

# Origins and history of the Dunedin Botanic Garden *Phormium* collection

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## Introduction

On 17th July 1909, the Superintendent of the Dunedin Botanic Garden (DBG), David Tannock, received a collection of *Phormium* (harakeke and wharariki, or New Zealand flax) from Mrs Elizabeth Matthews of Dunedin. He described the donation as consisting of “flax seedlings” (Tannock, 1909, 17 July) including “50 varieties, many of them fine garden plants” (Tannock, 1909, 16 Aug). More than one hundred years later, descendants or divisions of the original donation of *Phormium* are still maintained and growing in the native plant section of the DBG, alongside Lovelock Avenue (Fig. 1A–C). There are now more than 100 individual plants in the collection, including varieties of both harakeke (*Phormium tenax*) and wharariki (*P. cookianum*). The age of the collection and diversity of *Phormium* accessions make this a valuable and notable collection.

Collections such as the DBG *Phormium* collection are important for cultural, horticultural, scientific, educational, amenity and/or biodiversity reasons (Given et al., 2006). For example, the Rene Orchiston collection growing at Lincoln, Canterbury includes the most extensive modern day collection of harakeke and wharariki weaving cultivars. It is culturally significant, utilised as a resource for weavers (Scheele, 2005) and scientific research (e.g., Scheele and Smissen, 2010). Although there are more than 50 harakeke and wharariki varieties in the Rene Orchiston collection, they are all of North Island provenance. In contrast, the history of the DBG *Phormium* collection, and the people



**Fig. 1** **A**, Part of the Dunedin Botanic Garden *Phormium* collection in its present day location in the Flax Borders of the Native Plant Collection alongside Lovelock Avenue. Photo: Bronwyn Lowe. **B**, Map showing the layout of the Dunedin Botanic Garden including the location of the Lower Garden and the Native Plant Collection. **C**, Location of the Flax Borders within the Native Plant Collection. Maps reproduced courtesy of the Dunedin City Council.

involved in its establishment and maintenance suggest that plants within that collection may have South Island provenance. Indeed, an oral tradition exists among DBG staff that some of the plants in the collection are South Island in origin (Tom Myers pers. obs.). This renders Dunedin's *Phormium* collection of particular interest not just to Māori and other weavers, but also to horticulturists, botanists and historians.

The significance of the Dunedin *Phormium* collection was recognised in 2007 by the award of a three-year Foundation for Research, Science and Technology Te Tipu Pūtaiao Postdoctoral Fellowship to an interdisciplinary group for an investigation of the plants' origins and properties. Representatives from the Dunedin Botanic Garden, the Department of Applied Sciences (Clothing and Textile Sciences) at the University of Otago, and a mātauranga Māori consultant (of traditional knowledge) have worked collaboratively on this project, enlisting the help of a kaumatua (elder), Māori weavers, a horticulturist and an environmental historian. The research has taken three main approaches. Firstly, the weaving properties of a selection of the plants have been assessed by weavers (Fig. 2A–B). Secondly, fibre properties and botanical characteristics have been measured (Lowe et al., 2009; Lowe et al., 2010; Lowe et al., in prep.). Thirdly, an attempt to trace the origins and history of the collection has been made, using documentary evidence, discussion with past and present DBG staff and consideration of the broader historical context of

