Alternative Crops Suitable for Dairy Land in Southern New Zealand

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Crops for Southland

History of crops for Southland

Crops for Southland (CFS), is an Incorporated Society started by the Southland District Council in 1995. At the time, Southland was going through a period of decline. Lamb prices were low, the dairy boom had not started, and rural services were being reduced. Many small 200 ha farms were being supported by a spouse working off farm.

The basic concept of CFS was to promote small scale horticultural enterprises on farms across the district. New jobs could be created and more wealth would be generated, directly on farms. A study in the Netherlands showed that for every 1 ha of horticultural crops, one job wass created directly on the land, and a further four jobs in the downstream economy (transport etc).

This whole concept created a lot of interest at the time. Initial seminars talking about some alternative crops were attended by hundreds of people from the farming community. Crops such as ginseng and paeonies were being looked at and grown on a small scale all over Southland.

After a few years in operation, a decision was made to look more closely at the climate and soils of Southland in an effort to better match crops to the environment. This would give a better chance of success when growing these 'new' plants. The Topoclimate Project involved logging soil and air temperatures at over 3000 sites spread across Southland, boring 21,000 holes to examine the soils and digging 650 pits to classify and describe them. This full data set is now available online at www.southlandnz.com.

At the same time that the Topoclimate project was being carried out, the Board of CFS decided to develop a New Crops Centre where crops suitable for Southland could be grown for display and information could be disseminated to the public. This shop-window for the activities of CFS, at 100 McIvor Rd, is open from 8.00 am to 4.30 pm weekdays.

The New Crops Centre currently has 92 crops in a demonstration area. A second area is a commercial planting of cut flowers including paeonies, hydrangeas, viburnum, astilbe and a few other novel flower crops. Flowers are cut from this block and packed and exported to markets in Asia, Europe and America. A third area is used for research purposes, both in-house and for commercial clients.

The staff employed by CFS, have a broad horticultural background, both practical and scientific. They are always available to talk to visitors and discuss growing ideas. The staff also provide information on the marketing of crops, run seminars across a range of topics and are available for on-farm consultancy.

Figure 1 New Crop Centre

Choosing the right crop

Although the range of options on display at the New Crops Centre is quite large, the crops can broadly be broken down into five categories: berry fruit, medicinal herbs, vegetables, cut-flowers and nut crops. The following sections discuss each of these in turn, before giving some more specific examples including financial information.

Nut Trees

Nut trees are a long-term crop, with harvest and tree maturity not happening for a number of years. This means any forward budgeting can be very hypothetical. On the positive side all market signals are showing a strong demand for nuts and nut products and there is not the explosion of plantings that we see in the olive industry. The returns per hectare are lower for nuts when compared to other crops, but the inputs both in materials and labour are also correspondingly lower. In summary, nut trees suit a low maintenance system provided immediate cash returns are not necessary.

Hazelnuts

Hazelnuts (*Corylus spp*) are well suited to the southern regions of New Zealand. We have seen examples of the fruiting in places as diverse as coastal Southland and Queenstown.

Figure 2 Hazels

A nut orchard is grown in a similar manner to an apple orchard. Trees are planted in rows with 2-3 m between the trees and 4-5m between the rows. This gives approximately 700 trees per hectare when headlands and shelterbelts are included. Trees reach a maximum height of 5-7 m after seven or eight years. They should begin producing a few nuts after year four, with full production coming once they reach their final height. Nuts drop on the ground around Easter and can be picked up any time within the next one to three months.

Hazelnut trees have separate female and male flowers on the same tree but pollinators are required to ensure a regular crop. The most widely planted cropping variety in New Zealand is

Whiteheart. Suitable pollinators for this variety include Merville de Bowiellier, Tonda de Romona and Alexander.

It is hard to give full financial advice for this crop as the returns vary depending on what you do with the nuts. Secondary processing adds significant value. Yields per tree vary from 3 to 5 kg. In-shell nuts are currently returning up to $5 per kg. When shelled and roasted this figure increases to $20-30 per kg and with further processing this figure can increase to $50 per kg.

A number of Hazelnut discussion groups are in operation around the country. Contact CFS for information on the group nearest you. For more information on Hazelnuts, visit www.agric.nsw.gov.au/reader/11246. Although this is an Australian site much of the information is also relevant to New Zealand.

