Anei te ringa tango otaota.

This is the hand that does the weeding.

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Ka nui te mihi ki a koutou. Ko Ranginui e tu mai raua ko Papatuanuku e takoto mai nei , tena korua. E nga rangatira o Ngai Tahu, tena koutou. E nga uri o nga iwi katoa, tena koutou, he mihi ki te whenua, ki te moana, ki te rangi. tena koutou, tena koutou, Tena ano tatou katoa.
Nga mate, nga aitua o koutou, ara, o matou, ko tangihia e tatou i tenei wa. Haere, haere, haere. Tenei matou o kaiawhina o te whenua. He kimi nei i nga taonga o te whenua. No reira, nga mihi nui ki a koutou, nga mihi aroha ki a koutou,
tena no tatou katoa.

This presentation is being given to celebrate Matariki 2007 and we will look at some of the core attributes related to traditional horticulture in Maori society. We may never truly understand the role of horticulture in traditional or pre-European times as we live in an age dominated by technology and influences beyond our control. Try as we may to separate our mind from these influences to place ourselves in a mindset where we can experience the traditional application of horticulture, we are subtly influenced by too many factors and will never live in a subsistence environment as it was in those times.

Take a walk back in time and imagine you are in a society which survived totally in a subsistence economy, where activities were seasonal and every year was different; sometimes highly productive and other times lean and harsh. Maori society was once like this and some of the key regulatory tools included the lunar calendar or maramataka and astrological phenomena. The maramataka allowed society to bring seasons into order, especially as each year had irregularities. So, maramataka had a role in regulation and order of the society or group. The astrological phenomena supported this.

Matariki is a reference to a constellation of stars known in European terms as The Pleiades. In Taranaki/Wanganui region they use the star Puanga (Rigel) to the same effect. The matariki signalled the end of a cycle of seasons and a time to consider the new cycle of seasons. All crops which were the basis of the food chain were harvested, graded and stored. It was mid-winter and a time to rest, to enjoy the fruits of their labours and to socialise through festivals and celebrations. Generally a poroporoaki to the old year was undertaken recognising those who had passed on and this was succeeded by a whakatau to the new season and newborn infants since the last season. The matariki celebration would not generally include physically working towards the next years' activities, but a period of stocktake and planning for it.

Nga kai o Matariki, nana i ao ake ki runga
The foods of Matariki, that have risen.

Lets have a look at the contribution of horticulture or food and fibre production to Māori society of those times. It is important to recognise that each tribe/iwi, hapū or whānau approached their horticultural activities recognising the limitations of their own resources; the climate, locality, soil factors and community needs.

Prior to European contact, Māori had no beasts of burden, no metal tools or implements and no exposure to other cultures. And yet, they had perpetuated primarily tropical crops which did not naturally grow in temperate regions, e.g., kūmara and taro. In general the New Zealand environment is marginal for any tropical crop adaptation at its subtropical north. Farther south the seasonal nature of the climate dictates the cropping systems applied to production. The Canterbury region, specifically Kaiapoi, Banks Peninsular and Waihora (Lake Ellesmere) were considered the most southern places that kūmara could be grown, and even then with some reservation about how successful the crops might be.

Other crops included taewa, also known as riwai, parareka, peruperu or Māori potato and introduced by early contacts with Māori at least as early as the eighteenth century. They are grown annually during the summer months and stored for use in the winter or off-season. Their importance ranked with kūmara as a staple part of the Māori diet. The advantage of taewa over kūmara was that they could be grown in colder climates and were easier to establish as they grew from tubers rather than shoots. As a late introduction to the Māori production system taewa were not subject to the same level of tapu as kūmara and proved to be much more reliable in production.

Hue or gourds were the only crop grown from true seed and required a long summer to reach full maturity. The seeds were primed in running water for several days before planting and every growth stage of the plant monitored to assess the future quality of its produce. Their fruit was eaten immature as a vegetable and certain plants were left to fully mature for the utility uses of its produce. Another crop worth introducing are the Para-tawhiti or king fern (*Marattia* spp.) which was a slow growing fern relished for its fleshy scales and planted near settlements as they took at least 5 years to reach harvest size. The aruhe or fern-root (*Pteris* spp.) was also cultivated in many regions as it was such a reliable staple food for many communities, especially such as the South Island where kūmara was not so easy, or impossible, to grow. The karaka (*Corynocarpus laevigatus*) tree – known as Kopi in the Chatham Islands) was also planted in groves near permanent settlements for its ability to provide fruits which were a staple food at the time as well as was the kouka, tii or cabbage tree (*Cordyline* spp.) which provided both a vegetable in its heart leaves and source of saccharine in the roots which were steamed and eaten.

Māori lived in permanent settlements and their cultivations were distributed around a district claimed by the residents. They practiced a form of rotational land use, generally used only woodash as fertiliser and cropped for no more than three annual seasons on a piece of land. Food storage was as important as the production of the crop itself. Without knowledge of storage they were likely to despair for good nutrition during winter months. The whole production system was based on the annual seasons with planting in spring, crop husbandry in summer through to harvest in late autumn. The winter was always a period of rest for both the people and the land resource.

