

Rose Germplasm L83

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L83 combines high levels of winter hardiness with recurrent flowering and resistance to blackspot (*Diplocarpon rosae* Wolf) and mildew [*Sphaerotheca pannosa* (Wallr. ex Fr.) Lév.]. It is crossable with an array of different rose hybrids as a pistillate and staminate parent and produces a high percentage of winter-hardy, recurrently flowering, and disease-resistant offspring.

Origin

L83 was obtained from *R. kordesii* Wulff x G49. G49 was obtained from open pollination of a tetraploid seedling, G12, in turn obtained from open pollination of the usually sterile *R. rugosa* Thunb. x *wichuraiana* Crép. hybrid 'Max Graf' (Fig. 1). G12 was examined cytologically by D.R. Sampson of Plant Research Centre and was found to be tetraploid. It originated presumably from unreduced gametes of the diploid 'Max Graf', as *R. kordesii* (6).

Description

L83 (Fig. 2) is a pillar rose, reaching a height and spread of 1.5 to 2 m in Ottawa. The flowers are fragrant, borne in clusters of four to eight, 7 to 8 cm in diameter, and have five petals that are medium pink, 63B above and 68B beneath (2). The foliage is abundant, glossy, yellow-green, 147A above, 147B beneath. The leaflets number seven to nine and are 3 to 4 cm long and 2.5 to 3.5 cm wide, obovate, acuminate, dentate. The thorns are falcate, about 40 per 10-cm stem section.

L83 has been observed in Ottawa since 1976. It has been exceptional for winter survival and disease resistance. Inoculation with three isolates of *Diplocarpon rosae* showed that it was resistant to two but not to the

third, which was isolated from the highly resistant *R. rugosa* hybrid 'Martin Frobisher' (4). No mildew was observed on L83; however, in Ottawa, little differentiation is ob-

served in mildew susceptibility among different rose genotypes.

Results From Cross Pollinations

The major difficulty in rose breeding is the identification and development of suitable pistillate parents. Most rose species and cultivars produce sufficient viable pollen and are usable as staminate parents. An excellent pistillate parent, such as *R. kordesii*, produces a high percentage of hips after pollination, with an array of different staminate parents, and the resulting seed germinate sufficiently well to produce the required number of seedlings. (Experience has shown

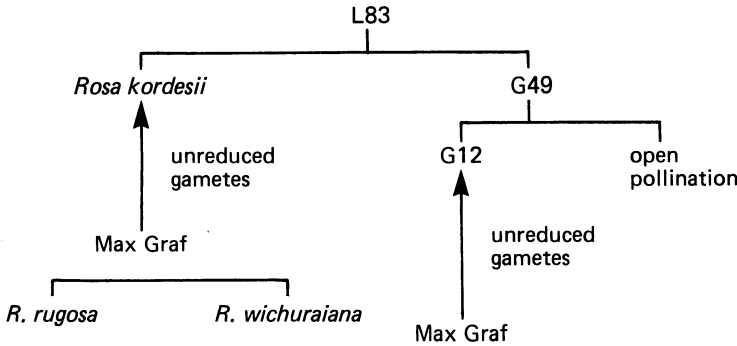


Fig. 1. Pedigree of rose germplasm L83.



Fig. 2. Rose L83.

Table 1. Crossability of L83 and *R. kordesii* Wulff.

Cross	Year crossed	Pollinations		Seeds obtained		Germination (%)
		Number	Success (%)	Total	per hip	
L83 x A. Mackenzie	1982	30	43	22	2	18
L83 x Dornröschen	1980	33	82	143	5	23
L83 x E10	1982	32	69	78	4	32
L83 x E12	1983	32	100	378	12	26
Crosses of L83		127	74	621	7	26
<i>R. kordesii</i> x A. Mackenzie	1976	55	95	1071	21	16
<i>R. kordesii</i> x Dornröschen	1980	35	91	245	7	32
<i>R. kordesii</i> x E10	1982	30	77	393	15	17
<i>R. kordesii</i> x E12	1983	32	97	378	12	22
Crosses of <i>R. kordesii</i>		152	93	2087	15	20
χ^2		---	13.85	---	11.16	5.56
P		---	0.01	---	0.01	0.16

Table 2. Results from reciprocal crosses of rose L83.

Cross	Year crossed	Pollinations		Number seeds		Germination (%)
		Number	Success (%)	Total	per hip	
L83 x Dornröschen	1980	33	82	143	5	23
L83 x Arthur Bell	1984	32	44	24	2	0
L83 x Queen Elizabeth	1984	31	29	11	1	0
L83 x B04	1980	30	27	23	3	39
L83 pistillate parent		126	46	201	4	25
Dornröschen x L83	1983	30	97	596	21	5
Arthur Bell x L83	1983	31	97	953	32	3
Queen Elizabeth x L83	1983	25	100	888	36	2
B04 x L83	1983	36	100	390	11	0
L83 staminate parent		128	98	2827	24	3
χ^2		---	27.83	---	7.18	22.51
P		---	0.001	---	0.05	0.001

Table 3. Test results of seedlings from crosses of L83 and *Rosa kordesii* Wulff^a.

