

KALMIA X RHODODENDRON DEBUNKED



MIKE GRANT, NICOLA H. TOOMEY
& ALASTAIR CULHAM

Introduction

Even if they have not grown it or seen it in the flesh, many rhododendron growers have probably heard of a reputed hybrid between *Kalmia* and *Rhododendron*. If such a thing could be confirmed it would represent the most genetically distant cross recorded in the *Ericaceae*. This article is a summary of an investigation (Grant *et al* 2004) conducted by the authors into the status of putative *Kalmia* × *Rhododendron* hybrids.

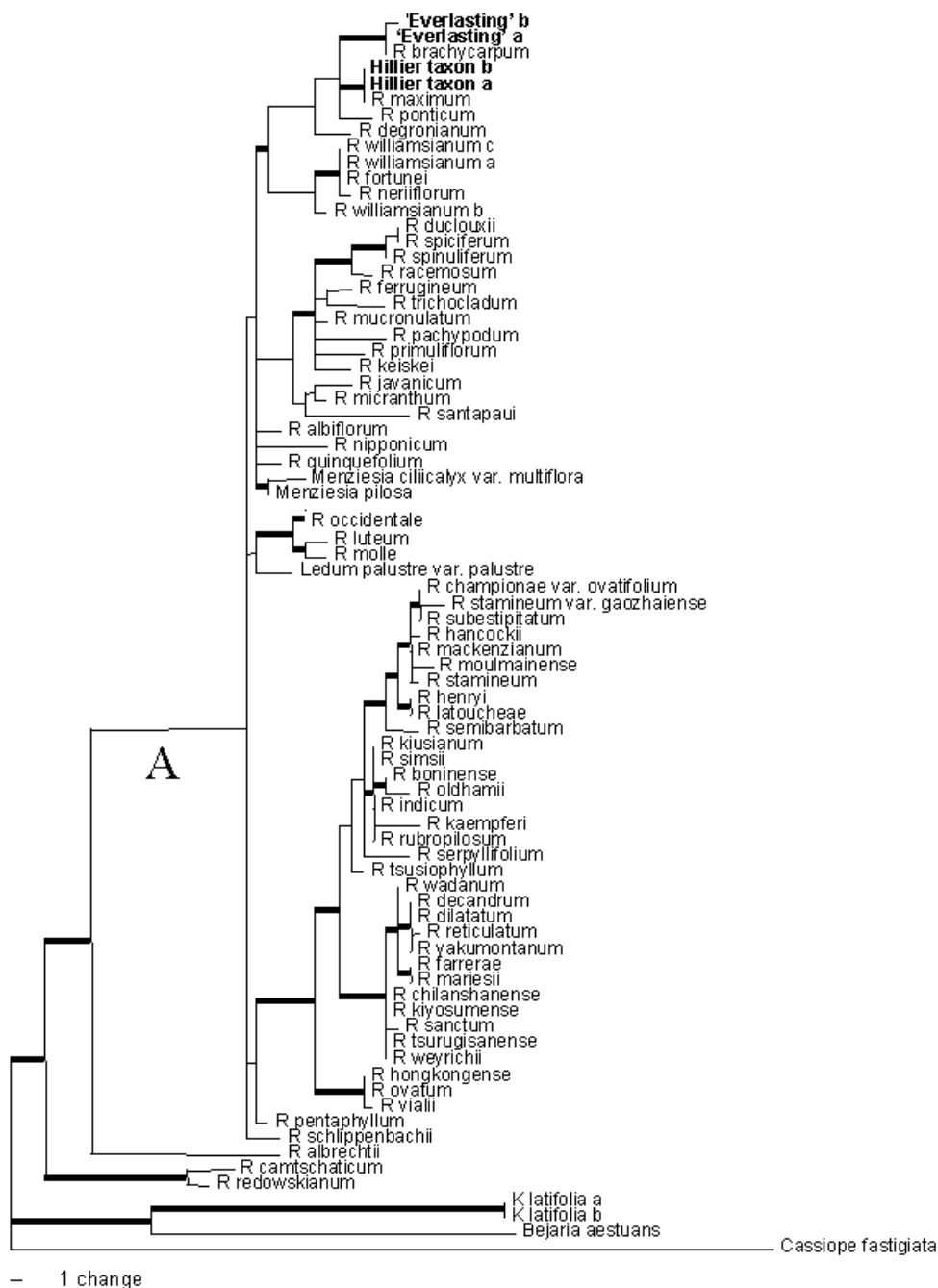
History of *Kalmia* × *Rhododendron*

The first reputed cross between *Kalmia* and *Rhododendron* (see right) was made in the 1950s by Halfdan Lem (1885–1969) in the USA, allegedly between *K. latifolia* and *R. williamsianum* (Pierce 1974). The hybrid was reported as having ‘pinkish white, cup-like flowers of all kalmias, but with a larger leaf resembling the male parent, *R. williamsianum*.’ (Pierce 1974). Note how this statement implies that *Kalmia* was the female parent. The one plant resulting from the hybridisation was named ‘No Suchianum’ (sometimes styled as ‘Nosuchianum’) in jest by Warren Berg in 1973. Unfortunately, when the cultivar name was brought to the attention of the International Cultivar Registration Authority for *Rhododendron* in

