

Development and care of *pā harakeke* in 19th century New Zealand: Voices from the past

Priscilla M. McAllum

Doctoral Student

Te Aka Tikanga (*Department of Māori Culture*)

Te Pua Wānanga ki te Ao (*The School of Māori and Pacific Development*) and the
Department of Biological Sciences

Te Whare Wānanga o Waikato (*University of Waikato*)

Private Bag 3105, Hamilton, New Zealand

[mcallump@waikato.ac.nz]

Abstract

Māori weaving is experiencing a resurgence. Some weavers are involved in the planting of *pā harakeke* so that they have a high quality resource on hand ready for use. A number of recent scientific publications, undertaken jointly with weavers, have explored the unique fibre qualities of different harakeke varieties along with specific aspects of Māori use of these varieties. In this paper, I examine Māori planting practices of *pā harakeke* and other aspects of resource management as revealed in literature sources from the late 18th to the early 20th centuries. Although some of the practices outlined here may have fallen into disuse over time, they may, nevertheless, continue to be appropriate for contemporary *pā harakeke*. It is hoped, therefore, that the information provided here will be of interest to contemporary weavers.

Introduction

Harakeke (*Phormium tenax*, commonly known as New Zealand flax) is overwhelmingly the most frequently used plant in Māori weaving, and has been since pre-European times. Numerous essential items were made from harakeke in Māori society prior to European colonisation, including many different kinds of basket (*kete*), clothing (*kākahu*), floor mat (*whāriki*), and fishing net (*kupenga*). Buck (1926, p. 61) notes that “with the exception of kiekie and toi used in some rain capes, the fibre used in Māori garments was obtained from the leaf of the *Phormium tenax*.” That is, harakeke was a key economic resource which provided the basis of life in previous times. However, weaving of all kinds became less common after European colonisation (Buck, 1911). The near loss of weaving (*whatu*) as an art, together with its revitalisation through the commitment of a small number of weavers in the mid-twentieth century, has been documented by Paki-Titi (1998). In spite of revitalisation efforts, the years during which the art of weaving was almost lost have had a negative impact on the transmission of traditional knowledge of harakeke itself. Indeed, Colenso (1880) remarked on the remains of old harakeke plantations which he came across in his travels.

Recent literature indicates a revived interest in traditional Māori management of weaving resources (see, for example, Mihinui, 2002; Moeke-Pickering & Kete, 2002; Puketapu-Hetet, 1989; Scheele & Walls, 1994). It also draws attention, in relation to traditional resource management by Māori, of a Māori world view in which concepts such as *whakapapa* and *mauri* play an important role. That this world view continues to be central to contemporary Māori resource management practices is evident in the

discussions of contemporary Māori authors (see, for example, Kawharu, 1998; Marsden, 2003; Mead, 2003; Mihinui, 2002; Puketapu-Hetet, 1989; Roberts, Norman, Minhinnick, Wihongi & Kirkwood, 1995). A number of recent scientific publications have elucidated aspects of harakeke growth and have provided information about some of the approximately sixty varieties known to Māori (see, for example, Harris, Scheele, Brown & Sedcole, 2005; Harris & Woodcock-Sharp, 2000; McBreen, Lockhart, McLenachan, Scheele & Robertson, 2003; Scheele & Walls, 1994). All of these sources are of very considerable significance. Even so, there has to date been no comprehensive examination of historical resource use and management of harakeke by Māori.

With the current resurgence of Māori weaving, many contemporary *pā harakeke*, or cultivated harakeke gardens, are being developed at sites around the country, including schools and *marae*. However, because of processes of colonisation, migration and other factors, the transition of knowledge through the generations has not been complete. For this reason, a critical analysis of historical documents is an essential part of the recovery of traditional knowledge. It is therefore timely to examine information associated with past Māori management of *pā harakeke*.

This paper analyses information contained in literature from the late 18th to the early 20th century with a view to illuminating historical Māori management techniques, and particularly planting practices, used in the development and care of *pā harakeke*. It is hoped that the information provided will be of interest and use to contemporary weavers. The focus here is on ‘hands on’ practical management of harakeke.

