MUSHROOM

INDUSTRY REPORT 07 | 08

R&D and Marketing investments seek to reposition mushrooms

Know-how for Horticulture™

In line with the industry strategic plan, our R&D and marketing investments continue to maintain important support programs to the industry, while simultaneously seeking to reposition mushrooms in the minds of the consumer.

The mushroom industry strategic plan was developed in 2006 following extensive consultation with mushroom growers and other parts of the industry supply chain. It states that the overriding goal for investment in marketing and promotion and research and development programs is to create an environment that allows growers to maximise the return on their mushroom industry investments. The strategic plan aims to address this by:

- Achieving market growth by developing an environment where there is a strong demand for mushrooms.
- Ensuring people in our industry are appropriately skilled and supported.
- Providing information to increase efficiencies on farm.
- Minimising risks to the industry.

It is a credit to this industry, and to the AMGA in particular, that the industry's strategic plan has been maintained as a 'live' document and is regularly revisited and updated. Consequently, the plan remains highly relevant and continues to guide the investment program effectively.

On one level, the current investment program is directed towards initiatives and projects that underpin the industry's ability to stimulate demand and to meet that demand with a high quality product. This part of the investment program has been in place for some time and has a strong focus on 'continuous improvement'. To date, it is the pursuit of continuous improvement that has enabled the industry's programs to remain effective in the face of increasing costs and declining investment (in real terms).

At another level, the investment program seeks to reposition the mushroom category in such a way that it can be differentiated from other products in the 'noisy' world of marketing and communication. The repositioning strategy is important for refreshing the industry and its products in the minds of not only consumers but all others in the supply chain.

In recent times there have been some changes to the membership of the Mushroom Industry Advisory Committee (IAC). Brian Carroll of Oakville Mushrooms was appointed to the committee in 2007 following the resignation of Michael Brown. In addition, the IAC has been strengthened by the addition of two independent R&D and marketing experts, Mr Barry Macauley (R&D) and Mr Ian Pakes (Marketing).

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These projects have been funded by HAL using the mushroom levy and/or voluntary contributions from industry with matched funding from the Australian Government for all R&D activity.

Good progress with cancer research at City of Hope

Dr Shiuan Chen and his team at the Beckman Research Institute of the City of Hope in California are making good progress with trials using mushrooms as a deterrent to human breast and prostrate cancer.

The present research, funded by the Australian and United States mushroom industries, builds on previous work at the Institute in which significant anti-cancer benefits were recorded when *Agaricus* mushrooms were fed to nude mice.

Clinical trials are about to commence with the Breast Cancer Trial now that the protocol has been approved. Patient surveys at the Beckman Research Institute have determined that mushroom powder tablets are the preferred method of administration of the medication. Tablets have been formulated and patient recruitment initiated.

The Prostate Cancer Trial protocol has been submitted and reviewed by the Institute's Internal Review Board and has been approved.

Meanwhile, it is planned to repeat the nude mouse experiments with the new mushroom powder preparation. Immunological experiments will be repeated to confirm previous findings.

In addition, Dr Marianna Koczwas, an oncologist at the City of Hope, is to initiate a clinical trial on lung cancer using a mushroom extract. This is based on the potential of the mushroom product for improving the immune function of lung cancer patients. The cytokine profiles of breast and prostrate cancer patients treated with white button mushroom powder will be compared with the profiles of lung cancer patients treated with another mushroom product. If the cytokine profiles are comparable, it could be interesting to consider a lung cancer trial using *Agaricus* mushroom powder.

Project MU06019

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MUSHROOMS FOR LIFE

Mushrooms For Life (M4L) is the strategic scientific engine room that will underpin the development of the mushroom industry in Australia over the next decade. The project is essentially about sourcing, analysing, evaluating, synthesising and communicating scientific information. The outcome is a greater awareness by health professionals and the public of the health benefits of including mushrooms more regularly in the Australian diet.

During the past year, the Mushrooms for Life website (www.musgroomsforlife.net) has been updated and new sections have been added: Mp3s (interviews), FAQs, and Ask the Dietitan. The latter generates questions from both the public and professionals. Topics include selenium, vitamin B12, uric acid and the effect of cooking on nutrient content. Five Mp3 interviews on mushrooms and health and one interview on the latest in nutrition research have been added. The Mp3s can be downloaded and listened to on an Mp3 player.

The M4L team is a major contributor and beneficiary of a collaboration between the US Mushroom Council, Mushrooms Canada, the UK Mushroom Bureau, nine European countries and the AMGA to form a global network to source new and impending mushrooms and health research. The information sourced has been integrated into our education of health professionals and the public on the health benefits of mushrooms.