1996 it was noted that it fell foul of Article 17.9 of the *International Code of Nomenclature for Cultivated Plants* (Treharne *et al* 1995) because it is styled in Latin. Therefore a new name, ‘Everlasting’, was coined by Pierce (Murray 1996 *in litt.*). It is quite widely cultivated by enthusiasts in north-west USA (Halligan 1994) and is favored for its long flowering season, perhaps caused by its apparent sterility, and its seemingly curious origin. ‘Everlasting’ is widely regarded as being an intergeneric



Rhododendron ‘Everlasting’ at RHS Wisley, previously thought to be a hybrid between *Kalmia* and *Rhododendron*



hybrid on the basis of its claimed parentage, apparent sterility and the seemingly *Kalmia*-like characters of a shallow, saucer-shaped corolla and widely spreading stamens. Despite the corolla and stamen characters there do not appear to be any other features of the flower that suggest an affinity with *Kalmia*.

‘Everlasting’ was reputedly crossed with *R. arboreum* subsp. *delavayi* resulting in a cultivar called ‘Brilliant Abbé’ (Anon 1985). The latter reference erroneously lists one parent as ‘Brilliancy’ (Murray 1996 *in litt*). We were not able to obtain material of ‘Brilliant Abbé’.

The next reputed cross between *Kalmia* and *Rhododendron* is represented by a plant (hereafter referred to as the Hillier taxon) in the collection at the Sir Harold Hillier Gardens and Arboretum in England. Harold G. Hillier obtained it from the US National Arboretum (where it may have originated) in 1961 and it is referred to as growing there in Jaynes (1997). It is also grown at Arboretum Trompenburg in the Netherlands where it is listed as an intergeneric hybrid (van Hoey Smith 2001). It was thought to represent a hybrid between *K. latifolia* and *R. maximum* (Hillier & Sons 1981) but subsequent editions (e.g. Hillier & Coombes 2002) have been more cautious and listed it under *R. maximum*. Likewise, Jaynes (1997) has questioned its intergeneric status. The reported evidence for hybridity is on the basis of the tendency of its flower buds to abort (Coombes, *pers. comm.*; Fortgens, *pers. comm.*) and its long petiole relative to length of leaf lamina; the latter character is reminiscent of *K. latifolia*. It has been suggested that its reluctance to flower is because *Rhododendron* flower buds develop on shoots of the previous season whereas those of *Kalmia* develop on

shoots of the current season. However, in 2004 this plant flowered at Arboretum Trompenburg and a photograph has kindly been supplied by Dick van Hoey Smith (see p.31).

