

# How the kūmara (*Ipomoea batatas*) came to Manaaki Whenua – Landcare Research

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I knew it was time to write down the experiences of Manaaki Whenua's kūmara-growing experiment. However, I am not a scientist who writes research papers, so I had to ask myself the question, "Which form of sharing comes naturally to me?", and the answer was loud and clear: storytelling. So here is my story of growing kūmara at Manaaki Whenua – Landcare Research, Lincoln, for the very first time.

## Whakataukī – proverbs about kūmara

*Kāore te kūmara e kōrero ana mō tōna ake reka – The kūmara does not speak about its own sweetness.*

*E tupu atu kūmara, e ohu e te anuhe – As the kūmara grows, the caterpillars gather round it.*

*Tuakana kūmara – A selfish person/older brother.*

## Te Timatanga – the beginning

I have to reach far back to remember when I first got interested in kūmara. It was 1999, through my late partner Autahi Tawiri. He was on a healing journey and embraced the stories of the people of Waitaha, who called the kūmara the 'Peace Child'. The name 'Peace Child' comes from the ancient story that the women on those first waka carried the seed tubers under their breasts in order to keep them warm and protected. These stories link me to a part of my life, and therefore belong to the whakapapa of the story I am going to tell.

## Rangahau – gathering knowledge

In May 2019 Anja Hess of Manaaki Whenua approached me and others about supporting her to create activities for our workplace Matariki midwinter celebration. She had some fantastic ideas. One of them was planting kūmara (*Ipomoea batatas* (L.) Lam.). As our work site is within

the Taumutu rohe (local tribal area), which, according to historical records, grew kūmara successfully, this activity sounded fun and fitting.

Just like most people living in Te Waipounamu – the South Island, I had no idea how to grow kūmara. This is when my journey of discovery into the world of kūmara started.

I soon found out that June was not the time to plant kūmara. However, as the curator of Manaaki Whenua's Ethnobotanical Collections, with a personal interest in food plants (my link to a previous life in farming), the 'seed had been planted' in my mind and I could not stop thinking about kūmara. This is when I thought of Nick Roskrug. Nick, from Tāhuri Whenua – National Māori Vegetable Growers Collective, has a longstanding relationship with Manaaki Whenua.

Anja and I discussed the possibility of inviting Nick to visit Manaaki Whenua's Matariki celebration and give us a live demonstration of how to grow kūmara in a traditional way. We consulted Holden Hohaia, our Māori partnerships manager, and he supported this idea.

I started watching YouTube videos on how people from different cultures grow kūmara, and I found out that kūmara are grown from tipu/slips and not usually from whole tubers, like potatoes. Tipu are small shoots growing from the nodes on the kūmara tuber. Once they reach a length of about 15 cm, they can be cut off and placed into a glass of water to encourage root growth. When the tipu have strong roots, they are planted out into the garden bed.

In the meantime, Nick instructed us to organise the material for the seedbeds. He recommended using polystyrene boxes filled with a mix of sand and potting mix or fine wood chips. Kūmara need warmth to grow tipu, hence the polystyrene. However, any box will do, especially if they are kept inside.

On 2 July, a cold winter afternoon, Nick shared his knowledge on growing kūmara with a group of Manaaki Whenua staff, friends of Te Kohinga Harakeke o Aotearoa, and Matiu Payne from the Lincoln University Mahika Kai programme (Fig. 1–2). Nick's interesting talk was rounded off with kūmara soup for everyone.



Fig. 1 Nick Roskrug assembling the kūmara seedbed at Manaaki Whenua – Landcare Research, Lincoln. 2 July 2019.



Fig. 2 Manaaki Whenua staff watching the kūmara preparation with interest. 2 July 2019.

The discussions that followed revealed that Matiu and his students had plans to grow kūmara at the Biological Husbandry Unit (BHU) at Lincoln University, Te Pā o Rākohautū School in Christchurch, and at Koukourarata on Banks Peninsula. I was now intrigued by the thought of exploring the growing of kūmara at such southern locations. Some records say that all the historical kūmara growing sites in Canterbury were coastal, with Banks Peninsula

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the most southern point in the South Island. However, the story Waitaha people shared with me was that kūmara were grown in baskets at Te Kohanga, now called Kura Tāwhiti or Castle Hill near the main divide. To me these stories suggest that maybe kūmara were grown further south and much further inland than commonly known.

### Te Tāpata – the seedbed

Matiu and his students came and helped prepare the soil for our māra kūmara (sweet-potato garden). Scott Thompson (Manaaki Whenua grounds supervisor) built the raised beds and the windbreak around it. Hana Walton (one of Matiu's students) supported me with regular visits, which lifted my spirits during tough times. All of these people prepared and maintained the māra kūmara in a physical but also a spiritual way. Together we prepared the seedbed for all that was to come.