Government nutrition documents do not include mushrooms in their literature despite mushrooms being the third biggest selling fresh food item at supermarkets. M4L is preparing submissions to rectify the situation and producing a background document on the importance of mushrooms in the diet for the Dietary Guidelines Working Committee.

Project MU06023

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South Africa Congress

In May 2008 growers and composters travelled to South Africa to visit mushroom businesses and attend the 17th Congress of the International Society for Mushroom Science.

The trip allowed growers and composters to learn from the experiences of their international counterparts and to get the latest in mushroom science, growing and marketing through attendance at the Congress.

The visit reinforced that Australia is at the forefront of the global industry but also reminded delegates of the rapid pace of change and the need to maintain a high level of competency across the full spectrum of industry activities in order to stay ahead of the game.

While South African mushroom farms do not generally yield as highly as Australian farms the tour delegates were able to learn much from their experiences. In particular composters were able to talk with the South Africans about their experiences in using irrigated wheat straw and the link between compost production and the spread of disease.

Growers saw first hand the difficulty in dealing with aggressive *trichoderma* and now better understand the measures that need to be taken to manage the disease. The South African experience with this disease also rammed home the importance of some of the work currently being done in the international research community on early detection of disease.

Conference delegates view a composting facility at Stellenbosch, near Cape Town

L–R Bill Littleson and Mick Surridge of Scatoplus get their hands dirty with Leif Levang from Highveld Mushrooms near Johannnesburg

KEY CONGRESS FACTS

- **Over 350 delegates attended with representation from researchers, spawn suppliers and composters, right through to marketers and promoters of the product.**
- **Delegates came from a total of 38 different countries**
- **75 presentations from 62 different presenters**

In terms of marketing, a key challenge for South African businesses is to educate their consumers about the safety and health attributes of mushrooms and importantly, how to use them. The Australian industry has been doing this for some time, however the targeted approach used by the South African industry provides a useful comparison for us as we trend towards more targeted messaging ourselves, particularly in the area of health.

The ISMS congress in Cape Town allowed delegates to interact with global leaders in mushroom science, production and marketing. The full three day program can be found at the conference webpage (http://www.isms2008.co.za). Copies of the presentations are available through AMGA.

In summary, delegates on the South African study tour found the experience to be hugely rewarding. Through interaction with South African mushroom businesses and the vast array of presenters and exhibitors at the congress they have forged new international relationships and gathered valuable information on the future of mushroom growing.

Project MU07006

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Progress with development of disease monitoring system

This multi-agency project, involving research and extension teams from Australia and New Zealand, is developing a sophisticated disease detection and monitoring system which is based on molecular biology technologies.

Genetic profiles are being established for pathogenic species/isolates of *Verticillium* (dry bubble), *Trichoderma* (green mould), *Mycogone* (wet bubble), *Cladobotryum* (cobweb), La France virus and Mushroom Virus X. These profiles will be used to identify and quantify disease from samples taken on farms. The use of molecular biology technologies will allow disease to be identified and quantified before symptoms appear in the crop.

To date, protocols have been developed and validated for the molecular detection of La France virus and Mushroom Bacilliform virus and work continues with the development of protocols for the detection of *Verticillium, Trichoderma, Mycogone* and *Cladobotryum*. In the final year of the project, protocols will be gathered for the molecular detection of Mushroom Virus X and there will be further development of methods for the detection and quantification of *Verticillium*.

In addition, a comprehensive collection of mushroom disease isolates is being established with samples from Australia, New Zealand and from research centres in South Africa, The Netherlands, Ireland and the United States. The collection is presently located at Crop & Food Research at Christchurch in New Zealand.

Another part of the project is screening isolates of fungal pathogens for fungicide resistance. To date, agar-based protocols have been developed for screening but it is now planned to develop molecular PCR tools for this purpose. These tools will allow rapid screening of samples from farms so that growers can be made aware when their submitted disease samples are resistant to specific fungicides.

Members of the project team met with international colleagues for the second International Workshop on Mushroom Disease Diagnosis which was held immediately prior to the International Society for Mushroom Science congress in Cape Town. In addition to Australia and New Zealand, participating research scientists came from South Africa, The Netherlands, Ireland and the United States.

Project MU07000

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MUSHROOM INDUSTRY PEST AND DISEASE SERVICE

The Pest and Disease Management Service (PDMS) is made up of several inter-related strategic activities that underpin the production security of the industry. Effective pest and disease management on-farm is crucial for producing mushrooms of appropriate quality in sufficient numbers to remain profitable.

Pest and Pesticide Survey

The 2008 Pest and Pesticide Survey contacted over 60 farms by telephone. Pest and disease status and pesticide use patterns on each farm were discussed. This survey follows similar exercises undertaken in 2001 and 2005 and enabled information to flow back to the AMGA Pest and Disease Strategic Review, resulting in better informed levy investment decisions.

