

## A Pink Longiflorum Lily Cultivar, “Elegant Lady” Suitable for Cut Flower Forcing

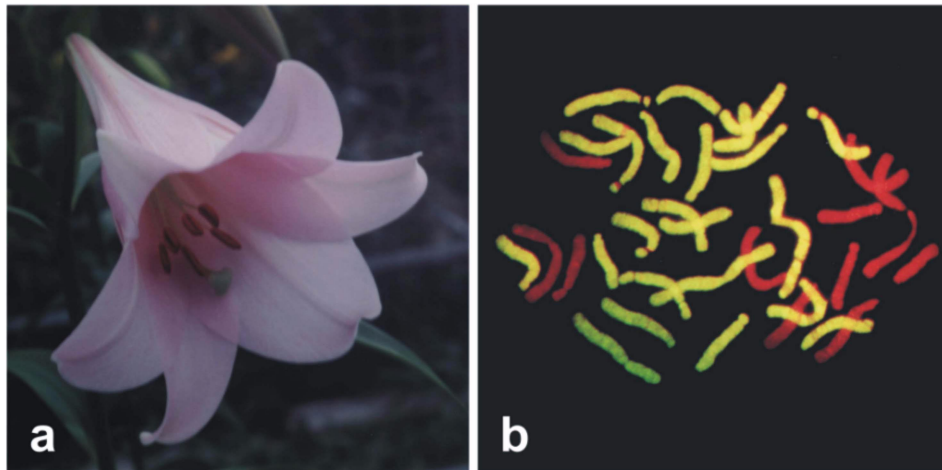
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**Abstract :** A new pink *longiflorum* (*Lilium longiflorum* x (*L. longiflorum* x *L. rubellum*)) lily cultivar was obtained by integrated intersectional hybridization techniques. The F<sub>1</sub> intersectional hybrid was obtained by crossing between *L. longiflorum* “Gelria” and wild type *L. rubellum*. Since the F<sub>1</sub> hybrid was absolutely sterile, amphidiploid of F<sub>1</sub> hybrid was made by using *in vitro* mitotic chromosome doubling technique to restore its fertility. The amphidiploid of F<sub>1</sub> interspecific hybrid had relatively high frequency of pollen viability and was used for the subsequent backcrossing progeny. Backcrossing to the *L. longiflorum* “Snow Queen” using pollen of F<sub>1</sub> hybrid produced a number of BC<sub>1</sub> seedlings. Flower color of F<sub>1</sub> hybrid (*L. longiflorum* x *L. rubellum*) was dark pink due to its male parent (*L. rubellum*) and BC<sub>1</sub> progeny was mainly the same flower color as soft pink with similar flower shape and plant type. Chromosome analysis was performed to analyze the ploidy value and the variation at chromosome level. The ploidy level of the F<sub>1</sub> hybrid was diploid (2n=2x=24) as expected. Each genome was transferred into F<sub>1</sub> hybrid from both parents, and the amphidiploid after chromosome doubling was tetraploid (2n=4x=48) without any chromosomal variation. Genomic *in situ* hybridization (GISH) result shows that all BC<sub>1</sub> plant derived from backcrossing was triploid (2n=3x=36) containing two copies of *L. longiflorum* chromosomes and one copy of *L. rubellum* chromosomes. Forcing days of F<sub>1</sub> hybrid was intermediate between parents, and by back crossing the forcing days was delayed but earlier than its maternal parent *L. longiflorum* under standard growing conditions. On the other hand, *Fusarium* resistance was relatively decreased when compared to *L. longiflorum*. It is the first pink *longiflorum* as a commercial cultivar through intersectional hybridization between *L. longiflorum* and *L. rubellum* and already in favor on the Japanese market.

**Key words :** Intersectional hybrid, Lily, GISH, Chromosome doubling, Early flowering



**Fig. 1. a.** Flower of BC<sub>1</sub> intersectional hybrid “Elegant Lady” (2n=3x=36) and **b.** its GISH analysis representing two sets of *L. longiflorum* and one set of *L. rubellum* chromosomes without any homoeologous recombination.

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<Received for Publication 27 December 2003>

**Table 1.** Pedigree of pink longiflorum "Elegant Lady".

Year	'92	'93	'94	'95	'96	'97	'98	'99	'00
Generation	2x F <sub>1</sub>		4x F <sub>1</sub>		BC <sub>1</sub>				
	"Gelria" X <i>L. rubellum</i>	921250-1 (LR)	"Snow Queen" X 950039 (LLRR)		961003-1 (LLR) . . . 147		961003-27		"Elegant Lady"
Remark	Crossing	Chromosome doubling	Back Crossing		Selection		Field trail		

**Table 2.** Genome composition and average value of several phenotypic characters of the parents (*L. longiflorum* and *L. rubellum*), amphimonoploid and amphidiploid hybrids, BC<sub>1</sub> progenies.

	Genome composition <sup>z</sup>	Genotype	Phenotypic characters			
			Flower color	Leaf shape	Plant height (cm ± SD)	Forcing time (days ± SD)
Parent	<b>LL</b>	<i>L. longiflorum</i> "Gelria"	White	Narrow	101 ± 3.7	95.0 ± 3.5
	<b>RR</b>	<i>L. rubellum</i>	Dark pink	Wide	25.8 ± 4.2	35.0 ± 3.9
F <sub>1</sub> (2x)	<b>LR</b>	<i>L. rubellum</i> × <i>L. longiflorum</i> "Gelria"	Dark pink	Wide	40.6 ± 8.9	46.7 ± 1.2
F <sub>1</sub> (4x)	<b>LLRR</b>	Chromosome doubled <b>LR</b> hybrid	Dark pink	Wide	48.2 ± 4.5	52.9 ± 2.7
BC <sub>1</sub> (3x)	<b>LLR</b>	<i>L. longiflorum</i> "Snow Queen" × <b>LLRR</b>	Soft pink	Intermediate	82.4 ± 8.2	74.6 ± 2.7

<sup>z</sup>**L** and **R** represent *L. longiflorum* and *L. rubellum*, respectively

**Table 3.** Genome constitution and chromosome composition of the F<sub>1</sub> hybrids and BC<sub>1</sub> progenies as determined by GISH.

	Genome composition	Accession number	No of individuals examined	Somatic chromosome number (2n)	Chromosome constitution	
					<b>L</b>	<b>R</b>
F <sub>1</sub> (2x)	<b>LR</b>	921250-1	2	24	12	12
F <sub>1</sub> (4x)	<b>LLRR</b> <sup>z</sup>	950039	1	48	24	24
BC <sub>1</sub>	<b>LLR</b>	961003	9	36	24	12

<sup>z</sup>**LLRR** was derived from artificial chromosome doubling of the **LR** hybrid