



# Organics in Canterbury

Issue No 33: November 2006

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This newsletter is published by the Canterbury Commercial Organics Group, in association with Heinz Watties, MAF Sustainable Farming Fund, Central Canterbury Organic Growers Discussion Group, Canterbury Organics and the Biological Husbandry Unit, Lincoln University.

[www.organics.org.nz/ccog/ccog.html](http://www.organics.org.nz/ccog/ccog.html)

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Articles, letters to the editor and advertisements are welcome.

## Organic Growers Risk Management Project

### ORGANIC ARABLE DEMONSTRATION DAY

Thursday 30 November 2006

1.45pm registration, 2.00pm – 5.00pm (BBQ to follow)

**Venue:** “Longlea Farm” - Midlands Seed Organic Farm, leased by Tim Chamberlain. Cnr. Fairfield Rd and Singletree Rd, Newlands, Ashburton (signposted from SH1).

This will be a unique opportunity to view an intensive organic arable system! Join us to see and hear about organic arable crops and production techniques:

- Linseed, process peas, carrot seed, wheat leaf, pasture and stock (Anthony White, Tim Chamberlain)
- Undersown crops to establish winter feed and pasture (Tim Chamberlain)
- Herbicide-free weed management, false/stale seedbeds, weed seed bank (Farhad Dastgheib, Charles Merfield)
- Soil testing results and interpretation for an organic system (Tim Jenkins)

### Everyone welcome!

Fee of \$10/person includes BBQ – pay on the day.

RSVP: for catering, to Sue Cumberworth, The AgriBusiness Group, email: [sue@agribusinessgroup.com](mailto:sue@agribusinessgroup.com)  
Phone/Fax: 03 329 6456, Mobile: 027 628 6110

*The demonstration day is supported by the Sustainable Farming Fund, Foundation for Arable Research, Heinz Wattie's and Midland's Seeds.*





**Advertisements** contact Mary [kem@xtra.co.nz](mailto:kem@xtra.co.nz) or 03 3029202 to place your ad

## **EM Courses at CPIT Seven Oaks**

FREE EM Workshop Effective Microorganisms (EM) for Home and Garden 18 Nov, 9am to 1pm at CPIT 7 Oaks Campus. FREE to participants. The workshops introduce students to the principles and practice of using beneficial Effective Microorganisms (EM) to improve soil health and the quality and yield of crops. The EM Bokashi composting system for recycling food scraps will also be covered.

## **Organic Hazelnuts**

Is anyone interested in the commercial production of organic hazelnuts? Gilda Otway is interested in meeting other hazelnut growers. Email [corganic@organics.org.nz](mailto:corganic@organics.org.nz) or 03 325.1344.

## **Work wanted on an organic farm**

An Agricultural Engineer from Uruguay, now living in New Zealand, would like work on an organic farm, preferably in the Ashburton area. Please contact Laura Rossi (03) 3037535 or email [lirossi@adinet.com.uy](mailto:lirossi@adinet.com.uy)

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## **Study organic growing at Christchurch Polytech**

The Certificate in Certified Organic Production (L4) is offered part time via paper-based distance learning so you can study from anywhere in New Zealand. The course aims to focus on individual student's needs and allows for tasks and assessments to be adapted to personal situations, while still achieving the outcomes.

Students will explore the principles of organic production, manage soil, practise composting and green manuring, design and implement rotation, weed and pest management plans, develop production and certification plans and learn the basics of organic animal husbandry.

Graduates of this programme are equipped with the knowledge and skills to be working with and managing a certified organic property and to become active members of the commercial organic industry. They will have a sound understanding of the organic principles, which will enable them to evaluate the holistic nature of a organic growing situation. Past graduates have found employment in a wide range of areas e.g. market gardening, orchard management, herb production, consultancy, processing and certification as well as running their own organic operations. For more information on our other organic and horticulture courses at CPIT please contact us on 0800 24 24 76 or visit [www.cpit.ac.nz/horticulture](http://www.cpit.ac.nz/horticulture)

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## **BHU Crop Protocols**

The BHU held a workshop in July to "trial run" a series of crop growing guides (protocols) that have been written by Tim Jenkins and others from the BHU. Members of Canterbury Organic and other growers assessed the guides and made suggestions. Crops for which guides have been written range from peas, potatoes, and onions to the more exotic dill, radicchio and Chinese cabbage. The protocols cover everything from planting times, nutritional requirements, soil conditions and potential weed and pest problems. These guides can be downloaded from the BHU's website [www.bhu.co.nz/crop.html](http://www.bhu.co.nz/crop.html).



