



Postharvest Newsletter

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PROJECT NEWS

Peanut research links could benefit China and Australia

There are significant opportunities for collaboration in peanut research between China and Australia, according to Dr Graeme Wright of the Queensland Department of Primary Industries, who visited China recently on a fact-finding mission at the invitation of the Chinese Government.



Dr Liao Boshou, peanut research coordinator at the Oilseed Crops Research Institute, Wuhan

There could be large mutual benefits from such collaboration in terms of information exchange and trade. Dr Wright is leader of ACIAR project PHT/1997/017, "Reducing aflatoxin in peanuts using bio-control and agronomic management strategies".

China has a substantial collection of peanut germplasm. The peanut germplasm at the Wuhan Oilseeds Crops Research Institute, the main centre for peanut breeding and research in China, contains some 6400 accessions, including material with resistance to bacterial wilt, a disease that, though not yet present in Australia, remains a risk to the industry here.

Australia's peanut germplasm collection, held at Biloela and Kingaroy in Queensland, contains over 1000 accessions, including material with good drought tolerance. Chinese researchers showed strong interest in current Australian research on breeding lines of peanuts resistant



The group of about 200 growers, village leaders, and officials who attended a seminar on the Australian peanut industry given by Dr Graeme Wright in the Zheng Yang peanut production area



Peanuts in China planted as an intercrop with wheat. The more-advanced peanut crop was planted 2 months earlier, while the emerging crop was planted following the wheat harvest.

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Contributors to this issue:

Ed Highley, Greg Johnson, Tim O'Hare, George Szrednicki, Mary Webb, Graeme Wright

to aflatoxin contamination, according to Dr Wright, and in obtaining information on aflatoxins in general. Monitoring for aflatoxins has become an important issue for China's peanut export business, he reports. China exports up to 450,000 tonnes of peanut kernels annually, but the detection of aflatoxin and heavy metal contamination in some recent shipments to European markets had threatened the trade. Since then, China has tightened management and monitoring requirements.

There appear to be two causes of the aflatoxin problem. First, the region of origin of the export crop.

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ACIAR focuses on linking farmers to markets

Linking farmers to markets”, an area that will be familiar to readers of this newsletter (see *PH Newsletter* Nos 51, 56, and 58), will be one of four, high-priority research areas for ACIAR until at least 2006.

ACIAR considers that, in the face of globalisation, the progress and resilience of rural communities will increasingly depend on:

- their understanding of, and access to, markets;
- the strength of their financial base; and
- the quality, efficiency and versatility of their production, processing, distribution and marketing systems.

China–Australia peanut research links...from page 1

Until recently, most of the peanuts destined for export came from northern China, where cool conditions during harvest are not conducive to aflatoxin production, especially before harvest. Some exporters have now begun to access peanuts from warmer, central and southern production regions, where preharvest aflatoxin is more common. Second, poor in-transit storage conditions on ships have been conducive to postharvest production of the toxins.

Peanut production in China has more than doubled over the past decade, rising from about 6 million tonnes in the early 1990s to over 14 million tonnes in 2001. About half

ACIAR has grouped avenues of research it considers intrinsic to its objectives within the “Linking farmers to markets” theme into six focus areas, which are briefly outlined here.

1. Matching products to markets

It is increasingly evident that expanding production cannot be relied upon as a means of improving returns to farmers. There is a need to examine how raw materials and processed products can better match market requirements, using data gathered on market demand patterns. The main objectives of this focus include: product development and value adding; identification of niche markets; monitoring or improving nutritional quality or end-use

the crop is used for oil, a third goes to domestic human consumption, and the balance to seed and for export, export commodity being drawn from the highest quality parts of the crop.

Peanut oil is regarded as a high quality oil in China and commands a significant price premium. It can be up to twice the price of other oils, such as palm oil. Though production of oilseeds continues to increase in China, demand for oilseed products remains ahead of supply, so China must import some of its requirements. Chinese officials suggested to Dr Wright that there may be major export opportunities for other peanut-producing nations, including Australia, to supply China with high-quality peanut oil and cake.