Chestnuts

Chestnuts (*Castanea* spp.) are more suited to northern Southland climates rather than those found down near the coast, but if good wind shelter is provided, they will grow in both places. Unlike Hazelnuts they need to be harvested from the tree and then chilled before shipping.

Chestnut trees tend to grow to a reasonably large size and can be planted at either a 12 by 12 m spacing (64 trees/ha) or a 6 by 6 m spacing (256 trees/ha) and thinned out as the trees mature to 12 by 12 m. Commercial plantings around the country tend to start producing fruit by year six. Total yields of around 4 tonnes per ha would be expected, with an average return of $2.00 per kg.

Chestnuts do suffer from several fungal diseases, most notably *phomopsis*. This leaves the nuts rotten inside their shell and makes the crop worthless. It is important to note however that this disease has never been recorded in the South Island. *Botrytis* and *phytophthora* also affect the trees. Another issue with this crop is cultivar choice. There needs to be more research and trial plantings before undertaking a commercial operation.

For more information on chestnuts contact the New Zealand Chestnut Council on www.nzcc.org.nz.

Medicinal Herbs

Medicinal herbs were all the rage a few years ago. So what happened to the acres of echinacea we saw around Southland or the borage contracts? Quite simply the world market got in the way. All of these crops produce a product that can be stored as either a dried root or seed or it can be made into a finished product and then sit on a shelf for a time before being sold. This makes New Zealand a less desirable place to grow these crops when compared to somewhere else with a lower labour cost structure e.g. Chile or China. These crops can still be

successfully grown but it is vital to secure a supply contract before any paddock is ploughed and seeds planted. The marketing of these crops is the absolute key to success.

Arnica

Arnica (*arnica montana*) is a daisy-type plant that grows in the mountainous areas of Europe. The plant produces a number of chemicals, collectively known as sesquiterpene lactones, in the petals of the flowers which are known to reduce levels of bruising after injury.

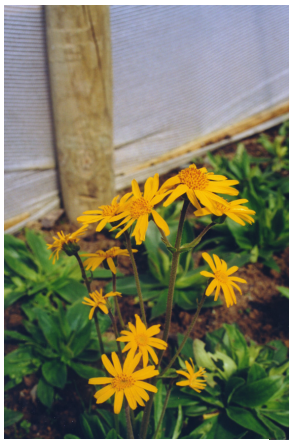

Figure 3 Arnica

The areas where arnica is being harvested in the wild are gradually being protected, meaning wild harvest is being reduced. This is causing a drop in supply at a time when the interest in alternative medicines is on the rise. Currently one New Zealand medicinal herb company is offering supply contracts and a further three have expressed serious interest in buying local product. Base price for contract has been offered at $60 per kg for dried flowers. Production should be around 700 to 1000 kg per hectare by year three. One difficulty with the crop is that most companies want to purchase organically certified arnica. This will be difficult in some southern regions, due to the wet climate and subsequent disease problems. The other main issue when growing organically is the invasive nature of white clover which can overrun a bed of arnica after two to three years. Conventional production, using agrichemicals in the first few years of a block's life, followed by a switch to organics later, may be the best way forward.

For more information on growing arnica, including a model gross margin, contact Crop and Food Research www.crop.cri.nz or Lynette Mitchell on mitchelll@crop.cri.nz.

Licorice

Licorice or liquorice (*glycyrrhiza glabra*) is a relatively recent crop at the New Crops Centre. The plant is a perennial woody herb that grows to a height of 1.5 m. It grows frost tender foliage that dies down in winter before emerging the following spring. The part of the plant that you harvest and use is the root. These are then shredded and boiled, with the vapours being concentrated in evaporators. The extract contains 6-8% glycyrrhizin and is widely used in herbal medicine.

Although the roots can grow down to 1 m in the soil, 80% of the mass is in the top 30 to 40 cm. This makes mechanical harvesting possible. Depending on plant growth roots are harvested after three to four years. Plants are grown in rows 700 to 100cm apart

Figure 4 Licorice

with 40 to 60 cm between the plants. As they grow they fill in the gaps. It is too early to say if this crop is commercially viable but it does have potential.