### Te Maramataka – the growing calendar

#### August 2019

Early in August, I bought 'Beauregard', 'Owairaka' and 'Tokatoka' tubers at the local supermarket in Lincoln. I chose two fat tubers and two slim tubers from each type of kūmara and put them into two different seedbeds. The boxes were made of polystyrene and had drainage holes at the bottom. They were filled with a mix of sand and potting mix (Fig. 3). The tubers were laid length-wise and half buried in the soil (Fig. 4). One seedbed went into a heated glasshouse (20°C), and the other went into an unheated shadehouse. Both boxes were watered and covered with clear plastic.



**Fig. 3** Tubers of 'Beauregard', 'Owairaka' and 'Tokatoka', potting mix and sand. 6 Aug 2019.



**Fig. 4** Tubers (left to right) of 'Tokatoka', 'Candy', 'Rekamauroa', and 'Beauregard' gifted by Nick Roskrug. 6 Aug 2019.

The third seedbed contained the tubers gifted to us by Nick Roskrug: 'Beauregard' (a second source of this cultivar), 'Candy', 'Rekamauroa', and 'Tokatoka'. They went into the heated glasshouse to give them the best chance of growing tipu.

#### September 2019

In September, Lincoln University's Mahika Kai programme students, led by Matiu Payne, joined Manaaki Whenua staff to help prepare the kūmara garden bed with a rotary hoe (Fig. 5). It was a culturally diverse effort enriched by Chinese, Fijian Indian, American, Māori, Iranian, Pākehā and Swiss people.



**Fig. 5** Matiu Payne and Mahika Kai students preparing the kūmara bed. 11 Sept 2019.

Also in September, the first signs of tipu were detected in the glasshouse, on 'Owairaka' (Fig. 6) and 'Tokatoka' (13 September), and on 'Candy' (30 September).



**Fig. 6** First tipu and small leaves on 'Owairaka'. 13 Sept 2019.

#### October 2019

In early October, 'Candy' and 'Tokatoka' were starting to grow shoots more vigorously. However, an infestation of aphids on the foliage of kūmara was discovered, coming from neighbouring *Coprosma* plants. Later that month (on 23 October), we had to spray the foliage: the aphid infestation in the glasshouse was affecting the health of the kūmara too much (Fig. 7). It appeared that the aphids may have transmitted a virus to the kūmara, which affected their foliage and made them curl and shrivel.



**Fig. 7** 'Owairaka' foliage affected by aphids. 4 Oct 2019.

Twelve weeks had passed, and I harvested the first tipu of 'Owairaka' in the glasshouse, by cutting sprouted sections from the original tuber, and putting them into water to grow roots. In comparison, also after 12 weeks, the 'Owairaka' in the seedbed outside in the shadehouse only showed the first signs of growing tipu.

#### November 2019

In mid-November, organic compost was added to the topsoil and mixed in with a rotary hoe. I also planted out the first rooted tipu of 'Candy', 'Owairaka' and 'Tokatoka' at 30 cm spacings (Fig. 8).

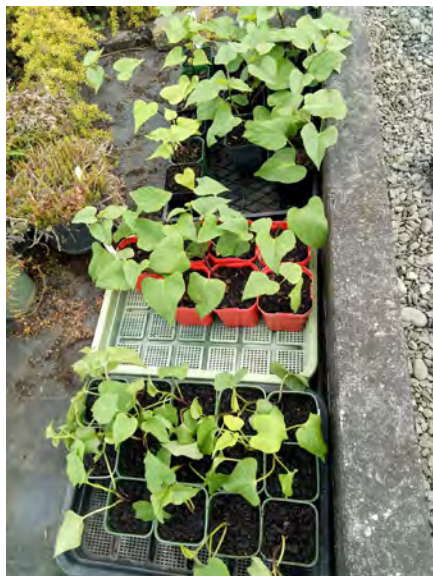


**Fig. 8** Newly planted kūmara selections 'Candy', 'Owairaka' and 'Tokatoka'. 14 Nov 2019.

Unfortunately, only four days later (18 November), a hailstorm shredded most of the newly planted out material.

### December 2019

By early December, most of the plants affected by the hail died so I replaced them with fresh material, grown on in pots to give them a better start when planted outdoors (Fig. 9–10). This made me wonder if starting the growing of tipu in Canterbury should be done later than the beginning of August, maybe more like the end of September for best results?