EH/GW



China's national peanut germplasm collection is at the Chinese Agency for Agricultural Sciences' Oilseed Crops Research Institute at Wuhan in east-central China



Dr Wright with government officials who organised his visit

sustainability; and food, wood and fibre processing. ACIAR also recognises the benefit of research into improving local agribusiness skills and management of supply chains and quality control—the aim being to enhance the availability of produce of consistent quality and to reduce losses or deterioration. This last goal is closely tied to focus area 3. Maintaining product quality after harvest (see page 4).

2. Strengthening developing country quarantine through technical and policy interventions

Quarantine is becoming increasingly important for developing countries, for two reasons: national biosecurity, and facilitation of trade. Biosecurity involves keeping exotic pests out, and preventing those that are already in from spreading—this problem has become even more acute as international trade and tourism increase. Being able to meet strict quarantine requirements such as nil insect and residue levels is imperative to participating in global trade. Many developing countries, however, do not have the means necessary to test for residues and have inadequate knowledge of their endemic pest species. Moreover, they lack the technical infrastructure to overcome these weaknesses.

ACIAR will support the development of postharvest systems to comply with regulatory, quarantine or niche-market requirements, using technologies that minimise reliance on chemical treatments, and will support the development of first-stage processing technologies and systems that eliminate or reduce sanitary or phytosanitary risks and add value.

Significant benefits should be achieved by research on: increasing information on pest, disease and weed problems in regional countries; improved diagnostic and taxonomic ability; better access to and processing of records and data through innovative databases and other information retrieval systems; and studies of the impact of sanitary and phytosanitary regulations on developing country trade, and how to minimise negative effects.

As the ACIAR priority regions include Southeast Asia and Papua New Guinea and the South Pacific, efforts in this field will also benefit Australia, by reducing quarantine threats.

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8th International Working Conference on Stored Product Protection

Food safety was the theme of a new session on the program for the 8th International Working Conference on Stored Product Protection, held at the University of York, UK on 22–26 July 2002. It was also a focus of the opening address to the conference, given by Lord Haskins of Skidby, Chairman of the large, Yorkshire-based food producer, Northern Foods PLC.

There were 300 participants in the conference, from over 40 countries.

Organising committee

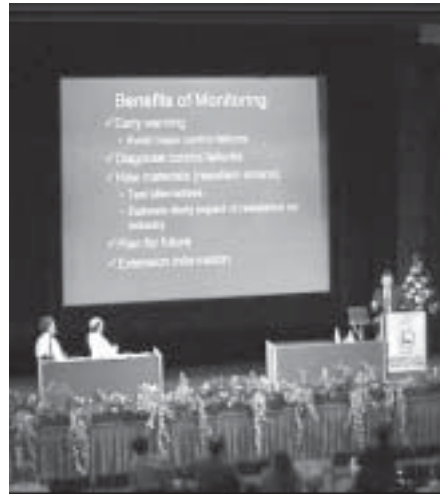
The Local Organising Committee for the 8th IWCSPP drew on expertise from across the UK, with the York-based Central Science Laboratory (CSL) providing the primary logistical input. Committee members were: Mr D. Armitage, CSL; Dr C. Bell, CSL; Mr P. Cogan, CSL; Dr D.A. Cooper, Agriculture and Food Technology, DEFRA; Dr P.F. Credland, Royal Holloway, University of London; Dr A. Evans, Crop Health Department, Scottish Agricultural College; Professor C. Haines, Natural Resources Institute; Dr Z. Lawrence, CABI; Professor N. Price, CSL; Miss C. Wakefield, CSL; Mr C. Watson, IGROX Ltd; and Dr K. Wildey, CSL.

Themes

The five themes of the conference were: The future of stored product protection; Biology, detection and biological control; Food safety; Chemical and physical control; and Processing and applications. Also on the program were six workshops, covering the following topics: Resistance to control measures; Museum pests; Intelligent automated grain management systems; Alternatives to methyl bromide; Trapping and spatial analysis for evaluating pest management practices in retail stores; and Biological control of stored product pests.

Trade exhibition

A trade exhibition held over the first two days of the conference attracted almost 20 companies offering goods and services in stored-product protection and related areas.



