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Physiological aging in taewa Māori  
(Māori potatoes, *Solanum tuberosum*)  
and the suitability of different cultivars for short  
season cropping.

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## Abstract

Altering the storage regime of potato (*Solanum tuberosum*) seed tubers alters the performance of crops grown from those tubers. The size and nature of these effects are cultivar specific. Potato seed tubers progress through a number of stages during storage, a process known as physiological aging. The rate of aging is affected by many factors the most significant of which is the amount of warming (thermal time) the seed is exposed to during storage. Having seed tubers of an appropriate age can increase early crop growth and improve early yields. With the recent establishment of the Tomato-Potato Psyllid (*Bactericera cockerelli*, TPP) in New Zealand, shorter growing seasons have become desirable, as ongoing costs of controlling TPP on potatoes and other crops are significant. Taewa Māori (Māori potato; *Solanum tuberosum* ssp. *tuberosum* & *andigena*) have been grown in New Zealand for over 220 years and have developed into a range of potato cultivars unique to New Zealand. Taewa hold significant cultural value and are part of the story of early colonial New Zealand.

Seed tubers from three cultivars of taewa, Moemoe, Kowiniwini and Waiporoporo, were exposed to different periods of warming (thermal time, degree-days) prior to planting. All three cultivars displayed some level of resistance to the effects of physiological aging over the range of thermal time studied. However some effects were observed. There was an increase in tuber number with an increased thermal time in the cultivar Moemoe, but no change in tuber fresh weight in any treatment. The tuber dry matter in Waiporoporo was highest in tubers exposed to 728 degree-

days indicating there may be an optimal amount of degree-days in terms of this parameter. The resistance of these taewa to physiological aging means growers might save on cool-storage costs by reducing storage time.

The early harvests and physiology of the three cultivars were assessed for their suitability to a short (90 day) season. The cultivar Waiporoporo showed the best yield characteristics for a table potato crop over a 90-day season. Waiporoporo set fewer tubers than the other two cultivars but the tubers it produced were larger and more suited to the table market. Waiporoporo had a higher tuber fresh weight than Kowiniwini and greater leaf area than Moemoe at 90 days after planting (DAP). Moemoe showed the best potential in terms of the salad potato, new potato and gourmet markets that require smaller tubers than the table market. Taewa growers looking to shorten their cropping season should consider using the cultivar Waiporoporo for the table market, and Moemoe for markets that require smaller potatoes.

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For Uncle Charlie.

No one could ask for a better role model.

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## Key words

*Bactericera cockerelli*

*Candidatus* Liberibacter solanacearum

Declination

Degeneration

Degree-days

Dry matter distribution

Kaitiakitanga

New Zealand

Physiological aging

Potato (*Solanum tuberosum*)

Seed tuber

Short season cropping

Sustainability

Tomato-Potato Psyllid

Taewa Māori

Thermal time

Tikanga

Tuber dry weight

Tuber fresh weight

Turangawaewae

Whakapapa

Zebra Chip disease