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THE DEVELOPMENT AND SIGNIFICANCE OF FUNGI
IN POULTRY REARING SHEDS

A Thesis Presented in Partial Fulfilment
of the Requirements for the Degree of
Master of Science in Microbiology
at Massey University

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1984

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SUMMARY

A study was conducted at the Poultry Research Centre, Massey University, to determine the numbers, types and patterns of development of fungi that occur in poultry rearing sheds. Two sheds, a broiler shed and a layer shed were analysed for the fungal population by weekly sampling of litter, feed and air. Particular emphasis was placed on the presence of Penicillium and Aspergillus as these genera contain species of potential significance to flock health as infectious or toxigenic agents. Use of the dilution plating method with modified Potato Dextrose Agar and Aspergillus Differential Medium for culture resulted in successful isolation of these genera. Further selectivity was attained with the use of a modification of the strip-bait method of Luttrell (1967). Air sampling was by the exposed agar plate method.

The poultry houses were found to contain high levels of viable fungal propagules. Of the total fungi, Penicillium, Aspergillus and Scopulariopsis were the major genera. Other genera included Rhizopus, Mucor, Cladosporium and Geotrichum. Penicillium was found throughout the trials. Scopulariopsis was present at low levels in fresh litter and feed but counts increased greatly with time. Counts of species of Aspergillus, (A. flavus and A. fumigatus) also showed increases mainly towards the end of the trials. Other genera (Geotrichum, Cladosporium etc.) were found on certain days only.

As litter aged, its pH and moisture content increased and these increases were correlated to the increase in total fungal numbers during the period of housing. Patterns of fungal succession in the litter were similar to those in air. For some species the increases in numbers in litter were preceded by a similar peak in the air (eg. A. flavus) whereas for others the peak in litter was earlier than the peak in air (S. brevicaulis). The correlation between patterns in air and those in feed and litter was more obvious in the layer shed, where a more active flock created greater air movement than in the broiler shed where the birds were docile and caused very little circulation of air.

A. flavus isolates were screened for the production of aflatoxin on coconut agar. Approximately 30% of all A. flavus isolates tested were toxigenic. Also, it was possible to extract the toxin after growth in

semisynthetic liquid medium from isolates which had been strongly fluorescent on coconut agar, but not those which had been weakly fluorescent.

Feed and litter samples tested for the presence of aflatoxin and other mycotoxins (T-2, ochratoxin and zearalenone) were negative for these mycotoxins.

The fungal population of poultry houses has been shown to include species which may be of economic importance. The large amounts of A. flavus (potentially toxigenic) and A. fumigatus (infectious), in particular, should not be ignored as they may well affect poultry health and productivity.

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