



New Zealand  
**Walnut Industry Group  
Information Pack**

Updated February 2008

---

This information pack will help you decide whether walnut growing is for you.

We are assuming that you are at the initial stage of gathering information, so we have included basic information about the soil and climate you would need to grow walnuts. You'll also find information on shelter, irrigation and some other issues that will help you decide whether it's practical for you to become a walnut grower.

The section on the New Zealand Walnut Industry Group will tell you about some of the support we can provide you. It's a very cooperative network of growers, propagators and processors and we would like you to be part of it.

For more detailed information about walnut growing see the Walnut Industry Group's *New Zealand Walnut Growers Manual*. (You can purchase it for \$72.00, inclusive of postage within New Zealand. Call Glenys Pluck on 03-347-9109.)

We will update this information regularly.

## Climate

A dry climate – such as that along the east coasts of both the North and South Islands – is preferable for commercial walnut production. It is possible to grow walnuts in high humidity climates, but the danger of walnut blight and other diseases is much greater.

High temperatures during summer are ideal. The upper limit is reached in the walnut growing areas of the San Joaquin Valley, California, where temperatures frequently soar into the high 30s and above, and sunburn is a problem. We seldom push that limit in New Zealand, and, indeed, are at the lower end of the acceptable summer temperature range. Our walnut trees don't grow as fast in our cooler temperatures, but the quality of our nuts is high.

Walnuts need some winter chilling and temperatures down to  $-10^{\circ}\text{C}$  pose no problem in the winter, when the trees have no leaves. However, young shoots, leaves, catkins and flowers may be damaged by frosts of  $-1$  to  $-3^{\circ}\text{C}$  during October and November. It is important in areas where late frosts may be a problem to select suitable cultivars.

There are two climatic factors in New Zealand that create significant problems. The first is wind, which we discuss in the section on shelter. The second is the wildly fluctuating weather during our spring and autumn. It is common for a warm spell in early spring to prompt bud burst, which may be followed over the next few months by a series of strong winds, hail, driving rain, and frosts – any of which can damage the soft new growth and disrupt pollination of flowers. There is not much you can do, except protect small trees from frost as far as possible and provide shelter for walnut trees of all ages. Once the trees are about two metres high, the frost danger is greatly reduced.

## Soil

The number one requirement is good drainage. Walnuts are very sensitive to inadequate oxygen in the soil. If their roots sit in stagnant water for more than a couple of days they are starved of oxygen and the trees can die.

If you are buying a property, it is best to view it in the winter, just after a good period of rain, to see whether there is any standing water. It is not a good sign, but if the land has been heavily cropped, the apparent poor drainage may be caused by a plough pan which you should be able to break up as you restore the structure of your soil over time. Determine the soil type on the property and its layers of clay, silt, sand, gravel and loam. A layer of clay is likely to impede drainage and root growth. Find out the height to which the water table can rise. If it comes within three metres of the surface, particularly during the growing season, it could present a risk to mature walnut trees.

Walnuts will grow more vigorously in a fertile soil, so you will reach full production earlier. However, high quality horticultural soil is usually expensive, so you must trade off the higher land price against the earlier production. Fertile soil is second in importance to good drainage.

It is possible to gradually restore both the fertility and structure (drainage) of soil that has been heavily cropped in the past. Grass, clover and deep rooting plants growing (undisturbed by

cultivation) on the orchard floor will increase the soil's organic content, which will in turn increase its capacity to hold nutrients, worm population, aeration, and structure. You can add fertilisers to address any major nutrient deficiencies but be aware of the limitations of your soil type.

## **Shelter**

In most areas of New Zealand, shelter is essential for good growth and productivity. Though you may read of the Americans and the French planting walnut orchards without shelterbelts, and the English recommending the walnut as a shelter tree, bear in mind that they are not operating in the same windy conditions that we are. You will need to think carefully about the size of your blocks, your shelterbelt species (with their final height, rate of growth, deciduousness, and other characteristics), and your irrigation and weed control for shelterbelts.

