Technology Transfer to grow, produce and market organic wine in the Mornington Peninsula and Yarra Valley

FINAL REPORT to

The Grape and Wine Research and Development Corporation

Project Number: **RT 02/16-2**

Principal Investigator: **Dr Uwe Hofmann**

Research Organisation: **Mornington Peninsula Vignerons Association Inc**

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Executive Summary

Information provided on the field visits and subsequent discussions between vignerons and Dr Hofmann covered general information on organic standards, soil improvement, cover crop management, weed control, canopy management and plant protection - Botrytis and Powdery Mildew specifically. There is a high demand for sound information on these topics as well as their influence on wine quality.

Translation of Dr Hofmann's book from German into English would be valuable, according to the growers who participated in Dr Hofmann's seminars and field visits.

Dr Hofmann felt his tour was well organised and left with enthusiasm as our growers expressed a willingness to experiment, in comparison to growers in other countries where he consults. Individual regions recorded specific issues of relevance.

In general, soil management was shown as sub optimal - more training on soil management would be good for organic and non-organic situations, and long term soil maintenance may be a rewarding topic for future seminars or farm trials.

The use of rye grass in the inter-rows was common practice amongst the seminar participants. Dr Hofmann was concerned about the allopathic effects on vine roots, and so he introduced the use of multi species as an alternative. The trialling of Australian seed mixes for vineyard floor management could be farm trialed also.

Undervine weed control was an important topic, with only one grower using straw mulch with success for soil life and moisture retention. Undervine weed control systems used overseas could be adopted for Australian conditions.

Dr Hofmann considers that our current canopy management allowed for too many shoots, too dense foliage and no ventilation a danger for powdery mildew and botrytis. A system adapted to Australian light, heat and disease conditions in cool climates would be required.

There was immense interest to alternatives to petrochemical plant protection. Although many products are available in Australia for organic and biodynamic use, there is no good compendium available including Australian trial results.

Background:

With proximity to a major and affluent urban centre (Melbourne) the demand for wine from organic viticulture (reduced input of petrochemical pesticides) has increased by consumers, tourists and growers alike.

Homoclime studies have identified similarities in climate between the Cool Climate growing systems of Germany and the Mornington Peninsula, the Yarra Valley, the Macedon Ranges and Beechworth.
Limited literature about organic viticulture exists in Australia and the training of growers in Victoria is non existent.

The aim of this project is to enable growers to access an international perspective regarding the growing of grapes and producing wine according to organic standards.

Objectives

Growers will get an overview on the oenological practices needed to sell organic wine.
The economic benefits of Dr. Hofmann coming and lecturing and consulting in the two viticultural regions is to enable growers and winemakers to plan and adjust their growing and marketing strategies according to modern methods and gaining a competitive advantage and fast market penetration through knowhow and development of appropriate skills.

The experience will be of great social benefit to the region as the knowhow can be intensified through reciprocal visits and contacts with the well guided "Organic Wine Research Program Rheinland Pfalz " of which Dr. Hofmann is the coordinator and supervisor.

The environmental benefits are evident as organic viticulture does not use synthetic pesticides and has the potential to improve undervine and interrow management and soil integrity.

Results/Discussion

Dr Hofmann delivered the seminars/vineyard walks in Beechworth, Yarra Valley and Mornington Peninsula. Results of interaction are recorded by the leaders in each group in:

Appendix A Beechworth (Natalie Lauckhart)

Appendix B Beechworth (Lachlan Campbell)

Appendix C Yarra Valley/Mornington Peninsula (Vanessa Hood)

Outcome

Dr Hoffman was able to address each grower's concerns or local problems with respect to implementing organic viticulture and producing organic wine through individual vineyard visits and vineyard consultations. Industry participants met in interactive small groups where relevant information could be received for each of the micro-climates that exist in the region. The technology transfer provided an awareness and consolidation in the skills of the people involved in the region and the start of a basis for the ongoing 'organic' aspect of the development of the region.

