

Guidelines for Growing Hazelnuts in New Zealand

Bulletin 1: An introduction to growing hazelnuts in New Zealand

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Introduction

Hazelnuts have been grown commercially in New Zealand since the 1980s, and at present (2016) orchards are present in all regions from Waikato to Southland. With good management and careful planning at setup, commercial operations may be able to supply domestic demand and possibly export hazelnuts from New Zealand to global markets.

This bulletin provides a background on the hazelnut industry in New Zealand and globally, and identifies key factors in establishing a commercially viable hazelnut orchard.

Landowners planning to plant hazelnuts should use the "Guidelines for growing hazelnuts in New Zealand" series of bulletins to guide them through selecting the most appropriate land, varieties and management systems. Consult local growers and consultants to source suitable advice and services applicable to your region.



Fig. 1: Mature hazelnut orchard, Canterbury

Hazelnut species

The commercial hazelnut industry is based on selections of *Corylus avellana*, a species of wind pollinated shrubs or small trees native to temperate areas of Europe and Asia Minor. The genus *Corylus* (family Betulaceae) consists of about 9 deciduous species naturally occurring in temperate forest areas across Europe, the Middle East, Asia, and North America. Up to 25 species have been described but modern taxonomy usually recognises 5 shrub and 4 tree species.

Environmental requirements

Commercial hazelnuts require a mild temperate climate. The main hazelnut growing areas in the northern hemisphere are characterised by mild summers and cool winters without extremes of heat or cold. Key temperature characteristics are:

- average annual temperature 12°C to 16°C
- maximum temperature 35 to 36°C
- minimum temperature -8 to -10°C
- chilling of 600 to 1200 hours (depending on variety)

Hazelnut trees have soft leaves and do not tolerate extreme heat, wind or moisture stress. In New Zealand conditions, good shelter is essential.

Ideal annual rainfall is 800 to 1000 mm, with rain evenly spread throughout the growing season. Locations with rainfall well distributed up until February may not require irrigation. Locations that experience prolonged periods of dry weather between November and the end of

January should install irrigation, especially if the soils are free draining (sandy or stony). Water requirements are estimated at about 1 to 1.5 megalitres of water per hectare per season for every 150 mm of annual rainfall less than 900 mm.

Warm dry weather over the harvest period (late February to early April in most areas of New Zealand) is advantageous. Dry weather lets husks dry quickly so that nuts fall free, the moisture content of the harvested nuts is low, and dry ground conditions favour easy machinery operation and clean nuts.

Out of season frosts in November and December have caused hazelnut crop losses in parts of New Zealand. Temperatures recorded in orchards affected by frost damage in the South Island suggest that air temperatures of -2 to -3°C may be sufficient to cause damage to nut clusters at this time. However, damage has been inconsistent, both within orchards and regions

Commercial hazelnut orchards require a fertile, well drained soil, ideally with a pH of 6.0 to 6.5 Hazels have a fibrous root system with most of the feeding roots in the top 60 cm of soil but deep soils allow the roots to exploit a greater soil volume. Land Use Class 1 and 2 soils are ideal and usually need very little modification. Class 3 soils will usually need extra management such as additional fertiliser, drainage (wet soils), ripping (clay soils and soils with a pan within the soil profile) or additional irrigation (free draining sandy or stony soils with a low water holding capacity). For successful harvesting using machinery, the orchard must be flat or gently sloping..

World hazelnut production

Hazelnuts are the one of the five most commonly traded nut crops worldwide, along with almonds, walnuts, pistachios, and cashews. The average annual world production (2009-2013 FAO data) is approx. 830,000 tonnes (in-shell). World production of hazelnuts increased 7.7% in the ten years from 2003 to 2013 (FAO

data) but the total hazelnut crop continues to fluctuate widely (Fig. 2), affected by a strong biennial bearing pattern and the dominant influence of the Turkish crop. Turkey is the largest producer with approximately 74% (64-78% range) of world production. Italy is the second largest producer (12-16%) followed by Spain, USA, Georgia, and Azerbaijan (approximately 3% each).

New hazelnut plantations have been established over the last 15 years in many countries with suitable climates such as Chile, Iran, Argentina, Romania and Australia. Increasing demand and improved profitability have also encouraged new plantings in countries with an existing industry, such as France, Georgia and the USA.