## Calendar of Events

### Thursday 30 November 2006 ORGANIC ARABLE DEMONSTRATION DAY

Venue: "Longlea Farm" Midlands Seed Organic Farm. Cnr. Fairfield Rd and Singletree Rd, Newlands, Ashburton (signposted from SH1). 1.45 pm registration, Demonstration Day 2.00pm – 5.00pm (BBQ to follow). See page 1 for details.

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**Organic websites** (if you know of other good sites please let the editor know so we can inform others next newsletter)

Canterbury Commercial Organics Group [www.organics.org.nz/ccog/ccog.html](http://www.organics.org.nz/ccog/ccog.html) (back issues of newsletters can be found here)

Organic Certifiers – Biodynamic/Demeter [www.biodynamic.org.nz/](http://www.biodynamic.org.nz/)

Agriquality [www.agriquality.com/auditing\\_and\\_inspection/organics.cfm](http://www.agriquality.com/auditing_and_inspection/organics.cfm)

Biogro [www.bio-gro.co.nz/](http://www.bio-gro.co.nz/)

Organic Farm New Zealand [www.organicfarm.org.nz/](http://www.organicfarm.org.nz/)

Lincoln University's BHU– [www.bhu.co.nz/](http://www.bhu.co.nz/)

BHU's crop growing guides - [www.bhu.co.nz/crop.html](http://www.bhu.co.nz/crop.html)

Soil and Health Assn – [www.organicnz.pl.net/](http://www.organicnz.pl.net/)

New Zealand Nature Farming Soc – [www.emnz.com/](http://www.emnz.com/)

Bokashi New Zealand [www.bokashi.co.nz/](http://www.bokashi.co.nz/)

Organic directory of goods and services <http://organic-register.com/index.html>

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## Farmers Market at Lincoln begins Nov 25

Make the Farmers Market at Lincoln part of your summer weekends each Saturday from 9am to 12pm. Food, glorious food is what the Selwyn Farmers Market at Lincoln is all about: a food, produce & flower market where local farmers & food producers sell directly to the consumer. The location of the market will be the Old Country Club off Edwards Street which offers a leafy environment with about 150 carparks.

Stallholders may only sell what they produce themselves within the region so you know you'll be getting the freshest goods around. We look forward to you joining us in creating a convivial atmosphere and regular community event on this centrally located, landscaped site.

Want to know more? Interested in being a stallholder? We'd love to hear from you!

Please contact Scott Rice, Market Manager, at [edibleseasons@gmail.com](mailto:edibleseasons@gmail.com) or phone 384-8711.

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**News from Organic Farm New Zealand** (certifying body for organic growers producing for the NZ market)

The big spring event was the AGM of Organic Farm New Zealand, held at Seven Oaks in Christchurch. This meeting was well supported by our committee members and local growers, thankyou – your input was valuable. In fact this contribution forestalled a move to hold future AGM's at Wellington as a cost saving measure. They will continue to be held in the regions.



The National Coordinating committee, responsible for governance of OFNZ has seven elected members. Peter Downard continues as Chairman, Terry Higginson (Far North and Central Northland), Richard Main (Auckland), Jim Bennet (Bay of Plenty) Heather Atkinson (Wairarapa and Hawkes Bay), Dennis Enright (Otago), Robyn Patchett (Canterbury & Nelson Bays). Hamish continues as the part time employee who actions office and secretary duties through the office at Soil and Health.

No doubt you will all have seen the web site [www.organicfarm.org.nz/](http://www.organicfarm.org.nz/) which is now up and running! To put OFNZ "out there" farm gate signs and T shirts and aprons are available from the OFNZ office. An advantage of our involvement with Soil and Health is that OFNZ is promoted alongside S & H eg. by advertisement in ORGANIC NZ, at Mystery Creek etc. Fieldays around the regions are also very important for spreading the word about the benefits of our domestic growers certification scheme.

There was some concern expressed at the meeting about the slow growth of certified growers. However it was pointed out that there is now a big proportion of fully organic growers which shows commitment to OFNZ.

#### Certification numbers

	CO	C1	C2	Full	TOTAL
2004	20	21	16	30	87
2005	48	28	36	70	182
2006	43	36	16	100	195

There was much positive action to report on from the meeting. The need for DDT testing in all regions was well emphasised by Jim Jolly. This will be followed up.

