

The Winston Churchill Memorial Trust of Australia

Report by Darren Nicolai

2008 Churchill Fellow

Advanced Composting and Mushroom Farm Management.

I understand that the Churchill Trust may publish this report, either in hard copy or on the Internet or both, and I consent to such publication.

I indemnify the Churchill Trust against any loss, costs or damages it may suffer arising out of any claim or proceedings made against the Trust in respect of or arising out of the publication of any Report submitted to the Trust and which the Trust places on a website for access over the internet.

I also warrant that my Final Report is original and does not infringe the copyright of any person, or contain anything which is, or the incorporation of which into the Final Report is, actionable for defamation, a breach of any privacy law or obligation, breach of confidence, contempt of court, passing-off or contravention of any other private right or of any law.

Signed

Darren Nicolai

December 2008.

Contents

Title Page – including signed indemnity clause	1
Executive Summary	3
Introduction	4
My experience	5
In Conclusion	9
Annexure: Media article	11



Executive Summary

Fellow: Darren Nicolai
 Occupation: Proprietor
 Avoca Mushrooms

Address: PO Box 956
 226 Taylors Road
 NORFOLK ISLAND 2899
 ☎ 6723 23252
 ☎ 6723 50695
 e. avoca.mushrooms@ni.net.nf

Project: Advanced Composting and Mushroom Farm Management

Commercial mushroom farming is not for the lighthearted. Mushroom farming is a precise and unforgiving business that relies heavily on mastering the art and indeed science of good compost. The Dutch are perhaps the worlds leading producers and innovators in the commercial mushroom farming industry, leading and facilitating research and development widely throughout Europe and the world where the industry network connects and supports both professional and amateur farmers.

Mushroom cultivation as an industry continues to evolve and change with the global challenges that increasingly impact primary production and commercial industry as a whole. Increasing costs of fuel, energy and natural resources coupled with global recognition of the need to review the impact of our commercial activities on the environmental have necessitated a rethink about what is best practice and how the mushroom industry can play a real role in recycling waste streams to produce a clean and sustainable food source which supports a diverse network of industry who in turn create employment that supports communities.

Whilst there are substantial differences of scale between the many farms and facilities I visited in Europe and my operation here in Norfolk Island, the underlying foundation for any successful commercial mushroom operation is based on some standard principles which farmers adapt to their local environment. These principles broadly include process, hygiene, energy and resource management. Each of these areas needs to be balanced and mastered to ensure the synergy that delivers a favourable outcome.

Mushrooms farmers never stop learning. Research and development by industry leaders disseminated through a raft of networks ensures that knowledge and improvements are shared, with benefit in particular for smaller farmers like myself who do not have this capacity themselves which in turn assists in promoting best practise and delivering for our respective consumers a continuously improved product.

In applying for a prestigious Winston Churchill Fellowship I sought to advance my experience of composting and mushroom farm management. Without question my Fellowship experience has taken me to a new level of understanding and provided the catalyst for my next stage of improvement, which will be focussed on reevaluating my energy use with a commitment to energy reduction, and increased recycling. These outcomes are, to me, significant and directly attributable to my fellowship experience for which I am extremely grateful.

Introduction

Early in 2008 I applied to the Winston Churchill Memorial Trust to join the roll of fellows seeking to excel in their chosen fields, which for me is mushroom farming. My application sought support to travel to Europe to advance my knowledge and skills in the commercial mushroom cultivation industry with focused emphasis on composting and farm management.

I was delighted to be successful with my application and proceeded with haste to confirm my travel itinerary and arrangements.

Having now returned from what seems like the best part of a year to organise and attend, I am honoured to report my sincere and absolute gratitude for the personal gain I have achieved from this journey, on so many levels, which has more than exceeded my highest expectations.

Of course no international travel from a remote island (with a population of less than 2000 people) with transit through several foreign countries is without its challenges however the success of the journey is maximised with the collective planning and assistance of the support staff and to Louise Stenhouse, Meg Gilmartin and Maggie Berganin; thank you so much ladies. I also thank my Referee's Hon. Geoff Gardner MLA and Mr. Warren Langman whose support added value to my application, and last but not least thank you to the staff at the Administrator's Office in Norfolk Island for their assistance and support also.