Dr Pat Collins (QDPI and ACIAR project PHT/1998/137) presenting the results of research on monitoring and managing phosphine resistance in Australia.

Presentations

The themes of the conference were covered in over 60 oral and some 130 poster presentations. There were seven keynote addresses:

- Taxonomic imperatives in stored product acarology, by R.B. Halliday

- Do resistant seeds offer a worthwhile avenue for progress in stored product protection? by P.F. Credland and J.H. Appleby
- Where does pest detection research go next? by J. Chambers
- Food for thought about organic foods, mycotoxins and GMOs, by W.F.O. Marasas and H. F. Vismer (see article in this issue)
- Philosophy guiding current and future fumigant research, by YongLin Ren and L.T. Vu
- Some considerations for effective use of heat treatments in food-processing facilities, by B. Subramanyam
- A two-dimensional model of grain storage with dynamic visualisation: predictions for temperature, moisture content, germination and respiration, by J.L. Woods and G. Xanthopoulos.

ACIAR connections

There were almost 40 participants from Australia, among them several researchers associated with ACIAR projects.

Dr Pat Collins of the Queensland Department of Primary Industries (QDPI), leader of project PHT/1998/137 (Enhancing the efficacy of phosphine fumigation in China and Vietnam), presented an oral paper on “Two decades of monitoring and managing phosphine resistance in Australia”.

Continued at foot of page 4.

The IWCSPPs

The International Working Conferences on Stored-product Protection (IWCSPP), first mooted in 1970, have been held every four years since 1974, first in Savannah, Georgia, USA, then in Nigeria, the USA, Israel, France, Australia, and China.

The conferences bring together research scientists, consultants, extension workers and industrialists involved in the safe storage of the world’s durable food commodities, such as grains, legumes, pulses, nuts, beverage crops and animal feeds. The meetings showcase work on the pests and diseases which may cause spoilage, adverse health effects and loss of the crop, and discuss new techniques aimed at safe, effective and environmentally friendly management of stored commodities. The objectives are to exchange information from widely differing agricultural and economic scenarios, ranging from farmer scale in the tropics to bulk scale in Australia, Europe, and North America, and to devise solutions to storage problems that are appropriate and cost effective.

The IWCSPP is steered by a Permanent Committee drawn from international stored-product specialists, while each conference is the responsibility of a local organising committee drawn from among storage and handling specialists in the host country.

Following a proposal made at the end of the York conference, it is likely that the 9th IWCSPP (2006) will be held in Brasil.

ACIAR focuses on linking farmers to markets...from page 2

3. Maintaining product quality after harvest

Retaining postharvest product quality is vital to being able to provide healthy food to consumers, and for meeting the increasingly strict requirements of global markets. Product deterioration can result from damage sustained during harvest, improper storage conditions, or contamination by insects or toxin-producing fungi. Postharvest losses in developing countries can typically be 20–30% of the total product, with additional damage affecting the overall quality of the produce. Developing countries can be particularly prone to contamination problems as they lack the diagnostic tools to monitor them.

ACIAR will continue to encourage the use of simple processing technologies to address product-quality issues. It is particularly interested in initiatives that seek to improve:

- energy and labour efficiencies in postharvest processing systems for staple products, especially for small and medium enterprises;
- integrated pest/disease management;

8th IWCSPP...from page 3

Dr Greg Daghli, QDPI, also a member of the PHT/1998/137 team, presented a poster paper on “Prospects for predicting insect mortality in relation to changing phosphine concentrations”, which reported on work supported by ACIAR and others.

Dr George Srzednicki of the University of New South Wales, also reported on work supported by ACIAR, in an oral presentation entitled “The effects of high-temperature drying on fragrant rice”. Dr Srzednicki is a member of the research team for project PHT/1994/037 (In-store drying of grain in China).

Several participants from China had connections with ACIAR projects.

Mr Li Fujun of the State Administration of Grain and local coordinator for ACIAR grain projects in China, co-authored a comprehensive paper on “The current situation and development priorities for grains postharvest technology in China”.