The central audit is still a stumbling block but the NCC approved a plan to set up a system for regional paperwork to be sent to another region to be assessed by their certifying team. The decisions made by region 2 (on the paperwork supplied by region 1) will then be sent to the standards committee for evaluation. Feedback and training will follow where necessary.

The NCC now has a regular monthly meeting so things are happening. The Standards committee is now in action. There are four members: Peter Downard, Terry Higginson, Peter Wilson from Auckland, and John Faulkner. All are experienced growers and John is a past lecturer in organics.

There are plans to progress with the manual and training for auditors. The Finance and Marketing committee is also getting into gear at last. There is also a move towards standardising cost of certification, payment to certification managers etc. The main problem has been a lack of positive action in regions where the C.M. and auditor are not paid.

The Standards issue was held over for another year with the proviso that all regions can contribute to an information sheet to be sent out to all members of OFNZ prior to postal voting before the next AGM. The meeting concluded with those involved previously saying it was the most positive and cooperative AGM there had been. So here's to more action!

*Robyn Patchett*



## News from Canterbury Organic (the local branch of Organic Farm NZ)

Canterbury Organic – the certification scheme for small growers or those wanting to produce for the local market, not export) – held its AGM on 29 July at Lincoln followed by a very pleasant organic dinner. Jackie Maxwell was elected Chair, Hugh Mingard Treasurer, and Sally Simmons Secretary. Gilda Otway has recently taken over from Hugh as Administrator. Hugh did a fantastic job for a number of years and his work is much appreciated by all involved in C.O. Thankyou Hugh. Gilda is a tutor in Organic Horticulture at CPIT (Christchurch Polytech) and also has her own patch of land at Little River where she and Nick have planted a hazelnut block.

For any enquiries regarding organic certification with Canterbury Organic please contact Gilda or the pod co-ordinator in your area – details below.

### CONTACT DETAILS:

**Canterbury Organic Office:** Gilda Otway (Administrator), 9 Harmans Track, Little River 8162 Banks Peninsula. Phone: (03) 325 1344 Email: [corganic@organics.org.nz](mailto:corganic@organics.org.nz)

### Pod Co-ordinators:

**Waimakariri and North Canterbury** Raymond Garb 027 2085199 [hcgarb@clear.net.nz](mailto:hcgarb@clear.net.nz)

**Selwyn (and areas SW of Christchurch)** Amanda Brennan 03 324 2699

**South Canterbury** Nathan Davies 03 612 6092 [aroaorganic@xtra.co.nz](mailto:aroaorganic@xtra.co.nz)

**Motueka** Michael Graham 03 5268180 [mikegraham\\_75@hotmail.com](mailto:mikegraham_75@hotmail.com)

Areas working towards establishment of a pod are West Canterbury & Kaikoura (please contact the office for further information on these or other areas).

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## Physical weed management

Charles Merfield (Merf) presented a seminar to the Canterbury Organic Growers group on physical weed management. These techniques are suitable for conventional as well as organic farmers.

### Key points

- Physical weed management should be **proactive rather than reactive**.
- The techniques used must be based on the weed's lifespan, method of propagation, germination requirements, morphology, & interaction with crop.
- Physical weed management involves *planning* & consideration of the whole farm design, including rotations; soil nutrients & structure; crop, pasture & livestock choices; cultivation; sowing, planting & related techniques; mechanical weeding & hand weeding.
- Cultivation is the main means of weed control but a major consideration is that cultivation has a detrimental effect on soil structure.
- After **primary cultivation** to prepare the seedbed, **secondary cultivation** to control the annual weeds can be undertaken.
- Secondary cultivation includes false and stale seedbeds.



- For a false seedbed, prepare the seedbed, leave until weeds germinate, then shallow cultivate to kill the weeds before planting the crop.
- Two or more false seedbeds can be used before the crop is planted, if time allows.
- The stale seedbed technique involves killing the weeds without disturbing the soil – create the seedbed, but delay planting so the weeds can be killed with a steam or flame weeder just before crop emergence.

The techniques used to manage weeds must be based on their lifespan, method of propagation, germination requirements, morphology, and interaction with crop. Weeds usually “match” the crop they are in e.g., permanent pasture will have perennial weeds rather than annual, and annual crops will have annual weeds which germinate quickly after disturbance. Annual species usually have huge seed output and must be controlled before seed is set. Some weeds may not be a problem during crop growth but control is necessary because they can be a nuisance at harvest e.g., clover in onions.

