VESICULAR ARBUSCULAR MYCORRHIZAS IN THREE PLANTATION CROPS AND CULTIVARS OF FIELD BEAN

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VESICULAR-ARBUSCULAR mycorrhizas (VAM) have been reported in a wide range of crop plants. The endophytes stimulate plant growth generally through their ability to increase phosphorous uptake, which makes them important in agricultural as well as natural plant communities. Early studies have brought out that the extent of mycorrhizal infection and the extent to which plants respond to infection, varies with the plant species. However, there is very little information available as to whether different cultivars of the single plant species also differ in harbouring VAM in their root system. Occurrence of VAM in cardamom, betelvine and pepper, and in different cultivars of field bean is reported in this communication.

The root and root zone soil samples of cardamom (*Elettaria cardamomum* Maton.), betelvine (*Piper betle* Linn.) and pepper (*Piper nigrum* Linn.) were collected from the University of Agricultural Sciences Farm, Bangalore. The root zone soil samples were also collected from eleven cultivars (three from India, one each from Australia, Burma, Czechoslovakia, Nepal, Pakistan, Senegal, Tanzania and USSR) of field bean (*Lablab purpureus* Linn.) grown at two fertility levels in the University farm. The two fertility levels were 25:22:0 (low) and 50:44:0 (high) of N, P and K in kg/ha respectively. Root samples were cleared with KOH and stained with trypan blue. The percentage mycorrhizal infection of root was determined by root slide technique. The number of mycorrhizal spores in root zone soil was determined by wet sieving and decantation technique.

Infection with vesicles and arbuscules characteristic of VAM was observed in all three plantation crops (figures A–C). The three plantation crops differed in their susceptibility to mycorrhizal infection. Cardamom recorded higher percentage of infection compared to betelvine and pepper (table 1). Root zone soils of all the three plant species contained higher number of mycorrhizal spores compared to soil away from the influence of roots, upholding the earlier view that plant root system stimulates the growth of VAM.

As far as we are aware, this is the first report on the occurrence of VAM in cardamom, betelvine and pepper.

**Figures A–C.** Stained roots of *A. Elettaria cardamomum* (×100), *B. Piper betle* (×100) and *C. Piper nigrum* (×100) showing VA mycorrhizal infection. EM—External mycelium; M—Mycellum inside the cortex; V—Vesicle.
The mycorrhizal spore numbers in the root zone of different cultivars of field bean differed (table 2). Highest spore numbers were recorded in the Australian cultivar EC 36417 and the least in cultivar PLS 62-2 from Pakistan. Three Indian cultivars grown at low fertility level harboured more or less the same number of spores in their root zone. Higher level of fertiliser application did not have significant effect on sporulation by VA mycorrhiza, except on the cultivar from Nepal and one cultivar from India (IC 648). Effect of fertilisers on sporulation by endomycorrhiza seem to vary with the soil type, and the kind and the level of fertiliser. Khan and Khrushcheva observed a decrease in spore numbers due to phosphatic fertiliser application where as Kruckelmann observed an increase due to application of fertilisers and organic manure. Spore production by mycorrhizal fungi in the root zone is closely related to the root infection and is known to vary with the plant species. The present study brings out that not only plant species, but also different cultivars of the same species vary in the extent of harbouring mycorrhizal fungi in their root system.

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EMBRYOLOGY OF SONCHUS OLERACEUS LINN

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EMBRYOLOGICAL literature reveals that Sonchus oleraceus Linn. of Compositae has not been studied.