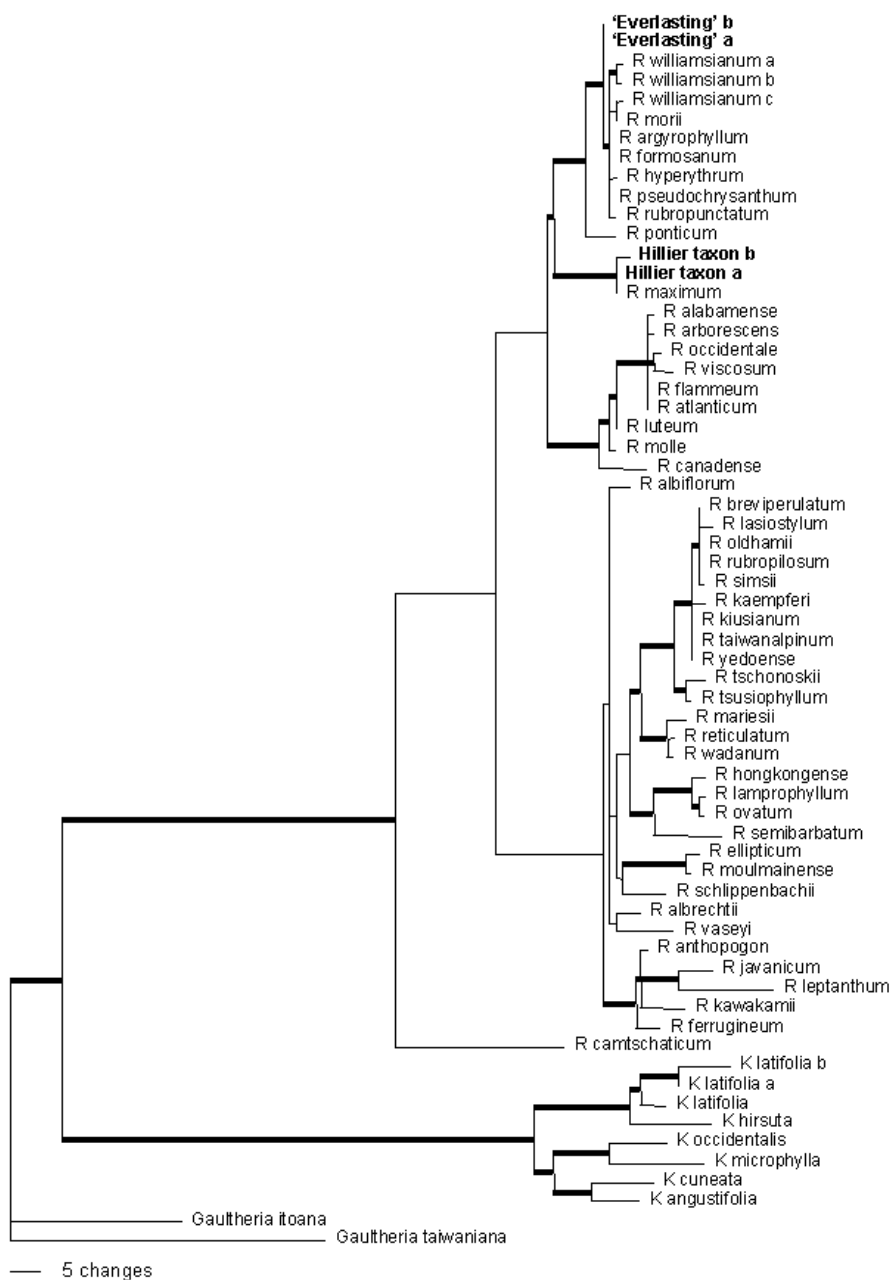
Other intergeneric hybrids in *Ericaceae*

Of other claimed intergeneric hybrids in the *Ericaceae*, the only ones that stand up to rigorous inspection are within tribe *Phyllodoceae*. These are × *Kalmiothamnus*, × *Phylliopsis* and × *Phyllothamnus* and they represent crosses between *Kalmiopsis*, *Phyllodoce* and *Rhodothamnus*. This interfertility reflects the close relationship between these three genera. The only cross in this group that has not yet been performed successfully is that between *Kalmiopsis* and *Phyllodoce* (Starling 1982).

Intergeneric crosses in other sections of the *Ericaceae* have all proved to be less resilient to taxonomic re-alignments. × *Gaulnettya* resides in *Gaultheria* now that *Pernettya* is sunk, × *Ledodendron* resides in *Rhododendron* now that *Ledum* is sunk and *Bruckenthalia* × *Erica* resides in *Erica* now that *Bruckenthalia* is sunk. × *Ericalluna* merely proved to be an abnormal *Erica*, not a hybrid with *Calluna*. This leaves us with the reputed *Kalmia* and *Rhododendron* hybrids mentioned above. The former belongs to tribe *Phyllodoceae* and the latter to tribe *Rhodoreae*, but Kron *et al* (2002) show that these two tribes are quite distantly related.

The investigation

Claims for intergeneric status of various hybrids are made on a fairly regular basis by horticulturists. Such pronouncements are sometimes worth investigating, not least because of what they may tell us about the



Dendrogram resulting from analysis of nuclear DNA ITS sequence data

relatedness of the genera in question. The two *Kalmia* × *Rhododendron* cases demand investigation because, if their parental status could be proved, they would represent the most distant intergeneric hybrids in *Ericaceae* and this would have important taxonomic implications. Perhaps more important is the potential for ornamental plant breeding! As International Cultivar Registration Authority for the genus *Rhododendron*, the Royal Horticultural Society has an interest in putative hybrids between *Rhododendron* and other genera. We therefore submitted material of the two available cultivars and related species to DNA sequencing. This would hopefully reveal any evidence for hybridisation and the direction of the cross should one be evident.

Materials and methods

Plant material was obtained from the Royal

Horticultural Society's gardens at Wisley and Rosemoor (England), and kindly supplied by the Sir Harold Hillier Gardens and Arboretum (England) and Glendoick Gardens (Scotland) (see table below). DNA was extracted from the leaves and two gene regions were amplified and sequenced. One region is known as trnL-F and is located on chloroplast DNA, the other region is known as ITS and is found on nuclear DNA. As chloroplasts tend to be maternally inherited, sequencing of chloroplast DNA would give an indication of the female parent if the intergeneric nature were proved.