### The “big picture”

Physical weed management involves not just machinery but consideration of the “big picture” – the whole farm design. This includes:

1. rotations,
2. soil nutrients & structure,
3. crop, pasture and livestock choices,
4. cultivations,
5. sowing, planting and related techniques,
6. mechanical weeding,
7. hand weeding.

Costs increase as you move down this list; it is therefore imperative to sort out weed issues as early on as possible, e.g., if an early germinating weed is a problem in a particular paddock, consider organising your crop rotation so that a late sown crop will be grown there. This will give you time to control the weed with several false or stale seedbeds before the crop is planted.

**1) Rotations** Rotations should be flexible, and include crops that have different planting dates, rooting habits, volume and type of top growth, length of production, cultivation requirements, harvesting requirements, weeding requirements, and should include green manures, cover crops and livestock.

**2) Soil conditions** Soil nutrients, pH, structure, and drainage should be at optimal levels so the crop is as competitive as possible against weeds.

**3) Crop, pasture and livestock choice** The pasture phase of the rotation needs to be as vigorous as possible, with minimal bare ground to help prevent weed germination and growth. Perennial weeds, such as dock and Californian thistle, can be a problem in pasture. Pasture species that can compete with them are lucerne and chicory.

Crop variety can also make a difference to weed management. Choose cultivars that have rapid establishment and growth, and that have a prostrate or leafy habit. Cereal varieties with long stalks can more successfully shade out annual weeds than short ones.



**4) Cultivation** Cultivation is the main means of weed control. A major consideration is that *cultivation has a detrimental effect on soil structure*. Minimising the number, depth and energy involved in each cultivation is crucial to minimising damage. A spring loaded tine weeder for example requires less energy and will cause less damage to the soil than a PTO mounted implement.

Most weed seeds will be in the top 5 cm of soil and for most crops, only the top 5-10 cm of soil needs to be cultivated for seed establishment. Cultivation to a greater depth leads to mixing of the soil, especially with ploughs or rotary hoes. This can bury seeds leading to a long term problem.

Compaction can also be a detrimental result of cultivation and can lead to huge yield losses. Minimising the weight of the tractor and machinery and sticking to permanent tramlines can reduce the effect. Soil type and soil moisture level is also important: clay soils are very prone to compaction whereas sandy soils are much less so, and damp soils will compact more than dry ones.

### **Cultivation approaches for perennial weed problems**

i) Weeds with tap roots – docks are usually killed if the root is destroyed to a depth of 10 cm or more by an undercutter bar, ploughing, rotary hoeing or a combination of these. A fallow can also be used – the field can be shallow cultivated (to 3-6 cm) every time the weeds produce above-ground growth. This can be very effective but is hard on the soil and takes the land out of production.

ii) Shallow creeping weeds – e.g., twitch. Don't cultivate below the creeping roots but top work to bring roots to the surface. Sheep can very effectively clean up roots and a warm nor-wester can help desiccate. Repeat surface cultivation with spring-loaded tines.

iii) Deep creeping weeds – e.g., Californian thistles. These weeds call for a zero tolerance approach and should be attacked before they become a major problem. If present in pasture, repeated mowing can control; in cropland, deep ripping or subsoiling can break up deep roots. When subsoiling, use another implement first to break up the first 20 cm before going to about 40 cm with the subsoiler. It is crucial to overlap passes to ensure all the roots are broken up. Also ensure soil conditions are suitable – soil must be dry enough to shatter. Dig a hole first and drop a clod of the soil from a height to see if it shatters. The hole is also useful to check the depth of the roots.

Lucerne and chicory are deep rooting species feeding in the same soil zone as Californian thistles and can provide effective competition. A vigorous pasture with these species can provide good control.

### **Cultivation approaches for annual weeds in cropland**

After **primary cultivation** (e.g., with a grubber, harrow, roller etc.) to prepare the seedbed for growing a crop, *secondary cultivation* to control the annual weeds can be undertaken. Keep the depth of cultivations within the germination depth of seeds – this rarely exceeds 5 cm. The aim is to encourage as many weed seeds to germinate as possible without doing too much damage to structure.



