10.3	5.4	8.1	17.9	18.3	19.7	12.0	16.8
6 (2.4)	22 (71.5)	10.5	6.1	7.3	15.4	14.2	17.1	10.7	14.8
6 (2.4)	24 (75)	12.6	7.7	6.7	13.6	8.5	15.5	9.6	13.2
8 (3.1)	14 (57)	8.1	3.9	5.1	17.6	8.5	19.4	7.7	11.4
8 (3.1)	16 (61)	6.5	1.8	4.7	14.9	10.5	16.5	7.4	10.7
8 (3.1)	18 (64.5)	5.3		4.4	12.6	11.0	13.9	6.9	9.9
8 (3.1)	20 (68)	4.6		4.0	10.6	10.1	11.8	6.3	9.0
8 (3.1)	22 (71.5)	4.4		3.7	8.9	7.8	9.9	5.6	8.1
8 (3.1)	24 (75)	4.7		3.3	7.6	4.0	8.4	4.7	7.0
10 (3.9)	14 (57)				9.7	2.9	9.5	3.7	4.0
10 (3.9)	16 (61)				8.3	4.3	8.5	3.7	4.3
10 (3.9)	18 (64.5)				7.0	4.9	7.4	3.6	4.4
10 (3.9)	20 (68)				5.9	4.7	6.4	3.4	4.2
10 (3.9)	22 (71.5)				5.0	3.6	5.3	3.0	3.7
10 (3.9)	24 (75)				4.2	1.7	4.2	2.5	3.1
12 (4.7)							4.2		2.3
12 (4.7)							4.0		2.2
12 (4.7)							3.8		2.1
12 (4.7)							3.6		1.9
12 (4.7)							3.2		1.7
12 (4.7)							2.8		1.3

Predicted days to open for buds of varying sizes, at different temperatures, for 51 hybrid lily cultivars (March 2016).

Bud length cm (inches)	Temperature, C (F)	Yelloween Vetto (O)	Yelloween (OT)	Zambesi (OT)
2 (0.8)	14 (57)	67.1	51.7	65.3
2 (0.8)	16 (61)	54.9	44.1	52.9
2 (0.8)	18 (64.5)	45.4	37.7	43.5
2 (0.8)	20 (68)	38.6	32.5	37.1
2 (0.8)	22 (71.5)	34.6	28.4	33.7
2 (0.8)	24 (75)	33.2	25.5	33.3
4 (1.6)	14 (57)	47.1	33.5	47.1
4 (1.6)	16 (61)	37.6	29.3	37.5
4 (1.6)	18 (64.5)	30.4	25.6	30.6
4 (1.6)	20 (68)	25.4	22.3	26.4
4 (1.6)	22 (71.5)	22.8	19.4	24.8
4 (1.6)	24 (75)	22.4	16.8	26.0
6 (2.4)	14 (57)	30.9	19.5	32.0
6 (2.4)	16 (61)	23.9	17.8	24.9
6 (2.4)	18 (64.5)	18.7	16.0	20.2
6 (2.4)	20 (68)	15.3	14.1	17.7
6 (2.4)	22 (71.5)	13.8	12.2	17.4
6 (2.4)	24 (75)	14.0	10.1	19.5
8 (3.1)	14 (57)	18.5	9.8	19.9
8 (3.1)	16 (61)	13.7	9.5	15.2
8 (3.1)	18 (64.5)	10.3	8.9	12.2
8 (3.1)	20 (68)	8.3	8.1	10.9
8 (3.1)	22 (71.5)	7.5	6.9	11.5
8 (3.1)	24 (75)	8.2	5.4	13.8
10 (3.9)	14 (57)	9.8	4.2	11.0
10 (3.9)	16 (61)	7.1	4.5	8.2
10 (3.9)	18 (64.5)	5.3	4.4	6.6
10 (3.9)	20 (68)	4.3	4.1	6.2
10 (3.9)	22 (71.5)	4.1	3.4	6.9
10 (3.9)	24 (75)		2.5	8.8
12 (4.7)			3.0	5.0
12 (4.7)			2.7	4.1
12 (4.7)			2.4	3.5
12 (4.7)			2.1	3.4
12 (4.7)			1.9	
12 (4.7)			1.6	