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FORMATION OF VESICULAR – ARBUSCULAR MYCORRHIZAE IN *PHOENIX DACTYLIFERA* L., CULTIVATED IN QASSIM REGION, SAUDI ARABIA

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Abstract

Fine roots of dates (*Phoenix dactylifera* L.) and surrounding soil were collected from mature dates orchards in Qassim region, Saudi Arabia. Based on spore identification, the mycorrhizal fungus associated with dates was found to be *Glomus mosseae*. The total frequency VA mycorrhizal colonization of fine root segments was 90%.

Introduction

Date-fruit (*Phoenix dactylifera* L.,) is an important cash crop in different countries, especially in countries of the Gulf area In deserts, sandy dune formations, sand movements, deficiency of nutrients, lack of organic matter, high evaporation, infilteration rates and other factors contribute to harsh environment and inhospitable site for plant growth (Olson, 1958). Accordingly, any factor that replenishes water and nutrients to the depleted soil will, undoubtedly, enhance the success of plant cultivation in sandy, arid desert region (Koske *et al*, 1975).

Vesicular-arbuscular mycorrhizae (VAM) are common in most plant families in arid region (Trappe, 1981) and may be of special importance because symbiosis among plants may increase drought tolerance and nutrient availability (Reid, 1970; Allen *et al.*, 1981). Investigation of mycorrhizal formation, of the cultivated plants in sandy desert regions is useful in agricultural practices, with benificial effects in sand stabilization, revegetation programmes and improvement of fertilizer efficiency. Although Khaliel (1985) has studied the mycorrhizal status of *Hammada elegans* in Unaiza range area, Saudi Arabia, apparently no similar investigation seems to have been carried out on *Phoenix dactylifera* L. The present study reports results of an investigation showing that date palm is mycorrhizal.

Materials and Methods

The site selected for this study was Qassim region, Saudi Arabia (Lat. 26° 10' N Long. 44°E) where the sand dunes are interspersed with communities of *Hammada elegans*, *Plantago* sp, *Saliva schimperi* and *Cyperus conglomeratus*.

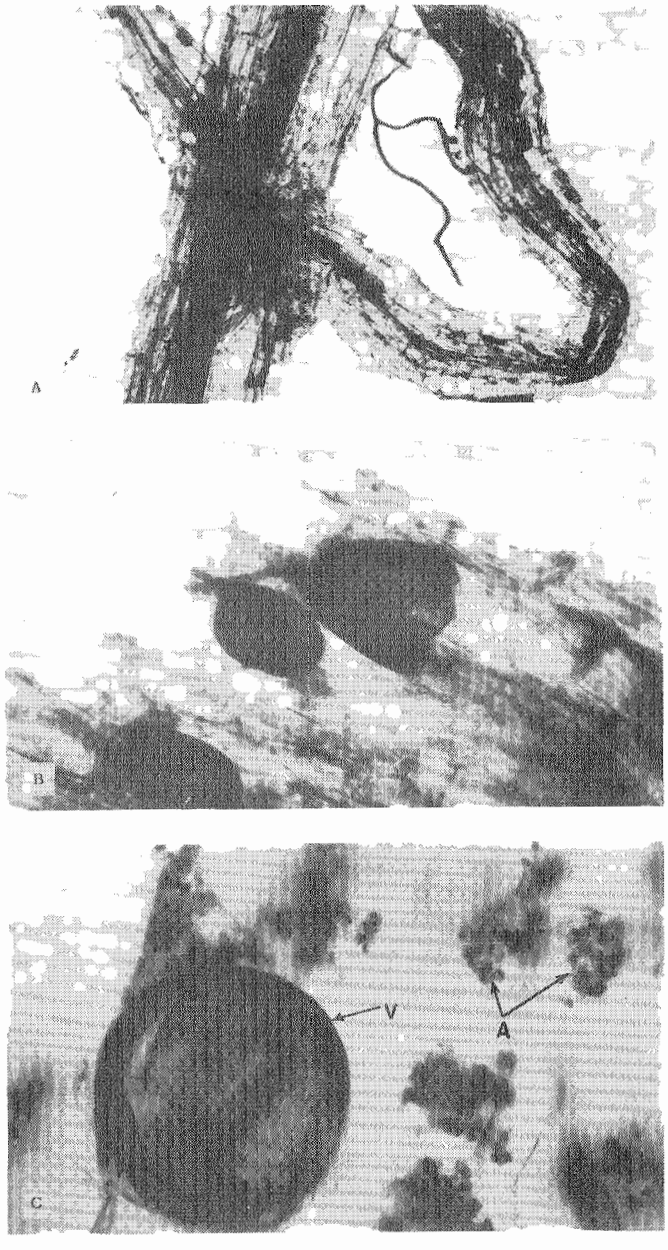

Fig. 1. Stained root segment of *Phoenix dactylifera* L.
A. Infected with VAM fungus *Glomus mosseae*.
B. With well developed vesicles.
C. Vesicles (V) and arbuscules (A) of

In April 1983, tree samples 3 from each of the 5 orchards were randomly and carefully excavated till the youngest roots were reached. Two to four grams of these roots were collected for each subsample tree, washed with tap water and preserved in plastic vials containing Formaline Acetic Acid Alcohol (FAA) solution. Surrounding soils were also collected from the top 20 cm, sealed in clean plastic bags, and transported to the laboratory in ice chest to prevent dryness.

Vesicular-arubscular spores were obtained by wet sieving and decanting according to the procedure devised by Gerdemann & Nicolson (1983). The FAA fixed root samples cut into 1 cm long segments, were washed in tap water cleared in 10% KOH, stained in trypan blue (Phillips & Hayman, 1970) and examined under a compound light microscope for mycorrhizal infection. Frequency of infection was also recorded.

Results and Discussion

The characteristic feature found were vesicles, arbuscules and hyphae (Fig. 1, A, B and C). The total vesicular arbuscular mycorrhizal colonization averaged 90% of the fine root segments. The fungal characteristics corresponded to the fungues *Glomus mosseae* (Nicol. & Gerd.) Gerd. & Trappe according to the classification proposed by Gerdemann & Trappe (1974).

Agricultural interest in VA mycorrhizal formation has increased since mycorrhizae can be exploited to improve production on marginal soils and to reduce fertilizer application to normal soils. They can therefore be considered as "biotic fertilizer" and can substitute for substantial amounts of some fertilizer (Menege *et. al.* 1978). In keeping with these considerations, mycorrhizal status of *P. dactylifera* L., suggests the potential use of mycorrhizal fungi as commercial "biotic fertilizer" for the economic crops that are likely to be mycorrhizal.

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