**Secondary cultivation** includes false and stale seedbeds – both these weed control techniques begin with cultivation to produce a firm seedbed with good tilth. Then, for a **false seedbed**, leave the seedbed until weeds germinate, then shallow cultivate to kill the weeds, then plant the crop. If time allows, two or more false seedbeds can be used before the crop is planted.

The **stale seedbed** technique involves killing the weeds without disturbing the soil – that is, create the seedbed, then delay planting the crop so the weeds that emerge before the crop can be killed just before crop emergence with a flame or steam weeder. In both false and stale seedbeds it is important that good germination conditions exist; if dry, irrigation should be used if it is available.

**Tine weeders** can be used for false seedbeds in broadacre situations and roller/cutters are suitable in horticultural situations. Rollers give good depth control for the undercutter bar. Both these pieces of machinery are fast, not PTO driven, and therefore involve low capital outlay.

**Blind harrowing** – for large seeded crops that can be drilled more deeply, blind harrowing can be used. This involves drilling the crop, waiting till weed seeds emerge, then shallow cultivating. The crop then emerges into a cleaner seedbed. These techniques cost time and money but are less expensive than controlling weeds later, or having a reduced yield.

**5) Sowing, planting etc.** Sowing rate should be increased by 5-10% to compensate for losses due to tine weeding. Spacing for broadacre crops can be changed according to spacing of the machinery, e.g., row width can be doubled to 30 cm and sowing rate also doubled – this ensures sowing rate per ha remains the same and the wide row means there is enough space for an interrow hoe. Another option is to overdrill crops such as cereals at 90° to minimise the amount of bare ground available for weeds to germinate. For row crops such as vegetables, all crops should have the same row width so weeding machinery (e.g., interrow hoe) can be left at a standard setting.

**6) Mechanical weeding** Weeding machines are most effective at killing weeds up to the time the weeds have 0-3 true leaves; once weeds are bigger than this the percentage of weeds killed decreases significantly. Weeds are most effectively killed in hot dry conditions and most machines work better with fine, stone-free beds – an exception is the spoon weeder which will work better in slightly coarser tilths or where there are soil caps, which it breaks up very effectively.

i) Broadacre machinery: is designed to go over the crop without causing too much damage, e.g., tine weeders. These are designed for larger, deeper seeded crops with flexible stems, e.g., peas and cereals. They can very efficiently flick out small annual weeds but are less effective against grass weeds and ineffective against established weeds. Forward speed needs to be quite fast – up to 8 km/hr to get the most effective kill. Crops at later growth stages need to be weeded more slowly to minimise damage.

Spoon weeders have a number of flat, thin spokes forming a wheel which is driven around by contact with the ground. The “spoon” at the end of the spoke lifts a cone of soil and weeds and throws it into the air. There is less coverage than with a tine weeder but can punch through a capped soil.



ii) Interrow weeders: A range of interrow weeders is available including steerage hoes, brush weeders (good for wet conditions), basket weeders (no use in stony soils), rotary-hoe hoes (rotovators), rolling cultivators and potato ridgers.

*More detail, and information on individual weeders is available in the publication "Organic Weed Control – A Practical Guide". This is available from Charles Merfield's website: [www.merfield.com](http://www.merfield.com) – go to research, then look down the list for the report Organic Weed Management.*

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## Organic Arable Field Day – Kowhai Farm, Lincoln, 1 November '06

*Kowhai Farm, Heinz Watties' organic farm at Lincoln University, was the venue for the NZ Institute of Primary Industry Managers' monthly field day. About 40 people – farm advisors, bankers, and farmers – gathered to hear about organic cropping at Kowhai Farm.*

### Summary

- Kowhai Farm, Heinz Wattie's organic farm at Lincoln University, is a 57 ha property growing organic crops (mainly process vegetables), and grazing sheep.
- The farm had an intensive cropping history and came with poor fertility and structure, and a high weed burden which is still an issue.
- Kowhai Farm has now been going for 7 years and returns are similar to a conventional cropping farm's.
- Yields from the organic crops are usually slightly less than conventional crops but premiums more than make up for this.
- Cultivation is heavily relied on for weed control, and hand weeding is also required in some crops.
- A restorative pasture phase of 2-3 years is used to rebuild fertility and structure depleted by cropping.
- The grazing is leased out to another organic farming operation.
- The farm is constrained by lack of capital and small size.