For more information on growing licorice, contact Crop and Food Research www.crop.cri.nz and look for broadsheet #121. It is hard to come up with financial information for this crop as it is so new to New Zealand but a quick search on the Internet shows prices around $10/kg for roots in Canada. See http://www.agf.gov.bc.ca/busmgmt/budgets/.

Cut flowers

Cut flower crops of one type or another seem to interest most of the visitors to the New Crops Centre. Harvesting times run from early spring with viburnum right through to the middle of autumn for hydrangeas. They suit small sheltered blocks of land and returns can be very good if the crop is grown well. In most cases groups of like-minded growers work together solving problems common to all. Flower exporters take care of selling the crop in international markets, meaning the grower can concentrate on growing only. The one negative aspect of cut flower production is the capital costs needed to start. These can be very high. It can also take three to four years before returns are made.

Paeonies

Crops for Southland has a block of 2000 paeonies (*paeonia* spp) at the New Crops Centre. This is run on a commercial basis with any profit being returned to the business. Paeonies are perennial plants that flower in November and December. Flowers are cut when still in the bud stage, packed into boxes and sent to markets in Europe, Asia and North America. New York City is one of the biggest markets for top quality flowers, with retail prices of up to $30 per bloom. Unfortunately growers receive a fraction of this, with gate receipts varying from $1.00 through to $4.50 per bloom (2003 season returns). The number of stems per plant can vary from 5 to 15. Although a lot of small blocks of paeonies can be found all over the southern regions in New Zealand the total amount exported is still only 1.5 million stems.

One downside to growing paeonies is the cost of setting up blocks. They are grown from root pieces that vary in price from $10 (varieties such as Karl Rosenfeld and Sarah Bernhardt) through to $45 dollars each (varieties such as Red Charm and Bowl of Cream). The plants take up approximately $1m^2$ each, so an intensively planted 1 hectare block with access rows and headlands, can have upwards of 5000 plants on it.

Figure 5 Paeonies

CFS has a lot more information on the labour requirements and costs associated with growing this crop. Contact us directly for this. The other good organisation to contact is the New Zealand Paeony Society http://www.nzpaeonies.co.nz/.

Astilbe

Astilbe (*astilbe* spp) are a very minor export crop. Asia takes the majority, with some sales in North America and Europe. Astilbe can be found in a range of colours, with pink being very popular during Chinese New Year. Whites and reds also make good money.

Figure 6 Astilbe

CFS has grown Astilbe in the commercial block for the past four years. Gross export prices are around 60 cents per stem, with costs of around 21 cents per stem. Planting is done in beds with plant spacing at 30cm x 30cm. Each plant costs approximately $1.00. Yields after three years should be around 20 stems per plant. They need to be lifted at this time and divided.

CFS has a lot more information on the labour requirements and other costs associated with growing astilbe. Contact us directly for this. Also talk to exporters. As this is a minor crop, care must be taken not to flood the market.

Vegetables

It has always been difficult to give advice on growing vegetable crops. The southern regions have an excellent climate for growth, but the marketing of these crops can be difficult. There are no major processing capabilities in Southland at present and companies such as Watties have no intention of setting up here. This makes the standard crops such as peas, carrots and potatoes somewhat difficult.

The one area of business where a potential for expansion exists is selling slightly alternative vegetables directly to restaurants in tourist towns such as Te Anau and Queenstown. Potential also exists to process these same vegetables for the local market. Some reasonably entrepreneurial work needs to be done to develop these ideas but it does look possible.

Wasabi

Crops for Southland has done a lot of work on the growing and marketing of wasabi (*wasabi japonica*). It is an Asian vegetable, processed into a paste and eaten as a condiment with dishes such as sushi and sashimi. It is grown in Japan in specially made gravel beds in what is essentially an outdoor hydroponic system. However in Southland, growing the crop directly in the soil like a swede seems to work. The period from planting through to harvest is 18 months. Beds are formed and plants spaced 40 to 50cm apart within them. Raising the beds

ensures good drainage and seems to reduce incidence of disease. The whole plant is removed from the soil at harvest. Leaves and stems are separated from rhizomes before processing.

Figure 7 Wasabi

Processing consists of either pulping the plant material into a paste, or drying it into a powder. There is also a market for fresh wasabi rhizomes in Japan. They must be chilled and cool freighted the whole way. At top restaurants, clients can pay up to $1000 per kg to have these rhizomes grated directly onto their dishes! Back in New Zealand, raw unprocessed rhizomes are currently worth $10 per kg with the rest of the stalks and leaves returning $3 to $5 per kg.

