Conversely, with the difficulty of gripping and penetrating the smoother pericarps on resistant lines, there was selection to fully utilise the exposed endosperm by more extensive feeding. This resulted in a deep feeding site.

Following the SEM studies, the texture of the pericarps with varying levels of resistance was quantitatively measured. This was done with a profilometer. Significant differences were found among the lines. When the number of eggs that were oviposited in these lines was regressed on these measurements, there was a clear trend of greater oviposition in those genotypes with higher measurement values or rougher textured pericarps.

These studies have led to the conclusion that the texture of the kernel pericarp is an important mechanism of resistance in whole kernel corn to Sitophilus zeamais and it can be measured

Finally, there were two points that surfaced as important considerations for future research:

1. Research findings indicate that there are chemicals on maize pericarp that need to be studied (as they affect insect behaviour) using more sophisticated techniques than those previously used. The reason being that current results are contradictory.
2. In view of future work, utilizing genetic engineering techniques in improving the HPR strategy, it is imperative that the precise resistance factors in question are quantitatively and qualitatively identified.

ROUNDTABLE IV. ADVANCES IN EARLY DETECTION IDENTIFICATION AND PREVENTION OF MYCOTOXINS

Discussion Moderator: J.R. Cole, USA.

Discussion were centered around three basic topics: New methods of detection and identification, methods for detoxification and methods for prevention of mycotoxins.

Although the ELIZA (Enzyme-Linked-Immunosorbent Assey) type asseys are not new, the application of this assey to mycotoxins (small non-immunogenic molecules) is a new and rapidly developing technology. At least seven different commercial companies are now presenting or will be presenting ELIZA type asseys for aflatoxin. These asseys have taken three forms, (1) card tests, (2) microtiter wells (standard ELIZA tests) and (3) Affinity columns. These all have different application potential. A discussion concerning these applications to developing countries suggested a possible application of the ELIZA card test to more primitive situations, while the other two types probably would be applicable to more of an analytical laboratory situation. The advantages and dissadvantages of each assey were presented and included sensitivity, reproducibility, economics, time required for analysis, number of aflatoxin detected and whether an ELIZA reader was required. It was concluded that this type of assey will no doubt have application to aflatoxin analysis at several application situations and ultimately may result in a multi-toxin assey in the form of a card type assey.

The second item discussed related to use of Ammonia detoxification of aflatoxin contaminated grain and meal. It was noted that ammoniation of corn and cotton seed meal in the USA was being routinely conducted in Arizona and Georgia. The technique has not yet

been approved by the FDA. However it was approved by these states and was legal if not shipped in interstate commerce. Preliminary studies using Bisulfite for detoxification of aflatoxin were reported. It was noted that little is known concerning the detoxification of other important mycotoxins such as DON (Deoxynivalenol, zearalenone, cyclopiazonic acid and T2 toxin, and these studies are desperately needed.

Finally, the third topic prevention was discussed both from both preharvest and postharvest viewpoints since unlike insect pests the same toxin producing fungi (Aspergillus flavus and A. parasiticum) attack oil seeds and grain both in the field and subsequently in the warehouse. In the case of preharvest aflatoxin contamination of peanuts, corn and cotton seed is directly associated with drought stress during the latter portion of the growing season. It appears that no aflatoxin forms in peanuts in the absence of drought stress even though significant invasion by aflatoxin producing fungi may occur.

The session finished with a lively discussion on the role of lypoperoxidation on aflatoxin biosynthesis. In vivo aflatoxin biosynthesis is enhanced by the addition of chemicals that induce lypoperoxidation within fungi. The possibility of using additives of BHA, BHT, TIO and cysteamine to inhibit aflatoxin biosynthesis in grain and oil seeds was discussed.

Although not directly related to the assigned topic there were some discussions on the effects of aflatoxin in human health particularly in developing countries. Also it was noted that the lowering of levels acceptable in developed countries may selectively affect levels approved in developing countries.

ROUNDTABLE V. ADVANCES IN THE USE OF MODIFIED ATMOSPHERES FOR STORED PRODUCT PROTECTION

Discussion moderator: C.H. Bell, U.K.

Currently three approaches for storage strategies based on modification of the atmosphere in structures not hermetically sealed were recognised. Firstly nitrogen could be used as a replacement atmosphere, supplied either by bulk transport or by on-site generation from compressed air; secondly carbon dioxide supplied either in bulk or from cylinder banks can be used, and thirdly there was the gas generated by combustion or catalytic convertion of hydrocarbon fuels.

Discussions commenced with nitrogen, which of the three alternatives had hitherto been regarded as the least promising avenue of approach. Compared to other atmospheres nitrogen on balance required longer exposures to kill pests, especially at lower temperatures, and only remained effective if the oxygen content of the atmosphere remained well below 2%. Thus in the case of a total atmosphere replacement within a storage structure the maximum rate of leakage that could be tolerated within the intended period of exposure was less than 10%. Hence the use of nitrogen was recognised to be restricted to very gas tight structures or to systems based on the