I anticipated returning from my fellowship with the knowledge and tools to take my farm to its' next level of performance. Even better than that I have returned to Australia with a renewed sense of enthusiasm, a return to the confidence that drove me to enter this difficult industry in the first place, and I have also established an international network of industry peers willing and able to assist and mentor as I strive to advance my own excellence. I'm not sure that I could even have asked, let alone anticipated, more than that!

I have published in our local newspaper an article (copy attached at page 10) which summarizes my trip and I am heartened by the number of people who have since contacted me to learn more of my experience and also to assist them in making their own applications. From these communications it has occurred to me just how relevant this wonderful training and development opportunity is particularly given that the applicant is able to determine where they will best gain the learning they seek. It is very humbling to think that as a beneficiary myself I now have the capacity to empower others to step up, perhaps even out of ones own comfort zone, to pursue the excellence that is within every one of us.

My experience

After nearly 24 hours in flying from Norfolk Island through Melbourne, Singapore and Heathrow I arrived in Schiphol, Amsterdam. From there I traveled by train to a small town called Venray, which was my base for the first week. Training started the next day with *C-Point* in Horst, The Netherlands. The training centre is a purpose built facility with a number of modern training rooms for the diverse range of courses offered in agriculture and animal husbandry over each calendar year. The course I attended was a 5 day

“Mushroom Theme Days” which covered composting, farm management and growth management. There were 20 participants from many countries including Switzerland, Brazil, Poland, Germany, Iran, USA and France. All participants had personal experience in the mushroom industry to varying degrees – some like me owned their own farms whilst others managed or were employed in commercial operations. The calibre of the participants validates the relevance and industry respect for *C-Point* training and consultancy.

Training was a mix of 4 days intensive classroom tuition utilising PowerPoint presentations and interactive participation between students and consultants Mark Ouden, Thei Staaks and Jan Gielen – all specialists in their separate fields. As well a day was spent visiting farms and composting facilities within the local region.

Subjects covered included;

- Compost preparation; raw materials, preparation of materials, automated preparation of compost, prewetting.
- Compost production (Phase I); traditional systems of compost preparation, indoor composting facilities (bunkers), airing systems, technical aspects of bunkers, good compost production technique, aspects of compost ready for processing.
- Compost processing (Phase II); technical aspects of Phase II tunnels, ventilation, filling, oxygen, pH, moisture content, nitrogen (ash), Carbon/ Nitrogen ratio, review of machinery used to minimise heat loss in compost transfer between Phase I & Phase II, the stages of Phase II including measurement and monitoring of each stage, and compost ready for spawning.
- Spawning (Phase III); hygiene, application rates, best practice spreading of spawn, strains of spawn, reputable suppliers of quality spawn, various spawning mediums including bags, blocks and tunnels, supplementation and review of a good spawned compost.
- Casing; function of, choice of quality casing soil, mixture of raw material, current types of casing soil used by the industry, evaporation, bacteria and the micro and macro climate, casing machinery, screening and storage of peat, and crop management.
- Cropping; best practice picking techniques, hygiene, production levels, minimising damage to cropping surface, correct body posture for safe picking, growing influences, watering during harvest, humidity, weighing including investment and maintenance in good scales, choice of picking trolleys, managing the various flushes, and protecting the finished product for retail.
- Energy; climate control programs, quality improvement, energy saving, energy agreements, computer systems to monitor energy use and efficiency in the mushroom farm, barometric pressure and oxygen correction, humidity correction, evaporation and managing □missions.
- Farm management; recording the right information, monitoring, making the connection between the records and yield, periodic review of practices, using the resources available to grow your operation.