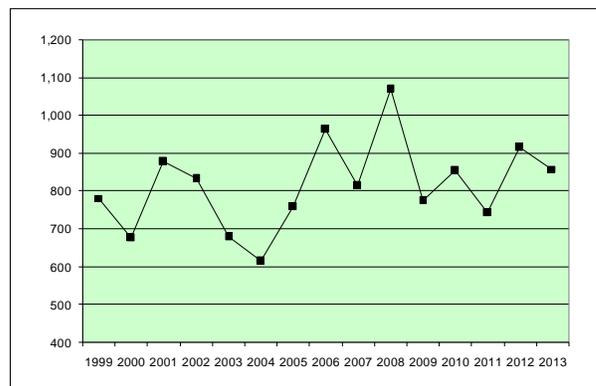


Fig. 2: World hazelnut production 1999 - 2013 (1000 tonnes). Data from FAO.

Hazelnuts in New Zealand

A small-scale hazelnut industry has developed in New Zealand over the last 40 years. Hazelnuts were introduced into New Zealand by early European settlers but were not grown commercially until the 1980's, when interest in new orchard crops led to small scale planting of hazelnuts and other nut crops. Early development was promoted by the NZ Tree Crops Association (NZTCA) working closely with the Crop Division of the Department of Scientific and Industrial Research (DSIR). Early trials were promising. A trial planted at the Appleby Research Orchard in Nelson was assessed for yield from 1970 to 1975 and one cultivar

(incorrectly labelled as Barcelona but later renamed 'Appleby') yielded an average of 10.3 kg per tree per year over that period. This equated to a crop of over 4 tonnes per hectare based on the spacing used in that trial. This is an excellent crop by international standards.



Fig.3: Hawke's Bay orchard, 1989. The trees are 4 years old.

A visit in 1981 by Dr Maxine Thompson from Oregon State University helped to focus the research on finding a nut with high quality kernels suited to the blanched kernel trade. The aim was to develop a nut that could fetch a premium price in local and international markets. Nut quality assessments by the Hazelnut Action Group, part of the NZTCA, identified a New Zealand selection, Whiteheart, as being well suited to the blanched kernel market. Research carried out at Lincoln University by Dr. David McNeil and others confirmed the excellent kernel qualities of the Whiteheart variety and this variety was recommended for planting in commercial hazelnut orchards.

Interest in nut crops grew through the late 1990's. The Southern Nut Growers Association was set up in 1993 to commercialise nut production, working closely with the Hazelnut Action Group. In 2002, the Southern Nut Growers Association split into specific nut groups and the Hazelnut Growers Association of New Zealand was formed. In the late 1990's the Crops for Cool Climates project in Southland identified hazelnuts as a crop with commercial potential for southern regions stimulating small-scale plantings on commercial sheep farms in Southland and Otago.

The New Zealand hazelnut industry

The 2007 Agricultural census revealed that New Zealand had just over 400 hectares of land planted in hazelnuts. These plantings are dominated by the Whiteheart variety. The main area of hazelnut production at present (2016) is Canterbury, followed by Otago (including Central Otago), Nelson, Southland and Marlborough. Most hazelnut plantings are on small blocks of land where owners are retired or have other sources of income.

The main group representing hazelnut growers is the Hazelnut Growers Association of New Zealand (HGANZ). The Hazelnut Growers Association has the following objectives:

- a) Encourage the planting of hazelnut trees, establishing trial areas for fruit and/or timber production including the establishment of gene banks.
- b) Promote, research and encourage a domestic and overseas export trade for hazelnuts.
- c) Promote and commission scientific research, including plant breeding, in all matters relative to hazelnuts.
- d) Facilitate for the benefit of members the results of all scientific investigation, technical and practical information about hazelnuts.
- e) Promote and provide for members, conferences, field days, workshops and any other training methods to further members' knowledge about the growing and production of hazelnuts.
- f) Promote an active liaison with the appropriate Research Organisations and Nut and Tree Associations in New Zealand and relevant International Associations.

The HGANZ has one summer field day each year plus a weekend gathering in June. The AGM is held during the June weekend gathering. Information is disseminated via the website (www.hazelnut-growers.org.nz) and a quarterly newsletter.



Fig. 4: HGANZ members touring a local orchard. Growers sharing their experience is an effective method of disseminating information.

New Zealand has a wide range of processors ranging from The Hazelnut Company, which has a medium sized processing plant in Canterbury, to smaller grower-processors who sell through Farmers Markets and small local retail outlets. Many also offer internet sales. Internet sales have seen small quantities of New Zealand hazelnuts exported to Australia, the USA, and Europe.

