

**Third International
Symposium on
Cucurbits, Townsville,
September 2005**

Dr Gordon Rogers
Applied Horticultural
Research Pty Ltd

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Horticulture Australia Project HG04053

3rd International Cucurbit Symposium Townsville Australia 2005

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Horticulture Australia Project HG04053

3rd International Cucurbit Symposium - Townsville September 2005

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Date:

24th December 2005

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Media Summary

The 3rd International Cucurbit Symposium was held on 11th – 16th September 2005 at Townsville and was attended by 130 delegates from all industry sectors. Scientists from 30 countries participated in the symposium and shared their experience and expertise with around 140 delegates at the Australian melon industry conference which was held at the same time. The latest information and developments in all facets of cucurbit research, growing and marketing was presented at the symposium.

Countries represented other than Australia included; Brazil, Canada, China, Croatia, Czech Republic, France, Germany, Greece, India, Indonesia, Iran, Israel, Japan, Korea, Lebanon, Malaysia, Nepal, Netherlands, New Zealand, Oman, South Africa, Spain, Sri Lanka, Taiwan, Thailand, Tunisia, Turkey and USA. This was a great deal of sharing of information between the worlds leading experts in all aspects of production and post harvest in cucurbits with Australian growers and industry people.

The technical areas covered by the symposium program were crop production & establishment, breeding & genetics, pest management & IPM, plant pathology, post harvest, greenhouse production, environmental management and sustainable production, supply chain, human health, cucurbits in the world scene, variety performance & selection.

The information presented at the symposium highlighted the breadth and diversity of research in cucurbits internationally and also the common issues and trends that researchers in different countries are addressing.

Some of the more diverse aspects of melon research presented were grafting techniques for disease control and quality, molecular control of fruit ripening & extending the shelf life of melons, systemic acquired resistance for disease management, the diversity of cucurbit types grown internationally and the range of uses, technology to measure fruit firmness of melons, melon processing treatments (juice, dried, frozen): physicochemical and organoleptic effects.

Some of the common research issues and industry trends highlighted were genetic research into management of viruses, powdery mildew and wilt, challenges associated with implementing and adoption of IPM techniques by growers, greenhouse cucumber research production (growing and hydroponic techniques, pest management and the expansion of greenhouse cucumbers particularly), the significance of calcium and potassium nutrition in melon crop and fruit quality, research into the quality attributes of melons eg storage life, eating quality (flavour, aroma, sugar content, firmness), research into the health attributes of cucurbits and melons (carotenoids, lycopene, ascorbic acid, vitamins, citrulline), growth of the market for seedless watermelons and marketing developments and efforts to improve the production of alternative melon varieties eg galia, charentais.

The symposium consisted of oral presentations, technical poster session, field tours and social events. A field day shared with the melon conference delegates highlighted the practical aspects of cucurbit and melon production. Some of the features were displays covering Silver leaf Whitefly, disease management, irrigation management and soil moisture monitoring, spray application efficiency, melon and cucurbit varieties and melon brix and firmness testing. There were visits to commercial growing and packing businesses. At NQ Fresh, Gumlu melon packing shed operations were inspected. At Corrick Plains, Giru zucchini crop production was inspected as well as a Hypervision sorting & grading unit in the packing shed. Some of the crop production features at Corrick Plains were raised permanent beds, crop rotations, nutrient and irrigation monitoring, IPM and biological pest management and pest monitoring.

Scientific papers are being edited by Gordon Rogers and Robyn McConchie. These will be peer reviewed, published in ACTA Horticulturae and distributed to symposium delegates. Abstracts of the symposium presentations were printed in a symposium handbook and are also available at the melon industry website

Feedback received from delegates indicated the symposium was very successful. China was chosen as the location for the 4th international symposium to be held in 2008.

Evaluation of effectiveness - survey results

The cucurbit symposium and melon conference were evaluated by using response sheets and some informal interviewing of delegates. There were separate response sheets for the symposium and the conference but all responses have been combined into the one report as there were very few delegates that did not attend sessions from both programs.

There was a very low rate of return for the response sheets. A question was included on the most outstanding presentation and this information was used to structure an award for the conference dinner. We had hoped that this, along with a randomly drawn prize for returning the form would encourage people to return their forms. Unfortunately this did not elicit a high return rate.

Participants were asked a range of questions including which sessions they enjoyed the most and why, what they found most useful and what they would have less of. They were also asked what sector of the industry they came from.

Both qualitative and quantitative analyses were used to interpret the data and draw conclusions about the effectiveness of the conference and give recommendations for future conferences.

Aims of the evaluation

The primary objective: The Australian Melon Association (AMA) organising committee wanted to know if the effort involved with organising the conferences with their associated costs and time commitments was the most effective method of delivering industry objectives. If so, how could it be improved for next time and what parts were particularly enjoyed by the participants.

The secondary objective: The investors in the project (e.g. State Governments and Horticulture Australia) want to know what impact their investment has had and how the industry has benefited.

Key Evaluation Questions

- ***To what extent have the participants improved their knowledge so they can better meet the needs of the cucurbit industry?***

There is strong evidence that the symposium and conference was very successful in helping to give the Australian industry access to international knowledge and resources. Resulting international project collaborations will provide flow-on benefits to industry in years to come. The benefits to industry in the short term will be in the form of more knowledgeable researchers, seed company representatives and the industry in general who would not otherwise been able to access these international findings. They will therefore be able to provide better service to growers.

For most delegates it was their first visit to a northern Australian production area. The field day provided excellent opportunities to see both the benefits and challenges of growing in this area and showcased the variety of technology and cultural practices in use.

- ***Is a conference an effective means of delivering information to industry?***

More than 80% of respondents agreed that a conference was the best way to keep industry informed. The sampling for this question is skewed to people that attended the conference.

- ***What were the unexpected outcomes of the conference?***

The conference and industry meetings seemed to generate increased support for an industry levy for marketing and research. There had been negativity and resistance among some sections of the melon industry to the introduction of a statutory levy for melon R&D leading up to the symposium and conference. This distracted the conference from some of its original intended outcomes of planning future R & D directions. It was seen as a priority by Horticulture Australia (HAL), the Australian Melon Association (AMA) committee and the conference organisers to address the issue of the proposed melon levy and future direction of the AMA before starting to address the issues of future R&D direction. The AMA annual general meeting reflected that most of the negativity had dissipated and the new committee will be able to move forward in a positive way although the levy was defeated at a vote taken before the conference.

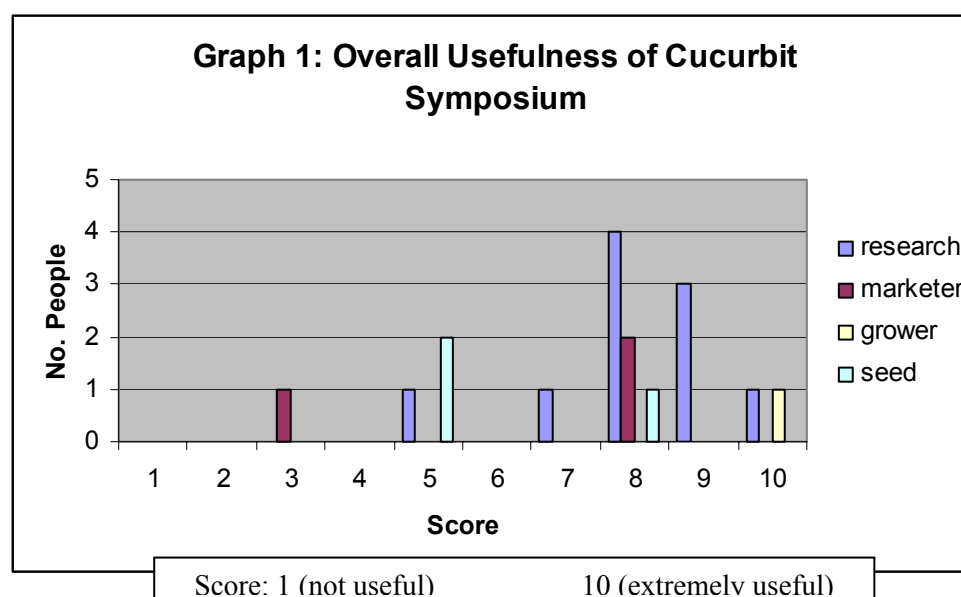
Bennett's hierarchy evaluation of the melon conference