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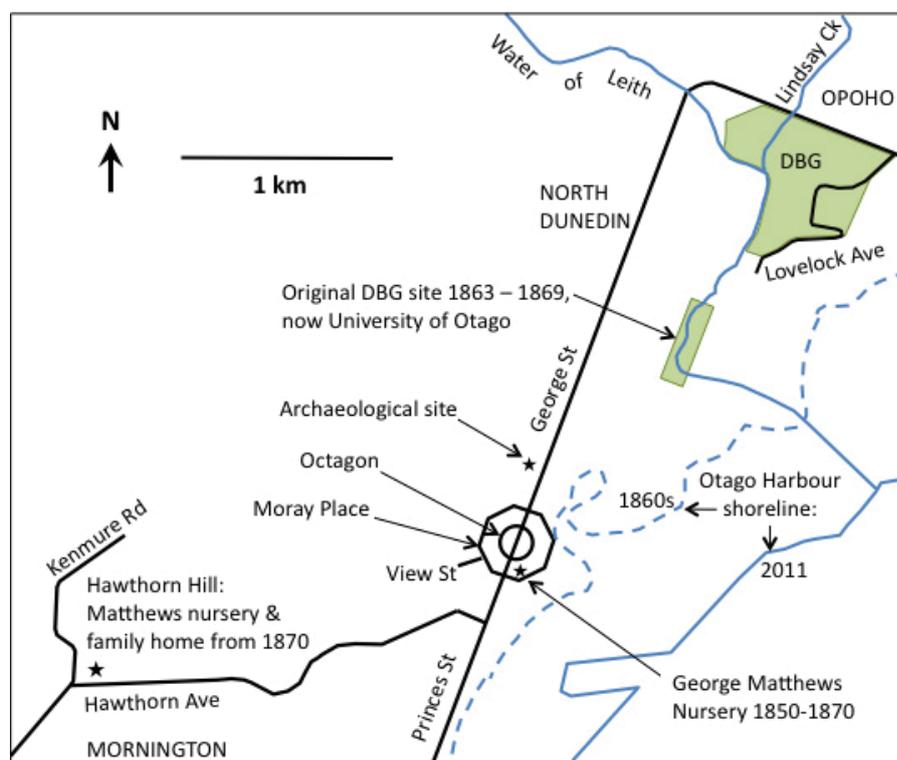
the *Phormium* fibre and horticultural industries in New Zealand. This article discusses information gathered through the third approach.



**Fig. 2 A**, Rua McCallum selecting a harakeke plant in the Dunedin Botanic Garden for assessment of weaving properties. Photo: Bronwyn Lowe. **B**, Roka Ngarimu-Cameron assessing the weaving properties of harakeke leaves harvested from the Dunedin Botanic Garden. Photo: Debra Carr.

### The Dunedin Botanic Garden *Phormium* collection

An investigation of documentary evidence (particularly from diaries and photographic material) has uncovered some details of the history of the *Phormium* collection. It is evident from David Tannock's diaries that a donation of "native plants and flax seedlings" (Tannock, 1909, 17 July) reached the DBG in 1909 and constituted the key specimens gathered by the nurseryman and forester Henry Matthews (1859–1909). Prior to being transferred to the DBG, these specimens were probably located in the garden of the Matthews family home, at Hawthorn



**Fig. 3** Map of the central Dunedin area, showing the relative locations of the Octagon; Moray Place, the site of the original Matthews nursery from 1850 to 1870; Hawthorn Hill, the site of the Matthews nursery from 1870 to the mid-1890s and family home and garden from 1870 to 1911; George Street archaeological excavation site; Dunedin Botanic Garden site 1863 to 1869; current Dunedin Botanic Garden site. Figure: Bronwyn Lowe.

Hill in Mornington, Dunedin (Fig. 3). After Henry Matthews moved away from Dunedin in 1896, the family's gardener and close friend, John McIntyre, continued to look after the prized collections of native and other plants in the Hawthorn Hill garden (Godley, 1994). Unfortunately, no extant planting plans or lists have been found for the Hawthorn Hill garden, other than anecdotal descriptions of the range of *Phormium* plants represented (e.g., Aparata Renata [Alfred Reynolds] in *Otago Witness*, 24 Nov 1892). Although there is no indication of how the plants were labelled, it is clear that the *Phormium* collection was passed on to David Tannock at the DBG by Mrs Elizabeth Matthews, only months after her son Henry's premature death (Tannock, 1909, p. 431).

In 1909, Matthews' *Phormium* collection was planted by Tannock and his staff in what is termed the 'Lower Garden' (Fig. 1B, 4) and remained there until 1922 (Tannock, 1910, p. 27). The plants were then moved to their present site, beside Lovelock Avenue (Tannock, 1922–1923, p. 125; Tannock, 1903–1940, 9–11 July 1922) (Fig. 1A–C, 5). While there are periodic references in the Garden diaries to 'flax' (i.e.,

*Phormium*) areas being 'cleaned' between 1909 and 1922, no evidence has been found of any significant additions to the areas during this time. Nor is there any clear evidence of additions to the Lovelock Avenue *Phormium* border being made after 1922, other than a lone reference to several *Phormium* varieties being replanted there in the 1939–1940 season (Tannock, 1939–1940). There has been some activity related to the *Phormium* collection since the 1940s, with removal of several *Phormium* plants to allow planting of *Pittosporum* plants during the period 1950–1960s (Cliff Donaldson, pers. comm. 2009), experimentation with developing variegated cultivars (Paterson, 1970, p. 144–145; Paterson, 1973) and division of some plants to establish *Phormium* borders in other parts of the Garden (Jane Wright, pers. comm. 2008). However, there is neither any known record nor any known living memory of major changes or additions to the *Phormium* border (Cliff Donaldson, pers. comm. 2009; Peter Heenan, pers. comm. 2009). Therefore, it seems that the *Phormium* collection today consists of original plants, repropagated material and plants descended from those planted out along Lovelock Avenue in 1922 by Tannock.