Growers were encouraged to trial desirable alternatives to current growing systems and vinification techniques. Grapecheque will monitor any changes that may take place as a result of this initiative

Considerable interest was shown in the economics of organics/biodynamics compared to conventional systems in cool climates and more information on these details and possible research is needed. In developing a more organic or biodynamic system, Dr Hofmann pointed out some useful guidelines, although encouraged participants to experiment with individual situations.

Appendix A

Notes from Uwe Hoffman's visit to Victoria in November 2002.
By Natalie Laukart and Jo Deretic

Results:
There were between 12 – 15 growers present at the Beechworth Vignerons Association Seminar held at Smiths Vineyard in Beechworth on the 21st November 2002. The main topics that were discussed (as determined to be priority topics by the growers present) included:

- European situation
- Spraying – does it induce problems?
- Better Monitoring for pests and diseases
- Growing Organic Riesling without Botrytis
- Compost teas
- Weed control
- Phylloxera
- Alternatives to Cu and S
- Powdery Mildew control
- Vine health - balance
- Regional issues

Generally the overall feedback received from Uwe indicated that canopy management and improving soils are the two major issues that growers in Beechworth, and possibly in all areas of Victoria that he visited, face. The participants at the seminar showed a lot of interest and had numerous questions to ask. The list of questions and answers were documented and can be found in the attached document. Field sessions also were very well received and instigated good exchange of information.

Outcome:

Economic –

- Growing native cover crops (Species differ between vineyards) can result in better water penetration, which reduces the amount of run-off, and the amount of water used overall for irrigation. Cover crops can also give natural populations of pests an alternative food source, which ultimately reduces spray costs, and yield loss due to pest damage.
- Good vine: soil balance reduces the need for chemical spray application (hence the cost) because good vine health can be a natural defence mechanism.

Environmental –

- Cover crops improve the soil organic matter and increase earthworms therefore reducing compaction and erosion which are both major issues in some viticultural regions

Social –

- Good communication was established between growers within the Beechworth Vignerons Association. There was a communal focus on organics and biodiversity.
- Growers were able to focus their production on a regional level rather than an individual level.

New research needed:

A number of issues were explored at different grower's properties and were considered to be important for further research:

- The use of Organic compounds to strengthen cell walls in vines to reduce fungal attach and basic Botrytis management in cool climates
- The adoption of organic Viticulture in a cool climate
- Opportunities for a translation of the organic book that Uwe has written and is considered to be the most valuable textbook in organic viticulture. This book would assist in the implementation of organic Viticulture in cool climates.

Appendix B

Notes from Uwe Hoffman's visit to Victoria in November 2002.

By Lachlan Campbell

Agenda
Thursday 21st Nov, 2002

9.00 am	Meet at Smiths Vineyard, Beechworth to set up for seminar Registration
9.30 am	Introductory exercise
10.00 am	Seminar starts
11.30am	Break for Morning tea
11.45 am	Drive to Pennyweight vineyards for field visit
12.30 pm	Return to Smiths for lunch
1.00 pm	Seminar continues
2.30 pm	Field visit at Smiths vineyard
3.15 pm	Break for Afternoon tea
3.30 PM	Discussion and Wrap up
4.30 pm	Discussions and wine tasting
5.30 pm	Return to Motel
7.00 pm	Meet at Gigi's for dinner with Beechworth Vignerons Association

Introductory Exercise:
List any issues or questions that you would like answers to today:
European situation
Spraying – does it induce problems?
Better Monitoring for pests and diseases
Growing Organic Riesling without
Botrytis
Compost teas
Weed control
Phylloxera
Alternatives to Cu and S
Powdery Mildew control
Vine health - balance
Regional issues

Session 1

Questions that Uwe answered (Morning session)

What cover crops would you use to reduce vigour in the vineyard?
Canola, chickory, lucerne because they all compete with the vines. Any cover crops that use water.