When buying land for planting walnuts, a block with mature shelter (external and internal) already in place is likely to be more expensive than "bare land", but it is worth weighing up whether the price differential will be offset by earlier production. If you are starting from a bare block, it will take about three years before your newly-planted shelterbelts will have grown sufficiently to provide protection to young walnut trees - depending on the growing conditions and the shelter species you use.

## **Irrigation**

Low cost water is an important factor in choosing a site. Walnuts are unlikely to die from water stress in New Zealand, but growth and yield losses in a 'typical' year will be significant in most dry climates recommended for walnut growing. In most of those climates, rainfall during the summer period is not sufficient to balance evapo-transpiration during that period. Even so you should weigh the value of using irrigation against the cost of installing, maintaining and operating it.

The most common system used in walnut orchards is sprinkler irrigation, where each tree has its own micro-sprinkler. Dripper irrigation is an option (at least in the first few years) but root development may be restricted to the smaller area covered by the dripper.

When you are looking for a property, it is worth assessing the suitability of any existing irrigation equipment for your purpose, e.g., bore size and drawdown, pump size, presence of sand in the water etc. As a guide, your water supply should be capable of providing 5mm of water per day across your full orchard area. For example, in a 10-hectare orchard, 5mm of water equates to a volume of 500 cubic metres. The pump should be capable of delivering that volume of water in 18 hours or less, otherwise, if you have a breakdown or power cut, it will be difficult to catch up on the trees' water requirements.

You will find useful advice from professional irrigation suppliers and engineers. Another valuable resource is the New Zealand Irrigation Manual (<http://www.ecan.govt.nz/plans-reports/irrigation-manual/irrigation-manual.html>), available at some libraries including Lincoln University. (You can read them in the library.)

## Pests and diseases

We are fortunate in New Zealand to have few walnut pests and diseases. It means that walnuts are one of the less difficult crops to grow in a restricted spray regime. Walnut blight and *Phytophthora* root rot are the main diseases, and hares the most common pest.

### *Walnut blight:*

Blight is the only disease which New Zealand walnut growers need to spray for routinely. It is a bacterium and is typically managed with copper-based sprays. They may be used in restricted amounts by organic growers. The spraying season is from September until January and the frequency and number of sprays increases with rainfall, humidity and temperature. In a dry season with low humidity, two sprays may be sufficient to effectively manage blight, whereas in a wet season with high humidity as many as 10 sprays may be required. Incomplete management of blight will result in loss of yield (since blight affects the nuts) and some reduction in vegetative growth (since blight affects the new season's growth) but it will not kill a tree because it does not affect old growth.

### *Phytophthora:*

This is a soil-borne fungus that attacks and rots the roots of a tree; it is the destruction of the root system that kills the tree. *Phytophthora* thrives in over-wet soils. It is difficult to eradicate the fungus from the soil and root system once it is established there. Thus walnuts should be grown in free draining soil and not over-watered. Whilst some walnut trees growing in wet conditions may survive, overall the odds are much better in free draining soils.

### *Hares/Rabbits:*

Both pests can fatally damage young trees and heavy rabbit pressure can inflict significant damage on older established trees. The safest option is to use tree-guards to protect young trees, ideally with 750mm tall plastic guards. Hares and rabbits cause damage in quite different ways. Hares practice careful 'estate management' and tend to remove novel features in their estate such as newly planted trees. They will bite off newly planted walnut (or other) trees, rather than eating them. Rabbits, on the other hand, seek somewhere to sharpen their teeth and can cause significant damage to tree trunks which may subsequently break in a strong wind.