Although these numbers can sound quite good, many difficult issues are facing the industry. Plant availability is limited and the crop is susceptible to a range of fungal diseases, specifically *phoma* spp. This grows inside the vascular tissues of the rhizomes, leaving a black stain and making the product unsaleable. The main problem, however, is the market. The Japanese industry is very protected by both import legislation and an auction system that will always sell local product first. Developing products for the emerging New Zealand market before looking to export may be the best way forward.

Figure 8 Horseradish

Horseradish

This is a really interesting example of a crop that has been around for many years on a small scale, but as culinary tastes change, it has become more common. Horseradish (*armoracia rusticana*) is an easy crop to grow. It can in fact be quite invasive. Like wasabi, processing is needed before sale. A number of small New Zealand based firms make Horseradish sauce and import the raw material from Australia. Look in your nearest supermarket to find the contact details of these firms. A phone-call may be all you need to establish a new business!

Berryfruit

Berryfruit is going through something of a renaissance, with a movement to healthy eating. Most contain high levels of vitamin C and antioxidants. The good thing about these crops is that most of the work is done by machinery, meaning lower labour costs. The product can also be sold in a number of different ways such as fresh, frozen, or as flavouring for ice-creams, yoghurt etc. Potential also exists to build a gate sales business targeting locals and passing tourists.

Blueberries

Growing Blueberries (*vaccinium* spp) in the southern regions of New Zealand on a commercial scale is relatively new. A peat bog near Otautau has become a test planting for a major Waikato grower concerned that a change in temperature in his home area may mean his plants do not get enough winter chilling to set fruit.

Figure 9 Blueberries

Of the estimated 350 ha of plants currently in the ground in this country, most are of the Northern High Bush and Rabbiteye cultivars. Plants are usually grown at 1.5 m intervals in rows 3.6 m apart to allow for mowers, sprayers etc to be used in a mature planting. A density of 1.5 m x 3.6 m requires 1876 plants per hectare. The cost of plants ranges from $1.10 to $2.25 each.

Weed control during the first two years is probably the most difficult problem in establishing a blueberry orchard. Weeds compete with blueberry plants for water, nutrients and sunlight. Mulching helps keep weeds under control and the soil moist and cool. As the mulch deteriorates it adds organic matter to the soil and creates a favourable environment for root growth, but can cause damage from root exposure if it is not replenished. Flowers should be removed in the first few years of a block's life. Maturity is reached after approximately eight years. A mature block should produce in excess of 10,000 kg per ha.

At the moment most of New Zealand's production is being exported to Japan and the USA. The return for a 1.5 kg tray of twelve punnets can vary from $12 to $45 depending on the time of the season. Frozen fruit is more stable, with A grade frozen fruit returning $3.75 to $4.00 per kg on the wholesale market. Pick-your-own should return $3.50 to 4.50 per kg depending on your location.

For more information on growing blueberries look at the following links

www.fndc.govt.nz/misc/SoilClimate/blueberry.pdf

www.blueberriesnz.co.nz.

Blackcurrants

Nearly everyone in Southland knows someone who was involved in the blackcurrant (*ribes* spp.) industry in Southland during the 1980s. So what happened to make a once thriving industry disappear? Firstly, nearly all the plantings were a variety called Magnus. Some blocks suffered from a reversion virus, leaving most of the fruit withered on the vine before harvest. At the same time, two of the larger growers decided to retire and sell-up. This meant smaller growers had to invest firstly in new plant stock and then try and get access to harvesting machinery which at the time cost upwards of $100,000. They all decided to cut their losses and

exit the industry. Although this was undoubtedly the best strategy at the time, those who stayed in the industry elsewhere have done reasonably well.

Figure 10 Blackcurrants

The majority of current commercial growers can be found in the Canterbury region, with a few also around Nelson. Blackcurrants require winter chilling to set fruit adequately, making the South Island the only likely options for industry expansion. The other important growing point is the need for adequate soil moisture, something easy to provide in the southern regions.

