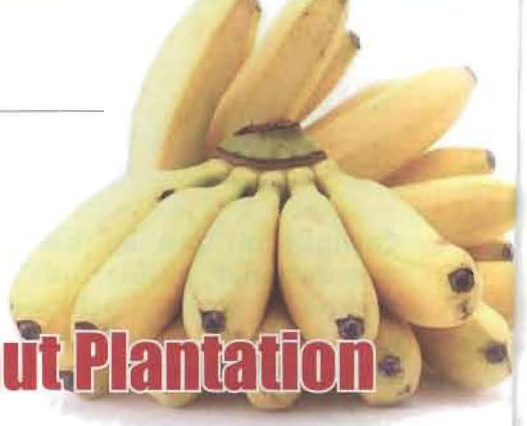

Banana cv. Ney poovan Potential Intercrop in Coconut Plantation

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Coconut is one of the commercially important plantation crops cultivated in India. Coconut being widely spaced owing to its morphological features provide ample opportunities for cropping in the interspaces. Sahasranamam and Pillai (1976) observed that only 23 per cent of the soil on area basis is effectively utilised by the coconut roots in a coconut plantation planted at 7.5m spacing. The effective root zone of an adult bearing palm growing under normal management is confined laterally within a radius of 2m around the base of the palm. About 74 per cent of roots do not extend beyond this distance. On depth basis, the top 30 cm layer is practically devoid of functional roots and 80 per cent of the roots are found between 30 cm and 120 cm depth from surface. It was further confirmed that more than 80 per cent of the root activity was confined to a lateral distance of 2m from the trunk. This shows that on an area basis of total available land in a pure palm stand is not effectively utilised by coconut roots and can support many more crops. Thus, the active root zone of coconut is confined to 25 per cent of the available land area and the remaining area could be profitably exploited for raising subsidiary crops (Reddy and Biddappa, 2000).

Banana (Musa sp.) is the second largest fruit crop grown in the world. In India, it is one of the most important commercial fruits which contain more carbohydrate and energy. Therefore it is mostly used in raw and cooked form. In India, banana is cultivated in an area of 830.5 thousand ha with an annual production of 29,779.91 thousand tons (NHB, 2018). Banana is originated from South East Asia, a region considered as the primary centre of diversification of the crop and where earlier domestication has occurred (Simmonds, 1966). Bananas and plantain are mostly grown not only for their nutritional value but also for their economic importance. Banana fruit is highly nutritious, easily digestible than many other fruits and it is popular for its aroma and texture. It is rich in K, Ca and low in Na and Fe content. It is an ideal food for weaning infant mother. The demand for banana is increasing day by day due to its nutritional value and high economic return realized by the farmers.

Performance of banana cv. Ney Poovan under coconut plantation

Coconut based cropping systems involving cultivation of compatible crops in the interspaces of coconut offer considerable scope for increasing productivity unit area, time and inputs by more efficient utilization of resources like sunlight, soil, water and labour (Bavappa and Jacob, 1982). Hence, the interspaces of coconut plantation can very well be utilized by introducing profitable fruit crops like banana. Banana cv. Ney Poovan is the choicest diploid (AB) cultivar (Syn: Kadali, Elakki bale, Njali Poovan) which is under commercial cultivation on a large scale especially in Karnataka and Tamil Nadu. The pseudostem of Ney Poovan is slender and bears bunch of 15-25 kg in crop duration of 12-14 months. The dark green fruit turn into golden yellow colour on ripening and the pulp is consistent, firm, fragrant and tasty with good keeping quality. Moreover, many earlier studies showed that banana cultivars are found to be shade tolerant. Further, it was clearly indicated that banana cultivation as suitable intercrops under coconut plantation was highly productive and profitable. In this context, an experiment was conducted for two years to study the comparative efficiency of planting system and

nutrient management in banana cv. Ney Poovan under coconut plantation at Department of Fruit Crops, TNAU, Coimbatore. The results revealed that there was a positive response in terms of plant growth, reduced the number of days taken from planting to shooting, shooting to harvest, reduce the total crop duration and highest yield (11.50 kg per bunch) obtained in the treatment combination of application of 100 per cent RDF (As per TNAU Recommended fertilizer for banana-110g :35g :330 g N P K / plant / year) along with Azospirillum @ 100g plant-1 + Phosphobacteria @ 100g plant-1+ AM fungi @ 100g plant-1 in single row planting system. The highest yield was attributed to more number of hands per bunch, finger per hands and as well to the higher average weight of fingers. Benefit cost ratio (2.52) is also highest in the same treatment and found that it will boost the farmer income (Fig .1).