## Nuts and/or timber?

The walnut veneer on the dashboards of the rich and famous, and the quoted prices for walnut gunstocks are powerful arguments for growing timber. However, it's worth keeping two things in mind. First, a walnut tree is unlikely to be large enough to mill until it is around 45 years old. Second, the generally-preferred species for timber is the black walnut (*Juglans nigra*), rather than the edible nut species, *Juglans regia* (English walnut). Note also that, like most high value hardwoods, walnuts grow poorly on the nasty clay banks where we commonly put our *Pinus radiata*.

Grafted walnut trees (*J. regia*) will start producing walnuts almost immediately, though we recommend that you remove the nuts over the first five years or so to allow the vigour to go into tree. Many growers remove the lower branches of trees (up to 1.5 m to 2m). It is mostly so that they can drive a tractor under them, but it also provides a "second string to the bow". If the trees have been well pruned to a high quality butt log, then timber harvest may eventually be a reality.

In the 1980s, members of the New Zealand Tree Crops Association had the foresight to begin walnut selection trials. They collected samples of high-performance walnut trees from around New Zealand, tested the nuts for quality (that's taste and suitability for commercial growing and processing), grew trial trees, and recorded the yields. Two of the selected cultivars that emerged from those trials have become the basis of the fledgling walnut industry in New Zealand. They are Rex (also known as 152) and Meyric (also known as 1199/4). Planting grafted trees of those cultivars ensures that you have a high quality, consistent product that is already in demand.

Seedling trees are a great deal easier to produce and therefore cheaper to buy. There is currently a good market for nuts from the non-grafted trees, but the price tends to be somewhat lower, and is likely to stay that way since the nuts are less consistent in physical characteristics and taste.

## **Market prospects for New Zealand walnuts**

The prospects for marketing high quality walnuts and value added products in New Zealand and overseas are very positive.

Most walnuts sold domestically are imported from USA, China or India, however, the quality is generally low with nuts often being old and not tasty. It creates a significant opportunity for New Zealand growers. We are able to grow an extremely good product in New Zealand as several New Zealand developed cultivars have outstanding appearance, taste, storage ability and nutritional value.

On the world market, demand exceeds supply, however, New Zealand growers setting their sights on the export market will need to be aware that in most other countries, growers are paid a commodity level price for their nuts. Most growers looking overseas will aim for niche markets with varietal nut products as many other New Zealand horticultural industries do.

Growers either sell their produce to one of the local processors or market them directly.

Currently, growers are paid \$10.50 per kilogramme for top grade kernels from grafted trees. Top grade seedling or wild walnut kernels earn up to \$8.50. To achieve good returns the harvesting, washing and drying techniques are vital whether you are presenting your walnuts for processing or for direct sale.

Processors sell to consumers either in-shell, shelled or as a walnut-based product such as walnut oil or walnut paste. There is a range of processors, from a large one buying nuts nationwide and selling a variety of products into many markets, to smaller operations serving a few suppliers, through to people simply processing their own nuts.

The best long-term markets for New Zealand grown walnuts are likely to be based on superior quality rather than bulk commodity. To encourage quality, the Nut Industries of New Zealand (NutNZ), with which NZWIG is affiliated, has developed quality standards for both nuts and processing operations. Registered processors who adhere to these standards are able to use the NutNZ certification mark 'CERTMARK NutNZ'. At present there is one such registered commercial walnut processing plant, Christchurch based Walnuts New Zealand - A Cracker of a Nut.

## **Time frames until first harvest**

Walnuts are not a quick-return crop. Though grafted trees are often able to bear straight away (as one-year old trees), it is usual to remove the nutlets in the first five years so that the trees' vigour will go into developing the canopy. Your maximum returns will come when the full land area is covered by the canopies. You could plant trees at very close spacings so that they reach full-canopy early, even while allowing the trees to bear. You would need to weigh up the cost of the extra trees against the returns from early fruiting.

On existing orchards (largely in Canterbury) 10 year old trees are producing an average of 5–10 kg per tree, and the yield should increase from there. Naturally the productivity is dependent on many factors including cultivar, climate, shelter and soil.