Some important agricultural practices developed and used by Māori during the crop production phase included:

- Improvement of soil through:
    - application of wood-ash/plant material as a soil amendment
    - placement of stones around crops to increase soil temperatures by improving heat retention
    - addition of sand or gravel to improve soil structure by "lightening" heavy clay soils
- Crop rotation
- Controlled burning of fern lands to control overcrowding and encourage vigorous regrowth and therefore edible fern-root production
- Pest control (e.g. caterpillars) through fumigation by burning kauri gum or dried kawakawa (*Macropiper excelsum*)
- Crop storage mechanisms (both storage houses above ground and insulated storage pits below ground)
- Sophisticated processes were developed to transform poisonous or otherwise inedible plants in order to make them edible (e.g. tutu [*Coriaria arborea*] juice had to be strained through finely woven bags in order to separate it from the highly toxic seeds and stems).

Crops were planted and grown according to their natural season and the calendar of events was well known prior to any activity taking place. To support this Māori utilised the maramataka or Māori calendar which was based on indigenous knowledge of astronomy, cosmology and the seasons, effectively 'indigenous lunar science' and substantiated by observation of the environment. Other tohu or signs were utilised in determining horticultural activities e.g., the arrival of the shining cuckoo and its shrill call *koia, koia, koia (dig!, dig!, dig!)* in spring was seen as the calling of man to work the tilling of the ground for crops, similarly the arrival of the star Poutu-te-rangi or flowering of certain trees or shrubs such as the kowhai also signified the arrival of spring and the start of a new planting season. These tohu or signs would differ between regions, iwi and hapū.

All levels of society, including chiefs participated in various activities associated with gardening or production of food. Labour was understood to have a social contribution and value and many whakatauaki or proverbs recognise this point. Each person had tasks assigned to them as suited to their rank. Tohunga for example, were responsible for the karakia and well being of the tribe through the spiritual presence over the crop. Mokai or slaves had the arduous tasks; young women graded the harvest (so as not to physically exert themselves if their childbearing years were yet to come) and the young men performed the more physical tasks such as planting and mounding. Labour fluctuated by seasons as various members of the community were taken away for other activities such as fishing or war.

A number of rituals were applied to the production of taewa. These were targeted at *Rongo* (also known as *Rongo-maraeroa*) the god of cultivated food and considered very important. *Rongo* would look after the crop and ensure a good yield and the survival of the tribe. The rituals included:

- Placing (or burying) mauri stones or taumata, which represented the god(s), around the planted area.
- The first part of the crop planted in a special area, next to one of the stones, the mauri would look after this crop and in turn it would be offered to *Rongo*.
- The tohunga would cook and participate in the first of the crop (harvested from the specially planted area) as they were the direct channels to the gods.
- In North Taranaki *Rakeiora* was acknowledged as their local god of kūmara – and later of taewa. Mauri stones representing him were placed among the crop.
- Te Arawa acknowledge *Matuatonga* as a kūmara god (and of cultivated root crops) brought on the Arawa waka and buried on Mokoia Island.

Site selection criteria for the crop were based on the knowledge of the region including soil variances, micro-climates, historical land use and nuances. Early crops, especially in Te Wai Pounamu were usually planted on north facing slopes to catch the morning sun. In Te Urewera, Bay of Plenty, they planted in light bush for frost protection. Main season crops were planted in the flats and open ground. A crop was grown for no more than three years on one site. Preparation then included clearing of vegetation at the crop site, burning any woody remains on the proposed site and using the ash as a fertiliser; a technique known as *whakapara* with the clearings were known as *waerenga*. Lastly, turning the soil was undertaken so that the vegetation decomposed naturally prior to planting. This was left to sit and encourage the first flush of weeds before the final preparation for planting – similar to the stale seed bed technique in modern horticulture.

All cultivation and harvesting activities were undertaken in working parties known as ohu. The first task was to break up the ground again after the first turnover and leave for a week at least, break down a third and last time ready for planting The mounds were moulded into rows then left until the tohunga and maramataka (calendar) told to plant. The tools used were *kaheru, hoto & peka*. These were forms of spades while *koko & tikoko* were forms of the shovel and *timo & timotimo* were forms of grubbers.

Planting was undertaken using the maramataka Māori Calendar. Anything planted from *Korekore-turoa* through the *Tangaroa* period to *Ao-tane* (day 26) will produce both good size and number of that crop. Days 25 and 26 (*Tangaroa-a-kiokio & Ao-tane*) are the best days for the whole month for both planting and fishing. (Note: these days and names are from the Ātiawa version of the maramataka)

Based on experience, the tikanga associated with seed selection for crops was based on keeping the best for planting (regeneration) so that the traits held within the seed are transferred between generations. This was metaphorically aligned to the process of whakapapa within tribal communities and strongly adhered to as it ultimately contributed to the survival of the people. Spoilt or undesirable crop material was eaten straight away or at least stored temporarily for use before the next season.