The Data

Historical documents form the basis for this enquiry into Māori management of *pā harakeke* in the 19th century and earlier. However, there are many problems associated with these texts.¹ These include the fact that the observers/ writers will have been influenced by their own interests and value systems. Thus, for example, Williams (2001, p. 217) notes that past Crown policy on the preservation of Māori knowledge (often involving indifference, apathy or outright challenge) has had a negative impact on transmission. In place of traditional coherent and intensive transmission of cultural knowledge from one generation to the next in the setting of the *whare wānanga*, we witness a struggle for survival in an unfamiliar and often hostile context. Thus, for example, Williams (2001, p. 224) notes that although the ethnographic work of Elsdon Best is of great value, Best himself neglected to preserve the original material of *tohunga* Te Matorohanga, material that was written down at a specially convened *wānanga* or gathering. What remains for posterity are only fragments of Te Matorohanga’s works which exist in Best’s notes.

The historical literature from the late 18th to the early 20th century can be divided into periods: the first period (from 1769 to 1840) was notable for the investigation of visitors from overseas; the second period (from around 1840 to the 1920s) can be characterised as a period of investigation by resident naturalists and ethnographers. In the first period, a number of early visitors to New Zealand made observations in diaries, journals and letters, mainly describing life in the first half of the 19th century. This group includes writers such as Lang, Marsden and Yate. A later group of New Zealand writers, such as Colenso, Beattie and Best, demonstrated their keen interest in ethnography in late 19th and early 20th century publications, and included material

relating to Māori plant knowledge. Māori writers such as Te Rangihiroa (Sir Peter Buck) and Makereti also contributed during this period.² I have, however, been unable to find early material written by Māori weavers about their practices, although it is possible that some exists, perhaps retained in private collections. Moreover, of the early ethnographers, only Best, Beattie and Shortland are recorded as having female informants (Yates-Smith, 1998, p. 27). Because Māori women have generally been the weavers, holding a great deal of knowledge concerning harakeke, this is of particular concern.

The Report of the Flax Commission to the House of Representatives (1870-1872) and its Appendices form the most comprehensive historical record for harakeke in the 19th century. The primary purpose of the Flax Commission was to investigate different varieties of harakeke that might have fibre suitable for commercial use, and the Commissioners reported on research into flax varieties and preparation relevant to that purpose. They therefore noted aspects of Māori practice and use of different varieties, mainly via reports received from different districts. The information recorded covers a range of material provided by both Māori and non-Māori. However, the brief of this report was such that it placed limitations on the kind of information recorded. The focus was on commercial use of harakeke fibre, or *muka*. As such, their interest in Māori methods of managing harakeke had a narrow focus.

Results

Early references to the management of *pā harakeke* are sparse. In the first half of the 19th century, some Pākehā observers seemed to consider either that harakeke had never been cultivated (see, for example, Terry cited in Bell & Young, 1842, p. 25), or alternatively that Māori had forgotten any resource management practices that had once been known (Bell & Young, 1842 p. 12; Brodie, 1845, p. 95).³ Brodie reported that “the cultivation of the flax has of late years been entirely neglected [by Māori]” (p. 95) which suggests a period of inactivity and loss. In a similar vein, Heaphy wrote that “[no] pains have ever yet been taken in its culture; and indeed but little are necessary, so luxuriant is it in its wild state” (Heaphy cited in Bell & Young, 1842, p. 19). Other early writers, such as Lang (1839, pp. 59-60), made only superficial observations of Māori weaving, or appeared to have little interest in harakeke (see, for example, Yate, 1835, p. 31).

Ethnological writing during the later part of the 19th and early 20th centuries which relates to harakeke is heavily weighted towards descriptions of the art and customs of weaving (see, for example, Best, 1898; Buck, 1923, 1924; Roth, 1979). These ethnographers recorded terminology associated with weaving in great detail, as well as customs associated with the *whare pora*, and names for different items of clothing. Unfortunately, they paid almost no attention to the plant itself. The exceptions to this trend are two papers, one by Best (1908), the other by Buck (1911), which provide what are almost certainly the two most valuable historical accounts of harakeke management. Additionally, a number of practices are reported, often fleetingly, in other sources. Taken together, these sources provide an important resource in relation to the practices used by Māori to manage *pā harakeke*.