Action plans to address specific issues that emerged are being developed and implemented. These include:

- New methods trialled to teach farms to be able to correctly differentiate between the two main fly species (and therefore select the most appropriate insecticide).
- Description of pest and disease control measures to be packaged to each growing system to enable the unique characteristics of the different growing systems to be understood and addressed.
- Journal articles and presentations to be developed to educate growers in safe and effective fungicide use.
- A new series of training modules on pest and disease identification and control to be developed and delivered aligning content to nationally endorsed competencies.

Regular column in Industry Journal

The following articles were published in the PDMS column of the AMGA Journal (published four times a year):

- Mummy
- New warnings for some fungicides
- Studies on Verticillium at the Marsh Lawson Mushroom Research Unit
- Mushroom Disease Monitoring System (MDMS) progress report
- Spot treatment techniques for Cobweb: Traps to avoid
- New book published on mushroom pest and disease control
- Phorids and Phase 3 compost
- Predatory mites and Pygmy mites sighted recently
- Pesticide updates
- Check pesticide rates
- Australian diagnostic laboratories contact details

Agora

Further development of the web based pest and disease service has occurred. Additional information has been written and uploaded into the knowledge base. There were increased logins and increased users. (154 separate logins between July 2007 and April 2008 from 33 different users).

PDMS enquiries

A number of pest and disease enquiries were received through the year. The topics ranged from pesticide selection and rates, water additives, bacterial disease, cobweb control, Verticillium control, trichoderma, fly control, orange cecids, mites and nematodes. There were no industry wide pest or disease epidemics.

Project MU07900

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Managing vectors that transmit fungal diseases

Some mushroom pests can carry the spores of fungal pathogens into locations with optimal conditions for germination and also into areas of minimal fungicidal protection. This has serious implications for disease incidence and development of fungicidal resistance.

Dry bubble *(Verticillium fungicola)* and green mould (*Trichoderma* species, especially *T. atroviride*) are important pathogens in the Australian industry. Mushroom phorids *(Megaselia hatherata)* and mushroom sciarids *(Lycoriella ingenua* and *Bradysia occellaris)* are vectors of dry bubble while red pepper mites *(Siteroptes mesembrinae)* can carry the spores of green mould.

Both fungal pathogens can be carried on dust and in soil, so are not totally reliant on vectors but their presence increases both the severity of disease and the difficulty of managing the problem.

This three year project, which is being undertaken at the Marsh Lawson Mushroom Research Unit (MLMRU) at Sydney University and with involvement of local compost producers and mushroom farms, is designed to evaluate the importance of vectors in transmitting disease and also to compare the level of disease control obtained by a range of fungicides with and without vectors.

During the first year of the project, colonies of the vectors have been maintained at MLMRU along with cultures of dry bubble and green mould.

Vectors can be dispersed when mushroom compost is transported from compost yards to farms and also when it is moved around the farms. Consequently the project is studying variations within vector species and, hence, their spore-carrying capabilities. *Verticillium* spore loads carried by sciarids have been determined by allowing flies to feed on infected mushrooms and then transferring them onto nutrient agar plates for short periods before incubating the plates and subsequently quantifying the *Verticillium* colonies.

A similar technique will be used with phorids and red pepper mites to determine their spore-carrying capabilities of *Verticillium* and *Trichoderma* respectively.

The next phase of the project will include further vector transmission studies utilising fungicide-susceptible and fungicide-resistant isolates of *Verticillium*. Compost yard/mushroom farm studies will involve the collection of fungal pathogens and vectors for detailed examination at MLMRU. In addition, three species of *Trichoderma* will be used for pathogenicity studies.

Results from the project will form the basis for determining the use pattern for fungicides in the presence of disease vectors. Further, relevant aspects of vector management strategies, especially physical exclusion and composting procedures, will be reported.

Structural differences which could influence the spore-carrying capabilities of the two mushroom sciarid species, have been examined with electron microscopy.

Project MU06021

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AMSAFE

This project involved the management of a Crisis Management Plan for the Australian Mushroom Industry.

The long-term success of the Industry in securing, safeguarding and growing valuable local and international markets relies on the industry's commitment to product integrity and quality.

This commitment is reflected in the industry's capacity to rapidly identify and effectively respond to potential or actual problems that may result in crisis situations. In turn, this response capability ensures that the industry will maintain its sound 'through-chain' reputation of producing quality mushroom products.

The Australian Mushroom Industry's Crisis Management Plan provides the management system and guidelines for preparing for, responding to, and recovering from crisis situations that could possibly affect the Australian Mushroom Industry, both domestically and internationally. The Plan is entitled AMSafe.