This hierarchy tells the story of the events and results of the Cucurbit Symposium and Melon conference

SEEC	The change in social, economic and environmental conditions are a long term measure and are not know at this point in time.
Practice Change	It is too early to say what practice change has occurred as a result of this conference. There were many comments that people were going to try something or investigate further but there has not been the time for this to be implemented. You could say that collaborative networks between researchers are a form of practice change.
Knowledge	There was a huge range of new knowledge presented as part of both conferences. Most people commented on something specific that they had learnt or that had direct relevance to their work.
Attitudes	There was a general attitude of enjoying the conference, getting useful information and wanting to come to future events. This was a surprise to some people who had come for political reasons.
Skills	This conference was the first chance some of the speakers had had to present to an international audience so new skills were gained in presentation and tailoring a message to suit an English as Second Language Audience.
Aspirations	A strong theme of collaboration and wanting to work with people and projects in other countries was evident from the scientific community. Industry commented on the need to reconsider the supply chain and the look at the whole process from a different angle.
Reactions	In general the reaction of participants was extremely positive. Some went so far as to say it was the best conference ever. There was good feedback about the combining of the scientific conference with the grower conference.
Participants	Total 274 Melon conference total 144 - 45 growers, 12 researchers, 87 industry Cucurbit symposium total 130 - 75 international delegates (all researchers) and 55 Australian delegates (20 researchers and 30 industry representatives and 5 growers).
Activity	3 rd International Cucurbit Symposium, 7 th Australian Melon Conference – presentations, visits to cucurbit farms and field demonstration site, socialising, poster sessions.
Resources	Funding from Horticulture Australia, Ausveg, commercial companies, Australian Melon Association, NSW DPI, VIC DPI, QDPI, Growcom, presenters, organising committee, Jupiters Hotel Townsville, Townsville businesses.

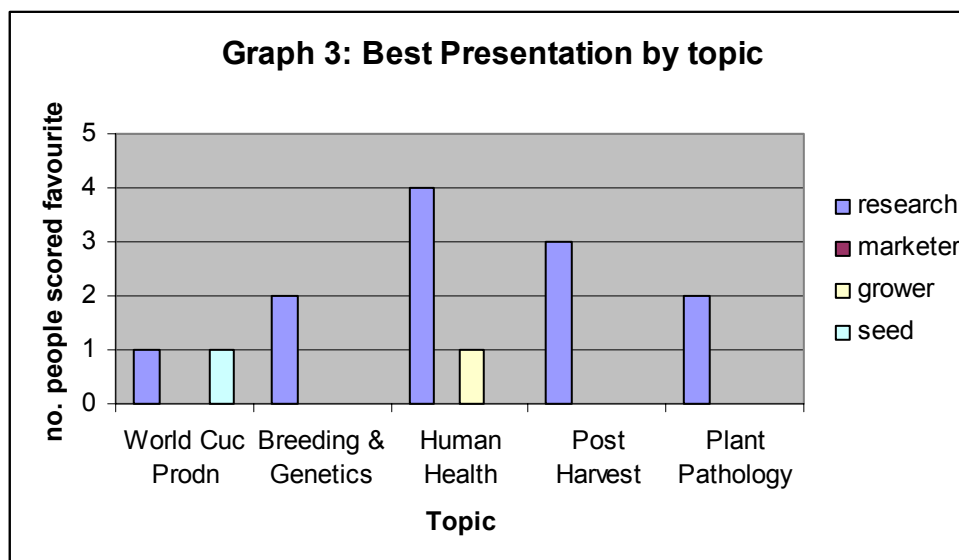
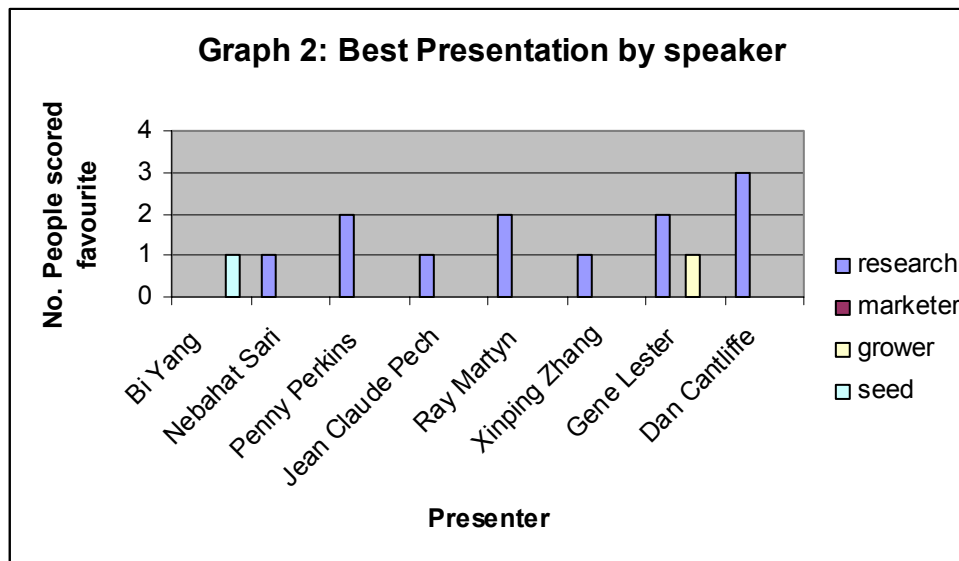
Rating and usefulness of the symposium

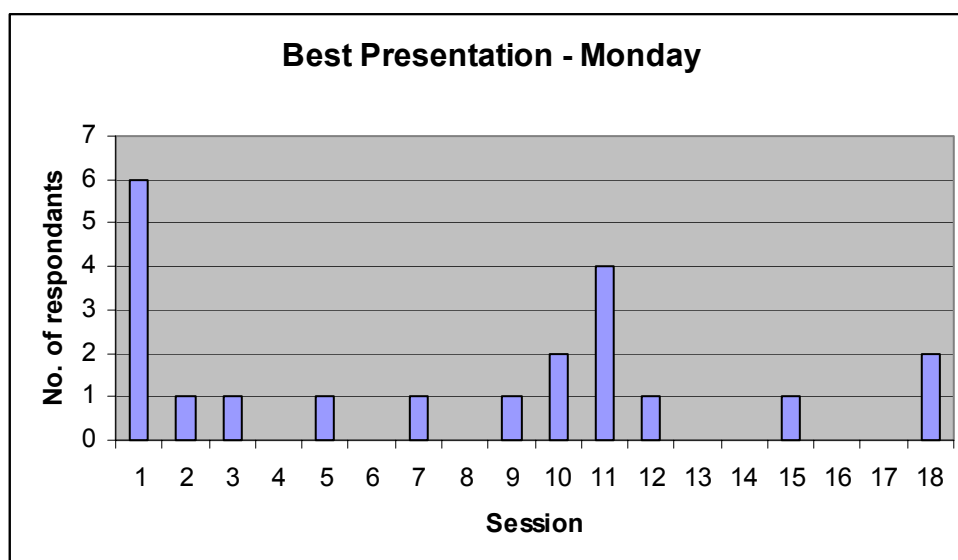
Results of the symposium evaluation suggested that the symposium was a success with participants rating the overall symposium highly for usefulness. This is illustrated in the following graph.



