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AN EVALUATION OF
FUNGAL BIOASSAY PROCEDURES FOR
ASSESSMENT OF SOIL PHOSPHATE STATUS.

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by
N. M. D. Mantjika

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I. INTRODUCTION.

Microbiological assays, especially with A. niger, have been used rather widely to assess phosphate status of soils. The merits as well as shortcomings of these procedures have been discussed in the literature by various investigators. The speed, cheapness, and simplicity with which microbiological assays may be carried out have been used as arguments in favour of their use. It was this type of argument, considered in relation to the fact that good correlations have been reported by a number of workers between results obtained by A. niger and by field tests, which suggested to the writer that microbiological assay might have special merit in those developing countries where a rapid assessment of soil potential is required in the interests of food production but where limited finance is available for full-scale soil investigations.

The work reported here was undertaken to investigate further the value of the A. niger procedure as a means of evaluating soil phosphate status and to examine the possibility that other fungi including some not previously employed for this purpose might be even more suitable.

The present investigation was confined to a range of New Zealand soils. As field response data were not available for these soils a pot experiment incorporating a number of crops was conducted to provide plant growth data with which the results of microbiological assay could be correlated.

Chemical testing of soils has found much wider application than microbiological assay and there is a possibility that such methods might provide superior evaluation of soil phosphate status, which could outweigh the advantages of cheapness and simplicity claimed for the biological techniques. As an extension of the present study it was therefore considered worthwhile to determine whether Truog's procedure (1930) for determining available soil phosphate (the method employed by the New Zealand Department of Agriculture) possessed any marked advantage over the biological assays. It was further considered of interest to determine whether any one form of soil phosphate or combinations of forms determined by selective extracting agents would show better correlation with plant growth than shown by biological assay.