The Plan complements existing emergency response plans held by individual Mushroom Industry organisations, Horticulture Australia Limited and Commonwealth, State and Territory Governments.

AMSafe is managed by an authorised Committee which makes decisions about crisis management on behalf of the industry. There are designated alternatives for Committee members. The Australian Mushroom Growers Association (AMGA) is the secretariat of AMSafe and the custodian of the Plan.

In 2007/08 consulting group Edelman Pty Limited provided an independent review of the AMSafe plan and the preparedness of AMGA to support the AMSafe Committee. A positive report was received. The project manual and procedures were updated and redistributed as part of the normal process.

AMSafe was not activated during 2007/08.

Project MU07012

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2008 CONSUMER MARKETING PROGRAM

Mushroom Month promotions and media celebrations occurred throughout September 2007. A radio advertising campaign in all capital cities informed consumer of health benefits and usage ideas for the BBQ.

A BBQ mushroom promotion and competition also commenced in September via a new recipe leaflet and radio advertising. The new recipe leaflet was distributed to wholesalers, retailers, greengrocers and statutory levy payers, providing consumers with quick, easy and innovative ideas for using mushrooms. The 'Go for 2&5' message was featured in the program.

Throughout the year a wide range of below-the-line and PR activities to promote fresh mushrooms were undertaken in each state by Australian Mushroom Growers State Promotions Coordinators to promote fresh mushrooms. A good coverage of the activities to provide consumers with information and ideas for the use of mushrooms can found on the levy payers website www.mushroomlevy.com.au.

A new cookbook *Mushrooms – The Great All-rounder* was launched in June 2008 and has already proven to be a huge hit with consumers and the media. Consumer research reports 46 per cent of Australians use mushrooms according to a recipe. The new book provides over 100 everyday mushroom meals that support the industry's strategy of putting quick, easy, and innovative usage ideas in the hands of the consumers.

The Mushroom Lovers Club is also part of our usage support strategy and now boasts over 12,000 members. Recipes are sent on a regular basis to consumers who have requested the service. This group also provide important feedback from time to time.

Project MU07500

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FOOD SERVICE MARKETING PROGRAM

The Mushroom Mania Food Service promotion (MM) during June 2008 was a great success with over 2000 restaurants participating nationally. MM aims to increase the amount of mushrooms (primarily Agaricus) consumed at a range of foodservice establishments in dining sector (DSO) around Australia throughout June and beyond the campaign period.

Chefs in local areas throughout Australia were encouraged to feature mushrooms on their menus via a telemarketing and internet campaign. Consumers were encouraged to eat out at participating restaurants via a national radio campaign that drove potential diners to the MM website www.mushroommania.com.au and then on to participating dining establishments listed on the website and those that were offering special MM deals.

Over 200,000 hits were recorded on the MM website during the campaign and feedback from participants about the success of the promotion for their businesses has beed very encouraging. The 2008 internet exit survey (evaluation research) won't be completed until August but anecdotal indications are

that mushroom consumption increased considerably during the campaign.

The 2008 MM Awards were designed to reward participants that were innovative in the way they promoted mushrooms and the event in their establishment. Some excellent examples have been recorded on the website. Planning for MM 2009 is already underway and promises to be another highly successful campaign.

Project MU07500

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MARKETING AND PROMOTIONS – RETAIL PROGRAM

Mushroom Madness is highlight of the industry's retail promotional program. A major radio advertising campaign during March informed consumers about mushrooms and told them about a consumer competition at the Mushroom Madness website www.mushroommadness.com.au.

Part of the campaign advertised the winners of the Mushroom Retailer of the Year competition and encouraged consumers to visit those stores to check out the offer. The presentation of the winners awards occurred in each winners store this year. To be able to publicly recognise the staff in front of their customers and media proved to be successful.

Retail promotions were run in conjunction with Coles and IGA supermarkets during the year. The Coles promotion ran in the lead up to Christmas with an advertisement in the Coles Christmas catalogue. The ad highlighted some Christmas usage ideas for mushrooms and a encouraged consumers to visit a specially created website for more innovative and traditional ideas www.mushroomsatxmas.com.au.

The IGA promotion involved an instore presence featuring a special display, recipes, a consumer competition, and store staff competition. Metcash reported very positive results with both consumers and their staff. Website hits for the competition exceeded expectations.

The highly successful recipe leaflet program continued with green grocers. Two new leaflets were produced in 2007/08. Over one million leaflets were distributed in March and September. In support of the leaflets, two media releases were circulated to all media outlets nationally with strong uptake particularly in the regional press.

The cookingwithmushrooms website continues to be popular with consumers with almost four million hits for the year.