Cross	Year planted	Number seedlings	% winter injury			Flowering weeks June-September			% mildew			% blackspot		
			0-5	6-25	26-100	0-5	6-9	10-16	0-5	6-25	26-100	0-5	6-25	26-100
L83 x A. Mackenzie	1983	4	100	0	0	50	25	25	100	0	0	25	25	50
L83 x Dornröschen	1981	28	57	36	7	71	18	11	93	3	3	64	18	18
L83 x E10	1983	24	45	54	0	29	63	8	---	---	---	---	---	---
L83 x E12	1984	57	68	32	0	39	30	32	84	12	4	65	9	26
Crosses of L83		113	62	36	2	44	34	21	88	9	3	63	12	24
<i>R. kordesii</i> x A. Mackenzie	1977	33	48	51	1	33	36	30	---	---	---	27	48	24
<i>R. kordesii</i> x Dornröschen	1981	46	13	43	43	76	13	11	96	4	0	20	48	32
<i>R. kordesii</i> x E10	1983	65	28	68	5	51	49	0	---	---	---	---	---	---
<i>R. kordesii</i> x E12	1984	56	21	75	4	72	18	11	96	4	0	43	46	20
Crosses of <i>R. kordesii</i>		200	26	62	13	60	30	10	92	8	0	31	44	25
χ^2			29.52			6.48			3.14			29.23		
P			0.001			0.04			0.21			0.001		

^aIn percent of observations based on 2-year means.

that 25 to 50 seedlings are sufficient to indicate which cross is less likely to produce offspring with the desired combination.) L83 was developed in the attempt to obtain a pistillate parent comparable to *R. kordesii*, but with improved winter survival, flowering attributes, and blackspot resistance.

The crossability of L83 and *R. kordesii* with four staminate parents was compared (Table 1). The pollen donors were: 'A. Mackenzie', 'Dornröschen', and the unnamed seedlings E10 and E12. 'A. Mackenzie' derived its hardiness from the ancestor 'Suzanne', a *R. laxa* Retz. x *R. spinosissima* L. hybrid (5). 'Dornröschen' derived its hardiness from 'Pike's Peak', a hybrid of *R. acicularis* Lindl. x 'Hollywood' (1). The seedlings E10 and E12 were derived from the cross L15 x 'Champlain'. They derived their hardiness from the ancestors 'Suzanne' and G12 (Fig. 1). For each cross combination, 30 to 55 pollinations were made (Table 1). Significantly more hips and seeds per hip were obtained from the combinations with *R. kordesii*, but the germination rate was lower than for the combinations with L83. The latter difference was not significant.

Reciprocal crosses of L83 were made with the shrub rose 'Dornröschen', the floribunda 'Arthur Bell', the grandiflora 'Queen Elizabeth', and the unnamed seedling B04 (Ta-

ble 2). B04 was derived from 'Bonanza' and A23. It derived its hardiness from the ancestor 'Suzanne'. The rate of success from pollinations was significantly higher when L83 was used as staminate, rather than pistillate parent. These crosses yielded more hips and seeds per hip, but the rate of germination was higher when L83 was used as pistillate parent (Table 2). Difference in rates of successful pollinations and seed germination between reciprocal crosses were observed previously in crosses of cultivars from *R. rugosa* Thunb. and *R. chinensis* Jacq. (3). It should be noted that crosses of *R. kordesii* with garden roses produce tender offsprings that do not survive the winters in Ottawa. The seedlings are grown without coverage, except that from the natural snow cover.

The value of L83 for the development of winter-hardy, repeatedly flowering, and blackspot-resistant roses is shown in Table 3. Although fewer seedlings were obtained from the combinations with L83 than for those with *R. kordesii*, the offspring of L83 yielded a significantly higher proportion of very hardy, recurrently flowering, and blackspot-resistant individuals.

It is concluded that L83 is a source for hardiness, recurrent flowering, and disease resistance. L83 is crossable with garden roses as a staminate or pistillate parent. Since gar-

den roses produce more seeds per hip, it is preferable to use L83 as staminate parent. In combinations with other roses, the high germination rate of seeds from L83 might outweigh the disadvantage of low seed production.

Availability

A limited number of rooted cuttings or budwood is available for research and development. Interested persons should request stock from: Plant Research Centre, Section Plant Gene Resources, Ottawa, Ont. K1A 0C6, Canada.

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