To break the classroom learning of the vast information provided as above the group visited a number of regional facilities which included;

- CNC, Holland & Walkro BL, Belgium; these are the largest composting facilities servicing mushroom growers throughout Holland, Germany and Belgium. The sheer scale of these facilities which are fully automated operations, and not remotely

commensurate with my traditional method of compost production. These farms each produce more compost per week than I do over a year! It was encouraging to note that their finished substrate had many features similar to that I achieve and so even though the 2 farms are at the opposite end of the scale to mine in terms of production levels, we share a similar finished product appearance. I particularly enjoyed talking to a range of staff working in these facilities who managed different functions and from this interaction with hands on workers they willingly shared what might be considered "trade secrets" learnt from years of mastering the art. Certainly I have put some of these differences into practice following my return and look forward to achieving some improvement in my composting operations.

- *Fancom, Horst*; this company specialises in agricultural computers, in particular climate control systems. Control and monitoring of the various environmental conditions during all stages of compost and mushroom production is essential and again, as with the composting facility in Belgium, these systems are far more advanced and utilised in facilities with massive crop output. Investment in these systems ensures the optimum parameters are achieved however the price tag for such technology leaves farmers of my calibre in awe and not on the immediate 'can have' list! Systems currently supplied by *Fancom* are as diverse as temperature, moisture and oxygen level monitoring systems for Phase I & II applications, automated management of Phase III, grow room monitoring and measurement and monitoring of emissions through biofilter systems. Certainly if one had the means to implement this level of technology there would be many positive benefits.
- *Agaricus BV, Lumarjon NL & DeChamps NL*; these farms are strictly established for cropping. Compost is brought into these farms in large trucks spawned and ready to grow on. The substrate is unloaded onto a conveyor belt that fills special cassettes, which fill the growing shelves. The cassettes are cased separately and the growing cycle starts soon after. Learning gained from visiting these farms, which again enjoy weekly output equal to more than a year of my production levels, concentrated around picking and hygiene. Staffing of up to 60 people to harvest the crops makes it all a very efficient and precise operation. I couldn't imagine having the task day in, day out of harvesting such huge quantities of mushrooms. The efficiency of the picking staff who carefully and quickly harvest the volumes of mushrooms that they do needs to be seen to be believed.

Another huge benefit I gained from my participation in the Theme Days was the time spent networking with the various farmers and suppliers of supplements and products used by commercial growers. I have since made contact with Australian agents for several of these new lines which I will now trial in my own operation to positively influence my farms performance. Certainly some of these brands were unknown to me even though they are widely used throughout Europe and Australia – I really look forward to monitoring the differences.

The end of the Theme Days was the end of my group learning environment. I had made a close connection with 2 farmers in particular, both of whom indicated interest in coming to the island to see my operation and share their extensive experience. I sincerely hope that the goodwill remains and I can again connect with these wonderful people.

Before leaving The Netherlands I took the opportunity to visit farms *Mush.Comb.* and *Beckermann*, composting machinery specialists *Thilot-Limbraco* and technology specialist *Gicom*. *Gicom* is an international tunnel composting plant who design computer controlled growing cells and tunnel composting facilities with specialised expertise in measurement

and control devices, biotechnological process control and air handling systems. Of particular interest to me is their semi-mobile tunnel container system for smaller compost capacities based on organic material in a semi mobile closed box – the container tunnel. The composting facility comprises a system of corrosion free and water tight modular units. The composting container is fitted with scrubbers and biofilters and is divided by a perforated floor to provide the aeration plenum and composting matrix. When filled with compost process air is recirculated and fresh air, as needed can be added as well as water. By circulating the process air it is possible to control parameters important to the composting process improving humidity, oxygen concentration and substrate temperatures. Designing a system best suited to my operation will take time and money however the long term benefit of investment in this technology is an advance I now understand and eagerly anticipate.