**Fig. 4** *Phormium* growing in the Lower Garden area of the Dunedin Botanic Garden, circa 1920, possibly from the collection donated by Mrs Matthews. Photo: "Botanical Gardens Dunedin", photographer unknown, reproduced with the permission of the Hocken Collections, Uare Taoka o Hakena, University of Otago, Dunedin.



**Fig. 5** Newly planted border of *Phormium* alongside the fence on Lovelock Avenue, Dunedin Botanic Gardens, circa 1922. Photo: "Botanical Gardens Dunedin" photographer unknown, reproduced with the permission of the Hocken Collections, Uare Taoka o Hakena, University of Otago, Dunedin.

Two questions remain about the origins of the collection. Firstly, did the DBG's *Phormium* collection contain material in addition to Henry Matthews' collection and, if so, where did it come from; and secondly, where did Matthews get the plants that were in his collection? The available documentary evidence has not yielded an answer to either of these questions, but it has provided a context that contains possible clues, some dating back almost to the very foundation of Dunedin in 1848. We know that much of the land on which Dunedin now exists was covered in *Phormium* in its pre-European state. This has been confirmed by archaeologists excavating a commercial site in central Dunedin, adjacent to George Street (Petchey, 2010) (Fig. 3). Further evidence can be found in early settlers' accounts (e.g., *Otago Witness*, 15 Oct 1859; I.M.I. [James McIndoe] in *Otago Witness*, 3 Feb 1904). Thomas Mackenzie, who arrived in Dunedin in 1858, could remember "when the Octagon was a wilderness of flax" (*Otago Witness*, 3 May 1905).



**Fig. 6** Panorama looking north east down View Street, 1861, with extensive areas of *Phormium* visible in View Street, Moray Place and the Octagon. George Matthews Nursery is located in Moray Place off the right hand edge of the photograph. Photo: William Meluish: "Dunedin from View St", reproduced with the permission of the Hocken Collections, Uare Taoka o Hakena, University of Otago, Dunedin.



**Fig. 7** View looking south toward the harbour edge and Princes Street in 1865, from hills above the Octagon. Typical dense stands of *Phormium* are in the foreground. Mornington and Hawthorn Hill are located in the upper right of photograph. Photo: J. Perry, reproduced with the permission of the Hocken Collections, Uare Taoka o Hakena, University of Otago, Dunedin.

Upon reaching Dunedin in 1850, Henry Matthews' father, George, established his first nursery in Moray Place; the site being described as "a quarter-acre of flax land" (*Otago Witness*, 16 Feb 1878). Although land clearing and development in central Dunedin soon removed most of the vegetation in the area, historical photographs show the propensity *Phormium* had to grow in this area through to the 1860s (Fig. 6). There was also *Phormium* on, or close to, the site of George's second nursery, at Hawthorn Hill, Mornington (Fig. 7); within the boundaries of the site where the DBG was first founded in 1863; and on the Opoho site to which the DBG was moved in 1869 (Fig. 8A–C). Therefore, *Phormium* was growing in the DBG and the surrounding Dunedin environs before these areas were developed by Pākehā (European settlers and their descendants), and some of this original local material may well still be present within the DBG.

The first records of deliberate *Phormium* planting within the Garden date back to the DBG's establishment at the Opoho site. *Phormium* from various unspecified locations was planted into the new nursery in 1869 by Alexander McGruer, curator of the Garden from 1869 to 1884 (*Otago Witness*, 27 May 1871). McGruer, under the direction of the Otago Provincial Government, experimented with cultivating *Phormium* from both seed and divisions, with a view to improving industrial fibre quality for use in rope and textile production. He was advised to follow the "interesting experiment" into the "cultivation of native flax" (Otago Provincial Government, 1869), being conducted in Christchurch Domain by Canterbury's Provincial Gardener, John Armstrong. The Christchurch experiment included 852 individual plants, representing 10 "varieties" received from Hawkes Bay, including Oue, Tihore, Tapoto, Huhiroa, Atiraukawa, Akewiki, Korako, Rauhangara, and Ratuwa (Anonymous, 1872).



