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SHOOT TIP CULTURE OF BANANA - AN OVERVIEW

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Traditionally, banana has been propagated through sucker. The type and size of suckers as a planting material has been one of the major components of banana research. Widespread occurrence of diseases, such as banana bunchy top virus, infectious chlorosis and other virus diseases became the major constraints to obtain disease free suckers. Micropropagation of banana attempted from different parts of the plant have shown the success of shoot tip culture to contain the spread of diseases. Although micropropagation of banana has been done on a commercial scale with more than ten commercial firms engaged in production of banana plants its success with new cultivar or superior clones have not been established.

The major steps involved in commercial micropropagation of plantlets by shoot tip culture are aseptic culture initiation, multiplication of shoots/buds, regeneration of plantlets and transfer to green house conditions i.e. hardening (Fig.1). For initiation of aseptic culture selected suckers are disinfected and cultured on a defined nutrient medium. After establishment they are further subcultured for profliferation of multishoots. These shoots are rooted to get complete plantlets, which are subjected to hardening in green house before planting in the field.

In the last 10 years, refinement of micropropagation technique has assumed greater significance and this method of propagation has become popular in many banana growing regions although less than 0.5% plantations have been brought out under *in vitro* multiplied plants. The current understanding of the micropropagation assures supply of quality planting materials on regular basis and also provides better investment options. Therefore, many questions which need investigation for making the micropropagation, a reality has to be addressed.

Although no genetic improvement from shoot tip culture is expected, yet the micropropagated plants have proved better compared to traditional planting under good management system. At the same time, under low input condition, the performance of micropropagated plants is inferior to sucker grown plants. It is also observed that, uniformity in flowering and harvest of the micropropagated plants succeeded in reducing the number of leggers (plants which are not harvested at peak) and helps in improving the yield. In banana plantations yield estimation of individual plants and there graphical presentation make a normal curve wherein 5-6% of the plants always produce very high bunch masses and many times they are earlier in harvest than the population means. Selection of these high yielding plants and their *in vitro* multiplication can be effectively utilized in increasing the population yield. Therefore, this also needs to be addressed under micropropagation for improving productivity.

Continual use of disease-free planting materials will greatly reduce the inoculum sources in the field, which will help to rehabilitate the infected area, thus eventually increasing production and productivity. In recent years, the widespread occurrence of disease has made it increasingly difficult to obtain disease-free planting materials by conventional means due to its low rates of multiplication. Thus *in vitro* multiplication by shoot tip culture method having emphasis on indexing and monitoring has great potential for producing specific pathogen-free planting materials in large quantity at a given time.

With continued efforts of the commercial firms to have high turnover phyto-sanitation and effective indexing against virus have been overlooked which has resulted in a more rapid increase in with virus infected planting material in many plantations as compared to the disease spread by suckers. Therefore, to make tissue culture propagation more effective, in achieving the best yields utmost care is to be taken for indexing for all the viruses and other pathogens on the source plants and cultures (Fig.1). In order to avoid the spread of pathogen through