Anthony White, agronomist for Heinz Watties and Kowhai Farm's manager, said Kowhai Farm came about after talks between Heinz Watties (HW) and Lincoln University (LU) in 1998. HW was keen for an organic demonstration farm because it had unsatisfied demand for organic produce and hoped more conventional farmers would convert to organics. LU was interested in a research and teaching farm. The 57 ha site, part of the LU cropping farm, was leased to HW in 1999 and the conversion process began.

The farm had an intensive cropping history, with a considerable weed burden (Californian thistles, nightshade, twitch and a range of annual weeds), poor structure and fertility. In fact, it was quite a test for organic production – if organic crops could be grown here, they could be grown anywhere. After taking over, the aim was to rebuild structure and fertility. However, rather than sowing down the whole farm in pasture, which would have been the ideal way to rebuild the soil, crops were grown on some paddocks to provide income.



In the first few years, there was little organic premium available for the farm in conversion, but after three years, Biogro certification was achieved and premiums of up to 200% (for onions) have made the farm more profitable. A range of crops is grown, mainly those in demand by HW such as peas, beans, carrots and corn. Pasture has been used in the rotation for two or three years to rebuild structure and fertility lost through cultivation and crop growth. Green manure crops are grown in between crops to provide a fertility boost, and crop residues, especially pea vine, are returned to the soil to add organic matter.

Process vegetable crops are preferred over cereals and other crops partly because they help to satisfy the demand for HW produce and because they are short term crops in which annual weeds are more easily controlled. Peas have been grown frequently during the cropping rotation but Anthony acknowledges that more pasture should be grown. This would increase fertility which in turn may make the growing of other, more fertility-demanding crops such as beans more successful.

Kowhai Farm has not achieved its goal of attracting more farmers to organic production, even though it has been relatively financially successful. This can be attributed to the difficulties of the first three conversion years, the lack of demand for other crops to fill the rotation, and the lower financial returns from stock during the pasture phase. Yields are usually slightly less than conventional crops but premiums more than make up for this. Organic premiums range from 50% for potatoes, 70% for peas to 200% for onions.

Inputs allowed under organic certification include Aglime and fine lime, reactive rock phosphate (RPR) and other non-soluble minerals, and Biogro approved foliar fertilisers.

Weed management on an organic arable farm is very different from a conventional one and relies primarily on cultivation. Ploughing is required for weed control, stale and false seedbeds are used to control weeds before germination or emergence and many crops are tine weeded and/or inter-row hoed several times after germination. Flame weeding is used on the onions; however despite intensive mechanical weed control hand weeding is usually also required in the onions, which is extremely expensive. The pasture phase depletes the soil weed seed bank and is also a good time to top thistles. Crop choice in some paddocks is also made on the basis of what weeds are present.

Financially Kowhai Farm is returning similar gross margins to conventional farms. However Anthony believes farm performance is constrained by a lack of capital (old machinery and irrigation equipment) and its small size which means it cannot benefit from economies of scale. Pressure to produce crops for Heinz Watties rather than have a greater area in pasture (which would improve fertility and structure) is also a constraint.

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## Organic stock management

*Raymond Garb, stock manager for Hart's Creek Farm, gave a presentation on organic stock management at the recent Kowhai Farm field day.*

### Summary

- The pasture phase, and stock, are an essential part of a cropping farm's rotation as a means of restoring soil fertility and structure.



- Stock provide a lower level of return than crops but are also less risky.
- Kowhai Farm leases out its grazing to Harts Creek Farm which runs Romney ewes and lambs on the pasture, crop residues and green manure crops.
- Organic lambs attract a premium.
- An all-grass wintering programme is used – minimal supplements are given.
- The internal parasite problem is managed by having sheep breed which are resilient to parasites, clean grazing, high feed intakes, and late weaning.
- Parasite-free grazing is probably the most important factor for an organic sheep operation to work well.
- Lice have traditionally been managed by shearing twice a year, but now a dip based on a bacteria that eats the lice is used.

The pasture phase, and hence stock, are an integral part of an organic cropping regime. The paddocks under pasture at Kowhai Farm are leased to Tim Chamberlain of Harts Creek Farm, an organic mixed cropping and stock farm based at Leeston. Raymond Garb, Tim's stock manager, spoke to the field day about organic sheep management and how the stock fit into an organic cropping regime.

Harts Creek Farm runs 1000 ewes and 200 - 300 mated hoggets. The sheep presently at Kowhai are the single lambing hoggets which lambed in August. They have been grazing greenfeed crops and pasture. Pasture is leased and other grazing (such as crop residues and green manure crops) is paid for.