Propagation by root division

Harakeke can be propagated by separating out and planting leaf fans taken from an established bush; this is often referred to as propagation by root division. Each of the ramets or fans (also sometimes referred to as ‘roots’ or ‘offsets’) must have attached root stock in order to grow. The second method is propagation of harakeke from seed.

Māori use of root propagation is reported in numerous sources (Best, 1908; Buck, 1911; Elder, 1932, p. 241;⁴ Kelly, 1866; King, 1793; Report of the Flax Commissioners, 1870-1871; Selwyn, 1847; Williams, n.d.). These sources cover much of the country, from Northland to the Eastern districts, Taranaki and the Urewera. Root division therefore appears to have been a well-known common method of propagating harakeke.

Propagation of harakeke by root division appears to have been well established before the arrival of Pākehā. Some of the earliest information about Māori cultivation techniques comes from Tuki and Huru, two high ranking Māori kidnapped in 1793 from the Bay of Islands, who were taken to Norfolk Island in the hope that they would be able to help the convicts there extract fibre from harakeke for the growing trade.⁵ Philip Gidley King (1793, p. 188) described in his journal how, according to Tuki and Huru, “it [*harekeke*] is cultivated by seperating [sic] the roots”. This method of propagation was still reportedly in common use a century later: Williams (n.d.) recorded that when Māori discover a *tihore* plant, they “propagate it by dividing the root stock and . . . plant it in rows near their ordinary habitations”. Propagation by root division remains the preferred method of establishing *pā harakeke* today. It appears, therefore, that Māori have been propagating harakeke by root division for at least 200 years, and most likely longer.

Distribution data from the Pacific Islands provides evidence that Polynesians had developed techniques to propagate other weaving plants in a similar way to harakeke prior to the colonisation of New Zealand (see, for example, Connor, 1983, p. 19). Propagation by root division developed as a cultivation method prior to colonisation of Aotearoa, and hence was probably quickly adapted by Māori to a range of plants in this country.

Propagation from seed

The Report of the Flax Commissioners (1870, p. 6) stated categorically that Māori did not grow harakeke from seed, and always transplanted harakeke, and this view was echoed by others (Canterbury Flax Association, 1871; Atkinson, 1921a). This view seems to be widely accepted today, as propagation by seed is not discussed in any later references. Additionally, Kelly reported that Māori had tried to propagate from seed unsuccessfully (Report of the Flax Commissioners, 1870, p. 9). However, detailed description of Māori seed propagation methods for other plant species such as *hue* (*Pteris esculenta*) are given by, for example, Colenso (1880), and Makereti (1986, pp. 215-216). These writers provide evidence that Māori experimented successfully with different methods of maximising seed germination.

There *is* evidence which refutes the widely held view that Māori did not propagate harakeke by seed. Examination of an early text by Murray (1836, p. 13) reveals evidence that they did. He quoted the words of a friend who wrote to him after consultation with a Māori informant (unfortunately neither the friend nor the Māori

informant are named) describing the Māori method of sowing harakeke seeds as follows:

After preparing the ground and sowing the seed, if they do not quickly see the plants appear, they spread a quantity of brushwood over the land and set fire to it. This being done, the plants soon make their appearance, and a crop is ensured.

This method is similar to other seed propagation methods described much later for *kumara* by Best (1976, p. 188). It is, however, currently unclear under what conditions Māori chose to grow harakeke from seed: propagation by root division is likely always to have been, in most contexts, a more effective way of propagating this valuable weaving resource. As Murray (1836, p. 15) noted (with regard to cultivating harakeke in the Scotland): “The difficulty of obtaining mature seeds appears to be a subject of little or no regret, from the great facility with which plants may be cultivated by offsets.” That is, propagation of harakeke by root division is much more effective than seed propagation for multiplying desirable varieties at a fast rate. This supports Māori preferential use of root division to propagate desirable varieties in *pā harakeke*.