The crop production was a varied and highly ordered process. From the initiation of the production system through karakia and association with key atua and people through to the day to day activities which kept the crop growing and targeting fruition. Production systems are based on tikanga specific to those undertaking the tasks. Different groups within the community would have different tasks. Specific tools and implements were used for specific jobs.

The gardens were known for their meticulous appearance and fastidious workers. Aspects of production would include pest and disease control, weed management, nutrition and fencing to keep out animals. It should be noted that the majority of the pest and disease pathogens seen today were not present in pre-European Māori society and hence no traditional management approach exists for many of the current plant health issues surrounding the traditional crops. Similarly, most plants now considered weeds in New Zealand cropping systems were not present in early Māori society. The majority of problem plants were likely to be shrubby plants such as manuka (*Leptospermum scoparium)* or tauhinu (*Ozothamnus letophyllus*) however with long rotation periods and short cultivation seasons, weeds did not appear to be a major problem to these early systems.

Harvest was another activity that involved the whole community with each person having their own task. As mentioned, young women did not carry heavy loads so would be involved in grading the produce with their older relatives. The harvest activity was undertaken based on the maramataka or traditional calendar and supported by tohunga and karakia and chants throughout the process.

Another process that required skill and was based on tikanga specific to each tribe; the reliance of stored produce to maintain the community through the winter months or during periods of drought, war, etc, highlights the importance of this activity. The traditional rua or storage pit was considered to be the most successful method of storage of root crops (excluding taro corms) based on excluding any moisture from the storage environment and the maintenance of a moderate and even temperature.

With the introduction of feral animals such as pigs, Māori adapted their storage facilities for crops such as potatoes and kumara. The timanga was an elevated platform, 2-3 metres high with sides that enclosed the platform but no cover. The enclosure was lined with fern and the crop stored within it. Pātaka and whata are other well known raised structures used as storehouses. Generally enclosed and often permanent structures, pātaka were often elaborately carved and used for long term storage of preserved and dried foods not suited to rua and also sometimes for tools, implements and garments.

Subterranean storage pits or *rua kūmara* are the most obvious remnant of early Māori horticulture evident today. Their presence is regarded as evidence of both gardening practice and settlement in many old pa sites. The number and distribution of the pits also indicates the size of horticulture practices and crop volumes handled by tribes. There are two types of *rua:* rectangular pits, generally accepted as being for storage of kūmara[1] and the bell shaped ones for fruits and other foods preserved in-situ.

Essentially rua were wholly or semi-subterranean and the sides were strengthened by the use of tree fern trunks and then lined with rushes and the floor covered with dried mānuka and fern fronds. A roof (kōpani) was placed over the rua after the kūmara or other produce was put inside (generally stacked loose) and often soil was then placed over the roof.

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[1] Note: seed and eating kūmara were divided at harvest and stored in separate rua.

Primary storage methods included:

- *Whakatoke* or simple pits for shorter-term storage of a lesser quantity of kūmara or other root produce;
- *Timanga* which are essentially open tiers on raised platforms to protect from browsing animals;
- *Whata* – similar to timanga;
- *Pātaka* or raised storehouses on legs at least one metre above ground level and sealed against rats and other pests.

The choice of storage option was primarily aligned to local conditions. All storehouses were rigidly tapu as were the few persons allowed to visit them for any reason.

Preserving food products was a common practice to extend the storage life of the food. Examples of traditionally preserved foods are:

- Smoked fruits of forest trees – stored in a *rua* and 'smoked' by burning brush wood such as mānuka and sealing the *rua* before the burning process was complete.
- Foods fermented in running water such as with kānga and taewa.
- Dried and cooked foods such as kūmara kao (steamed and dried)
- Foods preserved in *hinu* or animal (bird or fish) fat

There were many other preparation and processing methods applied to food products in traditional times. Some of these methods continue to be used in the present day as a specifically Māori process and some are re-gaining favour as potential commercial opportunities in New Zealand and abroad.

It was common in traditional times for tribes to participate in a system of exchange known as hoko or ohaoha. The exchange was generally of commodity products allowing both parties to partake of each others food products and thus break their monotonous diet. The term given to the act of receipt of these food products was whakaeanga. Ultimately all these products of the labours of the community ended up on the table in the daily meals or feasts for visiting tribes or celebrations. The respect given to their production and contribution to the survival of the community was recognised through the relationship of horticulture to the realm of the gods, through Rongo-marae-roa and other atua and to the contribution a successful season made to the mana of both individuals and groups.

This has been a very quick introduction to traditional Maori horticulture and will hopefully give a glimpse of the detail and experience applied to the tasks of food production and handling. No reira, nga mihi nui ki a koutou, kia ora ano tatou.

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