INTRODUCTION

The most important application of plant tissue culture is clonal propagation. The technology for mass propagation is well developed for commercial application. It is the sole method by which most of the ornamentals and other commercial plants are being produced in countries like Holland, USA, Germany, Japan, etc. where most of the sophisticated modern tissue culture laboratories have been established. The tissue culture of ornamental plants is rather recent (less than 40 years) many developments have already occurred in the limited span of time. Most micropropagation industries are horticultural based and horticultural species are classified into fruits, vegetables, plantation and spices, aromatic and ornamental’s among the plants micropropagated. Ornamentals account for nearly 75% which constitutes the orchids, ferns, foliage plants and herbaceous ornamentals.

Foliage ornamental plants provide a fascinating display of greenery not all of them are green. Some of the most popular ones have leaves that are purple or pink or red or splashed white or yellow or red markings and any imaginable colour, pattern and colour combination can be found. What they have in common is attractive and fascinating foliage.
High quality ornamental plants are preferred and produced because of the growth of plant trade industry year after year. Many new hybrids and varieties are regularly produced to meet the various likes and dislikes of the growers. Thus a nursery involved in sale of plants or the flowers, it has to offer new hybrids and varieties from time to time to serve the craze of the day.

Most rapid adoption of micropropagation as a commercial practice has taken place in the foliage plant industry and there is growing trend towards commercialization of foliage plants through tissue culture.

Micropropagation has certain desirable qualities compared to conventional methods where the former provides large number of plants free of known pathogens and makes available large number of selected types of plants in a relatively short period of time.

Extensive practice with ornamentals has demonstrated that a process using pre-existing meristems as starting material for shoot multiplication is infinitely more suitable to achieve the objective than the process where any kind of de novo shoot formation is involved. In deed, systems based on axillary branching and nodal culture are considered as safe methods (Lawrence, 1981), meaning that with such a system the risks of variations are proportional to the variation already present in the mother plant.
Isolate of AMF differ in their ability to improve plant growth under greenhouse conditions (Carley and Brown, 1990). The foliage plants have gained much popularity in modern times due to their easy growth and appealing foliage. Most of the foliage plants in the trade are native to the tropical and subtropical zones. Approximately 500 species and cultivars of foliage plants are now being cultivated commercially. There has been a tremendous expansion of the foliage plant industry in the world.

Foliage ornamental plants viz., Syngonium ‘infrared’, Philodendron ‘Ceylon gold’, Caladium hortulanum belonging to the family Araceae helps to beautify the environment having unusual colours and spots on the leaves and are invaluable as long term foliage ornamental plant. Musa urenoscopus is a rare ornamental banana is also an important ornamental plant.

Syngonium cv. Infrared is one of the attractive and undemanding foliage plants, is also one of the strongest because its arrow head shaped leaves are pink in the earlier stage and dramatically change the colour as it ages based on light and shade effect. The plants are kept small by pruning and not allowed to climb. The long stems are pinched off at any season to increase the branching and pink colour of leaves. This can be grown well in pots and hanging baskets or against bark covered slabs of wood or sections of the trunk of a tree fern. It grows best in bright indirect or curtain filtered sun light.
Philodendron 'Ceylon gold' is a climbing type having golden green leaves which are very beautiful. It is allowed to trail along the ground as cascade from the hanging container or trained and tied to a slab of bark covered wood or tied to a moss covered stick in a container. It makes a valuable plant for decoration of the conservatory in pots. It can be efficiently used in shade garden and indoors. It grows in any good soil and require plenty of water during growth. The plants are pruned now and then to keep the plant dwarf to suit the container size and to get fully covered radium golden green foliage.

Caladium hortulanum is a foliage ornamental plant with leaves upto 24 inches long and shaped like gigantic spear heads. It has the colourful foliage combining red, white and green colour. The plants grow from bulb like masses of storage tissue called tubers and go through a four to five month annual rest period during which the leaves will dry away. Caladium do best in bright indirect or curtain filtered sunlight. During the growing period keep the soil should be kept moist and fed every two or three weeks. During the dormancy period four or five months the bulbs are stored in dry peat moss at 55 to 60° and to start the growth after tubers are divided and planted.

Musa urenoscopus is an ornamental banana which is rhizomatous tree like tall herb with vivid green elongate foliage with parallel veins of noble appearance.
It has erect pseudostems made up of sheathing bases of the leaf stocks. They are bulbous and have perennial root stocks. It is a decorative species which produce inflorescence of red bracted heads. It grows well in humid tropical conditions.

Multiplication through conventional method of propagation is not rapid enough to meet the demand of the foliage plant industry. The micropropagated plants remain compact and retain special colour specific to the cultivar and species for a long time.

There is a high potential for introducing arbuscular mycorrhizal fungi (AMF) into micropropagated plants. Application of AMF mycorrhiza appears to play a key role in favouring ex-vitro development of micropropagated plantlets (Verma and Schuepp, 1994, 1995, 1999).

One of the major obstacles in the application of tissue culture methods for plant propagation has been the difficulty in successful transfer of plantlets from laboratory to the field. The reasons for such a difficulty appears to be revealed to the dramatic change in the environmental condition. Ajith Verma (1999) has developed protocols to overcome some of the constraints.

In recent years, many high value crops are raised through tissue culture. Micropropagated plantlets cultivated on agar rooting medium are usually delicate
and hence, hardened before planting in the field. During the process of hardening, micropropagated plantlets get acclimatized to the outside environment. During the process usually 20-40 per cent mortality is observed.

Our preliminary studies indicate that rooted plantlets showed marked improvement in the growth and survival when inoculated with VAM fungi. Hence, the present study was conducted to explore the in vitro micropropagation of foliage ornamental plants viz., Syngonium 'infrared', Philodendron 'Ceylon gold', Caladium hortulanum and Musa urenoscopus on MS basal medium supplemented with different concentration of auxin and cytokinin and inoculation of VAM fungi, during hardening.