What kind of companion plants would go well?

Fennel instead of roses at the beginning of the rows would be better because they harbour beneficial insects. Roses are pretty and can give an indication of powdery mildew pressure but the species of powdery mildew that affects roses is different to the one that affects grapevines.

How come deep rooting plants don't compete against the vines for water?
I can't say that some species of plants do not compete for water but the reason for planting deep rooted cover crops/ species is because it improves water penetration in the soil.

What is a weed and what is not a weed?
Most plants we think are weeds are not. These plants usually have flowers which attract beneficial bugs for example: aphids attract lacewings and ladybirds.

Can cover crops affect the flavour of the wine; eg: minty flavours from Gum trees?
There can be some influence but grapevines are the only factor that strongly influences quality and flavour. The use of compost just prior to harvest can induce bad flavours.

What are some of the bad flavours instigated from veraison to harvest?
As berries are softening some outside flavours can effect the taste of them. You can have an influence from pollution as well as some surrounding plants (but we can not say this is always the case) With the minty flavours being observed in Australian wines you can not say that it is always the Eucalyptus trees that cause this. Germany also has minty flavours and does not have Eucalyptus trees.

Why were you saying that you need to use a 3 – 4 month cycle with cover crops?
Grasses can establish a good root system, are vigorous and biodiverse. To change the diversity of plants and therefore impact the type of nutrients that are recycled back into the soil you need to use a rotational basis and change the variety of the cover crop. Reseeding can reduce the costs.

Does pressing down work for both summer and winter crops?

Yes, hot and dry conditions will dry the soil out and evaporation can be very high. Grass and lucerne have a high evaporation index but cover crops don't. They mulch the soil and keep the moisture in.

When should cover crops such as Vetch be pressed down?

Most cover crops should b pressed before budburst, after this you can mow them. This improves the soil moisture and re-seeding of the cover crops also occurs. For winter crops these will flower after bud burst and seed after harvest.

African black beetle can be devastating around this region. Are there plants that keep that out? Normally grasses encourage any pasture pests so the best thing to do is get rid of grasses in the inter-rows. Use of cover crops and other means to improve the soil structure will encourage the microbial population of the soil and harbour beneficial fungi and/or insects that kill the larvae of this beetle.

So basically you're saying that we choose our strategy.
Either give them a habitat so that they stay away from vines or reduce the population by planting appropriate cover crops and improving the soil structure.

Are earwigs beneficial?
They are called in-between bugs. In the vineyard they are no problem and can be quite good predators. They are a big problem in orchards as they feed on the fruit. The only problem earwigs cause in the vineyard is you can harvest them!

How many people get earwig damage?
3-4 people get earwig damage and believe they eat the young shoots of the vine.

What is the effect of mechanical weeding on earthworms and fungi in the soil?
There is a very low risk of damage but it can depend on the machinery. If the machinery loosens the top layers of the soil you can kill the earthworms. Discs are better to use in humid areas not in dry conditions. It is best to cover the soil with mulch in hot areas.

Boron deficiency is a problem here what can we do about it?
Put your Marc back onto your vineyard, the highest source of Boron is in Marc.

What about high Potassium levels in the Marc and what if we have high Potassium soils here in this region?

You have to try and bring everything into balance. If you have high Boron also increase your Magnesium and other trace element levels. Nitrogen is good as it competes with other elements, therefore you build up other elements to counteract with each other.

What about composting Marc and other things?
Ensure you have made the compost properly as it has to be mature, also plants such as tomatoes can grow from the compost if it has not properly been heated to 150°C.

Session 2

Information and Questions for Uwe at Pennyweights Vineyard:

Steve Morris showed us his Riesling vines. Has ryegrass and clover as cover crops. Sows in autumn (after harvest) and turns it in in spring to conserve water. For disease control he uses Bordeaux mix for downy and Sulfur for powdery mildew.