**Fig. 8** **A**, View looking west over the lower area of the Dunedin Acclimatisation Society Grounds in 1868, prior to this becoming the site of the Dunedin Botanic Garden in 1869. Photo: B. Riemann: "Acclimatisation Gardens 1868". **B**, Close up of a portion of this photograph showing *Phormium* growing on the banks of Lindsay Creek within the grounds. **C**, C. P. Clifford, Acclimatisation Society Grounds Manager 1864–1870, standing on the bridge he built across Lindsay Creek, with a large *Phormium* plant on the creek bank. Photographer unknown. Photographs reproduced with the permission of the Hocken Collections, Uare Taoka o Hakena, University of Otago, Dunedin.

Evidence suggests McGruer was experimenting with *Phormium* from three sources: seedling *Phormium*, North Island *Phormium*, and Otago *Phormium* (McGruer, 1874). Quite possibly, McGruer's North Island *Phormium* was received from a similar source to Armstrong's, or Armstrong may have forwarded some of his collection. We also know that at least some of the seedling *Phormium* had an Auckland provenance, as six years later plants reportedly grown from Auckland seed were "over 6ft, and the plants are thick as well as tall" (*Otago Witness*, 19 Feb 1876). With the end of one of the flax trade's periodic booms in 1873

(Cruthers et al., 2009), interest in experimentation with *Phormium* as a commercial fibre languished for more than two decades. However, since there is every possibility that some of the material McGruer worked with stayed on in the DBG, some material of both North Island and Otago origin could have been included in the *Phormium* border in 1922.

Extant references to *Phormium* in the DBG peter out after the 1870s, only to reappear following the appointment of Tannock as Superintendent in 1903. *Phormium* was planted on an island in a lake on the Lower Garden in 1905 (Tannock, 1903–1940, 15 & 30 June 1905) and in the following year

Tannock suggested an experimental garden to complement the work being done on North Island experimental farms, which included trials with *Phormium* (Dunedin Horticultural Society, 1906–1909, Nov 1906). While the arrival of Henry Matthews' *Phormium* collection in 1909 was the key event, it is likely there was by then plenty of *Phormium* from both close and distant sources already in the DBG collections.

It also seems that Henry Matthews' *Phormium* plants were from various locations; they constituted after all a 'collection' of plants. It is unclear, however, not only from where but when the bulk of his collection was obtained. Henry increasingly took charge of the family's garden and nursery business after his father George's death in 1884 (*Otago Witness*, 2 June 1892), but some of the plants may have been gathered in the period before then, from 1850 onwards. For example, George Matthews and his contemporaries Dr James Hector and Arthur Beverly all exhibited collections of native plants during the 1860s at horticultural shows and other exhibitions in Dunedin. Hector and Beverly collected plants from Otago (*Otago Witness*, 30 Jan 1869) and as far away as the West Coast of the South Island (Shaw, 2000), but it is unclear whether George personally collected more widely than his local environs. Nor is *Phormium* mentioned specifically in any of these collections. However, if McGruer could get *Phormium* seed (and possibly divisions) sent from Auckland in 1869, there is no reason why George Matthews could not have done so as well. There is also plenty of evidence that George, unlike most of his horticultural contemporaries, was very interested in native flora, not just in the exotic plant material which made up the greater part of his business (Shaw, 2000, p. 32; *Otago Witness*, 12 Jan 1861; *Otago Witness*, 26 Mar 1864). By the late 1860s horticultural interest in variegated varieties of *Phormium* was increasing among Pākehā in New Zealand, as well as among horticulturists and gardeners in Europe (e.g., *Otago Witness*, 30 Jan 1869; *North Otago Times*, 6 Nov 1868). Clear evidence exists that variegated *Phormium* was growing naturally in the Otago region

(*North Otago Times*, 20 Nov 1868; *North Otago Times*, 1 Dec 1868). It would have been natural for George to retain any interesting *Phormium* varieties that came his way with a view to their potential as ornamentals in a burgeoning overseas market and, after 1884, any such material would have passed to his son Henry.