Why do farmers bother with stock on a cropping farm when returns are lower than they are from crops? Organic crops need legumes, organic matter and animal manure to replenish the soil's supply of nitrogen and minerals which are basically "mined" out of the soil during the cropping phase. The microbes in dung also speed up the cycling of organic matter and nutrients.

This restorative phase is therefore essential to cropping and fortunately stock provide income in the process. Stock provide a lower level of return than crops but are also less risky. Premiums are now offered to organic lamb producers. Three companies supplying UK supermarkets have paid from \$4.90 to \$6/kg with prices currently at the higher end of the scale. The price is fixed for the whole season (December – May) and they will take lambs from 13-21 kg which means there is no pressure to lamb early. Last season Harts Creek Farm averaged 17.3 kg; this year they would like to be nearer the upper limit.

Without being able to regularly drench sheep for internal parasites, sheep breed becomes important. The sheep at Harts Creek Farm are Romneys from the North Island selected for resilience to parasites, high fertility and easy care. The flock is being built up with ewes that successfully lambed as hoggets and then had twins every year after that.

At Harts Creek Farm an all-grass wintering programme is used – minimal supplements are given. After some experimentation with alternative organic drenches, Tim has decided not to use any at all. The sheep have free access to a mineral salt mix.

Despite access to good feed, it seemed that lamb growth rates would slow right down at weaning. To get around this, they aim to not wean lamb until most of the lambs in any given



mob are sold. The advantages of this are bigger sale weights, healthier lambs, earlier finishing and less stress and work for the humans! The disadvantages are a lower stocking rate.

A stocking rate of 10 ewes and their lambs per ha is aimed for. Grazing can include pasture, green manure crops, crop residues and regrowth. Cereal leaf regrowth is especially good because it is parasite free. First year pasture has a lower worm burden than older pasture. Parasite-free grazing is probably the most important factor for an organic sheep operation to work well. Harts Creek Farm aims to maximise the area in parasite-free new pasture by undersowing most of the larger scale crops with basic pasture mixes which can be grazed for a couple of months or even a year or more. The cropping rotation is quite flexible so the sheep grazing has to be as well.

In summary, the internal parasite problem is managed by sheep breeding which is resilient to parasites, clean grazing, high feed intakes, and late weaning.

Lice are another problem which must be managed differently under an organic regime than conventionally. Shearing twice a year has been relied on to keep lice populations low. However, now a dip called Extinosad is available which is based on a bacteria which eats the lice. Although its not organically certified, permission can be given for its use. It is used annually.

Flystrike management is based on prevention. Sheep are shorn once and crutched once or twice during the fly season. Bales of pea vinings to provide extra dry matter are available to the sheep if they are grazing soft lush pasture. Ryegrass varieties with endophytes are not used in the pasture mixes.

Subjects up for discussion at the moment are lambing date, whether to vaccinate lambs, pasture species to use for undersowing that may be more advantageous to sheep, and shearing dates and intervals.

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## **Integrated Weed Management in Onions** *Farhad Dastgheib*

A three year study on non chemical weed management in onion was completed this year. The project studied two different approaches to weed management, i.e. pre-crop and in-crop. For the pre-crop practices that may help suppress weeds, cover crops during winter were studied. For weed control during the season, flame weeding and steam weeding were studied at different growth stages of onions.

### **Cover crops**

In the first year (2003-04), six cover crops, namely triticale, ryecorn, oats, a mixture of oat and vetch, hairy vetch and sub-clover were planted in April and the crop residue was mulch-mowed and incorporated into the soil in October. Hairy vetch and subclover did not produce a good stand and left a lot of spaces for weeds to grow. Populations of rye, triticale and oats were similar and all produced a good cover in a short period. The mixture of oats and vetch had the highest crop density.

In the second year five cover crops were compared namely: ryecorn, oats+tares, oats+hairy vetch, radish and brassica during the winter. These were sown on 15 March 2004. Data were



collected during the winter on weed density and crop and weed growth. Crops were mow-chopped on 23 September and all plots were scraped with a rotary hoe close to soil surface to cut the roots; plant residue was left to dry. The soil was grubbed, followed by rotary hoe and roller. This produced a fine and firm seed bed with plant residues incorporated into the top soil.

Some cover crops reduced the weed population and growth (biomass) during the winter season. Ryecorn, and oats mixed with either of the legumes were especially effective and gave remarkable reductions in weeds even towards spring. Mixtures of cereals and legumes are probably more beneficial in most situations as the legume crop can add nitrogen to the soil.

