

## INTRODUCTION

A large volume of literature has accumulated on the subject of mycorrhiza since the first important contribution in 1885 by Frank, who realised that there might be a symbiotic significance in the relationship. Many workers have since elucidated numerous points concerning the occurrence, significance, morphology and physiology of the ectotrophic mycorrhiza of conifers and other trees, the ectendotrophic mycorrhiza of the Ericales and the endophytic mycorrhiza of orchids and other plants with irregular modes of nutrition; but whereas the structure of the remaining kind of mycorrhiza, the vesicular-arbuscular type, which is of very common occurrence, has been studied in some detail, and several hundred plants recorded in which it is found, there is still little precise information on the identity of the fungus concerned, or on the role it plays in the nutrition of the higher plant.

Early in the history of the subject it was realised that for exact knowledge to be gained on the part played by the fungus in the partnership, the two components would have to be cultivated separately and together, and comparisons of the growth of both in each condition made. This has been possible with the first three types of mycorrhiza mentioned above, but so far, due to the difficulty of isolating the fungus in pure culture, it has not been done with the fourth. This is the main reason why, compared with the other groups, information is lacking. Evidence of this dearth of knowledge of the group is that not only is the exact taxonomic position of the fungus unknown, but it is not certain whether the endophyte found in different plants belongs to one species or to several, and there is some reason for believing that two fungi of widely separated affinities - a Phycomycete and a

Fungus Imperfectus - are very often simultaneously endophytic in the same root, to give the normal infection.

Because it has become generally accepted for this sort of mycorrhiza, the name vesicular-arbuscular will be used in the present paper, although due to the varying interpretation of the term by different workers it is apt to lead to some confusion.

The present investigation, which is limited to the vesicular-arbuscular type of mycorrhiza, is concerned with two main aspects of the subject, and will therefore be divided into two distinct sections.