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Researching harakeke (*Phormium tenax*) using mātauranga Māori and western science methods

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Background

Harakeke – biodiversity and cultural heritage

Harakeke (*Phormium tenax*, New Zealand flax) (Fig. 1) is a monocot plant species endemic to Aotearoa (New Zealand) and Norfolk Island. There are many varieties of harakeke, in part due to intraspecific variation and hybridisation with wharariki (*Phormium cookianum*, mountain flax) (Fig. 2), and in part due to a long history of plant selection for whatu and raranga (traditional Māori weaving), industrial fibre production and horticulture [1].

In the past, Māori oral tradition ensured that unique weaving varieties could be identified, however colonisation has fragmented this knowledge. A resurgence of interest in traditional Māori weaving led to the establishment of a National New Zealand Flax Collection in 1987. The Collection contains over 60 named weaving cultivars, all Te Ika-a-Māui (North Island) provenance [2].

In 1909, a collection of 50 varieties of harakeke and wharariki was donated to the Dunedin Botanic Garden (DBG), in Te Wai Pounamu (the South Island) [3]. Over 100 plants descended from the original donation are still growing in the Garden today. However, the original provenance and weaving characteristics of these plants remain unknown, and they could represent varieties that are distinct from those in the National Collection.

Identifying unique weaving varieties – Mātauranga Māori and western science

Mātauranga Māori is traditional Māori knowledge or wisdom. Māori weavers draw on this knowledge to select harakeke cultivars suited to the object being woven (Fig. 3). Characteristics used to assess the harakeke include properties of the leaf and the whītau (fibre aggregate) extracted from the leaf (Fig. 4). Western science could contribute to this knowledge by assessing the properties of the leaf and fibre aggregate from a botanical and textile science perspective. Our ability to protect the biodiversity and cultural heritage of this species could be improved by using knowledge from both world views to identify unique varieties of harakeke.

Aim

To investigate the origins and characteristics of harakeke cultivars in the Dunedin Botanic Garden collection from both mātauranga Māori and western science perspectives.

Methods

The research is guided by a kaupapa Māori (Māori ideology) methodology [4] This includes:

Consultation

- Discussion of the proposed research with representatives of the Māori, scientific and general community through hui (gatherings, meetings) at the beginning of the project, June 2007.
- Reporting on progress and results to date through hui, July 2008.
- Discussion of results and outcomes through hui, planned for the end of the project, February 2010.

Participation

- A mātauranga Māori consultant is the kaitiaki (guardian) of the project, guides tikanga (rules, customs, the correct way to work with the harakeke) as the research proceeds and participates in the research.
- A Kaimahi Harakeke (reference group) elected at the first hui also guides tikanga for working with the harakeke, the range of scientific methods used, and participates in the research.

Data collection

- Qualitative assessment of a range of leaf and whītau properties by Māori weavers (Fig. 5).
- Quantitative assessment of leaf morphology and tensile properties (Fig. 6) of fibre aggregate by western scientists.

Results of whītau assessment

Quantitative assessment of fibre aggregate strength by tensile testing shows similar patterns of ranking and variance among cultivars to qualitative scoring of whītau strength by Māori weavers, indicating that tensile testing can provide additional information for identifying cultivars (Fig. 7).

Outcomes to date

- Exchange of knowledge between western scientists and Māori weavers regarding methods for assessing whītau/fibre aggregate, and protocols that affect the type of data that may be collected.
- Whakawhanaumatanga (building of relationships) among people and the plants.
- Raising awareness in the wider community of the diversity of harakeke in the DBG collection and associated cultural heritage.

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*The Kaimahi Harakeke are: Huata Holmes, Kahutoi Te Kanawa, Roka Ngarimu-Cameron, Anna Gorham, Christine Holtham, Wendy Raumati, Lydia Matenga and Lucas Miller.



Fig. 1. Harakeke (*Phormium tenax*). Bush height 2 m.



Fig. 2. Wharariki (*Phormium cookianum*). Bush height 1 m.



Fig. 3. Kete (bag or basket) woven from suitable harakeke in the DBG collection.

Artist: Roka Ngarimu-Cameron.



Fig. 4. Traditional Māori method for extracting whītau from harakeke leaf.



Fig. 5. Qualitative assessment by Māori weavers of whītau extracted from the leaves of DBG harakeke cultivars, and quantitative measurement of leaf morphology.



Fig. 6. Tensile testing to measure fibre aggregate strength (tenacity). Test length 100 mm.

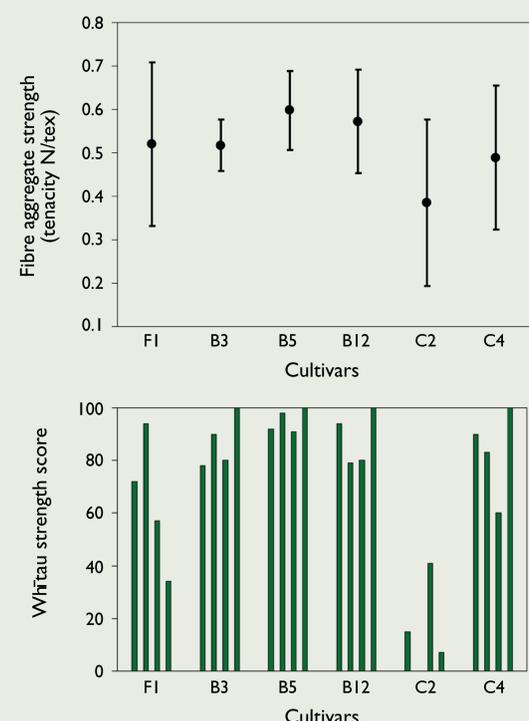


Fig. 7. Strength of fibre aggregate/whītau from 6 DBG harakeke cultivars. a) Tensile test results ($n=40$, except $C2 n=16$, error bars are standard deviation). b) Qualitative scores (0 = weak, 100 = strong) by 4 Māori weavers.

References

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