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resource

# The science of feijoas

*Feijoas are popular in Aotearoa/NZ, fruiting in autumn in warm regions. NZASE Science Communicator Mike Stone explores what we know about feijoas and how they may be a useful context in horticulture and science classrooms.*

## Classification

The feijoa is a flowering plant in the myrtle family, and is native to South America. Myrtles are woody with evergreen leaves and brightly coloured flowers with numerous stamen. Essential oils can be extracted from the leaves of some myrtles, such as mānuka.

Feijoa's botanical name is *Feijoa sellowiana*, named after the two people who first collected the fruit in Brazil and took it to the world: German Friedrich Sellow and Brazilian João da Silva Feijó. Feijoas were first brought to Aotearoa/NZ in the early 1900s from Australia, France or Egypt – accounts vary. It is also called *Acca sellowiana* and pineapple guava, and we now grow over 20 varieties.

## Propagation

Like many other kinds of fruit trees, feijoas can be grown from seed (**sexual reproduction**), but don't grow true to type (ie, they differ from their parents), and grow only slowly for the first 1-2 years.

To extract seeds, squeeze out the seedy pulp into a jar and

cover with water, letting the liquid stand for four days. Strain and dry the seeds before sowing (the seeds will remain viable for 1-2 years if kept dry). Germination takes place in three weeks.

Feijoa can also be cloned from a healthy parent plant that produces much fruit of good size and flavour (**asexual reproduction**). Cuttings are the most successful way of **propagating** feijoas. Autumn is an ideal time to plant feijoas in most parts of Aotearoa/NZ, allowing the roots to establish over winter in preparation for a growth spurt over spring.

## Growing conditions

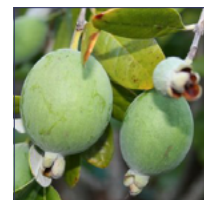
Feijoas are one of the easiest fruits to grow in a home garden, as there are usually very few problems and the trees fruit prolifically without much intervention.

They will tolerate a range of soil types, but the best harvests come from plants growing in well-drained soil with a pH between 5.5 and 7.0. This tree prefers warm-temperate or sub-tropical conditions, requires at least 100-200 hours of **winter chilling** to fruit, and is frost-tolerant (at least to -5°C).

Feijoas need fertilisers regularly from spring to harvest – a balance of nitrogen (for leafy growth), phosphorus

*Feijoas. Image: Arina Krasnikova, Pexels.*

*The feijoa life cycle, from left: Seeds, sprouts (Healthbenefitstimes.com); seedling (Bunnings); adult tree (Yelod, Wikimedia, CC BY-SA 3.0); flowers (Melodi2, Wikimedia, CC BY-SA 4.0); fruit on the tree (Alasam, Flickr, CC BY-NC-ND 2.0); fruit (Didier Descouens, Wikimedia, CC BY-SA 4.0).*



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(for root development) and potassium (for flowering and fruit production). Some sources also recommend sheep pellets after fruiting.

Feijoas need to be watered deeply and regularly from mid to late summer, when the fruit is developing and ripening. A light pruning in the summer after fruit is harvested will encourage new growth and increase yields the following year.

*Feijoa flowers, Longwood Gardens, Pennsylvania, Daderot, Wikimedia, CC0 1.0.*



### Flowers

The brightly coloured flowers – long bright red **stamens** topped with large grains of yellow pollen – appear around Christmas. The bisexual flowers may be borne singly or in a cluster. Feijoa flowers are similar to those of pōhutukawa and southern rata, other members of the myrtle family.

### Pollination

Some cultivars of feijoas are **self-pollinating**, and others need **cross-pollinating** (from another nearby plant).

If feijoa trees are not fruiting, it may help to plant another **cultivar** close by, or prune the canopy to allow space for **pollinators**.

In Aotearoa/NZ, bees, bumblebees, and medium-sized birds – silvereye, blackbird and myna – pollinate feijoa. Flowers pollinated with compatible pollen show 60 to 90% **fruit set**.