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Health benefits of mushrooms

AMGA's market research has indicated that specific health associations between mushroom consumption and positive health outcomes is of key interest to consumers.

Focus group respondents in the 20–35 age bracket clearly indicated in 2006 that they would change their consumption and purchasing behaviour if the industry was able to provide credible information showing the positive benefits of including mushrooms regularly in their diets and those of their families.

Based on this, and similar related evidence, the industry is strategically focussing its R&D and marketing investments towards health messages for consumers.

A new initiative is the investment in four research projects which are about to commence at medical and nutrition facilities located at institutions in the United States. Separate projects have been designed to demonstrate the benefits of mushrooms in countering obesity, heart disease, influenza and in providing antioxidant benefits.

Background information on the projects is set out below:

Obesity

A one year clinical weight-control study is to be supervised by staff and graduate students at the Johns Hopkins Schools of Public Health and Medicine.

The study builds on the results from a recent short-term study in which white button mushrooms were substituted for beef in a dietary trial with normal weight, overweight and obese adults. Results from that study strongly suggest that the substitution of low energy density mushroom foods for high density foods, such a beef, can be an effective method for reducing daily energy intake.

Two randomised, controlled, parallel groups of participants will be used in the study, with the groups comprising omnivorous, mushroom eating adult men and women who are overweight or obese and wish to lose weight.

During the first six months of the study, both groups (mushrooms and control) will be prescribed an energy-deficient diet designed to achieve a weight loss of 10 kilograms. For the second six months of the study, all participants will be prescribed a weight-maintenance diet. The mushroom group will continue using mushrooms in their diet.

The effectiveness of mushroom substitution for high energy density foods in weight loss and weight maintenance will be determined through changes in a range of bodily functions, such as blood pressure, oxidative stress and condition of the immune system.

Based on previous research, it is anticipated that the group which receives mushrooms for substitution in meals will be more likely to achieve and sustain significant weight loss.

Heart disease

The project, to be undertaken at Arizona State University, is designed to demonstrate that commonly consumed mushrooms can beneficially alter processes critical in cardiovascular disease.

Cardiovascular disease is a leading killer in many developed countries. The process is recognised to involve fatty plaque build-up in the aorta until blood flow is ultimately blocked or a clot is released as the body tries to repair damage from the plaque build-up.

Cardiovascular disease is an inflammatory condition with early onset involving release of pro-inflammatory stimuli. The project aims to show that commonly consumed mushrooms, which contain the bioactive phytochemical – ergothioneine – can reduce the release of these stimuli.

Influenza

This project, undertaken at USDA's National Immunology Laboratory at Tufts University in the United States, is designed to further demonstrate the capacity of white button mushrooms to modulate human immune cell functions.

It has been established that immune function is critical to preventing and controlling microbial infection. However, there are limited strategies available to efficiently modulate the immune response.

Nutritional interventions that involve optimising the intake of essential nutrients and utilising promising functional foods have become an increasingly favoured approach to modulate immune cell function.

Previous research has shown that mushrooms have anti-tumour, anti-viral and anti-bacterial properties while dietary supplementation with mice, using white button mushrooms, has shown enhancement of the innate immune function.

This mushroom-induced enhancement would have the potential to prevent viral infection and/or expected viral clearance post-infection.

However, this postulated benefit of consuming mushrooms needs to be substantiated in an infection model and the Tufts University project will employ a mouse model of influenza virus infection to test the hypothesis.

Anti-oxidant benefits:

The anti-oxidant, ergothioneine, is primarily produced by fungi and is not synthesised by animals. Mushrooms are a major source of ergothioneine with dry weight levels ranging between 0.4 and 2.0 mg per gram.

The overarching goal of the one year project at Pennsylvania State University is to evaluate the bioavailability and bioactive effect of ergothioneine. Two pilot studies are to be conducted with human subjects.

One study will evaluate the availability of ergothioneine in mushrooms and its effect on antioxidant capacity and biomarkers of inflammation.

There will also be an observational study to assess dietary factors that influence ergothioneine levels in red blood cells.

These studies will provide the groundwork for subsequent studies that will evaluate more complex biological effects of mushroom consumption on chronic disease endpoints.

Project MU07014; MU07015; MU07016; MU07017

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INTERNATIONAL MUSHROOM INDUSTRY COLLABORATION

The future strategic underpinning and technical support of the Australian mushroom industry is highly dependent on international collaboration. The Australian industry lacks the size, critical mass, and financial resources to sustain the professional technical support services required for a successful industry. The Mushroom Industry Plan 2006–2011 highlights the need to establish and maintain international networks for R&D and marketing and promotion, and to ensure the industry is equipped with the necessary skills, resources and structures to facilitate international co-operative R&D and M&P projects.