Professor Cao Yang (Zhengzhou Institute of Technology), a member of the ACIAR project PHT/1998/137

- use of genetic engineering technologies to reduce the susceptibility of commodities to pests, pathogens and deterioration; and
- sorting, grading and processing technologies that will deliver benefits to smallholders.

In efforts to reduce contaminant damage, ACIAR will also support research into low-cost contaminant monitoring and amelioration technologies, better cleaning treatments and safer packaging, better codes of manufacturing practice, and improved standards and system harmonisation.

4. Development of higher-value forest and cash-crop products

Forest and cash-crop plantation products have the potential to yield some well-priced food and fibre products. They also provide an opportunity for landowners to diversify their production base, use land that may otherwise be marginal for annual crops, and integrate crops that have labour-intensive peaks with ones that have more flexible labour needs. Historically, however, plantation-type crops, because they take a long time to grow, have often been unattractive to farmers, whose needs dictate a preference for quicker crops such as grains and vegetables. Farmers will have to be convinced of the benefits before plantation farming and harvesting

(Phosphine fumigation practices) team, presented the results of a survey of psocid species infesting stored grain in China and of resistance to phosphine in field populations of *Liposcelis entomophila*, one of the most common grain-psocid species.

The final presentation in conference session was given by Mr Jan Graver, CSIRO, on behalf of co-authors Dr Barry Longstaff and Dr George Srzednicki. The topic was “Improving postharvest commodity quality management through training”, and the presentation reported on computer-aided learning systems, the development of which has been supported by ACIAR, the Australian Agency for International Development, and others over the past decade.

A conference proceedings currently in preparation will be published by CAB International. It will contain all papers presented, as well as session summaries, and reports of the workshops and other ancillary activities.

GS/EH

forest products are more widely accepted.

As this is a relatively new area of interest, ACIAR intends to focus research initially on: market and consumer requirements for such products; quality factors such as storability, appearance, flavour and nutrition of food crops; and the strength, durability and appearance of fibre crops. Such factors will then need to be prioritised in terms of their ability to attract higher unit prices. Specifically, researchers need to look at the particular species or variety grown, the cultivation system used, the timing and method of harvest, the storage systems used, the various processing steps before marketing, the method of transport to market, and the presentation at market. Economic and social incentives need to be identified to encourage farmers to adopt the plantation approach, and in that regard, this focus area is closely allied to 1. Matching products to markets.

5. Reducing wastage from rural-product processing

As agriculture and processing become more intensive, the amount of waste produced increases. This is becoming an increasing problem globally, as demand for animal, seafood and processed plant products intensifies due to population increase and rising disposable incomes.

Research is required both to reduce the amount of primary waste produced, and/or to find and develop ways of actually using these agricultural “waste” products.

ACIAR will encourage projects that: develop capacity for the analysis of soil and crop contamination, and develop technical decontamination strategies; develop and assess more efficient, less wasteful crop, forest and animal germplasm and production systems; and seek innovative and efficient technologies for environmentally acceptable effluent control in important food, fibre and forest-product processing industries. Collaboration between industry and government will be important in such research projects on effluent control.

In developing methods to enhance the use of agricultural wastes, ACIAR will support projects that investigate how waste products can be used as inputs for other production systems, e.g. residues from crop harvesting could be fed to livestock.

Continued on page 6.

Monitoring mycotoxins and pesticides in grain and food

The reviewers of project PHT/1996/004, "Monitoring mycotoxins and pesticides in grain and food production systems for risk management in Vietnam and Australia", have commended its contribution to overcoming the hazards to human and animal health consequent on the occurrence of chemical residues and fungal toxins in food and feedstuffs.

The review was conducted in Vietnam during March 2002 by Professor Mike Morgan, University of Leeds, UK, an international authority on the use of antibodies in food science, and Professor Vu Trieu Man, Hanoi Agricultural University, a plant virologist with experience in the use of ELISA tests in virus diagnosis.