### Fruit

Feijoa fruit from March to June, autumn in Aotearoa/NZ. The fruit falls to the ground when ripe and at its fullest flavour, but it may be picked from the tree prior to falling to prevent bruising.

Different varieties fruit at different times in

the season, so planting a mix can extend the fruiting season.



*Feijoa fruit, photo: Mike Stone.*

### Pests

The shrub has very few significant insect pests, although guava moth is a problem in the north of the country. The caterpillars of this pest damage the inside of the fruit, causing it to fall off prematurely or be inedible when picked. Infections can be treated with a neem oil spray.

The anthracnose fungal disease devastated crops in Northland in 2019. It causes fruit to fall off trees while still small and can spread quickly within an orchard, especially from rain splash.

Feijoas can be afflicted by leafroller, mealybug, hard wax scale and greedy scale. They do not cause significant damage but in large numbers may reduce yields.

Feijoa do not appear to be at risk from myrtle rust. Since the fungal disease was first detected in Aotearoa/NZ, no feijoas have become infected. The same is also true in other countries, and attempts to infect feijoa in controlled conditions have proved unsuccessful.



*Te pūrēhua guava, Guava moth, Coscinoptycha improbana, from Manaaki Whenua, Landcare Research.*



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## Feijoa industry

Most commercial feijoas are grown in warmer parts of the country, especially around Gisborne.

Feijoa currently have a short growing season, a short shelf life and do not travel well. With airfreight now too expensive to be economically viable, feijoa are mostly produced for the domestic market.

To sell the fruit at optimal maturity (ie, best taste) they need to be picked before they drop off naturally, using under-strung nets catching fruit from a shaken tree.

Feijoa contain substances beneficial for our health – fibre, vitamin C, potassium, and essential oils, as well as phenolic acids and flavonoids. These compounds can provide antioxidant, anti-inflammatory, and antimicrobial benefits.

Research into feijoa is exploring –

- Extracting bioactive compounds from fruit pulp or peel to find new pharmaceutical compounds for medical and other applications.
- Finding a cultivar that is tasty and has a long shelf-life.

## Questions

1. Using your own knowledge and the context here, give the meaning of the **terms in green**: sexual reproduction, asexual reproduction, propagate, winter chilling, stamen, self-pollination, cross-pollination, fruit set.
2. What might happen to feijoa if:
  - a. Aotearoa/NZ had a very dry summer with watering restrictions in place?
  - b. Winter was not as cold as usual?
- 3.a. Use the name *Feijoa sellowiana* to explain genus and species.
  - b. Describe what is meant by a cultivar (also called a variety).
  - c. Try to find the name of three feijoa cultivars and some of their properties.
4. Describe three things you need to do to successfully grow a plant like feijoa from a cutting.
5. Identify the parts in a picture of a feijoa flower or from a dissection (feijoa flowers from Sep – Dec).



*Feijoa orchard, Hawkes Bay. Heathers Feijoas.*

6. Describe what happens when a feijoa flower is pollinated and fertilised. Use the terms pollen, stigma, pollen tube, style, ovary, fertilise, egg. Try to take a photographic sequence of this process.
7. Name the parts seen inside the feijoa fruit.
8. Find pictures of the flowers of pōhutukawa and southern rata. Compare and contrast these with feijoa.
9. What more information does this [video for growers](#) add?
10. Try extracting some manuka oil. [This article may help.](#)
11. Using agar plates, test the antibacterial and antifungal properties of feijoa extract (a possible science fair project).

## Ngā Kupu

**Hae** – Pollen

**Haenga** – Pollination

**Haenga whakawhiti** – Cross pollination

**Hema-toa** – Stamen

**Momo** – Species

**Whakamakuru tipu** – Plant propagation

**Whakaputa uri tōrua** – Sexual reproduction

**Whakaputa uri tōtahi** – Asexual reproduction.

*Te Aka Māori Dictionary and Paekupu*

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