Gave up mulching after 9 years because the vines didn't grow. He had straw under the vines and heaped cut grass on top. The soil is very free draining and it is possible that the grass suppressed the micro-organisms. May be better to reduce the competition.

Has a problem with powdery – what can be done?
Improve your canopy management, open up the canopy (maybe try a different trellis system). 60% of plant protection can be improved with canopy management.

What are some alternatives to Cu and Sulfur?
Sodium silicate, Fennel oil, milk whey etc (see notes)

What to do to improve soil profile?
Continue with cover cropping as you are.

Session 3
Questions that Uwe answered (Afternoon session)

Are vegetable oils applied as foliar sprays?

They can be applied in fertigation, as a fumigant or as foliar sprays. Can also use Casuarina extracts.

How is compost tea made and at what rate would you apply it?
Generally, compost tea is made by washing compost with water and turning it. Then, use it at 500 – 800 L per hectare by spray application (don't forget to use a filter otherwise the nozzles will clog up).

Would you spray Sulfur for powdery mildew during flowering?
That depends on the conditions. If the flowering period is short (ie only 1 or 2 weeks) then it is not necessary to spray. Can spray with a dusting sulfur at 5% capfall and then after 100% capfall. If flowering period is more than 4 weeks then it may be necessary to spray because during this time the mildews can get in. If it's not necessary to spray, don't spray otherwise you could lose your crop (especially so with Sulfur).

Can you talk about the mode of action of fennel oil?
Fennel oils get inside the fungal hyphae and kill the hyphae from the inside out.

Is it worthwhile spraying silica at flowering?
No.

Session 4
Questions that Uwe answered (Wrap-up session)

What is your general perspective of your travels around Victoria – what can we all improve on?

Canopy management and soil improvement (cover crops and soil balance)

Applications of compost – the ins and outs?
To make an impact and get soil improvement requires at least 20cm deep compost. Only require about 5 – 10 cm for soil conditioning. This obviously also depends on the compost type (eg: animal manure or household waste).

Are there other resources that we can go to, to extend our knowledge on cover crop species?

Chris Penfolds program, look around your vineyard and see what is native and what works well. Internet site of UC Davis has list of cover crops their optimum conditions etc, managing cover crops in vineyards book; Internet database on Waite Univ on cover crops in Australia.

Agenda
Friday 22nd Nov, 2002

8.30 am	Meet Lachlan at Moyhu
9.15 am	Meet at Richard Carsons vineyard, Cheshunt
11.00 am	Meet at Peter Reids vineyard, Myrhee
1.00 pm	Meet at Vivian Beaumonts vineyard, Tahbilk
4.00 pm	Drop David Madge off at airport
5.00 pm	Drop Uwe and Jo off at the Downtowner, City

Issues faced in the King Valley

Vineyard floor management.
Management of Rhine Riesling in cool climates
Phylloxera management with compost
Scott Henry trellis design compared to Smart Dyson management.
Use of Organic compounds to strengthen cell walls in Vines to reduce fungal attach.
Adoption of organic Viticulture in a cool climate
Opportunities for a translation of the organic book.
Botrytis management for cool climates.

Appendix C

Notes from Uwe Hoffman's visit to Victoria in November 2002.

By Vanessa Hood

Region: Yarra Valley
Date: 18/11/03
Place: Emperor's Prize Vineyard, Coldstream
Time: 2-5.30pm
Participants: 19

Issues that growers were interested in (identified at the beginning of the session):

- Economics of biodynamics
- Feasibility of organics in the Yarra Valley
- What fungicides can be used?
- Use of Cu/S is expected to be restricted. What are the alternatives?
- Herbicide alternatives?

- Products available?
- What rate of horse manure do you use for powdery mildew control?
- Switching from conventional to organic?