Progress report

They reported that the project, since its implementation in July 1999, has made considerable progress in:

- identifying pesticide and mycotoxin targets for immunoassays based on surveys of Vietnamese



Members of the PHT/1996/004 review team enjoy a break from project assessment. L-R: Mr Tran Van An, Postharvest Technology Institute (PHTI), Ho Chi Minh City; Mr Mike Zeiss, CIDSE (International Cooperation for Development and Solidarity); Prof. Ivan Kennedy, University of Sydney; Prof. Le Van To, PHTI; Prof. Vu Trieu Man, Hanoi Agricultural University; Prof. Mike Morgan, University of Leeds, UK; Dr Alice Lee, University of Sydney; Dr Jenny Irwin, CSIRO Plant Industry; Mr Vo Thanh Hau, PHTI; and Miss Nguyen Thi Thu Trang, PHTI

agricultural produce, knowledge of pesticide usage, and climatic conditions

- training Vietnamese scientists to postgraduate level in immunochemical techniques, particularly in the chemical procedures required
- the development of immunoassays for aflatoxin B₁, ochratoxin A, alternariol monomethyl ether, DDT and endosulfan, and the training of scientists in high-performance liquid chromatography (HPLC) techniques to support assay validation.

At the time of the review, prototype kits had been developed in ELISA and immunoaffinity column form for aflatoxin B₁. The kits were in use in feedmills in Vietnam and were being independently validated. In addition, the Vietnamese partners had provided training courses for national scientists and international audiences.

The reviewers considered that further use could be made of the team's enhanced analytical capability to enhance national monitoring and surveillance programs. They also concluded that further work was needed to finalise technical elements of the project and to realise the full potential of what has already been achieved.

ACIAR has accepted the five key recommendations of the reviewer that relate to immediate action by the Centre. Some other recommendations are about issues that need to be considered jointly by Vietnam and Australia.

Project extended

ACIAR has agreed to extend the project for a further two years. This will allow completion of tests under development and formulation of a manual of analytical protocols covering the contaminants involved. Also, further work to consolidate baseline data on produce-contaminant levels will be encouraged as it will facilitate future assessment of the impacts of improved monitoring in this area. In addition, ACIAR recognises that, for the project to be completely successful, antibodies need to be produced in sufficiently large amounts to satisfy the need for wide dissemination. This recommendation will be addressed as a key element of the project extension, with a focus on completion of tests currently under development.

ACIAR will encourage the project team to continue reporting of project achievements to Vietnamese and Australian regulatory authorities. It will support the preparation and publication of standard analytical protocols and procedure manuals for pesticides and mycotoxins in Vietnam, with particular emphasis on project-derived contaminant tests.

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Background to PHT/1996/004

Following the completion of an ACIAR project in India on the development of simple test kits to detect pesticide residues in plant foods (PHT/1993/009), this project was established during 1999 to enhance the monitoring of agricultural produce contamination by mycotoxins and pesticides in Australia and Vietnam. The project aims to develop rapid, simple, immunoassay procedures for the contaminants of most immediate concern, to train Vietnamese scientists in assay development and validation and enhance their capability for sustaining such research, and to improve monitoring and trace-back procedures in Vietnam, with consequent benefits for the environment, the economy, the farmer and the consumer. Contaminant testing is becoming an essential part of market-access compliance and, increasingly, a serious barrier to equitable market access by developing countries. By boosting Vietnamese expertise in the development and use of enzyme-linked immunosorbent assay (ELISA) and immuno-affinity chromatography (IAC) technologies, the project aimed to make access to the technology affordable for Vietnam, while enhancing capability for "international validation" of their testing/certifying capability.

PHT/1996/004 partners: University of Sydney; Postharvest Technology Institute, Ho Chi Minh City; CSIRO Plant Industry; AWB Agrifood Technology; Pasteur Institute and University of Agriculture and Forestry, Ho Chi Minh City

ACIAR-Philippines consultation

Priorities for agricultural research ventures between Australia and the Philippines were discussed in the 2002 consultation between ACIAR and representatives of national and local government departments, private sector associations, national and regional research organisations and consortia in the Philippines.

Several overarching issues were identified. These included the need for research to support both the development and implementation of policies that increase the efficiency of agricultural production and marketing. The need to increase the international competitiveness of Philippines agriculture was recognised, with a

view to expanding the markets for Philippine agricultural products and services, taking into account the impacts of trade liberalisation.