## **Time commitment in setting up and managing a walnut orchard**

Most walnut growers work in full-time employment while setting up their walnut orchards – which makes it easier to cope with the long establishment period. The orchard size that is manageable depends on your employment hours and other responsibilities, however, orchard sizes commonly range from 4 to 10 hectares, with a few as large as 20 to 50 hectares.

Set-up tasks in the first few years include:

- Shelter belt establishment. You may need to plant several thousand trees on a 10-hectare block.
- Ordering your walnut trees. Be prepared to wait several months for them to be ready.
- Irrigation installation. You may need to have a bore drilled and purchase and install irrigation equipment.
- Planting. You will need to dig or auger holes for planting, then place shelter boxes around trees to protect them from wind and hares.
- Pruning – You will need to prune the young trees to encourage a branch structure for optimum mechanical strength and production of fruit.

On-going management tasks include weed control for both shelter trees and walnut trees, irrigation, pruning and spraying to protect your trees against disease.

### NZWIG activities

The New Zealand Walnut Industry Group Inc. has been established to support New Zealand walnut growers by:

- Encouraging discussion and learning amongst growers
  - Holding field days to enable learning from experts and other growers and enabling growers to benchmark progress against other growers
  - Arranging social events to enable contact and discussion with like-minded people
- Instigating research and development to improve the knowledge of walnut growing in New Zealand.
- Disseminating information on current knowledge and best practice in walnut growing
  - Providing the basic information pack for new growers
  - Distributing the quarterly NutNZ journal, *Health in a Shell*, containing articles on research results and industry current best practice for walnuts, hazelnuts and chestnuts
  - Producing a quarterly newsletter
  - Updating and expanding *The New Zealand Walnut Growers Manual*, which is a comprehensive guide to walnut growing in New Zealand

### Membership of NZWIG

To join the New Zealand Walnut Industry Group, contact Hugh Stevenson, 647 Ridgens Road, RD1, Christchurch, tel (03) 318 8553, email: [treasurer@walnuts.org.nz](mailto:treasurer@walnuts.org.nz)

A full annual subscription for NZWIG is \$100 per orchard and includes the nut industry journal, *Health in a Shell*. Any additional person associated with the orchard may join as a personal member for \$20 per year. The personal membership does not include *Health in a Shell*. If you are joining NZWIG for the first time, we will give you a 50 per cent discount.

### NZWIG committee/sub-committee structure

The management committee of NZWIG is elected annually, with committee members standing for a two-year term, and half retiring (but eligible for re-election) each year. As well as chair of the management committee, treasurer and secretary, NZWIG has chairs for sub committees responsible for events, research, information and the growers' manual. There are two representatives for the committee of Nut Industries of New Zealand.

Position	Responsibilities
Chair	
Secretary	
Treasurer	Finances, subscriptions, membership.
Chair Research Committee	Determine research needs in walnut industry; apply for research funding; manage research projects; ensure dissemination of research findings occurs.
Chair Communication Promotion Stability Committee	Coordinating the collection and dissemination of information. Edit and update Growers Manual. Develop links with processors and propagators. Handle media contact.
Chair Quality Committee	Write quality standards. Lead Horticultural Export Authority process.
Chair Education Committee	Plan field days/social events to encourage sharing of information between growers, and dissemination of research findings.
Newsletter Editor	Prepare quarterly newsletter to inform growers of coming events.
NutNZ Representatives	Represent walnut growers' interests on the NutNZ committee, with regard to <i>Health in a Shell</i> and the quality standard.

## NZWIG research projects

Our major current project is *benchmarking* - to compare performance in a range of orchards. The project will enable us to establish performance benchmarks and give us a better understanding of what growth rates and yield to expect from our orchards.