New varieties have been bred by a number of research companies and these have circumvented the reversion virus problems faced by Magnus. The HortResearch Ben series is an example of these types. Blackcurrants benefit from high organic matter levels, especially near the surface where the majority of the feeding roots are active. Plants are usually established from cuttings planted directly into the field 0.30 cm apart. Contact the following nurseries for access to plant stock and to find prices: P Hyatt, Upper Moutere, Ph 03 543 2877; Geoff Langford, HortResearch, P O Box 51, Lincoln (new releases only), Ph 03 325 6350.

Row widths depend on machinery but 2.8 to 3 m is most common. For hand harvesting wider spacing can be used up to 0.8 m between plants. North-south oriented rows appear to perform better.

For an excellent local link which looks at the growing of blackcurrants look at the following site http://homepages.ihug.co.nz/~nelsonc/blackcurrant.htm.

Some things to think about before getting started

There are some generic issues that need to be looked at before getting too carried away with crop selection and planning. Think closely about the following three items.

Growing skills

Many people claim to be good home gardeners. Unfortunately this does not always mean they will succeed when a hobby turns into a full time occupation. If you are getting involved in a full time horticultural enterprise, take time to up-skill yourself. This may mean doing a course through a local training provider or via the Open Polytechnic. The other option is to make sure you start small and grow your skills as your crop grows. After a few years you will know enough to expand. In all cases take whatever opportunities are on offer to attend seminars and discussion groups. You can guarantee that any problems you are facing have already been experienced by someone else. Battling on in isolation is not the best way forward. Never be afraid to ask questions and employ a reputable consultant.

Protection from the wind

Protection from the wind is essential for any high value horticultural crop, especially cut flowers and even nut crops. Planting this shelter must happen early in the planning stages. The key rule when designing shelter is that the zone of protection offered by the shelterbelt will extend into the paddock only four to five times the height of the shelter trees.

Good shelter can even directly benefit dairy farms. Studies coming from Australia show that grass growth can improve by up to 10% behind effective shelter, with a corresponding increase of 7% extra production coming from the cows. For a production focused industry, this may be a relatively easy way to increase profitability.

Environment Southland has produced the map below to help people select suitable shelter species depending on where they live in Southland. Shelter trees suitable for the Coastal Zone may not necessarily be suitable for the Inland Zone etc. Contact CFS directly for a list of tree species suitable in each zone. For more information and free onsite consultancy visits, contact Environment Southland on 03 215 6197.

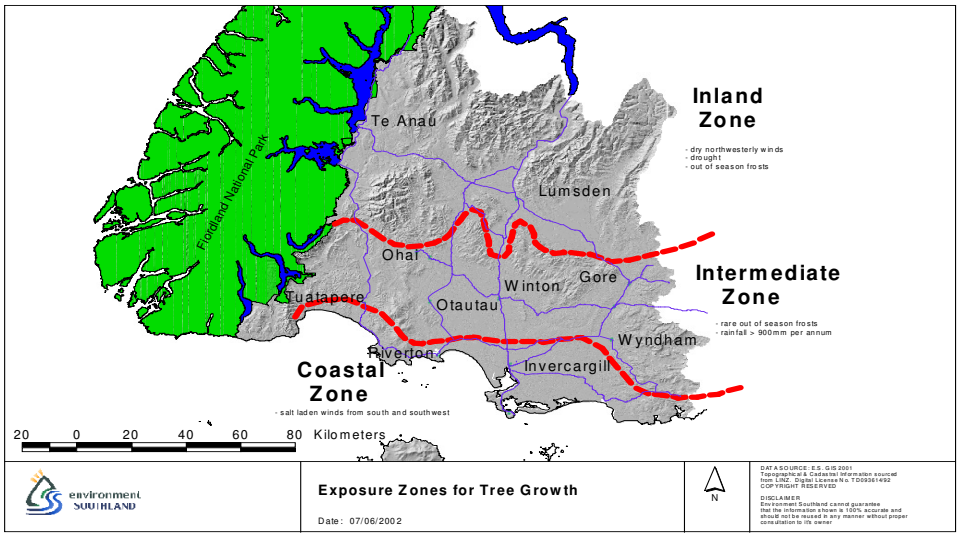

Figure 11 Exposure Zones

Business skills

In many cases lack of basic business skills has led to the downfall of potentially lucrative businesses. Once again, attend courses and seminars and do not be afraid to employ a business consultant to plan the best way forward. It is an old cliché but: 'those who fail to plan, plan to fail'.