Hand-in-hand with competitiveness, is the need to improve agricultural productivity to raise rural incomes—responding to market opportunities with higher-quality commodities produced at competitive costs.

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Monitoring mycotoxins and pesticides...from page 5

It is also recognised that the development of Vietnam's expertise in immunochemistry will require continuing support. Attention to ongoing development of the expertise and proficiency of industry personnel involved in contaminant monitoring is therefore particularly encouraged.

Other issues for further consideration by Vietnam and Australia include:

- The need for collection of data on existing mycotoxin contamination of agri-food materials, and ongoing surveillance and monitoring programs for mycotoxin contamination at the national level.
- Collection of data on existing pesticide contamination of agri-food materials, and continuing surveillance and monitoring programs for pesticide contamination.

- A program leading to international validation should be developed, agreed on, then implemented as soon as possible. Participation in proficiency-testing schemes should be investigated at an early stage.
- Commercialisation of tests (ACIAR will encourage the project team to undertake initiatives in Vietnam and Australia that foster wider uptake and acceptance of the contaminant tests developed in the project).
- Consideration needs to be given to production of significant amounts of some mycotoxins (and other toxins in the same category) that are becoming impossible to obtain commercially.
- The impact of increased monitoring and trace-back needs to be assessed.

EH

ACIAR focuses on linking farmers to markets...from page 4

6. Enhancing incomes and income distribution through institutional and agricultural policy reform

Government policies, including those relating to institutional structures, are essential for realising improvements in incomes and income distributions. In agriculture, specific policies that could improve rural conditions include those that influence:

- inputs, such as credit policies;
- intensification or facilitating more extensive production, such as land ownership;
- yields, such as extension policies;
- output prices, such as export taxes and subsidies; and
- market access, such as trade agreements.

Policy and institutional research can produce high returns, as its adoption can be rapid and produce widespread benefits at low cost. Collaborative research with developing countries is the key, and ACIAR will target areas where policy changes are more likely to be adopted, such as using Australian expertise in trade liberalisation in low-income regions, and improving links between farmers and markets.

Thus, ACIAR's aims for the next few years are positive and ambitious, and offer opportunities for the funding of a broad range of research topics, that will bring benefits to many of ACIAR's partners.

Full details of the Centre's recently announced priority research and development areas for the next five years can be found at <www.aciar.gov.au/projects/index.htm>, or a package can be obtained from the ACIAR Communication Group <comms@aciarc.gov.au>.

MW/EH

AusAID-CARD workshop on environmental risks of pesticides

A joint Australia-Vietnam workshop on "Environmental risk assessment, monitoring and remedial action for pesticide residues", was held in Hanoi and Ho Chi Minh City during July.

It reported the results of research cooperation between Vietnamese and Australian scientists in project PHT/1996/004 and other activities that is helping to provide a much-needed solution to the problem of the harmful effects of pesticides on public health and the environment in Vietnam, and on Vietnam's agricultural exports.

The workshop introduced to participants a number of agricultural management practices to reduce water and soil contamination. These solutions will provide better quality assurance for produce, thereby improving international demand for Vietnam's agricultural products.

The workshop was part of a two-year pesticide assessment project, funded through the Australian Agency for International Development's (AusAID) Capacity-Building for Agriculture and Rural Development (CARD) Program.

This CARD project brings together collaborating groups at the Hanoi University of Science, the University of Agriculture and Forestry HCMC, the Centre for Analytical Services and Experimentation HCMC, the Post Harvest Technology Institute, and the University of Sydney. It will conduct integrated pilot studies over two years at separate field sites in northern and southern Vietnam. The pilot studies are expected to provide an effective model for extension throughout Vietnam.

GM foods: safer than organic produce?

How safe are organic foods? How dangerous are genetically modified (GM) foods? These are questions of the moment among consumers in many Western countries.

Proponents of food derived from organically grown crops maintain that such foods, because they are not contaminated with the residues of pesticides and other chemicals used in broad-scale agricultural production, are safer than those from conventional crops.