From the Netherlands I travelled to Belgium and then France. Not a seasoned traveller I found France a little more difficult than the assurances I had been given by my travel agent who assured me language would not be a barrier. Certainly it was not my experience that people were multi-lingual and on a number of occasions I was drained of every ounce of patience. Nevertheless the effort was worth it and I spent my time in Bordeaux visiting the French Mushroom Technical Centre which is large experimental station working in partnership with local industry with advanced research in the *Agaricus* strain of mushroom cultivation. The majority of my time in Bordeaux was spent at *Sarl Renaud et Fils* facility which has a long history of mushroom cultivation starting out in caves. Of course success has brought to this facility massive expansion and extensive automation that enables this farm to play a major role in supplying local markets. I am very grateful to Bruere Adrien, Production Manager for his genuine friendliness and willingness to give of his time so generously. Bruere was a breath of fresh air and managed to communicate effortlessly despite our different languages. Certainly I could have easily spent a month in this beautiful farm taking in the hospitality and learning from this kind gentleman.

I also visited *France Champignon* who have a number of very successful operations throughout France. Of particular interest to me from this visit was the range of products created from their mushroom production, packaging and the material they have developed to advertise and encourage consumers. This is a largely ignored area of my own operation whilst not essential, given competition for me is limited, retaining consumer confidence and interest through diversifying my product range may increase demand and sales and open opportunity for export markets off island. Certainly there were product lines that I feel I could introduce without the need for significant capital investment which will add value to my farm and offer some more creative and healthy food lines. I look forward to implementing these ideas in the very near future.

I had anticipated, rather ambitiously, perhaps out of ignorance, travelling more extensively through France to include taking advantage of some of the contacts I made at the Theme Days however the train network in France is extremely busy, not particularly novice friendly and transport by taxi is outrageously expensive. Travelling with a companion to assist with navigating and hiring a car would be far more advantageous than relying on a train network to move around in a large foreign country. I lost my nerve on more than one occasion, checked into the wrong hotel, had to pay to use the toilet on a Paris train platform and nearly missed my flight when the reception desk forgot to make my wake up call. All worthy of a laugh in hindsight but unsettling at the time.

France, as one would expect, is a visually beautiful place and I enjoyed several days wandering around the shops, taking in the fresh fruit and vegetable markets and tasting some of the amazing range of fresh mushrooms available. Gourmet and specialty mushrooms are of increasing importance to the discerning mushroom consumer and provide new opportunity for me in developing new product lines to complement my range. Opportunities for inspiration are endless in Paris and Bordeaux.

Conclusion

My fellowship was an opportunity for me to learn and grow in an industry that is largely unsupported here in Norfolk Island other than by the consumers who have a somewhat insatiable appetite for the organic mushrooms that I cultivate. My fellowship was not about proving anything and consequently this report does not make recommendations about mushroom cultivation.

Equally, I have tried not to labour discussion about mushroom cultivation per say given that for the average person, the technical aspects of growing mushrooms would unlikely be of any interest.

What I can confidently conclude, from my own Churchill Fellowship experience, is the real value in integrated learning, networking and engaging in person with the experience and knowledge of industry professionals to advance your own success. Without a doubt everyone, in any field, starts somewhere and with perseverance, dedication and a willingness to grow and seek ways to improve will achieve success. Each of us is a role model for someone and each of us has the capacity to rise above the challenges that test our commitment. When we find whatever niche our passion hides within and nurture that passion we find our path to personal excellence.

I am committed on a personal and financial level to the success of my own mushroom farm. I have struggled with all of the challenges that face farmers generally in dealing with the long hours and small returns. However I have never lost sight of the desire to provide an organic mushroom of high nutritional value to support the local community which includes tourists from mainland Australia and New Zealand. Any person who purchases mushrooms grown at Avoca Mushrooms purchases my commitment to excellence and integrity.

I am extremely grateful for the very significant and generous investment the Winston Churchill Trust have made in me and I trust that the benefits will be far reaching for those who eat mushrooms in Norfolk Island. I am confident that my own positive experience will also benefit future fellows who for now aspire to join the very rank of fellows that proudly includes me. Perhaps the only recommendation I would make to aspiring applicants is they not be too ambitious when designing their itinerary – foreign travel is both challenging and tiring and intensive learning needs to be balanced with time out to avoid overload.

Darren Nicolai
Avoca Mushrooms