**Fig. 9** Potted kūmara plants growing in a cold frame.



**Fig. 10** Potted kūmara being planted out with a good root structure.

In mid-December we had a lot of strong nor'west winds, which burned and shredded the kūmara leaves. To provide greater protection, we built a wind shelter for the kūmara bed with wind cloth and waratahs.

Despite the battering from adverse weather, we still had plenty of healthy material growing on and it was a good time of the year to study the different colours and leaf-shapes. The young leaves of 'Beaugard' are purplish-brown with a smooth edge, turning green when more mature. 'Owairaka' sometimes has purplish stems, but not always and the leaves are heart-shaped with a smooth edge. 'Tokatoka' leaves are a lighter green and slightly toothed.

The week before Christmas, I planted out the last kūmara for the season (Fig. 11). During the planting, I noticed that the 'Owairaka' tubers in the seedbed had already started forming baby tubers (Fig. 12). I also planted out some of the old tubers which had grown all the tipu for us. It just didn't feel right throwing them away after all the work they had done for us.



**Fig. 11** Kūmara bed fully planted and protected by wind cloth. 19 Dec 2019.



**Fig. 12** 'Owairaka' with baby tubers. 19 Dec 2019.

### January 2020

We watered the plants once a week during summer, starting 20 January. The plants were not touching each other yet (Fig. 13).



**Fig. 13** Kūmara plants becoming well-established but not yet covering the whole garden bed.

### February 2020

By mid-February the plants filled in the bed and the soil was not visible anymore (Fig. 14). 'Beaugard' and 'Owairaka' were growing long shoots, acting like many other Convolvulus family members. 'Candy' and 'Tokatoka' were much more compact. I heard from Māori vegetable growers, and also read in Mike Burtenshaw's *A guide to growing pre-European Māori kūmara in the traditional manner* (2010), that the traditional kūmara Māori grew were much like 'Tokatoka'. Their growth habits were compact, with slim tubers.



**Fig. 14** The kūmara plants have fully covered the garden bed. 10 Feb 2020.

In late February, we followed traditional methods and untangled the plants in order to get more sunshine and warmth onto the soil (Fig. 15). We also stopped watering in order to keep the soil as warm as possible.



**Fig. 15** Untangled kumara vines folded back onto themselves. 26 Feb 2020.

### March 2020

In early March we added flat stones to half of the bed. The idea was for the stones to absorb the heat of the day and extend the time of warm soil temperatures into the evening.

In mid-March we buried temperature sensors 10 cm deep under the stone-covered soil and under the bare soil (Fig. 16). These sensors were loaned to us by John Hunt. The idea was to compare the temperatures of the soil covered and not covered by stones and note the difference at the end of the growing season.



**Fig. 16** Temperature sensor locations marked with blue flags. These were installed 14 March 2020.

It's a good thing I love checking the weather forecast. When I noticed that we would experience a freak cold snap during the night of 17 March I quickly got some large weed mats that were lying around and covered the whole kumara bed before I went home. Sure enough, we had a frost overnight, but most of our plants survived and kept on growing for another 6 weeks.

25 March was my last day visiting our māra kumara, because on 26 March New Zealand went into lockdown due to the coronavirus (COVID-19) outbreak.

### April 2020

The kumara were on their own this month, doing what they do best, which is growing tubers that are a source of low-glycaemic carbohydrates, full of fibre, minerals, vitamins and antioxidants.

When New Zealand moved to Level 3 in response to COVID-19, I was allowed to visit the māra kumara (Fig. 17) for two days (30 April and 1 May) in order to harvest the treasures hidden underground.



**Fig. 17** Kumara bed just before harvesting, showing some end of season browning-off due to frost. 30 April 2020.

### May 2020

We harvested the kumara and dried them in the mild autumn sun for two days (Fig. 18). I made notes and weighed the tubers harvested from the four cultivars.



**Fig. 18** Newly harvested kumara drying in the sun. 1 May 2020.

### Results from the harvest

Sixty kumara tubers were harvested totalling 35.4 kg from all four cultivars. General growth observations were noted as follows.

**'Beauegard'**: This was the least successful tipu grower. It grew long tubers, and most of them had discoloured skin with brown/black splotches. The tubers grew close to the surface and were often intertwined. Most tubers were small (124–587 g, with an average weight of 393 g).

**'Candy'**: As with 'Beauegard', the tipu didn't grow vigorously in the seedbed. The plants produced only small amounts of tubers (weighing 236–597 g, average 349 g). Interestingly, the plants grown from the old tubers instead of the tipu produced more tubers. Like 'Tokatoka', it is a more compact plant with shorter vines.