Those who speak out about GM foods, on the other hand, are more likely to be opponents than proponents. Opponents of GM foods say that they are unsafe because, among other things, they contain foreign genetic material ("Frankenstein foods"), and we do not know about any possible long-term consequences of transferring genetic material from one organism to another. The arguments between proponents and opponents of GM foods are long and tortuous.

A paper* presented at the 8th International Working Conference on Stored Product Protection (see page 3) looked at the specific case of the occurrence of mycotoxins in organic and GM foods, with findings that, though perhaps in hindsight not unexpected, nevertheless provide food for serious thought.

Marasas and Vismer, members of the PROMEC Unit of the South African Medical Research Council, take as their starting point that "organic foods that are grown without the use of insecticides and fungicides may be expected to be infested by insects and infected by fungi to a larger extent than conventionally grown foods and concomitantly contaminated with higher levels of mycotoxins". They then focus on two examples of mycotoxins in conventional versus organically produced and genetically modified foods: patulin in apple juice and fumonisins in *Bt*-maize.

* W.F.O. Marasas and H.F. Vismer, Food for thought about mycotoxins, organic and genetically modified foods. Proceedings of the 8th International Working Conference on Stored Product Protection, CAB International, Wallingford, UK, in press.

Patulin in apple juice

Although patulin-producing fungi occur in a range of foods, only apple juice and apple cider have been found to be naturally contaminated with patulin, produced by *Penicillium expansum*. Patulin has been shown to have mutagenic, immunotoxic, neurotoxic, and other effects in a range of animals. It is regarded by UK authorities as an *in vivo* mutagen. They recommend that patulin levels in products intended for human consumption should not exceed 50 µg/kg.

The results of research by the PROMEC Unit indicate that even conventionally produced apples cannot be stored for more than 7–10 days before processing if the level of patulin in juice is not to exceed 50 µg/L. Longer storage significantly increased the level of toxin. Patulin levels can be held down by removing rotted fruit, but the apple juice production itself has only marginal effects on the level of patulin in the final concentrate.

Thus, even in conventionally grown apples, keeping down patulin levels requires judicious handling of the crop. The South African study found that patulin levels in juice derived from such apples were in the range 244–3993 µg/L. These are still too high, but much lower than the levels of up to 45,000 µg/L that have been found in organic juice.

Fumonisin in maize

The fumonisins are a family of food-borne carcinogenic mycotoxins. They are especially prevalent in maize, a staple food of humans and an important animal foodstuff in many parts of the world.

Maize is widely grown by small-scale and subsistence farmers in Africa, using practices that fall within the definition of "organic farming". The crop is particularly prone to infection by the fungus *Fusarium verticillioides*, the main source of fumonisins in maize. There are serious health consequences. In the Transkei of South Africa, for example, a highly significant correlation has been found between the incidence and rate of oesophageal cancer and consumption of home-grown maize.

Marasas and Vismer note that transgenic maize hybrids (known as *Bt* hybrids) have been shown to signifi-

cantly reduce levels of insect damage to the crop, as well as to increase yields with significantly lower fumonisin concentrations than their conventional counterparts. Their point is that *Bt* maize hybrids could be very important in reducing fumonisin levels in maize products, and therefore in enhancing the quality and safety of maize for human and animal consumption, particularly in Africa.

Conclusions

Mycotoxins in food and feedstuffs are a very significant risk for human and animal health. The Council for Agricultural Science in the United States has ranked the human health risk posed by fungal toxins in food as being an order of magnitude greater than that from the residues of pesticides and other chemicals. Thus, consumers of organically grown foods, which are likely to carry higher fungal loads than conventional foods, may unwittingly be exposing themselves to a higher risk of carcinogenic and other factors deleterious to health. Conversely, resistance to the use of genetically modified *Bt* maize may be depriving developing country farmers and consumers of the benefits of increased yields and lower fumonisin levels, and all the positive health outcomes that would flow from these.

EH

ACIAR-Philippines...from page 6

Opportunities may come through research for development and marketing of higher-value aquaculture, fruit, livestock products and processed foods.

Environmental matters were not neglected: the consultation noted that improved productivity should not come at the expense of natural resources degradation.