NZWIG has also researched sustainable methods for blight management. The project ran from August 2001 to August 2007. The three major aims of the project were to:

- investigate optimal timing of copper sprays, so that a grower can use the minimal amount of spray to maximum effect. We have shown that it is particularly important to put on several sprays
- investigate the effectiveness of alternative spray types, so that several spray options are available to growers
- investigate biological control of walnut blight, using the naturally occurring bacteriophages (which kill the blight bacteria) present in the tree canopies. We have shown effectiveness in the lab but need to do further work to demonstrate it in orchard conditions.

We also have some smaller projects are underway:

- (1) Cultivar trial. We have planted trial blocks including 9 new selections (as well as Rex and Meyric, which are currently the most commonly planted cultivars) in four orchards around New Zealand and will be assessing them each year.
- (2) Rootstock trials. English walnut (*Juglans regia*) is currently used as the main rootstock in New Zealand, but Californian black walnut (*J. hindsii*) and Paradox (*J. hindsii* pollinated by *J. regia*) are usually used in America where they produce vigorous growth and are more resistant to *Phytophthora* root rot. We are undertaking trials to determine whether we can achieve better growth in New Zealand.

(3) Pruning/Training experiments. We are assessing a range of training strategies for juvenile walnut trees and have already published some results.

## History and related organisations

Commercial walnut growing in New Zealand was initiated by members of the New Zealand Tree Crops Association (NZTCA), and particularly one of its special interest Branches, the Walnut Action Group (WAG). Most of the early trials on grafting, cultivar selection, and orchard management were carried out by the South Island Branch of WAG, working with researchers from Lincoln University.

In the 1980s the Southern Nut Growers' Association (SNGA) was established, to provide more focus on nuts (as opposed to the broader multi-crop goals of the NZTCA) and commercial aspects of nut growing, including large-scale orcharding, processing and marketing. SNGA funded research on walnut processing (including storage characteristics) and nutritional composition.

By 2001, the level of orcharding knowledge and market access for walnuts, chestnuts and hazelnuts had reached a level where growers felt sufficiently confident to establish their own Industry support groups. These are the New Zealand Walnut Industry Group, the New Zealand Chestnut Council and Hazelnut Growers of New Zealand. SNGA devolved its membership to these groups, and now functions as an umbrella group rather than having members of its own. SNGA is now called Nut Industries of New Zealand (NutNZ). It has three main roles: (1) production of the quarterly journal *Health in a Shell* for affiliated nut industry groups, (2) maintenance and application of quality standards for processing and marketing of nuts, and (3) joint representation of the nut industries.

The Walnut Industry Group was initially set up to administer the funding for the Walnut Blight Research project from MAF's Sustainable Farming Fund.

In 2002, NZWIG decided to expand its role to provide a broad range of support for the walnut industry. At the present time there are over 140 members on over 100 properties. Members are in the central and southern North Island, Nelson, Marlborough and Central Otago, with the largest numbers in Canterbury.

## Walnut propagators' scheme

For more than ten years, the North and South Island branches of the Walnut Action Group has operated a voluntary scheme to encourage grafted varieties and raise funds for research. The scheme is in association with participating walnut propagators. The contribution to research comes from a fee of \$0.50 on each grafted tree.

NZWIG has now taken over the administration of the scheme, and is maintaining a list of walnut propagators who have chosen to participate. We suggest that you buy your trees from propagators involved in the scheme.

The participating propagators are:

- Peninsula Tree Nursery  
walnut@ihug.co.nz  
(03) 329 0045
- Quality Tree Company
- Fords Nursery  
fordsnurseries@xtra.co.nz  
0800 421 444
- Harrison's Nursery

qtc@clear.net.nz  
(03) 344 1977

- River Terrace Nurseries  
rivernuts@xtra.co.nz  
(03) 542 3317

Harrisons\_trees@clear.net.nz  
(06) 357 0054

- Waimea Nurseries  
sales@waimeanurseries.co.nz  
(03) 544 2700

Ask your propagator for a *Certificate of Authenticity*. It will certify the variety of walnuts you have bought. If you eventually decide to sell your walnut orchard, it could be a valuable document.