This voluntary levy project enabled travel to attract global support for the Mushrooms and Health Global Initiative (M&HGI) from the UK and European industries, chair the 2007 Annual Meeting of the ISMS Executive Committee and present a paper on the M&HGI at the International Medicinal Mushroom Conference. The project also supported attendance and involvement at the ISMS Congress in South Africa and the establishment and maintenance of the industry's cooperative research projects in the US.

The Australian industry will benefit through collaboration with other countries on a number of new international R&D projects that are essential for our strategic future. These projects include: the breast and prostate cancer clinical trials with agaricus mushrooms at City of Hope Hospital in California; the ergothionine antioxidant work at Penn State University; the mushrooms and weight management research at Johns Hopkins Hospital in Baltimore; and the agaricus mushrooms and human immune system work at Tufts University in Boston.

In addition to the new projects above, MU07004 has enabled the Mushroom Disease Diagnostic project MU07000 to be expanded into a global project with additional collaborators in the Netherlands, South Africa, Ireland, and USA. The Mushrooms and Health Global Initiative that was originally funded by USA and Australia now has additional financial support from Canada, the Netherlands, France, Spain, Belgium, Italy, Poland, Germany, Denmark, UK and Ireland.

In addition to the benefits to the R&D program, collaboration with many industry and private mushroom marketers and PR people from around the globe has enabled many good ideas to be incorporated into our Australian marketing and promotions programs.

Project MU07004

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TRIALS WITH A NEW CHEMICAL AGAINST TRICHODERMA

Green mould, caused by *Trichoderma* species, is a persistent problem in the Australian mushroom industry that limits both production and quality.

Efficacy and residue trials at the Marsh Lawson Mushroom Research Unit (MLMRU) at the University of Sydney are evaluating the chemical – imazalil – which has been shown to be effective against *T. aggressivum* in the United States.

However, *T. harzianum* and *T. atroviride* are the main green mould species in Australia and, hence, imazalil is being trialled against these.

The US work has concentrated on the use of imazalil as a spawn treatment but trials at MLMRU are also trialling incorporation into the casing and watering onto the mushroom beds.

Previous work at MLMRU provided residue information on using the fungicide carbendazim against green mould when applied either as a spawn treatment or when watered on. However, it is unwise to rely on a single chemical and results to date with imazalil indicate that it could be a useful alternative to carbendazim.

Project MU06013

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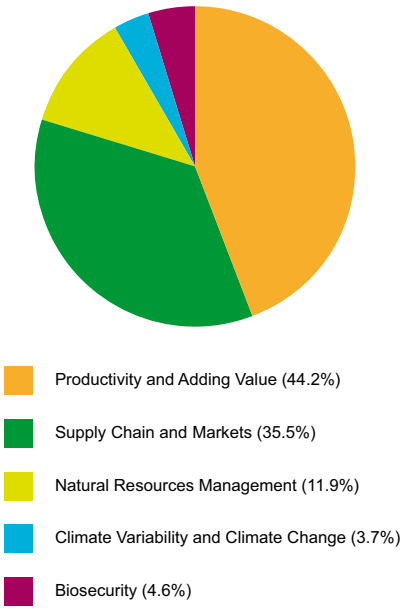
Investing in Australian horticulture

AUSTRALIAN GOVERNMENT PRIORITIES

As part of the Australian Government's commitment to rural research and development, horticulture industries can access matching Commonwealth funding through HAL for all research and development activities.

The Australian Government's Rural Research and Development Priorities aim to foster innovation and guide R&D effort in the face of continuing economic, environmental and social change. HAL's operations are closely aligned with these priorities.

Percentage by value of Mushroom Projects



This chart shows the percentage of expenditure in HAL's mushroom R&D program against each of the Australian Government priorities for rural research and development. Full details of expenditure across all industries is available in HAL's annual report at www.horticulture.com.au

Productivity and Adding Value

Improve the productivity and profitability of existing industries and support the development of viable new industries.

Supply Chain and Markets

Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.

Natural Resource Management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

Climate Variability and Climate Change

Build resilience to climate variability and adapt to and mitigate the effects of climate change.

Biosecurity

Protect Australia's community, primary industries and environment from biosecurity threats.

In 2007/08 the Australian Mushroom Growers Association (AMGA) acted as the service provider on 15 projects.

Full details can be found on page 11 of this report.

RELATIONSHIPS AND ROLES RELATING TO HAL PROGRAMS

Horticulture Australia Limited (HAL) is a not-for-profit industry owned company. Its role is to manage the expenditure of funds collected by the Australian Government on behalf of horticulture industries.

HAL invests $85 million annually in projects to benefit horticulture industries.

