# YCORRHIZAL ASSOCIATION IN PLANTS

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:h on mycorrhizal symbiosis has given con- vidence in Western countries that it is bene- the plant in one way or other. Mycorrhiza ot fungus and mycorrhizal state can be de- he occurrence of a fungus or fungi constant- root system of a particular species of plant, apparent pathological effect on the root or plant as a whole. The Russian Scientist y[1] was the first who observed this pheno- the roots of sweet pine sap (*Monotropha hipophitis*). Later it was observed that almost all the fruit trees like pome fruits, stone fruits, nuts, apple, pear and other species are infested with mycorrhiza. Roots form a symbiosis both with mycorrhiza which live either inside the cells or on the root surface of a plant.

Extensive studies on mycorrhiza were conducted in temperate countries like Sweden, Queensland, Polland and Egypt by several workers. Much work was done

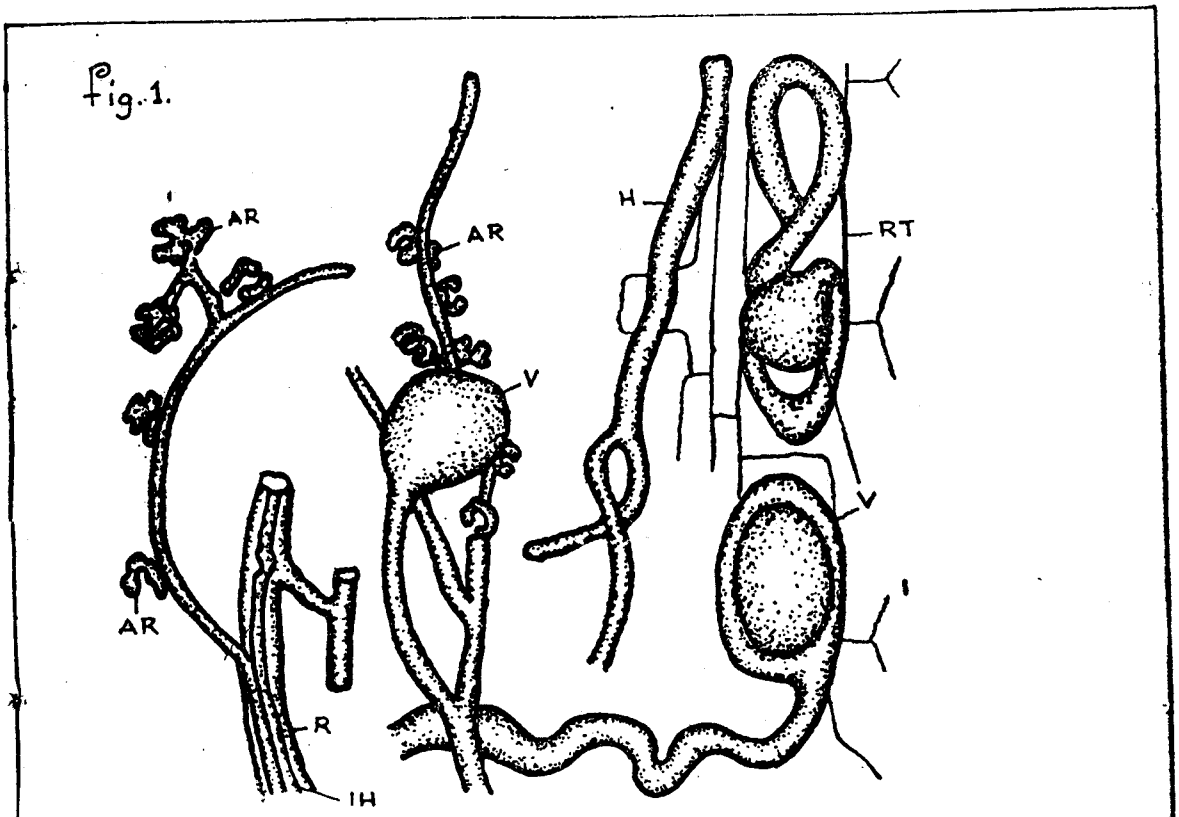


Fig. 1.

AR- Arbuscule, V- Vesicle, IH- Internal hyphae, RT- Root tissue, R- Root, H- Hyphae.

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in the Rothamsted Experimental Station, England by Mosse and co-workers[2]. Studies during the last three decades prove that most higher plants are mycotrophs, while the majority of forest trees have ectomycorrhiza, most nonwoody species including a large number of agricultural plants form endomycorrhiza, usually of the vesicular-arbuscular type (VA). Fungus root association has been classified as ectotrophic and endotrophic depending upon the nature of its existence in plants.

Ectotrophic mycorrhiza are formed by the majority of forest trees. In this many of the fine lateral rootlets are enveloped by the fungal mycelium which forms an external sheath around the infested root. Ectotrophic mycorrhiza benefit forest trees by aiding in absorption of inorganic and organic nutrients, supplying trees with growth regulating substances, deterring root pathogens, decreasing soil toxicity, increasing host plant resistance to drought and extreme soil temperatures (Slanks)[3]. Inoculating soil with proper mycorrhizal fungi has aided in establishment of forests in previously treeless parts of the world. Recently endo-mycorrhiza have been shown to benefit their hosts in a manner generally similar to ecto-mycorrhiza. These findings have transformed mycorrhizal symbiosis from a subject of academic interest to a biological factor of major importance in forestry and agriculture.

The most widespread mycorrhiza so far reported is the so called vesicular-arbuscular type (VA), (Nicolson)[4]. This type of mycorrhizal association is found in the majority of annual and perennial plants, in which the cortex of the root invaded, usually in the absorbing region of the root, characterized by special organs known as vesicle and arbuscules (Fig. 11). The British Mycologist Butler[5] stated that this type of mycorrhiza may supply to the host fat, some accessary nutrients or growth promoting substances. Improvement in growth and also the uptake of increased phosphate was observed in many plants having this type of mycorrhizal association (Mosse)[6]. From the University of Oxford it was reported that the hyphae form a better distributed surface for absorbing P from the soil than the root alone in onion plants. Soyabean plants accumulated greater amounts of P, N, Ca and Mn in their foliage than non-mycorrhizal plants, increasing the yield to 29 per cent. Rubber Research Institute, Malaysia suggested that ability to form mycorrhizal association might in certain soil be an important factor in the growth of rubber tree. It was reported from Isreal that roots of Avocado fruit trees were infested with VA mycorrhiza and the avocado trees form no root hairs and the fungus component in mycorrhiza function as root ha[illegible] Mosse[6] has again reported that inoculation with V[illegible] mycorrhiza in Stylosanthes and Maize greatly improved plant growth, P uptake, nodulation and nitrogen fixation. VA infection stimulated flower production in Petunia, the formation of fruit in Strawberry and the development of pollen in maize (Daft and Okusanya)[7] Gilmore[8] observed that Peach seedlings showed Zn deficiency symptoms when grown in steamed yololoam – sand and growth was improved greatly by inoculating with VA and prevented Zn deficiency. From New York Deal[9] reported that VA mycorrhiza in grapevine accelerated the vegetative growth of vine leading to high production of fruits.

In India, agriculture research on mycorrhizal association is still an unexploited field. The occurrence of the vesicular-arbuscular mycorrhiza (VA) in coconut root and a few common weeds of coconut garden was first reported by Lily[10] in 1975. Elaborate study on this aspect may certainly give an insight into the beneficial effects of VA mycorrhiza in the P nutrition of coconut palm.

## References


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