During the 1880s the *Phormium* fibre industry in New Zealand was moribund (Blair, 1884). However, there is evidence that horticultural interest in *Phormium* was on the increase, at least in Dunedin, with variegated *Phormium* regularly advertised for sale by the Matthews Nursery from the beginning of 1881 (*Otago Witness*, 12 Feb 1881). Henry Matthews' native plant catalogue of about 1890 listed four 'varieties' of *Phormium* for sale, called by him "*P. colensoi variegata*, *P. hursthousii*, *P. flaccidum* and *P. robustum*" (Matthews, c.1890); none of these are now recognised as species. The catalogue emphasised the firm's 30-year history of collecting, propagating and selling native plants. In 1892, the Matthews garden at Hawthorn Hill was described as having more than 16 'varieties' of *Phormium*:

"These were distinguished by the colours of their leaves, and some of them are very beautiful. Many have the leaves nearly crimson. The markings are very rich in colour. Some of the edges of the leaves are a rich deep pink when young, and get red, or reddish brown as they age; others are streaked with white and pale green, orange and green, yellow and green &c." (Aparata Renata [Alfred Reynolds] in *Otago Witness*, 24 Nov 1892).

Henry soon added to the number of Matthews' *Phormium* selections for sale, with his 1893–1894 catalogue referring to "18 distinct varieties of these handsome plants" (Matthews, 1893).

Henry Matthews was appointed New Zealand's Chief Forester in 1896, and was frequently in the North Island from then until his death in 1909. During that time it is very possible that Matthews added to his *Phormium* collection at Hawthorn Hill, as a result of his travels around New Zealand and his exposure to and

involvement in government-sponsored experimentation with *Phormium*. The *Phormium* fibre industry experienced a resurgence during this period, and experiments with the plant were carried out in the government experimental farms and horticultural stations at Waerenga, Ruakura and Weraroa (all in the North Island) (Department of Agriculture, 1908, p. 318–319, 352–353). The botanist Leonard Cockayne, who was closely involved in the experimentation at Ruakura, commented in 1908 that:

"by the end of next year the Ruakura station will be able to show hybrids between some of the best varieties [of *Phormium*], and some knowledge also will be gained as [to] the hereditary characteristics of certain distinct forms, and a commencement will be made as to the effect of different soils, climates and manures upon the production of fibre" (*Waikato Argus*, 28 May 1908).

*Phormium* was also planted at the state nurseries established by Matthews at Rotorua and (in the South Island) Tapanui (Matthews, 1899–1906), although the evidence suggests these plantings were primarily for ornamental purposes (e.g., Matthews, 1899–1906, 1902 C1, p. 78, 1905 C1, p. 98). Henry had an interest in experimentation with *Phormium* both for fibre and horticultural production during this time; by 1904 he had a collection of more than 40 distinct selections of "more or less intrinsic value for manufacturing purposes" (I.M.I. in *Otago Witness*, 23 Nov 1904) through which he intended to educate flax millers in the selection of varieties and experimentation for industrial potential (I.M.I. in *Otago Witness*, 23 Nov 1904; *Otago Witness*, 5 April 1905). However, it is impossible to tell from the available documentary evidence whether these 40 selections were from the collection in the Hawthorn Hill garden in Dunedin, from trial plots at the government farms and state nurseries, or from both.

In short, we cannot know for certain where or when Henry Matthews got the *Phormium* plants in his collection, but it is likely that they came from sources throughout New Zealand

rather than exclusively from the South Island, and were gathered over a period of probably at least twenty years and possibly half a century.

## Conclusion

Particular interest and significance can be attached to the plants in the Lovelock Avenue *Phormium* border at the DBG. While the botanical characteristics and fibre properties of the living plants can be explored and their weaving qualities assessed, the reconstruction of these plants' history is at best tentative and inconclusive, because the oral record is fragmentary, and the documentary record is patchy and often contextual rather than precise. No extant labels, stock lists or planting plans have been found from the collection's early days.

This article demonstrates both the potential for and limitations of an 'environmental history' approach towards questions of biotic provenance. The ultimate origins of the *Phormium* plants which David Tannock accepted into the DBG in 1909 remain uncertain; nor is it clear how precisely Henry Matthews' collection of 1909 matches the collection to be found beside Lovelock Avenue more than a hundred years later. However, it is now easier to appreciate not only the excitement Tannock undoubtedly felt upon receiving this collection in 1909, but also the importance of retaining the integrity of the plant material in the Dunedin Botanic Garden's *Phormium* collection in the 21st century.

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