Markets

Most hazelnuts (95%) are traded as kernels. Despite increased reporting of the health benefits of eating nuts, most hazelnut kernels (95%) are still used in chocolate, baking or confectionery.

Globally, Europe is the largest market for hazelnuts. Germany is the largest single European market, followed by Italy, Belgium and Switzerland. In recent years, Italy and Spain have become net importers of hazelnuts.

The local New Zealand market for hazelnuts is small but increasing. Imports amount to between 200 and 250 tonnes per annum (Fig. 5). Most hazelnuts are imported from Turkey but large quantities are also imported from the USA, Italy and Australia (nuts which appear to have been imported from Australia are probably re-exports of hazelnuts imported from other countries).

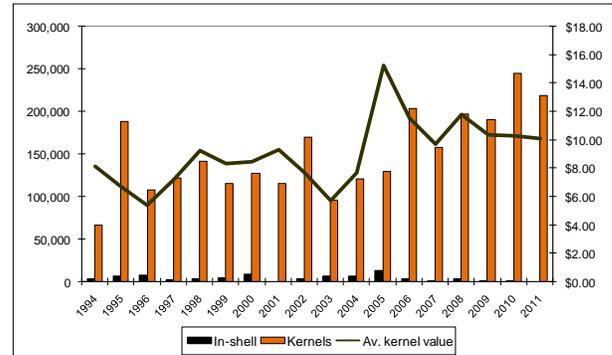


Fig. 5: NZ Hazelnut Imports (kg) and Average Per Kilogram Value of Imported Kernels (\$/kg) 1994 - 2011. Data from Statistics NZ

There are no accurate figures for local production but it is estimated to be less than 100 tonnes per year. The trees on the 400 hectares (approx.) already planted, once in full production, should be capable of producing between 600 and 1200 tonnes per annum. This exceeds the current volume of hazelnut imports. New large-scale plantings would therefore need to plan to supply export markets.

Potential export markets exist in Australia and Asia. Hazelnuts form a small part of the Australian nut industry with an estimated 300 hectares planted by 2012. Annual imports of hazelnuts into Australia amount to about 100 tonnes in-shell and 2000 tonnes of kernel, double the anticipated domestic crop. There may be an opportunity for New Zealand hazelnuts to replace some of the hazelnuts currently imported into Australia.

In China, in-shell hazelnuts are sold as a high value snack item. Consumers prefer nuts which have been partly cracked (allowing the shell to be broken easily by hand) then soaked in flavoured brine. The Oregon hazelnut industry is a significant supplier of in-shell hazelnuts into the world market and China is now the largest market for the Oregon crop.

Economics

The key influences on the economics of hazelnut production are yield, market price, and the scale of operations. Both high nut quality and high yields are necessary for profitable hazelnut growing and are achieved through:

- choice of suitable climate and soils
- choice of suitable varieties for the environment and markets
- appropriate planting system (suitable nursery stock, orchard layout and early training)
- good orchard management techniques (pruning, soil nutrient management, orchard floor management, irrigation)

The yields achieved in hazelnut orchards are variable. While orchards in Oregon expect to yield around 2.5 to 3 tonnes/ha, average yields in countries like Turkey, with less intensive orchard management, fall below 1.5 tonnes/ha.

Early production is an important factor in economically viable production. Hazels should have a small crop in the third year after planting, with the first commercial harvest in the fourth or fifth year. Growers should plan to harvest 1 tonne/ha by year 6 and 2.5 tonnes/ha by year 10. These yields have been achieved by New Zealand growers with good management in suitable environments. Gross margins for well-managed hazelnut orchards in Australia, Oregon (USA) and Italy are commonly in the range \$4000 to \$7000/ha.

Costs of establishing a hazelnut orchard vary according to how much development work (shelter, irrigation, land preparation) is required, ranging from about \$8500/ha (established shelter, no irrigation required), up to \$25,000 starting with bare undeveloped land requiring significant modification.

Useful websites:

Tasmanian Government Department of Primary Industries, Parks, Water & Environment (DPIPWE): Hazelnuts Gross Margin & Profitability Analysis.

dPIPWE.tas.gov.au/Documents/Hazelnuts-GM---Profitability-Analysis.xls

Oregon State University. <https://catalog.extension.oregonstate.edu/topic/agriculture/hazelnut-production>

Hazelnut Growers of Oregon: www.oregonhazelnuts.org.

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All photographs: Murray Redpath

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