Further questions/issues that arose during the session:

- Are any native grasses used as cover crops? Reg Egan has used some in his vineyard in the Yarra.
- How fertile do we want the soil in the Yarra Valley? "Heathly soil=healthy plant" was the general answer
- Has anyone used paper mulch? Maris Feldgen is going to have a trial on his place with it. Roz Dewez has experience with mulching using other materials.
- What is the C:N ratio of grape marc? 8:1
- Does compost cause problems with high rates of potassium? Not if used at low rates (eg. $20m^3$/ha)

➢ There was a lot of interest in the economics of organics/biodynamics compared to conventional systems in cool climates.

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Region: Mornington Peninsula
Date: 19/1102
Place: Willow Creek Vineyard, Merricks North
Plus vineyard visits (Jo Pittendrigh, Don Lazzar, Joe Vaughan)
Time: 10am-5pm
Participants: 19

Issues that growers were interested in (identified at the beginning of the session):

- Is organic viticulture 100% foolproof here on Mornington Peninsula/
- Can organic viticulture survive with no copper or sulfur?
- How can organic viticulture work in a cool climate?
- How does Australian organics classification fit into the world scheme?
- How do I improve sandy soils?
- Do you get more money for organic grapes?
- Is it cheaper to grow organically?
- Can a 50:50 approach work?
- Do you get better flavours with organic grapes?
- Weed control?
- Botrytis control?
- Conventional/organics- is there a combination that is 'sustainable'?
- Is organics 'sustainable'?
- Organics in warmer climates
- Milk for powdery mildew control?

Further questions/issues that arose during the session:

- Does pine oil control big hardy weeds? No, according to Don Lazzar, and it is quite expensive
- Lots of interest in how to make compost. Uwe recommends doing it properly or not at all
- Can you use fowl manure in an organic systems? Yes, but the source of manure allowed in Australia is restricted, according to David Madge.
- What other training in organic viticulture is available in Victoria? No one knew the answer!
- Jo Pettindrigh has used milk against powdery mildew and thinks it is successful.
- Andrew Hickinbotham is thinking about rolling down his cover crop instead of mowing it.

➢ 'We are standing on ground that we are paying rate for, so why not use it?" Joe Vaughan commenting about maximising the benefit of the mid-row wherever possible.

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Region: Macedon/Kyneton/Sunbury
Date: 20/11/02
Place: Moonstruck Vineyard, Spring Hill
Plus vineyard visits (Andre Deutsch, Terry South)
Time: 10am-4pm
Participants: 17

Issues that growers were interested in (identified at the beginning of the session):

- Information about mulches
- Weed control (2 people)
- Herbicide pesticide residues
- Powdery mildew (3 people), downy mildew and botrytis
- Economics of organics (2 people)
- Couch grass
- Permissible chemicals
- Organics here in Macedon/Kyneton/Sunbury- is it feasible?
- Criteria for certification (2 people) Australia vs overseas?
- Water use
- Nematode control
- Pests in the first year of vine growth
- What fertilisers to use?
- Is biodynamcs viable?
- How many biodynamic vineyards are there worldwide?

Further questions/issues that arose during the session:

- There are no vineyards certified organics in the area, but there are a few vineyards that are run using organic principles.

- There was a lot of discussion about cover crops
  - How do you convert from a grassy cover-crop to a mixed systesm?
  - Aren't broad leaf weeds a host for light brown apple moth?
  - How can you use lucerne as a cover crop because it uses lots of water and phosphorous?
  - Can you use ryegrass in combination with other species in your cover crop?
  - Should we roll down the cover crop instead of cutting/mowing?
- What sort of damage does the underview weeder do the soil?
- Where do you get biological herbicides?
- Wis N drawdown a problem with using bark chips as a mulch?
- Can rice hulls and poultry manure be used as a mulch/compost?
- Would you suggest we make our own compost or buy it commercially?

- 'He is not giving us a recipe, but giving us guidelines. We now have to go away and work it out for our situation." Ben Honey summing up the session in his words.