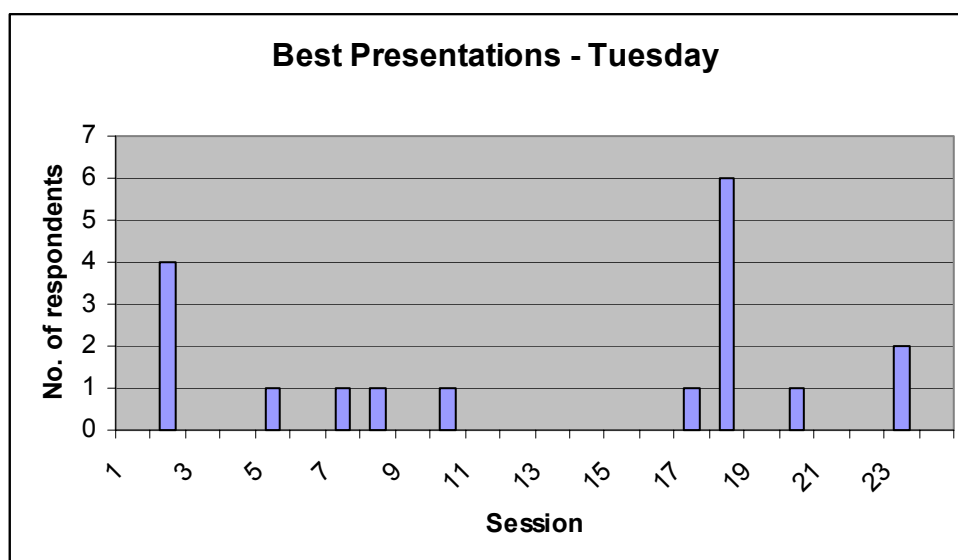
Session evaluation

The symposium evaluation also looked at the sessions, with the participants specifying “The most outstanding presentation” The session summary can be seen in the following two graphs (Graphs 2 & 3).

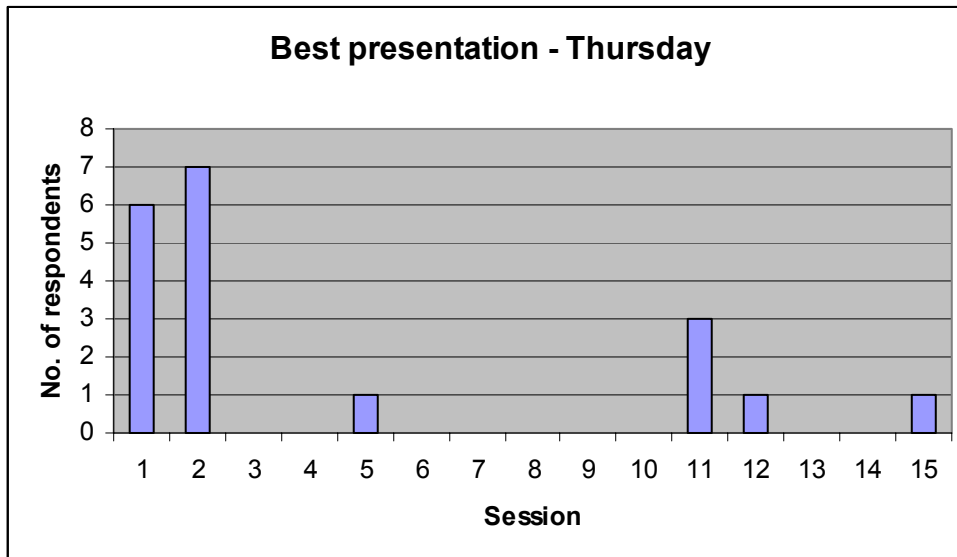




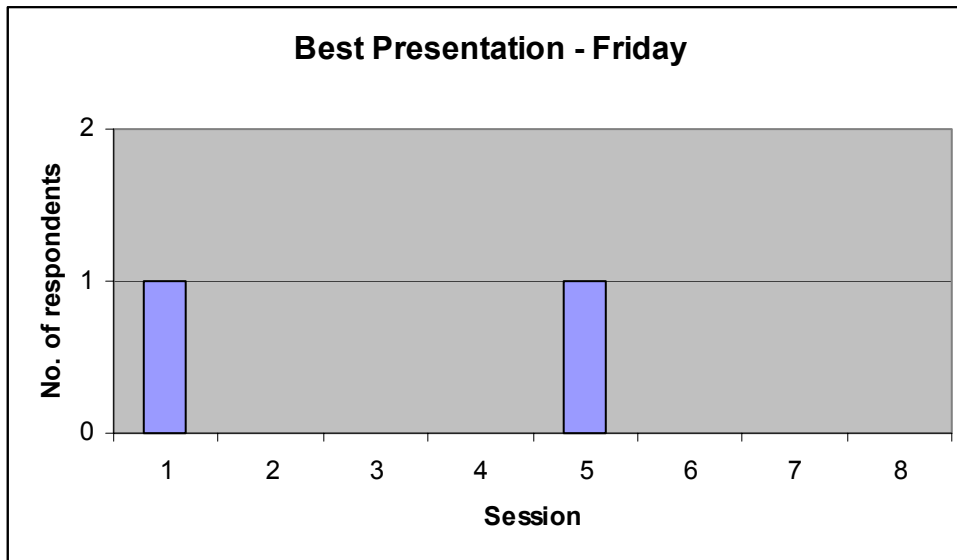
- 1 Molecular control of fruit ripening and sensory quality of Charentais melon (Jean Claude Pech)
- 2 Functional genomics to identify genes affecting the aroma of melons (Efraim Lewinsohn)
- 3 A single insertion of ACC Oxidase gene in antisense orientation extends the shelf life in muskmelon 'Galia' hybrid parental line (*Cucumis melo* L.var. *reticulatus* Ser.) (Dan Cantliffe)
- 4 Isolation and characterization of an ethylene receptor homolog gene, *Cm-ETR2*, from melon fruit (Willis Owino)
- 5 Progress of Biotechnology for Cucurbit Improvement: Past and Future (Hiroshi Ezura)
- 6 Advances in breeding melons for resistance to vine decline (Belen Pico)
- 7 Fruit quality characteristics of 'Galia' F1 Hybrid (*Cucumis melo* L. var. *reticulatus* Ser.) muskmelon developed from a transgenic male parent (Jeanmarie Mitchell)
- 8 Chilling Injury of honey dew melons: symptoms and critical temperature (Nianlai Chen)
- 9 The Effect of inhibitors of ethylene synthesis and action on intact and fresh cut melons (Charles Whitehead)
- 10 Assessing potential benefits of technologies : Benefits of improving postharvest quality technologies in the Australian rockmelon industry (Roby McConchie)
- 11 Genetic improvement of watermelon in the USA (Xinping Zhang)
- 12 Watermelon (*Citrullus lanatus* L.) Genetic Resources in Turkey and their Characteristics (Nebahat Sari)
- 13 Screening of Turkish Melon Accessions for Resistance to ZYMV, WMV and CMV (Kazim Abak)
- 14 Analysis of the interaction melon-Melon necrotic spot virus controlled by the recessive resistance gene *nsv* (Cristina Nieto)
- 15 Non-chemical postharvest disinfestation treatments for cucurbits against fruitfly for export to New Zealand and interstate (Elizabeth Hall)
- 16 Changes in Cell Wall Polysaccharides During the Storage of 'Wasada-uri', a Local Melon Accession with Five Carpels (Takashi Nishizawa)
- 17 Physiological and biochemical changes associated with fruit development and ripening in some cucurbits (Ramano Rao)
- 18 Major fruit aroma compounds are cleavage products of carotenoids in cucurbits (Yaakov Tadmor)