**'Owairaka'**: This is the cultivar that grew the most vigorous tipu. It also grew large tubers (273–1053 g, average 677 g), along with many leaves and long vines. It managed to grow in dense clay, and the tubers grew deeper than the other three cultivars. 'Owairaka' produced the largest amount of tubers per plant. The tubers were mostly roundish instead of long (Fig. 19).



**Fig. 19** Large and healthy tubers of 'Owairaka'. Note one white tuber from the same plants that produced typical purple-coloured tubers. 1 May 2020.

Most tubers were healthy, except for the ones in heavy clay, which were often discoloured or insect damaged. Some started sprouting while in the soil.

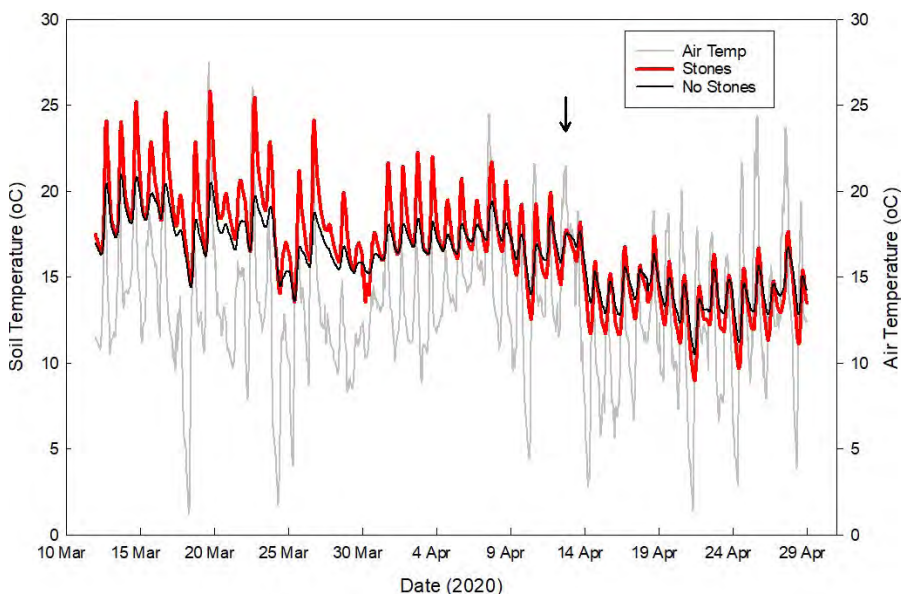
**'Tokatoka'**: The tubers didn't grow tipu as vigorously as 'Owairaka'. The tubers grew in two different shapes: long or round (weighing 299–1019 g, average 683 g). The tubers were found right under the plant, growing close to the surface and often intertwined. Most of them were healthy (Fig. 20). 'Tokatoka' is a compact plant with short vines.



**Fig. 20** Healthy (top) and discoloured (bottom) tubers of 'Tokatoka'. 30 April 2020.

### 'Some like it hot' – temperature recordings

John Hunt created an interesting graph displaying the data from the temperature sensors buried on 14 March (Fig. 21). Up until about 12 April we see clearly that the soil of the kūmara garden covered in stones (red line) consistently reaches higher temperatures than the soil not covered with stones (black line). But then something changes and the stone-covered soil temperature becomes almost equal to that of the soil not covered in stones. Here is what we think happened.



**Fig. 21** Graph of soil and air temperatures in the outdoor kūmara bed, 14 March to 29 April, 2020. Image: John Hunt.

Between 14 March and 26 March, Hana and I kept folding back the vines of the kūmara plants so that the stones were free of leaves and exposed to the sun for optimal heat absorption. Then the COVID-19 pandemic hit and we went into lockdown. From 26 March onwards nobody folded the vines back. Slowly but surely the stones were covered under the kūmara plants' abundant growth of leaves and the sun didn't warm the stones anymore.

The air temperature (grey line) got really cold a few times. This didn't affect the stone-covered soil very much when the stones were exposed to the sun all day. However, when they were under the leaves, the stones seemed to keep the soil colder for longer, which can be seen by temperature drops around 14, 22, 25 and 28 April.

John Hunt suggested that if stones were added earlier in the growing season, the kūmara would enjoy temperatures above 20°C earlier in the season and could possibly extend the growing season in colder climates like that of Canterbury. Of course adding sand to the soil and making the soil light and warm could also help.

### Conclusions

It is certainly possible – and rewarding – to grow kūmara in the cool climate at Lincoln. The plants have to be well looked after and protected from frost and wind.

'Owairaka' was our star performer.

### Acknowledgements

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