Grain Quality — Session Summary

Conveners: B. Juliano and C. Wrigley

Maintenance (or even improvement) of grain quality must be a primary goal of storage strategies if the market value of the grain is to be preserved. The grain quality session was thus important for the overall objective of the conference. The session consisted of two keynote addresses and thirteen poster papers, seven of which were also presented orally. The keynote addresses provided an overview of grain-quality maintenance concerns: postharvest physicochemical changes before and during storage (Juliano) and the use of mathematical models to predict conditions and the period of safe storage (Wrigley et al.). Five of the contributed papers were on methodology (two on moisture analysis, one on a hedonic model for consumer demand for quality, and two on the mathematical modelling of quality changes during storage); one described seed-quality changes in controlled atmosphere storage, five were on the effects on processing or nutritional quality of various pretreatments and two dealt with effect of insect damage during storage on quality.

In the general discussion session, aspects of quality that can be expected to change during storage and/or preparation for storage were discussed, putting a monetary value on these properties. Changes in viability and germination rate are relevant to the storage of all grains (for use as seed), but particularly to malting barley (for which high germination is essential). Progressive loss of protein quality during storage is particularly relevant to wheat (loss of dough-forming/-baking quality is slower than loss of sprouting enzymes). The drying stage is critical to rice and maize quality to minimise cracking/fissuring within the endosperm and to prevent stack-burning (yellowing) and mycotoxin contamination.

An important approach to understanding the progress of these quality changes during storage is to quantify them in statistical models, thus permitting predictions to be made prior to critical loss of quality. These models need to take into account the specific aspects of quality that are critical to the target market, namely temperature and moisture content (activity) of the grain, its initial soundness, the effects of any pest control measure, and possible cultivar differences. Grain temperature and moisture content emerged as the most important determinants of quality change. Both of these can be manipulated, but at a cost. The benefit may or may not warrant this cost and should be predictable from the model. Controlled atmospheres for pest control (such as reduced oxygen levels) may delay quality deterioration, but they do not greatly improve quality retention, except possibly retarding grain oxidation.

Grain quality evaluation must continue to be any integral part of stored-product protection studies.