Although some weed suppression in the spring was noticeable following ryecorn, this was not adequate for onions. However, the benefits from cover crops are several fold and it is still very useful to have a ground cover during winter. Some of the likely benefits from cover crops under our organic systems are: adding organic matter and nutrients to the soil, improving soil physical conditions, protecting soil from erosion and suppressing weeds.

### **Thermal weeding trials**

Many organic growers use flame weeding pre-emergence to control emerging weed seedlings in onions, however, they do not use the technique post-emergence because they are not sure if onions would tolerate the heat. Replicated field trials at Leeston and demonstration plots at Kowhai Farm (Lincoln) compared different times of flame weeding in onions. The objective was to see if onions could tolerate post-emergence flame.

Results showed that flame caused some tip burning of onions but this was temporary and onions beyond the 2-leaf stage were tolerant. However, a few late-emerging onions which were small at the time died. Flame weeding killed young weeds and kept plots clean for a couple of weeks, new weeds emerged in these plots later in the season. Plots which were flamed twice post-emergence remained cleaner than others.

In the second year, two thermal weeders machines were compared: 1) flame weeder using LPG as fuel, and 2) steam weeder using diesel to generate steam which was delivered to plants through nozzles. Fourteen treatments were compared at 2-, 3-, and 4-leaf stage.

The results showed no significant difference between the flame or steam weeder. Timing of operation, on the other hand, had a significant effect on weed control. On average, the earlier the operation, the better was the weed control. Repeated operations produced the cleanest plots, provided a weeding at 3-leaf stage was included. A visual assessment in January did not show any significant difference between treatments on onion vigour.

The experiments in the third year focused on post-emergence thermal weeding as a weed management tool in onions. The question was, does the shock received by onions during flame or steam operations affect onion yield or quality, similar to the damage after a hail storm. Large plots were used and hand weeding was performed following thermal weeding to more closely simulate real field conditions. No evidence of harmful effect on onions was found after two passes of either flame or steam. Onions lost a leaf, but recovered later in the season and in some treatments produced very good yields. No increase in neck rot was found in these onions in the storage.



The main weed control cost in organic onion is hand weeding with a range of \$4000 - \$6000 per ha. This can even be greater in a bad year. With such high costs, it is necessary to ensure that hand weeding is financially justified. A cost benefit analysis indicated that in a normal year with moderate weed pressure, thermal weeding and other mechanized weeding operations can maintain weeds below the competition threshold during early stages of onion growth, therefore extra labour cost for hand weeding may not necessarily result in significant yield increase. In a bad year or in a weedy field, weeds continue to compete seriously with onions and it becomes necessary to control them and the extra labour cost may be justified.

In the absence of evidence of damage to onions from thermal weeding, the judgment on the benefits of this operation will be a financial question. Timely passes of either flame or steam could help reduce the high cost of hand weeding.

Most organic onion growers already employ a pre-emergence flame weeding. Thus, three passes at pre-emergence, 3-leaf and 5-leaf stages are recommended as a financially viable option for most onion growing conditions. Thermal weeding, like other weed control options has limitations (e.g. tolerant weeds) and should be used with other methods.

### **Tolerance of weed species to flame**

Observations showed that the weed killing power of flame or steam depends on weed species and their age. In general, grasses and weed species with protected growing points are tolerant to flame. Also, species with thick leaves or with a thick waxy cuticle are more tolerant. Plant age is very important. Fathen is quite sensitive up to 4 or even 6 leaf stage, but large plants may regrow from the axillary buds on the main stem. Medium to large perennial plants with underground reserves will regrow after flame.

## **General weed management recommendations in organic onions**

- Choose a paddock with low weed pressure.
- A cover crop gives good weed control over winter and a legume/cereal mix such as oats & peas can provide very good amounts of nitrogen for the subsequent onion crop.
- A fine firm seedbed is important for onions so enough time must be allowed for the cover crops to decompose.
- Use the false or stale seedbed technique to stimulate weed seeds to germinate. Killing these with a flame or steam weeder is preferable so the seedbed is not disturbed.
- During the growing season two passes of thermal weeding should give economic control of many weed seedlings, with follow-up mechanical weeding with a steerage hoe and/or basket weeder. Hand weeding may be required.

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## The newsletter mailing list needs updating. Your help is needed!!!

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