- 1 Hydroponic Greenhouse Production of Specialty Cucurbit Crops at the University of Florida (Dan Cantliffe)
- 2 A new crop for North American greenhouse growers: Beit Alpha cucumber - progress of production technology through university research trials (Nicole Shaw)
- 3 Effect of Cucurbit Rootstocks on Growth and Yield in Greenhouse Cucumber (Reza Salehi)
- 4 Effect of light quality on the growth and photosynthesis characteristics of cucumber under solar greenhouse (Shaohui Wang)
- 5 Successes and limitations of some cucurbit releases in Queensland (Mark Herrington)
- 6 The ECP/GR Cucurbitaceae Working Group (Maria Jose Diez)
- 7 The Spanish Melon Genomics initiative (Belen Pico)
- 8 Veginet – Vegetable science international network (Prem Nath)
- 9 Challenges for the implementation of integrated pest management of cucumber pests in protected crops - an Australian perspective (Marilyn Steiner)
- 10 Analysing industry needs to fine tune IPM project activities (Sue Heisswolf)
- 11 Effect of row covers on silverleaf whitefly (SLW) (Homoptera: Aleyroditidae) Population Densities and Crop yield in Zucchini (Sohail Aslam Qureshi)
- 12 The management of major insect pests Bactocera cucurbitaceae and Aulacophora spp in cucurbits under 3 intensive systems: Integrated, Chemical and Organic agriculture in Sth Sri lanka (Rohan Rajapakse)
- 13 Water and fertilizer-use efficiencies of field and greenhouse-grown cucumbers (Elio Jovicich)
- 14 Effect of nitrogen form on yield, fruit number and leaf nutrient content of two greenhouse cucumber cultivars in soilless culture (Froozandez Soltani)
- 15 Alternative use of pine bark media for hydroponic production of 'Galia' muskmelon results in profitable returns (Nicole Shaw)
- 16 Protected cultivation of cucurbits under low cost protected structures: A sustainable technology for peri-urban areas of northern India (Balraj Singh)
- 17 Late- season Vine Declines of Melons: Pathological, cultural or both (Ray Martyn)
- 18 Root rot, stem and wilt diseases of greenhouse cucumbers in Australia (Len Tesoriero)
- 19 Postharvest harpin treatment suppresses decay and induces the accumulation of pathogenesis-related proteins (Bi Yang)
- 20 Incidence and distribution of viruses infecting cucurbit crops in the Northern Territory and Western Australia (Brenda Coutts)
- 21 Shoot/root ratio of cucumber is affected by environmental conditions (Hans Peter Klaering)
- 22 Effects of plug size, mycorrhiza and cultivation period on growth and development of watermelon transplants (Marina Radulovic)
- 23 Rockmelon agronomic practices and effect on fruit production & quality (Gordon Rogers)

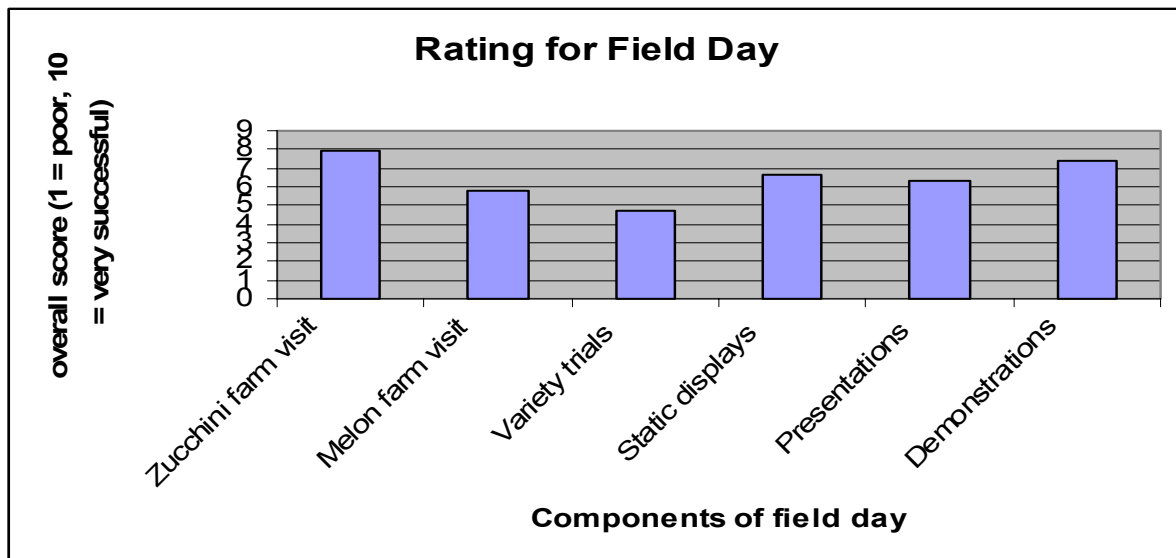


- 1 Foliar applied Potassium during fruit growth: affects harvest fruit sugars, ascorbic acid, beta-carotene and firmness (Gene Lester)
- 2 Watermelons and Human Health (Penny Perkins Veazie)
- 3 History and present state of cucurbits grafting in Japan (Yoshiteru Sakata)
- 4 Mini Triploid watermelon cultivar yield and quality evaluations, and marketing considerations in the United States (Jonathan Schultheis)
- 5 Influence of fertigation rates applied at different developmental stages on developmental stages on muskmelon earliness, yield, and quality (Richard Hassell)
- 6 In vitro micro propagation of Bottle gourd (*Lagenaria siceraria*; *cucurbitaceae*) - A prospective root stocks for the grafting of watermelon and other cucurbits (Shyamali Saha)
- 7 Barrier Reef water quality protection plan (Chris Manning)
- 8 Land & Water – Issues & Solutions for Growers (Margi Milgate)
- 9 Managing Cucurbit Powdery Mildew and Fungicide Resistance (Meg McGrath)
- 10 Systemic Acquired Resistance as a strategy for disease management in rockmelon (*Cucumis melo* Var. *Reticulatus*) (Robyn McConchie)
- 11 Melon production in China (Bi Yang)
- 12 Current Trends in Cucurbit Production in the U.S (Dan Cantliffe)
- 13 Cucurbit – everyone's crop (Prem Nath)
- 14 Cucurbits in Australia (Gerard Kelly)
- 15 National F & V Coalition Go for 2 & 5 Fruit & Vegetable Promotion Campaign (Chris Rowley)



- 1 Temporal and spatial dynamics of powdery mildew species on cucurbits in the Czech Republic (Ales Lebeda)
- 2 Comparative performance and preservation of chemical management tools for powdery mildew on cantaloupe (Michael Matheron)
- 3 Temporal changes in pathogenicity and fungicide resistance in *Pseudoperonospora cubensis* populations (Ales Lebeda)
- 4 Epidemiology of damping off disease in greenhouse cucumber crops in the Sultanate of Oman (Mike Deadman)
- 5 Marketing and Consumer focus for research (Rob Robson)
- 6 Monitoring Melon Supply Chains (Scott Ledger)
- 7 NIRS for sweetness sorting: A users guide (Kerry Walsh)
- 8 Osmotic Treatments in Melons (Cantaloupe & Muskmelon) Processing: Physicochemical and Organoleptic Effects (Fahkri Shahidi)

The field day was assessed by giving each component a rating out of ten. The graph below shows an average of those ratings. Ratings varied dramatically with some components scoring both a 1 and a 10. This is most likely a reflection of the range of audiences that attended the conference/symposium.



