

# STRAWBERRY BREEDING IN NEW ZEALAND

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Pukaki Orchards Ltd, through its parent company, Turners and Growers Ltd, became involved in strawberry breeding in 1982. In that year a joint agreement was made with the Crop Research Division of the Department of Scientific and Industrial Research (DSIR), Lincoln. From 1983 to 1986, 50,000 seedlings have been evaluated and 51 selections made. No cultivars have been released. Cooperating growers in the testing programme want "to run" with an 'Aiko' × 'Pajaro' selection, 'T26', and a day-neutral selection 'T30' (Fern seedling × Douglas).

## STRAWBERRY ORIGINS

The cultivated strawberry, *Fragaria* × *ananassa* Duch, is the result of a hybridization of the two native American species; *Fragaria chiloensis* (L) Duch and *Fragaria virginiana* Duch.

A French army officer, Amédée Francois Frézier is credited with the first development of the cultivated strawberry. In 1714 he returned to Brest, France, from a foreign mission where he had seen the large fruited *Fragaria chiloensis* at Concepción, Chile. Within a few years an industry developed at Brest where Frézier's pistillate plants of *Fragaria chiloensis* were interplanted by chance with staminate plants of *Fragaria virginiana*, so that an improvement of cultivated strawberries began. Much of the improvement is a result of the last 25 years of work. Most of the successful cultivars have emanated from the University of California, Davis, programme under the direction of Dr. Royce S. Bringhurst and Victor Voth.

Active strawberry breeding programmes have also been undertaken in the Eastern U.S.A., Canada, Britain, Europe, and Japan, but none of the cultivar releases have proved adaptable to New Zealand conditions.

## METHODS

Dr. Ivor Lewis from the Crop Research Division of DSIR, maintains all the parents and carries out the crossing programme in the spring in a greenhouse at Lincoln. The seeds are scarified and raised to the two-leafed stage in the greenhouse. The seedlings are then sent in January (mid-summer) to the Turners and Growers Limited Research Facility at Mangere, Auckland, planted in Root-trainers and grown-on in a shade house until field planting in April/May. The seedlings are planted on a mound covered with a black poly-

ethylene mulch. The mounds are 750mm apart. The spacing between seedlings in the row is 250mm.

The majority of seedlings flower within 5 months of planting and are evaluated twice per week until the end of December.

Our selection criteria is for yield, taste, the aromatics of the fruit, colour, firmness, plant growth, ability to produce runners, and resistance to disease.

**Propagation and Subsequent Testing.** At the end of December final selections are made. All other seedlings are removed. A 100mm layer of sawdust is placed around the seedlings which then start to produce runners.

Tissue-cultured and field-grown runners are produced over the autumn. These daughter plants are used as stock in the nursery and for progeny testing. Progeny testing is carried out in a hydroponic greenhouse and at cooperating growers properties. Because strawberry yield and quality characteristics are dependent on the clone and the climate of the growing area the three grower co-operators properties are in different areas of the Auckland district.

The grower testing also evaluates new cultivars imported from overseas for chilling requirement, planting time, and planting distance. Strawberry plants have a chilling requirement similar to many deciduous fruits. Every cultivar has an optimum winter chilling requirement for best performance. If the chilling requirement is completely satisfied during the winter, a normal growth cycle occurs: leaves and flowers develop in spring, and runners are

**Table 1.** The chilling response of seven strawberry cultivars to 0, 15, or 30 days cool storage at 2.2°C.

Cultivar	Cool storage (days)	Weight of fruit per plant (gms)	Average berry weight
Tioga	0	537	13.33
Pajaro	0	407	20.61
Douglas	0	363	13.08
Aiko	0	275	15.90
Tioga	15	590	14.13
Pajaro	15	327	17.69
Douglas	15	368	14.55
Aiko	15	206	15.17
Tioga	30	383	12.16
Pajaro	30	325	19.22
Douglas	30	451	14.21
Aiko	30	190	13.62
T7 (Douglas × Holiday)	15	499	15.63
T8 (Holiday × Tufts)	15	332	11.99
T17 (Holiday × Douglas)	15	410	16.72
Sample SE		98	2.48

produced in summer. Weak plant growth and small, soft fruit with reduced shelf life may result from insufficient winter chilling. Excessive chilling causes poor fruit production and excessive plant growth and runnering.

Table 1 gives an example of the chilling response testing that is carried out.

### SUMMARY

The success of our programme is our ability to propagate high quality plants for grower testing. Along with the breeding programme we also run a nuclear and elite plant certification scheme and distribute and sell about 60% of all strawberry plants sold in New Zealand.

## DUNCAN AND DAVIES NEW ZEALAND PSEUDOPANAX SELECTIONS

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Family—ARALIACEAE—mainly a tropical family with some genera in temperate regions, e.g. *Pseudopanax*  
Genus—*Pseudopanax*

### OUTLINE OF THE PSEUDOPANAX SPECIES

There are approximately 20 species of this genus of which about 14 are endemic to New Zealand. Species that were previously classified in the genus *Neopanax* are now included in the genus *Pseudopanax*, which are glabrous shrubs or small trees with very variable leaves which may be simple, digitately compound or palmately lobed. The juvenile leaves of young plants often differ greatly from those of the adult.

Some of the species, particularly *Pseudopanax crassifolius* are excellent plants from a landscape point of view with a great variety of foliage type and plant form not found in any other hardy exotic trees. In other species, particularly *Pseudopanax laetus* and *P. lessonii*, the plant form is not so characteristic but they are excellent foliage plants and are very suitable for growing in pots and tubs for interior decoration or on patios and terraces.

Not all of the species are completely hardy. *P. lessonii*, *P. discolor*, and their cultivars can be somewhat tender where heavy frosts are experienced.