Propagation from seed encourages genetic diversity and the establishment of different genetic varieties. That is, seeds have a mixture of characteristics of the parent plants, and tend to be very variable. On the other hand, propagation by root division effectively preserves the characteristics of the parent plant, as the genetic material in every fan is identical to the parent bush. This is extremely useful where a weaver wishes to increase stocks of highly valued varieties.

It is not clear whether an interest in genetic variability was the purpose behind germination of harakeke from seed, although the identification and use of around 60 harakeke varieties by Māori suggests this would be a valid hypothesis. Two issues pertaining to this suggestion need to be considered. Harakeke growth from seed germination is much slower than propagation by root division, as it takes approximately 6-8 years for a seed to develop into a mature plant. As well, a range of desirable forms in natural stands (which could then be cultivated by root division at a faster rate) may have been available for selection by weavers. Another hypothesis is that Māori germinated harakeke from seed when attempting to establish large areas of harakeke in areas with a poor natural distribution, or with large populations and high resource usage. As yet data on natural distributions of harakeke in the pre-European period have not been analysed in relation to weaving needs.

Planting methods

The development of *pā harakeke* using propagation by root division raises the question of planting methods. There are, in fact, a number of 19th and early 20th century sources which describe planting of harakeke. Buck (1911) provided the most succinct record of planting as follows:

Suitable ground having been prepared, the roots were planted perhaps in groups of four, slanting outwards from one another. These would all grow up into one large bunch, which was called a *pu harakeke*. The next *pu* would be planted about 8 ft. away. The bunches were arranged in rows of from six to

thirty or so. Each row was called a *pa*, a term which was also applied to the whole collection in the phrase *pa harakeke* or *pa muka*. The *pa harakeke* was carefully weeded, and as the various roots sprouted up earth was banked between the divisions of the bunch.

However, contrasting information is provided by other authors in relation to planting distances. These can be compared in *Table 1*.

Table 1: Descriptions of planting distances between *pū harakeke*, and rows from 19th and early 20th century literature

Planting description	District	Source
roots one foot apart	Northland	King (1793, p. 188)
each root to be planted about 2 yards apart	unknown	Brodie (1845, p. 92)
spaces of 6 feet between plants, and rows 6 ft apart	possibly Eastern districts	Selwyn (1847)
each native flax plant occupies about two square yards of ground; <i>Tihori</i> [sic] is set in rows about 3 feet apart	unknown	Moore (1849)
spaces of 6 feet between plants, and rows 6 feet apart	probably Taranaki	Kelly (1866)
6 feet between rows and plants		Report of the Flax Commissioners (1870)
<i>tapoto</i> variety is planted in rows 20 feet apart	Pourerere, Hawke's Bay	Nairn, in the Report of the Flax Commissioners (1870 D.14, p. 8), from Māori sources
<i>wharanui</i> variety is planted in rows 20 feet apart	Pourerere, Hawke's Bay	Nairn, in the Report of the Flax Commissioners (1870 D.14, p. 8), from Māori sources
6 ft or 8 ft or 10 ft apart.	possibly Wellington	J T Mitchell (1905, p. 35) based on his memory of Māori plantings 35 years prior

There is considerable variation in reported distances between harakeke bushes. This variation may relate, in part, to the fact that some authors appear to be describing planting methods whereas others may be describing either planting distances, or the distances between *existing* plants. However, the distances recorded between planted harakeke roots certainly appear to increase over time. There are two likely reasons. Firstly, there may have been substantial variation in planting practices, particularly between regions. These regional differences may also have included variation in which varieties were chosen for cultivation, with bush size depending on both the variety and growth conditions (see below for further discussion). Secondly, the commercial milling for industry may have had a significant impact on harakeke planting distances. During the later part of the 19th century, commercial harvesting was prevalent in many areas, and non-Māori interest was closely focused on this industry. Although initially natural stands of harakeke were harvested, by the end of the 19th century landowners were planting harakeke for planned commercial harvest. Large distances between rows of harakeke allowed tramlines to pass through so the leaves could be carted more easily. It is possible that what has been reported as Māori

practice during this period is misrepresented as such, or that Māori planting distances themselves changed in response to industry. Hector (1889, p. xvii) noted that harakeke was in constant use by Māori during the early contact period, and that “a very considerable trade in the article [*Phormium* fibre] existed as early as 1828”. This trend increased with the development of more effective stripping and scutching machinery in the second half of the 19th century.