Major themes

Melon E-news is an effective communication tool to keep in touch with industry and notify them of future events.

The last melon conference held in Melbourne in 2001 had strong support for a central website. In fact it was one of the main outcomes from that conference that the Melons Australia website was developed. The Melon E-news newsletter produced fortnightly by the melon industry development officer is a spin off of that website. The delegates commented that E-news was an effective way of communicating with industry.

100% of evaluation respondents had heard of the conference through the e-news (as well as other methods of promotion). More than 80% said it was a good way to communicate with them.

Networking and social interaction is a highlight for delegates

There was consistent feedback from people that the chance to develop networks and potential collaborations was very important. Growers were able to establish these networks along the supply chain and with other growers. Researchers and industry were able to make valuable contacts with people from a wide range of countries. This is something that would not be possible to achieve any other way. The previous conference evaluation showed the delegates wanted more opportunities for interaction and the conference program and feedback seemed to address that suggestion.

There was some negative feedback on the quality of one meal and this has been followed up with the caterer. In contrast the night at the Billabong Wildlife Sanctuary was a consistent highlight of day one's program and the cane-fire on day three was also a mentioned many times as a highlight.

"Billabong Sanctuary, it was wonderful."

".....networking sessions going into the wee hours of the morning"

"Registering and meeting people from all over the world at my first cucurbit symposium."

The field day was useful but each event should have been given more context

Although comments about the field day were generally very positive there was some disappointment at the lack of information provided about the area that we travelled through and the farms that were visited. The reason for this lack of information was probably due to the fact that there were no locals on the organising committee and so a lot of this information was not know. This is something that could be addressed for future events by insuring there is a local on each bus or at least a prepared sheet of info that could be read out if there is no local present.

"more direction on buses as to purpose of each visit."

".....somebody on the bus to describe the region, local history, geography, soils, crop production issues etc."

International collaboration between researchers

Perhaps the strongest theme was that of the potential for collaborations, exchanges and multi-nation projects. This is a unique benefit that would not have been achieved by any other method and shows the value of combining the melon conference with an international symposium.

"It has certainly given new ideas and opportunities for collaboration."

"it made me think of going to other countries to do research, and to be part of international projects."

Summary of delegates highlights

Monday

- networking opportunities
- evening function at Billabong Sanctuary

Tuesday

- Poster session
- Importance of extension
- Good report on presentations
- Count the seeds in the pumpkin (social competition)

Wednesday

- contact with growers (zucchini farm in particular a highlight)
- cane fire
- interactive displays

Thursday

- human health topic
- plant nutrition topics
- interaction between growers and scientists

Friday

- plant pathology and Rob Robson's presentation
- poster session in the morning after the conference dinner

Summary of delegates suggestions for improvement

Monday

- need a talk on a controversial topic
- Keynote address that asked some hard questions to get people thinking

Tuesday

- Chairmen to control better and summarise main points made
- Mismatch of times topics in last session

Wednesday

- variety trials
- more information on buses as to what was happening etc.

Thursday

- growers session not in sync with cucurbit symposium therefore missed some good speakers

Friday

- poster time should be between 1-2.30pm (only comment)

Limitations of the evaluation

The evaluation process was conducted in-house so there is the possibility that the data is biased because of this.

The relatively low number of responses may have skewed the results.

Due to the high number of overseas delegates it was decided to conduct all evaluations at the conference because contacting them afterwards would be extremely difficult and expensive. Just contacting the Australian delegates would lead to a skewed sample. The need for the evaluations to be conducted at the conference means there has not been sufficient time pass for the participants to implement practice change or even reflect on the information delivered. There certainly has not been enough time for flow on effects to impact the wider industries' social, environmental and economic conditions.

Verification of results reported in this summary

This section represents a summary of the information collected as part of the evaluation of the conference/symposium. Central themes have been stated as a way of summarising a broad range of data. For further information or to view the empirical data contact Sally-Ann Henderson at sally-ann.henderson@dpi.vic.gov.au or Joanna Embry at jembry@growcom.org.au

Conference program

Monday 12th September		
9.00 – 10.00am	Symposium Opening	
10.00 – 10.30am	MORNING TEA	
10.30 – 12 noon	Postharvest – Session 1	
	Molecular control of fruit ripening and sensory quality of Charentais melon	Jean Claude Pech
	Functional genomics to identify genes affecting the aroma of melons	Efraim Lewinsohn
	A single insertion of ACC Oxidase gene in antisense orientation extends the shelf life in muskmelon 'Galia' hybrid parental line (<i>Cucumis melo</i> L. var. <i>reticulatus</i> Ser.)	Dan Cantliffe
	Isolation and characterization of an ethylene receptor homolog gene, <i>Cm-ETR2</i> , from melon fruit	Willis Owino
12.00 - 1.00 pm	LUNCH	
1.00 – 2.30pm	Breeding and Genetics – Session 1	
	Progress of Biotechnology for Cucurbit Improvement: Past and Future	Hiroshi Ezura
	Advances in breeding melons for resistance to vine decline	B. Pico
	Fruit quality characteristics of 'Galia' F1 Hybrid (<i>Cucumis melo</i> L. var. <i>reticulatus</i> Ser.) muskmelon developed from a transgenic male parent	Jeanmarie Mitchell
1.00 – 2.30pm (concurrent)	Postharvest – Session 2	
	Chilling Injury of honey dew melons: symptoms and critical temperature	Nainlai Chen
	The Effect of inhibitors of ethylene synthesis and action on intact and fresh cut melons	Charles Whitehead
	Assessing potential benefits of technologies: Benefits of improving postharvest quality technologies in the Australian rockmelon industry	Robyn McConchie
2.30 – 3.00pm	AFTERNOON TEA	
3.00 – 4.30pm	Breeding and Genetics – Session 2	
	Genetic Improvement of Watermelon in the USA	Xingping Zhang
	Watermelon (<i>Citrullus lanatus</i> L.) Genetic Resources in Turkey and their Characteristics	Nebahat Sari
	Screening of Turkish Melon Accessions for Resistance to ZYMV, WMV and CMV	Kazim Abak
	Analysis of the interaction melon-Melon necrotic spot virus controlled by the recessive resistance gene <i>nsv</i>	C Nieto
3.00 – 4.30pm (Concurrent)	Postharvest – Session 3	
	Non-chemical postharvest disinfestation treatments for cucurbits against fruitfly for export to New Zealand and interstate	Elizabeth Hall
	Changes in Cell Wall Polysaccharides During the Storage of 'Wasada-uri', a Local Melon Accession with Five Carpels	Takashi Nishizawa
	Physiological and biochemical changes associated with fruit development and ripening in some cucurbits	Ramana Rao
	Major fruit aroma compounds are cleavage products of carotenoids in cucurbits	Yaakov Tadmor
5.00pm depart for	Australian Wildlife Dinner at Billabong Sanctuary	