Research projects should be designed to meet the needs of farmers, processors of agricultural product and policymakers. Involvement of community groups in the districts where the research will be applied and of policy stakeholders in the projects will also be encouraged. Project design should also take account of devolution of the management and governance of extension responsibilities to local government units.

Finally, it was noted that opportunities exist for follow-up activities that would enhance the impact of earlier ACIAR projects. For more details, visit <www.aciar.gov.au/projects/index.htm>.

CURRENT AWARENESS

Aflatoxins affect African children's growth

A research team from the International Institute of Tropical Agriculture, Ibadan, Nigeria and the University of Leeds, UK, announced during July that young African children show the kind of stunted growth usually associated with malnutrition when they eat food contaminated with aflatoxins, a toxic by-product of moulds that can grow on crops such as maize and peanuts if they are stored in hot and humid conditions. The results of the team's study of nearly 500 young children (aged from 9 months to 5 years) from 16 villages in the West African countries of Bénin and Togo were published in the British Medical Journal. The research, funded by the German development agency (BMZ) and the National Institute of Environmental Health Sciences, USA, shows, for the first time, an association between aflatoxin and growth effects in children.

Australasian Postharvest Horticulture Conference 2003

The Australasian Postharvest Horticulture Conference, to be held in Brisbane, Queensland, Australia from 1–4 October 2003, will bring together researchers from a broad range of disciplines to discuss the latest developments in all aspects of postharvest horticulture. The program will provide an environment fostering

interaction, and participation in sessions relevant to delegates' areas of interest and expertise. The conference organising committee and the Queensland Department of Primary Industries extend a warm invitation to all potential participants.

The conference will offer presentations from local, national and international sources—and will enable participants to network with others working in similar fields. The conference committee, headed by Dr Tim O'Hare, has been able to attract several leading national and international speakers.

For further information, visit <www.aphc2003.org>.

ACTA Horticulturae 575

Acta Horticulturae 575 of the International Society for Horticultural Science (ISHS), published recently, is the Proceedings of the International Symposium on Tropical and Subtropical Fruits held in Cairns, Australia in November–December 2000. It's a hefty work, of two volumes and almost 900 pages, that contains many papers of interest to members of the postharvest research and development community. Seventeen papers were presented in a postharvest session of the symposium, covering topics from the development, handling, and marketing of transgenic fruit, to dragon fruit quality and storage life, to

postharvest disease control in lychee, the last-named topic being covered by ACIAR Postharvest Technology Program manager Greg Johnson and co-authors Tony Cooke and Uraporn Sardud. Sections on technology transfer, economics and marketing, and processing and product development also contain papers of interest. For details on the availability of the proceedings, visit <www.ishs.org>.

Advanced drying technologies

Advanced Drying Technologies, by Tadeusz Kudra and Arun Mujumdar, a new publication that "offers classification and selection criteria for new and advanced drying system and compares conventional dryers to novel technologies, including modified fluid bed, superheated steam, and impinging stream dryers", may contain information of interest to grain-drying specialists. For further information, go to <www.dekker.com>.

Fumigants and pheromones workshop

The 6th International Fumigants & Pheromones Conference & Workshop will be held in Copenhagen, Denmark on 3–5 June 2003, organised by Insects Limited, Inc. USA and Tanaco Danmark A/S. Further details can be found at <www.insectslimited.com>.

DR ED JAY

Members of the grains postharvest community will be sad to hear of the death, after a short illness, of Dr Ed Jay on 20 August 2002.

Ed Jay was a research entomologist with the USDA, Savannah, Georgia. During his career, Ed worked with international and US scientists in the use of modified atmospheres for stored-product pest control. He was a guest scientist with the CSIRO Stored Grain Research Laboratory and participated the ACIAR/National University of Singapore-sponsored international conference on fumigation and controlled atmosphere storage of grain, held in Singapore in 1989.

Ed was a founding member of the Permanent Committee of the International Conferences on Controlled Atmosphere and Fumigation in Stored Products. He was well published and served for 13 years as the Editor for the Americas of the Journal of Stored Products Research.

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