The Flax Commissioners (1870, p. 6) noted in their report that “[it] seems to be overlooked that planted flax will not be allowed to grow into large bushes”. This suggests that small distances may be appropriate in some contexts. Crozet (1999) noted that harakeke bushes he saw planted in Northland were “small”. This, together with the fact that Tuki reported close planting (King, 1793, p. 188), lends support to the hypothesis that there was a relationship between planting distance and bush size.

The transplanting of fans to propagate harakeke also requires a decision on the number of fans to place together at any one site. Evidence suggests that the number of fans planted in any one hole probably varied in different areas (*Table 2*).

Table 2: Records of the number of rooted harakeke fans placed in one planting hole.

Number of fans (with root attached)	Reported District	Time period	Source
3	Bay of Islands	1793	King (1793, p. 188)
2	possibly Tuhoe but not specified	around 1900	Best (1908)
4	Whanganui River	around 1900	Buck (1911)

Planting one fan only in each hole is probably the most common method of planting today, possibly because that is the amount of material often supplied by the giver of a desired variety. However, some weavers still prefer to plant two or three fans together. Pendergrast (2000, p. 14) noted a “traditional method used by the late Mrs Marara Maihi” where fans were planted singly or in groups of three with the rhizomes pointing outwards. It can be seen here that there appears to have been considerable variation in practice previously. Best additionally recorded that in Tūhoe tradition it was considered unlucky to plant an uneven number of harakeke fans in a hole (Best, 1972, p. 1010). The number of suggested fans recorded in Pendergrast differs from Best’s record, although Pendergrast’s description of planting orientation from the East Coast area is similar to that described by Buck (1911) with reference to the Whanganui River area. However, the overall preference for more than one fan may be based on the faster speed of bush development into harvestable material.

The Flax Commissioners (1870, p.7) noted one practical reason for variation in the number of roots planted: “[if] close planting should be adopted, only one root should be planted at one place”. Although it is not clear from the context whether this referred to Māori practice, it seems likely that it did. Another explanation relates to the nature of traditional knowledge itself, which is based on experience, and therefore open to change (see, for example, Grenier, 1998).

Planting seasonality

Seasonality is mentioned frequently in the 19th and early 20th century literature in relation to resource management by Māori. It is mentioned, for example, with reference to *kumara* (Best, 1976; Makereti, 1986, p. 193). Harakeke planting also appears to have been strongly seasonal. Kelly (1866) reported that the best season for planting is April or May. His indication of seasonality may be based on communication with Bishop Selwyn as his list of harakeke varieties is strongly suggestive of Selwyn's work (Selwyn, 1847). Best (1908), however, reported that fans were planted out in the 4th month of the Māori year, which corresponds to spring in the western calendar. Firth (1972, p. 71) also recorded flax planting as an activity for September, or spring. In this case, historical reports and modern practice correlate well: transplanting of harakeke fans in autumn or spring is common today. Because seasonality is important for a large variety of activities undertaken by Māori, from fishing to planting of crops, it is likely that continuation of this practice has been supported by this broad base of traditional knowledge.

A number of planting practices for harakeke were dismissed as involving superstition by Best (1977, pp. 102-103). These involve practices that involve observation of wind and wind direction:

When it was planted near a village for daily use, it was highly essential that the planters should note and remember what wind was blowing at the time of planting. When the plants had developed and the leaves were ready for use it was necessary that such leaves be cut during the prevalence of the same wind; if cut at any other time the fibre of the leaves will be found to be of poor quality.