Tuesday 13th September		
8.30 – 10.00am	Greenhouse Production – Session 1	
	Hydroponic Greenhouse Production of Specialty Cucurbit Crops at the University of Florida	Dan Cantliffe
	A new crop for North American greenhouse growers: Beit Alpha cucumber - progress of production technology through university research trials	Nicole Shaw
	Effect of Cucurbit Rootstocks on Growth and Yield in Greenhouse Cucumber	R Salehi
	Effect of light quality on the growth and photosynthesis characteristics of cucumber under solar greenhouse	Shaohui Wang
8.30 - 10.00am (concurrent)	Breeding & Genetics – Session 3	
	Successes and limitations of some cucurbit releases in Queensland	Mark Herrington
	The ECP/GR Cucurbitaceae Working Group	M Diez
	The Spanish Melon Genomics initiative	B. Pico
	Veginet - Vegetable science international network	Prem Nath
10.00 – 10.30am	MORNING TEA	
10.30 - 12.00pm	Pests and IPM	
	Challenges for the implementation of integrated pest management of cucumber pests in protected crops - an Australian perspective	Marilyn Steiner
	Analysing industry needs to fine tune IPM project activities	Sue Heisswolf
	Effect of row covers on silverleaf whitefly (SLW) (Homoptera: Aleyrodidae) Population Densities and Crop yield in Zucchini	M Qureshi
	The management of major insect pests Bactocera cucurbitaceae and Aulacophora spp in cucurbits under intensive systems: Integrated, Chemical and Organic agriculture in Southern Sri Lanka	Rohan Rajapakse
10.30 - 12.00pm (concurrent)	Greenhouse production – Session 2	
	Water and fertilizer-use efficiencies of field and greenhouse-grown cucumbers	Elio Jovicich
	Effect of nitrogen form on yield, fruit number and leaf nutrient content of two greenhouse cucumber cultivars in soilless culture	F Soltani
	Alternative use of pine bark media for hydroponic production of 'Galia' muskmelon results in profitable returns	Nicole Shaw
	Protected cultivation of cucurbits under low cost protected structures: A sustainable technology for peri-urban areas of northern India	Balraj Singh
12.00 - 1.00 pm	LUNCH	
1.00 – 2.00pm	Poster Session	
2.00 – 2.30pm	ISHS Cucurbit working group business meeting	
2.30 – 3.00 pm	AFTERNOON TEA	
3.00 – 4.30pm	Plant Pathology – Session 1	
	Late-Season Vine Declines of Melons: Pathological, Cultural or Both?	Ray Martyn
	Root rot, stem and wilt diseases of greenhouse cucumbers in Australia	Len Tesoriero
	Postharvest harpin treatment suppresses decay and induces the accumulation of pathogenesis-related proteins	Yang Bi
	Incidence and distribution of viruses infecting cucurbit crops in the Northern Territory and Western Australia	Brenda Coutts
3.00 – 4.30pm (concurrent)	Crop production and establishment – Session 2	

	Shoot/root ratio of cucumber is affected by environmental conditions	H Klaring
	Effects of plug size, mycorrhiza and cultivation period on growth and development of watermelon transplants	Dean Ban
	Development of a crop management program to improve the sugar-content and quality of rockmelons	Gordon Rogers
6.00pm	Buffet Dinner at Quarterdeck, Jupiters	

Wednesday 14th September		
Cucurbit & Melon Field Day - Ayr & Burdekin Valley		
7.15 - 6.00pm	<p>Tour: Melon Property NQ Fresh, Gumlu. Inspect crop production, packing techniques & technology.</p> <p>Cucurbit & Melon Field Day at Queensland Dept. of Primary Industries & Fisheries, Ayr</p> <p>Field demos & trials with melon varieties featured, Technology in practice – field stations highlighting diseases, insects, irrigation, nutrition, packaging, handling with samples, information, publications.</p> <p>Tour: Zucchini Property Paul & Peter Le Fleur, Giru. Inspect crop production, packing techniques & technology. Field Day continues at QDPI Research Station, Ayr</p>	
6.30pm	Poolside BBQ at Jupiters Hotel	

Thursday 15th September		
8.30 – 10.00am	Human Health	
	Foliar applied potassium during fruit growth: affect harvest fruit sugars, ascorbic acid, beta-carotene and firmness	Gene Lester
	Watermelons and Human Health	Penny Perkins-Veazie
10.00 – 10.30am	MORNING TEA	
10.30 – 12.00pm	Crop Production – Session 2	
	History and present state of cucurbits grafting in Japan	Y Sakata
	Mini Triploid watermelon cultivar yield and quality evaluations, and marketing considerations in the United States	Jonathan Schultheis
	Influence of fertigation rates applied at different developmental stages on developmental stages on muskmelon earliness, yield, and quality	Richard Hassell
	In vitro micro propagation of Bottle gourd (<i>Lagenaria siceraria</i> ; cucurbitaceae) - A prospective root stocks for the grafting of watermelon and other cucurbits	Shyamali Saha
12.00 – 1.00pm	LUNCH	
1.00 -2.30pm	Environmental Management in cucurbits	
	Great Barrier Reef water quality protection plan	Chris Manning
	Land & Water – Issues & Solutions for growers	Margie Milgate
	Plant Pathology – Session 3	
	Managing Cucurbit Powdery Mildew and Fungicide Resistance	Meg McGrath
	Systemic Acquired Resistance as a Strategy for Disease Management in Rockmelon (<i>Cucumis melo</i> Var. <i>Reticulatus</i>)	Robyn McConchie
2.30 – 3.00pm	AFTERNOON TEA	
3.00 – 4.30pm	World cucurbit production	

	Melon production in China	Yang Bi
	Current Trends in Cucurbit Production in the U.S.	Dan Cantliffe
	Cucurbit - everyone's crop	Prem Nath
	Cucurbits in Australia	Gerard Kelly
Evening	Symposium Dinner - Quarterdeck at Jupiters	

Friday 16th September		
8.30 – 10.00am	Poster Session	
10.00 – 10.30am	MORNING TEA	
10.30 - 12,00pm	Plant Pathology – Session 3	
	Temporal and spatial dynamics of powdery mildew species on cucurbits in the Czech Republic	Ales Lebeda
	Comparative performance and preservation of chemical management tools for powdery mildew on cantaloupe	M Matheron
	Temporal changes in pathogenicity and fungicide resistance in <i>Pseudoperonospora cubensis</i> populations	Ales Lebeda
	Epidemiology of damping off disease in greenhouse cucumber crops in the Sultanate of Oman	M Deadman
12.00 – 1.00pm	LUNCH	
1.00 – 2.30pm	Supply Chain	
	Marketing & Consumer Focus for Research	Rob Robson
	Improving melon supply chain handling systems	Scott Ledger
	NIRS for sweetness sorting: A users guide	Kerry Walsh
	Osmotic Treatments in Melons (Cantaloupe & Muskmelon) Processing: Physicochemical and Organoleptic Effects	F Shahidi
2.30 – 3.00pm	AFTERNOON TEA	
	Symposium completed	

