

Appropriate Storage

Convener — Mervyn Adams

The main purpose of this workshop was to provide a dialogue between specialists from different disciplines and different geographical locations, so as to further a long-term appreciation of each others views, and provide a forum for discussion on the provision of appropriate technology and pest management. The workshop was sponsored by the Insecticide Resistance Action Committee (IRAC) as part of its program for improving the management of resistance. Problems of resistance to pesticides in storage are increasing at a time when concerns are also being voiced about pesticide residues, and registration costs for new products are soaring. To improve the efficacy of storage pesticides and ensure their correct application there is a need for all specialist groups involved — economists, store designers, construction engineers, managers, and fumigation and pest control specialists — to work together in a concerted effort to reduce the likelihood of infestation, improve early detection of problems, and provide an appropriate environment for their use.

The workshop was attended by about 80 people, and a quick poll of the participants showed representation from a wide variety of disciplines and experience of problems from many countries. It was structured as a fairly free-ranging debate with key topics introduced from the chair to maintain the discussion. This enabled participants to discuss in greater depth key issues, which had relevance to their situation, that had arisen during the conference, as well as raising other topics of interest. The subjects covered included: pest control, mycotoxins, fumigation, controlled atmospheres and the integration of these with store design and management.

Initial discussions concentrated on raising the standards of management and pest control in the storage environment, so as to facilitate appropriate control measures. This included more contact between users and designers. The most important factor was felt to be the lack of incentives for good quality management. In many case customers were given little choice but to accept damaged and infested produce. Although it is true that customers were becoming more quality conscious, it was felt that in many regions there was a need for active promotion of quality improvements by providing incentives to farmers and store operators. This would assist in the acceleration of storage improvements. At present many management systems allow wastage and offer no financial incentive to those carrying out good hygiene and pest control.

On the subject of mycotoxins, it was felt that the problem was becoming more widely recognised, but that resources were still lacking for a proper investigation of their significance. The discussion examined the role of health experts in this field and concluded that money spent on carrying out surveys of cases of toxicity might better be used to educate people and assist in determining the cause of specific problems so that they could be solved.

There was considerable discussion on the use of fumigants and the need to have buildings correctly designed to allow proper fumigation, or at least to allow provision of a gastight enclosure by sheeting. The use of SIROFLO™ in Australia was noted and interest was expressed in its use in other areas where the management may be less sophisticated and access to gas cylinders unlikely. However, most discussion was on the increase in the use of phosphine for small-scale farm storage. Apart from the problem of safety, there is also the risk of increasing resistance. With the lack of suitable alternative fumigants which can be used at this level, there was considerable discussion on whether such fumigation should be banned. However, it was felt that such an action would be impossible, and that better training of users and sealing of stores, and safer product packaging, was a more appropriate solution.

Moving on to the use of sealed structures, it was felt that more information was needed for hot humid climates and smaller stores. Reference was made to the ancient pit stores in places such as Morocco and the use of sacrificial straw and grain around the edge to use up the oxygen. In many countries the provision of an external source of inert gas would be a problem, so small-scale inert gas generators were a possibility. Coupled with better sealing, these could provide secure village grain storage. The problem of ownership of grain in co-operative type stores was raised in the context of managing a more complex storage system.

As a result of the discussions some major action statements were agreed:

- Management interaction with pest control operations is vitally important requiring better incentives to ensure reliable control.
- Quality improvements in the long term may be end-user driven, but in the short term require implementation by handlers and processors, taking account of the economic effect of their imposition on those involved in the supply chain.
- The importance of mycotoxins has previously been underestimated. The possibility of further co-operation with aid agencies involved with human health should be considered to increase the potential funds available.
- Admitting that, in spite of the risks, fumigation of small-scale farm stores is taking place, more work is required on improving sealing techniques at this level and providing safer packaging for small quantities of fumigant.
- More information on the use of sealed storage structures for small-scale users in differing climates is required before their use can be widely expanded.

It is suggested that these action points be taken up by all the participants in the conference and that during the next meeting in China an opportunity should be provided for more interaction of the type that made this workshop successful.

Finally, the most important aspect of the discussion was the interchange of ideas and awareness between the more technologically advanced countries and those with a mainly subsistence agriculture. Many people felt that the workshop had opened their eyes to situations they had not considered before. This is encapsulated in the comment of one attendee with regard to field trial work, who said 'In Australia you may lose a few tonnes of grain if it goes wrong, in my country the farmer and his family would lose their life, as their stored food is all they possess'.