An Industry Advisory Committee (IAC) is established for each industry with a statutory levy and annual income exceeding $150,000. The IAC is a subcommittee of the HAL Board. It makes recommendations to HAL on the expenditure of funds.

The Peak Industry Body (PIB) for an industry is responsible for recommending to HAL the establishment of, and any changes to, statutory levies. The PIB for an industry with a statutory levy recommends membership of the IAC to HAL and must demonstrate how the skills required on an IAC are met by the persons they recommend for appointment to the committee.

For more information please visit www.horticulture.com.au

CONSULTATION FUNDING

Consultation funding is paid by HAL to cover costs for IAC meetings, annual levy payers' meetings and costs within the partnership agreement between HAL and the member industry that are specified as consultation, for example R&D program consultation. Consultation does not include funding for conferences, publications or general communication or industry development officers/managers. These activities can be funded as projects in the industry program. In 2007/08 $168,000 of consultation funding was provided to the AMGA.

Across Industry Program 2007/08

The mushroom industry contributes funding towards an across industry program that addresses issues affecting all of horticulture. Details of the current program are listed below. A full report of the program can be found at www.horticulture.com.au/industry/acrossindustry.asp.

Project No.	Title
Outcome 1	Enhance the efficiency, transparency, responsiveness and integrity of the supply chain for the total industry to provide clear market signals
AH04007	Pesticide regulation coordinator
AH04009	Coordination of minor use permits for horticulture
AH06004	Horticulture Code of Conduct – Industry Support Package
AH07033	Incident Response Protocol – development and training for horticulture
Outcome 2	Maximise the benefits of horticultural products in the eyes of consumers, influencers and government
AH07006	Promoting the health advantage of fruit and vegetables to increase their consumption
AH07007	Horticulture Wellbeing Initiative
Outcome 3	Position horticulture to compete in a globalised environment
AH07002	HAL Market Access Coordinator
AH07003	Market access support program
AH07017	Codex Committee on Fresh Fruit and Vegetables participation
Outcome 4	Achieve long term viability and sustainability for Australian horticulture
AH06002	Horticulture Industry Strategic Plan (Future Focus)
AH06015	Cooperative venture for capacity building (CVCB) membership fees
AH07009	Horticulture Water Initiative
MT07029	Managing pesticide access in horticulture
AH07001	Horticulture Statistics database
AH06019	Australian horticulture's response to climate change and climate variability
AH07022	Horticulture for Tomorrow – Environment Communication Program
AH07026	The Current and Future Human Resource Needs of Australian Agriculture
AH07027	Horticulture component of the National Climate Change Research Strategy for Primary Industries
AH07031	Peri-urban horticulture and land use planning: Literature Review & 'Tool-kit'
AH07032	Independent quarantine and biosecurity review

AUSTRALIAN MUSHROOM GROWERS ASSOCIATION (AMGA) – HORTICULTURE AUSTRALIA LIMITED (HAL) PARTNERSHIP AGREEMENT

The mushroom industry's research and development projects are supported by a strong industry communication and consultation program. Funding for these activities is provided through a Partnership Agreement with HAL. Industry levies, together with matching funds through HAL, are the source of funds for the Partnership Agreement.

These matched funds enable AMGA to undertake the following key activities:

- Conduct the Annual Levy Payers Meeting. The Annual Levy Payers Meeting is one avenue for AMGA, HAL and research providers to report to levy payers on the outcome of your levy investments. It is also an opportunity for levy payers to provide input into the research program.
- Provide secretariat services for the Mushroom Industry Advisory Committee (IAC). This includes planning and organisation of regular IAC meetings to ensure that the industry's R&D investment program is well guided.
- Communicate with and consult with industry. This ensures that levy payers are given ample opportunity to provide input into the levy program (through industry meetings and so on), and are informed about the progress of projects that are underway.
- Consult directly with HAL. This covers participation in advisory committees across the broader horticulture sector, HAL forums, and other formal and informal consultation between AMGA and HAL personnel.

Other projects, such as AMsafe, Pest and Disease Management Service (Agora) and industry statistics collection are also funded through the Partnership Agreement.