Delegate List

3rd International Cucurbit Symposium

First Name	Last Name	Company Name	Country
Kazim	Abak	Cukurova University	Turkey
Ahmad	Abdullah	MARDI	Malaysia
Chrys	Akem	QDPI & F	Australia
Laxman	Aurangabadkar	Ankur Seeds Pty Ltd	India
Majid	Azizi	Ferdowsi University of Mashhad	Iran
Sharlene	Bott	Withcott Seedlings Qld Pty Ltd	Australia
Guy	Boyd	T Systems Australia	Australia
Garth	Campbell	Terranova Seeds Pty Ltd	Australia
Daniel	Cantliffe	University of Florida	USA
Janine	Carmichael	Westranell Horticultural Solutions Pty Ltd	Australia
Paul	Centofanti	Syngenta Seeds Pty Ltd	Australia
Qingjun	Chen	Beijing Agricultural College	China
Chris	Clark	HORTRESEARCH	New Zealand
David	Commens	South Pacific Seeds	Australia
Matt	Coulter	Stoller Australia Pty Ltd	Australia
Brenda	Coutts	Department of Agriculture, Western Australia	Australia
Mike	Deadman	SultanQaboosUniversity	Oman
Maria Jose	Diez	Polytechnic University of Valencia	Spain
Jonathon	Eccles	AUSVEG	Australia
Joanna	Embry	Growcom	Australia
Richard	Emery	Stoller Australia	Australia
Graham	Erhart	Withcott Seedlings	Australia
Hiroshi	Ezura	University of Tsukuba	Japan
Shuangxi	Fan	Beijing Agricultural College	China
Nikolaos	Fanourakis	Technological Education Institute	Greece
Steve	Fore	US Watermelon Promotions Board	USA
Stewart	Frankling	Nufarm (Australia) Ltd	Australia
Masayuki	Fujita	Kagawa University	Japan
Nobuko	Fukino	National Research Institute of Vegetable & Tea	Japan
Ali	Ganjloo	Ferdowsi University of Mashhad	Iran
Judy	Greensill	Australian Melon Association	Australia
Xingfang	Gu	Chinese Academy of Agricultural Sciences	China
Graham	Hall	Moraitis Fresh Produce	Australia
Elizabeth	Hall	Department of Primary Industries and Fisheries	Australia
Richard	Hassell	Clemson University Research & Education Ce	USA
Eddie	Hayes	Nufarm Australia Ltd	Australia
Sue	Heisswolf	QDPI & F	Australia
Sally Ann	Henderson	DPI Victoria	Australia
Mark	Herrington	DPI&F Queensland	Australia
John	Hojmark-Andersen	T-Systems Australia	Australia
Liu	Hongyu	Northeast Agricultural University	China
Andrew	Horsfield	Nufarm Australia Ltd	Australia
MD. Daud	Hossain	Kagawa University	Japan
Xuesen	Huang	Seed Company	China
Lisa	Hurry	Serve - Ag Pty Ltd	Australia
Terry	Hyde	Withcott Seedlings	Australia
Shaun	Jackson	South Pacific Seeds	Australia
Siti Hawa	Jamaludoin	MARDI	Malaysia
Mandy	Jeppersen	Nufarm Australia Ltd	Australia
Elio	Jovicich	University of Florida	USA
Nam-Jun	Kang	Protected Horticulture Experiment Station	Korea
Sirichai	Kanlayanarat	King Mongkut's University of Technology	Thailand
Gerard	Kelly	NSW Department of Primary Industries	Australia
Hans-Peter	Klaring	Institute of Vegetables and Ornamental Crops	Germany
Larry	Knerer	Shamrock Seed Company	USA
Arash	Koocheki	Ferdowsi University of Mashhad	Iran
Brenda	Lanini	Harris Moran Seed Company	USA
Alain	Latche	INRA/INP-ENSAT	France

Nilton	Leal	SOB	Brazil
Ales	Lebeda	Palacky University	Czech Republic
Gene	Lester	US Depatment of Agriculture	USA
Efraim	Lewinsohn	Israeli Agricultural Research Organisation	Israel
Dean	Liere	Syngenta Seeds P/L	Australia
Ray	Martyn	Purdue University	USA
Michael	Matheron	The University of Arizona	USA
Ronald	Mau	University of Hawaii	Hawaii
Alex	May	Syngenta Seeds P/L	USA
Jaap	Mazereeuw	Enza Zaden	Netherlands
John	McBride	Seminis Vegetable Seeds	Australia
Robyn	McConchie	University of Sydney	Australia
John	McDonnell	T-Systems Australia Pty Ltd	Australia
Jonathan	McIntier	Seminis Vegetable Seeds	Australia
Geoff	McKeown	NZ Vegetable & Potato Growers Federation	New Zealand
Leanne	McLennan	Australian Melon Association	Australia
Jack	Milbank	Growcom	Australia
Jeanmarie	Mitchell	University of Florida	USA
Mohebbat	Mohebbi	Ferdowsi University of Mashhad	Iran
Merv	Mohr	Landmark	Australia
Julie	Nichols	Vegkiss Productions	Canada
Cristina	Nieto	CEBAS-CSIC	Spain
Jacqueline	Nieuwenhuis	Enza Zaden (Australia) Pty Ltd	Australia
Girish	Nikhade	Ankur Seeds Pty Ltd	India
Musa	Nimah	American University of Beirut	Lebanon
Takashi	Nishizawa	Yamagata University	Japan
Jean Claude	Pech	Ecole Nationale Superieure Agronomique	France
Nev	Pedersen	Growcom	Australia
Penny	Perkins - Veazie	USDA - ARS	USA
Belen	Pico	Polytechnic University of Valencia	Spain
Sohail Aslam	Qureshi	Central Queensland University	Australia
Marina	Radulovic	The Institute for Agriculture and Tourism	Croatia
Rohan	Rajapakse	University of Ruhuna	Sri Lanka
Steven	Roberts	Rijk Zwaan Australia Pty Ltd	Australia
Gordon	Rogers	Applied Horticultural Research	Australia
Fatkhu	Rokhman	Pt. East West Seed Indonesia	Indonesia
Shyamali	Saha	Graduate School of Bioagricultural Sciences	Japan
Yoshiteru	Sakata	National Institute of Vegetable & Tea Science	Japan
Reza	Salehi	University of Tehran	Iran
Nebahat	Sari	Cukurova University	Turkey
Maurice	Schiavon	Rijk Zwaan Australia Pty Ltd	Australia
Jonathan	Schultheis	North Carolina State University	USA
Peter	Scott	Sakata Seed Company	Australia
Bruce	Searle	Crop & Food Research NZ	New Zealand
Fakhri	Shahidi	Ferdowsi University of Mashhad	Iran
Nicole	Shaw	University of Florida	USA
Rajendra Nath	Singh	Banaras Hindu University	India
Balraj	Singh	Indian Agricultural Research Institute	India
Terry	Skelton	Seedlings Australia P/L	Australia
Marilyn	Steiner	New South Wales DPI, GHI	Australia
Peter	Stoffella	University of Florida/IFAS	USA
Siva	Subramaniam	DPI&F Queensland	Australia
Froozandeh	Sultani	Tehran University of Karaj	Iran
Xiaowu	Sun	Hunan Melons Institute	China
Yaakov	Tadmor	Israeli Agricultural Research Organisation	Israel
Akio	Tazuke	Ibaraki University	Japan
Len	Tesoriero	NSW Department of Primary Industries	Australia
Suzanne	Thornell	Perfection Fresh Australia	Australia
Hari Prasad	Tiwari	Agronel Research & Development Forum	Nepal
Greg	Tolla	Seminis Vegetable Seeds	USA
Margaret	Tuttle McGrath	Cornell University	USA
Bourbos	Vaguelis	NAGREF	Greece

Kerry	Walsh	Central Qld University	Australia
Steve	Walsh	Syngenta Seeds Pty Ltd	Australia
Shaohui	Wang	Beijing Agricultural College	China
Yu-hua	Wang	Agricultural Research Institute	R.O.C.
Jan	Westra	Westranell Horticultural Solutions Pty Ltd	Australia
Charles	Whitehead	University of Johannesburg	South Africa
Grant	Wilson	Seminis Vegetable Seeds	Australia
Paul	Yeates	Serve - Ag Pty Ltd	Australia
Huh	Yun-Chan	National Horticultural Research Institute	Korea
Xingping	Zhang	Syngenta Seeds P/L	Australia

Key outcomes of the conference

The International Cucurbit Symposium achieved its aims of delivering the latest international and Australian research and development information on cucurbits.