At face value, these practices might seem strange, but there is at least one oral tradition maintained among weavers that suggests the way harakeke is planted in relation to the prevailing winds of the area is important in terms of survival and growth. Winds are often indicators of bad weather, something that can clearly affect the appropriate timing of harvesting, or the growth of the plant itself. Further consideration of the meaning behind these comments may yet illuminate the practices described.

Irrigation of pā harakeke

Māori irrigation of harakeke was not recorded by Kelly (1866), Best (1908), Buck (1911) and others. However, Crawford (1869) noted that "it is said in the old days of Māori flax cultivation, the plants were irrigated, although always planted on a hillside". This record provides evidence of a significant resource management practice. Cross (1912, p. 151) also mentioned irrigation by Māori, but as her writing is remarkably reminiscent of that of Crawford, he is likely to have been the authority for her statement. Frustratingly, Crawford (1869) did not elaborate further on his comment. It therefore remains unclear whether he was referring to watering or ground-based irrigation systems. Nor can we know the extent of irrigation use from this rather tantalising report. Even so, the fact that Crawford's paper focussed on the usefulness of cutting drains to increase growth in commercial harakeke plantations, places his comment in a context of ground-based irrigation of some kind.

Management of the flower stalk

A small number of historical records refer to management of the harakeke flower stalk (that is, the peduncle and inflorescence, or *kōrari*). Hector (1889, p. 9) recorded a number of practices that ‘should be’ carried out in relation to the harvesting of harakeke. He did not, however, specifically identify them as Māori. One of these practices was cutting the flower stalk as soon as possible, and then rubbing the cut part with a little earth to prevent “bleeding”,⁶ or, better still, twisting it off. Buck (1911) also identified the Māori practice of removing the flower stalk. He gave two reasons for this: firstly, that it “exhausts” the plant, and secondly, that there was no chance of cross-fertilisation and propagation by seed. Two further sources (Atkinson, 1921a, 1921b; Report of the Flax Commissioners, 1870, p. 7) reported that Māori refrained from cutting *harakeke* from the time that the flower stalk shoots until the time that it dies off. Removal of the flower stalk continues to be part of Māori management of highly valued varieties today.

Fertilisation of the harakeke plant

Expert contemporary weavers consider the return of excess or ‘waste’ material from the harakeke plant to the base of the plant a traditional part of the weaving process. Weavers are held to have a responsibility to nurture the plants they use, and as part of this philosophy, to return any excess material from weaving “*hei whāngai i te harakeke*” (Mihinui, 2002).⁷

The return of excess weaving material to harakeke plants is, however, poorly documented in the 19th century literature. For example, the practice is not recorded by Best (1908) or Buck (1911). However, in their report to Parliament, the Flax Commissioners recorded their belief that a top dressing of refuse (thoroughly decomposed) would keep down weeds and shelter roots from sun and supply the minerals required by a harakeke plant (Report of the Flax Commissioners, 1870 p. 7). This seems remarkably similar to what has been recorded as traditional Māori practice, although, in fact, Māori practice was not mentioned in this context in the report.

One late 19th century source outlines a different approach to the disposal of excess material from harakeke. Guthrie-Smith (1969, p. 92) reported the story of Te Otua who, while he was running, “stepped on the spot where the refuse flax of the village was deposited. It was about a couple of feet thick with the butts of the great blades . . .”. This story suggests that, in this case at least, excess harakeke material had *not* been deposited back with the plant. In this part of Hawke’s Bay in the North Island, there may have been a designated area for such material. The village to which reference is made appears to have been close to the lagoon where a flax swamp was growing, so that the harakeke may not have been highly valued ‘*muka*’ harakeke from cultivation, but a more common variety from the swamp. It does, however, suggest that more than one strategy was used by weavers in the 19th century in relation to disposal of excess material.