Project MU07900

For more information contact:
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Mushroom Program 2007/08

Project No	Project Title	Levy or VC	Start Project	Project Completion	Organisation	Contact
MU05002	Mushroom Disease Monitoring System (MDMS	Levy and VC	18-Apr-06	31-Jul-07	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU05005	Mushrooms & Health	Levy	1-Apr-06	30-Sep-07	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU05013	Mushroom Analytical Business Case	VC	16-Jun-06	30-Sep-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU06013	Facilitation of new/existing products for the mushroom industry	Levy	1-Aug-06	30-May-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU06019	Mushrooms and Breast / Prostate Cancer Research	VC	1-Jun-07	30-Sep-10	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU06021	Managing vector transmitted fungal diseases of cultivated mushrooms	VC	31-May-07	30-Sep-10	Sydney University	Afsheen Shamshad 0433 179 353
MU06022	2007 National Conference - Peppers Fairmont Resort Leura, October	VC	21-Jun-07	30-Jan-08	Australian Mushroom Growers Association Ltd	Glen Cardwell 08 9367 3556
MU06023	Mushrooms and Health Research Portfolio	VC	29-Jun-07	30-Sep-11	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07000	Development of a disease monitoring system for the Australian mushroom industry	Levy and VC	1-Jul-07	30-Sep-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07003	Facilitation of information transfer to the Mushroom Industry through AMGA Journal	VC	31-Jul-07	31-Jul-07		Judy Allan 0427 671 057
MU07004	International Mushroom Industry Collaboration	VC	1-Jul-07	30-Sep-08	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07006	South Africa Study Tour, May 2008	VC	1-Jul-07	30-Sep-08	Horticulture Australia Limited	Will Gordon 03 9909 7543
MU07014	Investigate effectiveness of mushroom substitution for high energy density foods on weight loss and health measures	VC	30-Apr-08	31-Oct-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07015	Beneficial effects of five commonly consumed whole mushrooms and key bioactive agent	VC	30-Apr-08	1-Aug-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07016	Effect of mushroom supplementation on resistance to influenza infection	VC	1-May-08	1-Apr-10	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07017	Human intake of ergothioneine in mushrooms & effects on bioavailability, antioxidant capacity & inflammation biomarkers.	VC	30-Apr-08	30-Mar-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07018	Postharvest Vitamin D enrichment of fresh mushrooms	VC	20-Jun-08	16-Dec-09	Australian Mushroom Growers Association Ltd	Greg Seymour 02 4577 6877
MU07019	ISMS Congress/Diagnostic Workshop, South Africa, May 2008	VC	24-Apr-08	30-Sep-08	Australian Mushroom Growers Association Ltd	Tony Biggs 02 4571 1321
MU07021	Investigation of protective health benefits of selected species of mushroom in relation to Alzheimer's disease	VC	1-May-08	31-Aug-09	Food Science Australia	Louise Bennett 03 9252 6486
MU07900	Mushroom Partnership Agreement 2007/08	Levy	1-Jul-07	30-Jun-08	Horticulture Australia Limited	Will Gordon 03 9909 7543

FINANCIAL REPORT
MUSHROOM INVESTMENT SUMMARY
YEAR ENDED 30 JUNE 2008

	Marketing 2007/08	R&D 2007/08	Combined 2007/08
Funds available 1 July 2007	594,743	115,520	710,263
INCOME			
Levies Received	1,582,246	527,415	2,109,661
Commonwealth Contributions		407,209	407,209
Other Income	23,703	23,724	47,427
Total Income	**1,605,949**	**958,348**	**2,564,297**
Budget	1,374,250	894,738	2,268,988
Variance to Budget	231,699	63,610	295,309
PROGRAM INVESTMENT			
Levy Programs	1,380,000	544,419	1,924,419
Service Delivery Programs by AMGA	24,000	180,000	204,000
Service Delivery Programs by HAL	30,000	90,000	120,000
Across Industry Funding		8,403	8,403
Levy Collection Costs	16,858	5,606	22,464
Total Investment	**1,450,858**	**828,428**	**2,279,286**
Budget	1,550,780	848,471	2,399,251
Variance to Budget	99,922	20,043	119,965
Annual Surplus/Deficit	155,091	129,920	285,011
Funds available 30 June 2008	749,834	245,440	995,274

MUSHROOM INDUSTRY ADVISORY COMMITTEE (IAC)

Richard Bell
Mick Surridge
Kevin Tolson
Doug Schirripa
Paul Neale
Bob Granger
Barry Macauley
Ian Pakes
Brian Carroll
Greg Seymour (ex-officio)
Will Gordon (ex-officio)

Climate Change is becoming an ever more important issue for the industry. In 2007/08 the industry began contributing to the horticulture component of the National Climate Change Research Strategy for Primary Industries (CCRSPI) as part of HAL's across industry program. HAL is contributing to the project in collaboration with other Rural RDCs, CSIRO and Federal, State and Territory Governments.

The aim is to develop a comprehensive research strategy that will allow our industries to be informed by good research and be prepared to respond to the opportunities and risks presented by climate change. The scope of the strategy will be broad, covering any issue that needs consideration over the short (3 years), medium (5+ years) and long term (10+ years).

FOR MORE INFORMATION CONTACT:

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