Conducting the Cucurbit Symposium in conjunction with the Australian Melon Conference was a great success. Delegates at both conferences were able to meet, network and share information and this should reap benefits for the Australian industry into the future.

The content of the cucurbit symposium had a scientific theme and the content of the melon conference, an industry theme. The international scientists remarked that being able to present and discuss their research with producers and industry was very beneficial. Delegates at both conferences were able to meet, network and share information and this should reap benefits for the Australian industry into the future.

There were many opportunities, during breaks and evening functions, for growers and scientists alike to network and bridge the gap between production and research. Also there was strong support and an excellent level of involvement from sponsors and trade exhibitors which provided practical and commercial aspects to the symposium.

The total number of registrations for the symposium was 130. There were 75 international delegates, (mostly research scientists) and 55 Australian delegates (20 researchers and 30 industry representatives and 5 growers) at the symposium. When the Australian Melon Conference joined in there were an extra 144 delegates (12 researchers, 45 growers, 87 industry representatives) making a total of 281 for both meetings.

The symposium generated an awareness among delegates of the extent and diversity of cucurbit research being conducted internationally. This contrasts with the relatively small research effort being carried out in Australia. There was also an encouragingly similarity between issue being investigated by research scientists and industry issues in Australia.

Technical highlights

However the symposium delivered many technical highlights. Some of these were:

1. Breeding & genetics – There is significant impact of biotechnology tools being used in cucurbit breeding and this will increase in the future. Key aims of cucurbit breeders include:

- Fruit quality in Galia melons
- Resistance to vine decline
- Resistance to the viral diseases ZYMV, WMV, CMV and melon necrotic spot virus.

There were successful releases of new cucurbits bred in Queensland and a reports of the Spanish Melon Genomics initiative.

Post harvest – Jean Claude Pech explained the molecular control of melon ripening, and work on the genetic control of melon aroma and how aroma compounds are linked to carotenoids was discussed. Shelf life of Galia melons could be extended using antisense ACC oxidase gene and the effect of inhibiting ethylene production on fresh cut melons was discussed.

Greenhouse Production – There were several papers permuted on greenhouse production of melons, and other cucurbit crops such as zucchini flower. This type of production is being led by Prof Cantliffe and his group in Florida. Work on the control of disease in this environment was presented.

Pests & IPM – Integrated pest management is being used to effectively control cucurbit pests and row covers have been investigated for the control of silverleaf whitefly.

Plant pathology – A holistic approach to the control of Vine decline was presented by Prof Martyn. The distribution of cucurbit viral diseases in Australia was discussed. There were some interesting papers presented on the use of SAR to control postharvest and other disease on cucurbits, including harpin, BTH and ReZist.

Powdery and downy mildew resistance and its management was also discussed.

Human Health aspects of melons were presented including the beneficial effects of Lycopene and Citrulline in watermelons and how supplemental potassium can increase the levels of Beta Carotene and Vitamin C in rockmelons.

Supply chain – various aspects of supply chain management and the use of NIR to measure fruit soluble solids levels were discussed. Rob Robson outlined changes which are likely to occur in the melon industry in Australia in the near future, and how we should best take advantage if these changes.

Recommendations for industry

The Australian research effort on cucurbits is small by international standards and if the melon industry introduced a national levy for R&D, it is likely that R&D on cucurbits would increase.

The concept of running industry and scientific meetings concurrently has beneficial effects for both groups and should be encouraged.

Support the emerging Greenhouse production of cucurbit crops in Australia.

Human health benefits of melons be studied and used more in promoting melons to Australian consumers.

The importance of calcium and potassium nutrition on crop and fruit quality be communicated to industry

Assist businesses in cucurbit supply chains to change or be informed of changes so they can meet changing consumer expectations and remain viable.

Recommendations for future conferences

The 4th International Cucurbit Symposium will be conducted in China in 2008. There seems there will be little opportunity to conduct a specific cucurbit conference in the future and any R&D relevant to cucurbits will need to be incorporated into a general vegetable industry conference or melon conference if appropriate.

Future meetings could be improved by giving consideration to:

1. Including a workshop session where industry members and scientists could discuss key issues facing the industry
2. Including a session whereby key issues and research priorities could be set
3. Providing a forum to foster the genesis of collaborative research approaches while the international group is together.
4. A formal concluding session and close of meeting.

Acknowledgments

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Australian Melon Association Inc Chairman - Judy Greensill

Australian Melon Association Inc Secretary / Treasurer - Leanne McLennan

Melon Industry Development Officer – Joanna Embry

NSW Department of Primary Industries, Horticulturist - Gerard Kelly

DPI Victoria, Industry Development Officer - Sally-Ann Henderson

Queensland Department of Primary Industries & Fisheries– John Brown

Applied Horticultural Research – Lynn Christie

Applied Horticultural Research – Dr Gordon Rogers

Sydney University – Dr Robyn McConchie

Their contributions included planning and conducting the conference program, content and presenters, securing sponsorship and ensuring the successful running of the conference.

The following companies are acknowledged for their sponsorship of the conference;

GOLD SPONSORS – Amcor Fibre Packaging Australasia

SILVER SPONSORS – Syngenta Seeds and Syngenta Crop Protection

BRONZE SPONSORS

Perfection Fresh Australia Pty Ltd, Westranell Horticultural Solutions, Terranova Seeds, Bret-Tech

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SUPPORTERS & DONATIONS

Woolworths Supermarkets, Premier Fruits, Lindsay Australia, T-Systems Australia, Bayer CropScience, SprayGro, Melbourne Market Authority, Col Johnson & Co Pty Ltd, Seedlings Australia, Hydrotech Monitoring

Thanks also go to Sally-Ann Henderson, DPI Victoria and Joanna Embry, Growcom who conducted the evaluation of the symposium.

Conference Budget

A summary of the symposium budget is set out below.

	Actual	Budgeted
INCOME		
Registrations	\$ 73,608.00	
Sponsorships	\$ 30,454.00	
Horticulture Australia Funds	\$ 100,000.00	
INCOME TOTAL	\$ 204,062.00	
EXPENDITURE		
Symposium Co-ordinator	\$ 23,450.00	\$23,450
Planning and Organisation	\$ 8,614.68	\$6,700
Brochures/Flyers/Advertising	\$ 6,244.68	\$5,100
Website	\$ 1,362.32	\$2,000
Satchels and name tags	\$ 3,112.20	\$4,300
Trestle tables/display boards, hire	\$ 2,500.00	\$2,530
Venue and Catering	\$ 44,355.36	\$28,200
Overseas Speakers airfares, accommodation & meals	\$ 8,592.10	\$12,000
Aust Speakers airfares, accommodation & meals	\$ 5,286.34	\$4,200
Bus Hire	\$ 2,423.18	\$4,260
Variety trial management	\$ 1,000.00	
Field Day hire, set up, equipment, materials	\$ 4,751.61	
Materials and Equipment Hire	\$ 1,296.00	
Symposium handbooks	\$ 3,819.31	\$3,750
ACTA Horticulturae Symposium Proceedings	\$ 18,750.00	\$18,750
Evaluation and Final Report	\$ 3,300.00	\$4,000
ISHS membership fees & event payments	\$ 7,930.00	
Insurance	\$ 662.00	
Dinner Entertainment	\$ 1,100.00	
Horticulture Australia Ltd VC 55% of \$100000	\$ 55,000.00	
EXPENSES TOTAL	\$ 203,549.78	
Profit/(Loss)	\$ 512.22	

Proceedings

Proceedings of the symposium will be published in the ACTA Horticulturae in 2006.