We also obtained numerous additional DNA sequences (including some from *Bejaria*, *Cassiope* and *Gaultheria*) from the EMBL/Genbank/DDBJ database, in order to put our sequences into context. All the sequences were then aligned and analysed and presented in the form of dendrograms (see pp

Name	Source	Origin	Accession no.
<i>R.</i> 'Everlasting' a & b	RHS Garden, Wisley	Cult.	W20012690
Hillier taxon a & b	Hillier Gardens & Arboretum	Cult.	H19841501
<i>K. latifolia</i> a	RHS Garden, Wisley	Cult.	W951916
<i>K. latifolia</i> b	RHS Garden, Wisley	Cult.	W960618
<i>R. williamsianum</i> a	RHS Garden, Rosemoor	Cult.	R960393
<i>R. williamsianum</i> b	RHS Garden, Rosemoor	Cult.	R888391
<i>R. williamsianum</i> c	Glendoick Gardens	Wild	None
<i>R. maximum</i>	Glendoick Gardens	Wild	None

Table: Accession data for plant material used in DNA sequencing

26 and 28) showing the relationships between the species and hybrids.

Results

The analysis of chloroplast DNA trnL-F (see p. 26) shows that *Rhododendron* 'Everlasting' is very close in sequence to *R. brachycarpum*, and the Hillier taxon is identical in sequence to *R. maximum*. Neither shows any closeness to *Kalmia*.

The analysis of nuclear DNA ITS (see p. 28) shows that *Rhododendron* 'Everlasting' has no exact match (note that a *R. brachycarpum* sequence was not available for this analysis) but groups with *R. williamsianum* and its close relatives. The Hillier taxon again shows an exact match to *R. maximum*. Neither shows any closeness to *Kalmia*.

Although not the intention of this study, note how the trnL-F analysis shows that *Rhododendron albrechtii*, *R. camtschaticum* and *R. redowskianum* are quite distantly related to the rest of *Rhododendron*, while *Menziesia* and *Ledum* fall within the genus. Of these, only *R. camtschaticum* was available for ITS analysis but shows a similar placement.

Discussion

The claimed origin of *Rhododendron* 'Everlasting' as a hybrid between *Kalmia latifolia* and *R. williamsianum* is refuted by the DNA sequence evidence. The combination of both chloroplast and nuclear DNA evidence indicates that *Kalmia* has not contributed to the genetic makeup of 'Everlasting' but that the cultivar is closely related to *R. brachycarpum* or the *R. williamsianum* group. When regarded as a rhododendron, 'Everlasting' can be keyed out to subsection *Pontica* in section *Ponticum* in Chamberlain's key (1982) to subgenus *Hymenanthes*, except

for the corolla lobe to tube ratio. The morphology of this plant fits the placement of the cultivar into subsection *Pontica* very well and this matches the molecular evidence. The open corolla tube is probably the result of a mutation in the genes controlling floral development.

The Hillier taxon also shows no sign of *Kalmia* in either DNA sequence and a close match to *Rhododendron maximum* in both sequences. The flowers produced in 2004 suggest a strong affinity with *R. maximum*. The evidence suggests that this, like *R. 'Everlasting'*, is a chance mutant of a rhododendron.

A new cultivar name

The plant that we have referred to as the Hillier taxon clearly needs a cultivar name. We therefore provide a name here and give a validating description. The name has been registered with the International Cultivar Registration Authority for *Rhododendron*. A nomenclatural standard herbarium specimen has been deposited in the RHS Herbarium at Wisley (WSY) and a duplicate at the Harold Hillier Herbarium (provisional code HILL). The name we have chosen reflects its historical, but erroneous, connection with *Kalmia*.

Rhododendron 'Kalamity'

An elepidote *Rhododendron* cultivar derived from *R. maximum*, recognised by its abnormally long petiole relative to leaf length and flower buds that often abort, propagated vegetatively. Leaves evergreen, c.100–120 × 20–30mm; leaf blade elliptic, apex mucronate, underside with thin, scattered, non-persistent, brown indumentum; petiole c. ½ as long as total leaf. Flowers as in *R. maximum*.



Rhododendron 'Kalamity', previously thought to be a hybrid between *Kalmia* and *Rhododendron*

Nomenclatural standard (designated here): Sir Harold Hillier Gardens and Arboretum, accession no. 1984.1501, herbarium barcode WSY0046145, 1 January 1996, Cult. (WSY; duplicate at HILL).

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Formerly a Senior Botanist at RHS Garden Wisley, Mike Grant is now Deputy Editor of The Plantsman, based in Peterborough.

Nicola Toomey is a Research Assistant and Alastair Culham is a Lecturer in Plant Taxonomy, both in the School of Plant Sciences, University of Reading.