The Report of the Flax Commissioners recorded that Māori “do not use manure though they prepare the soil with great care” (Report of the Flax Commission, 1870, p. 7). That Māori did not use manure would be expected given a Māori world view in which bodily functions and *tapu* are linked. The comment on soil preparation, nonetheless, emphasises the importance of soil condition to promote growth and

vigour of harakeke and accords with the observations of Buck (1911). Furthermore, careful weeding of cultivations seems to have been a feature of Māori agriculture (see, for example, Best, 1908, 1976; Buck, 1950, p. 89; Kelly, 1866; Makereti, 1986, p. 191; Selwyn, 1847).

It appears that ashes were at times used to assist growth of the plant, as reported by Murray who observed that the ashes from burning brushwood were used when propagating from seed (Murray, 1836, p. 13). This method of using ashes as fertiliser has also been reported by Shortland (1856, pp. 203-204) and Buck (1950, p. 89). Nonetheless, excess harakeke was not burned, according to Best (1908), but this restriction pertained only to *harakeke muka* (or *harakeke whitau*) varieties, and not to “common varieties” or *harakeke māori*. Contemporary weavers also ensure that harakeke refuse is not burned, but the differentiation between burning *harakeke muka*, and *harakeke māori*, has become blurred and this distinction does not now seem to be made by large numbers of weavers.

Discussion

Relatively little detail of Māori harakeke management practices is recorded in the literature prior to the 1930s. In part, this appears to be due to the perceptions, and misconceptions, of non-Māori observers, many of whom appeared to believe that harakeke cultivation had either long been abandoned by Māori or had never existed. In fact, in the entire period from the late 18th to the early 20th century, there is, very little recorded material about resource management of harakeke. Furthermore, very little information of any kind has been gleaned from South Island historical sources. This makes the little information that *can* be recovered about the management of *pā harakeke* by Māori during this period even more valuable.

In spite of the limitations of the written historical records, they do reveal a number of interesting practices, some of which confirm what has been passed down in oral tradition. For example, themes which emerge from the historical literature are considerations of seasonality, the life cycle of the plant, and suitable conditions for growth. Other historical practices are either not referred to at all today, or are different from usual practice. There appears, for example, to be a discrepancy between early planting distances and commonly recommended distances today (see, for example, Scheele & Walls, 1994). Particularly interesting are references to irrigation of *pā harakeke* and traditional sites for *pā harakeke* on hillsides.

Conclusion

What is clear is that Māori have planted harakeke in a structured and methodical way possibly for several hundred years, and that care was given to maintenance of the *pā harakeke*. It was probably common in many regions for Māori to plant a number of roots together, leaning outwards. These were most likely arranged in rows in *pā harakeke*, which may in turn have bordered other cultivations. Planting of harakeke appears to have occurred preferentially in spring or autumn. Weeding was considered important, as was the care of bushes. Soil preparation, irrigation and aspect of the *pā harakeke* also seem to have been considered. In the final analysis, these historical reports are of traditional methods which have evolved over time through Māori experience of different environmental conditions and observation of the effects of different treatments. These examples of traditional knowledge can therefore be considered by contemporary weavers in the light of their own experience of harakeke,

with the continuing goal of developing and maintaining well cared for and vigorous *pā harakeke*.

Endnotes

1. A discussion of issues in historical research, including validity and accuracy of data can be found in Cohen, Manion and Morrison (2000).
2. Detailed biographical information and context about many of the ethnographers from the 19th century can be found in Yates-Smith (1998).
3. It is important to bear in mind that some of these writers may not have had access to information that may have tempered their views.
4. This compendium of Samuel Marsden's letters mentions root propagation on his 1820 visit.
5. Norfolk Island harakeke is described as *Phormium tenax* and no morphological features which are different from the range of *Phormium tenax* in New Zealand have been reported.
6. The rubbing of earth is reminiscent of measures taken when bark is removed from traditional dyeing trees by Māori.
7. Literally, to feed or nourish the harakeke.

Acknowledgements

This study was funded by the Foundation for Research, Science and Technology, and Te Pua Wānanga ki te Ao, University of Waikato. Many thanks to the reviewer who provided valuable comments on an earlier manuscript.

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