Fig 1 View of single row planting system under coconut plantation

The research at CPCRI clearly indicated the scope for integration of Coconut with other component crops. Coconut based HDMSCS, initially conceptualized and developed in the eighties and further refined in the succeeding years, is a highly versatile, sustainable, profitable system, optimizing the use of available resources. Different models tailor-made for various agro-ecological zones and suiting different requirements of households have also been evolved over the years. By the latest projections, a coconut based cropping system using multi species cropping of coconut with pepper, banana, nutmeg, pineapple, ginger, turmeric and elephant foot yam generated a net income of Rs. 3.7 lakhs per ha, which is 150% higher than that of coconut monocrop (1.4 lakhs)

Multi species cropping system has further evolved into mixed farming system by integrating livestock enterprises in to it. It is a classic case of the society demanding it and the research institution answering the distress call. Off late, the coconut growers are exposed to economic risks and uncertainties owing to the frequent price f1uctuations for the produce. In this context, it is needless to emphasize the importance of crop/ enterprise diversification in coconut gardens. The research at CPCRI clearly indicated the scope for integration of crops and animals in the coconut garden for enhancing income and providing employment throughout the year. The system, thus developed, is a closed one, requiring less off- farm inputs, and gives importance to recycling of produces / wastes among the components in the system. It facilitates high input use efficiency and energy-efficient practices through proper linking/ integration of different components and intelligent management of available resources. Besides enhancing coconut yield, there was substantial improvement in soil and plant health status, soil physical properties and soil biology, thereby making CBIFS more economically feasible and ecologically sustainable. Added attraction is that subsidiary income is also realized from all the component units. As per the recent investigations, a coconut based mixed farming system (CMFS) comprising coconut, pepper, banana, fodder grass, crossbred cows, poultry birds, goat, and pisciculture generated a net return of ` 5.5 lakhs, which is 288% higher than that of coconut monocrop (Chowdappa et al., 2016).

CPCRI, Kasaragod also conducted experiment during the year 2011 in order to utilize the available land resource effectively and generate more income from the system banana was chosen as a component crop and it was planted around the periphery during 2011. In one hectare area of coconut plantation approximately 195 banana suckers were planted in an interval of 2m under single row system.

Fig 2. View of double row planting system under coconut plantation

Cultural practices were adopted as per the package of practices. From this crop component, 728 kg of biomass on dry weight basis was produced per annum, which was recycled into the system (Subramanian et al., 2016).

Cultivation of banana cv. Ney Poovan under coconut plantation.

Trim the roots and decayed portion of the corm, cut the pseudostem leaving 20 cm from the corm and grade the suckers to size to avoid wilt diseases, infected portion of the corm may be pared and dipped for 5 minutes in 0.1% emisan solution (1 gram in 1 litre of water), pralinage is done with 40 g of carbofuran 3 G granules per suckers (dip the corm in slurry solution containing 4 parts clay with 5 parts water and sprinkle carbofuran to control nematodes). Alternatively, dip the corm with 0.75% monocrotophos, shade dry for atleast 24 hours before taking plantings. The treated corms are planted in a pit size of 45 cm x 45 cm x 45 cm in single row system and double row system interspaces between the coconut garden. The recommended spacing for banana 1.8 m x 1.8 m was adapted. As per TNAU Recommended doses of fertilizers (RDF) for banana 110g :35g :330 g NPK per plant per year was applied as per treatment schedule. The treatment consisting of two factors, one is planting density (single row planting system and double row planting system) and another one is nutrient management (75 % RDF alone , 100% RDF alone,125% RDF alone, 150% RDF alone, 75% RDF along with Azospirillum @ 100g plant-1 + Phosphobacteria @ 100g plant-1+ AM fungi @ 100g plant-1 , 100% RDF along with Azospirillum @ 100g plant-1 + Phosphobacteria @ 100g plant-1+ AM fungi @ 100g plant-1, 125 % RDF along with Azospirillum @ 100g plant-1 + Phosphobacteria @ 100g plant-1+ AM fungi @ 100g plant-1 and 150% RDF along with Azospirillum @ 100g plant-1 + Phosphobacteria @ 100g plant-1+ AM fungi @ 100g plant-1). The biofertilizers were applied to the plant twice, one at the time of planting and another at 60 days after planting. Application of inorganic fertilizers as per the treatment schedule was applied at the time of planting, 3rd months after planting, 5th months after planting, 7th months after planting and shooting stage at different split doses. Ten plants of uniform size were selected at random in each treatment for recording the observations. The yield attributes were taken after the harvesting of bunches. Yield attributing characters viz., days taken for shooting, number of hands bunch-1, number of fingers bunch-1, pulp weight, peel weight and pulp peel ratio were recorded and are subjected to statistical scrutiny.

Other cultural operations like watering, weeding, desuckering, propping, removal of withered styles and perianth, pruning of leaves, mattacking, earthing up and denavelling should be carried out as and when required. Harvest the bunch and give a top cut to the plant leaving the pseudostem as such so that the nutrients in it leach down and are available to young plant left for first ratoon (if to be taken). Don't cut the pseudostem from base as it is a common practice of the farmers.

Conclusion

In the present scenario, coconut intercropping is gaining importance. This system will help farmers to get additional income from coconut garden. Growing of intercrops in coconut gardens produces more food and agricultural products, ensuring food security of the people in rural and urban areas. At same time, it generates more employment opportunities and livelihood, enhancing farm income and the purchasing power. Moreover, successful intercropping technology is more useful to the farming community to increase farm income when compared to mono cropping system.

References

Sahasranaman, K. N. and N.G. Pillai. 1976. Mixed farmimg in coconut garden. Intensitve Agric., 14(9): 6-10.

Bavappa, K. V. A. and V. J. Jacob.1982. High Intensity Multispecies Cropping - A new approach to small scale farming in the tropics. World Crops 34 (2): 47-50. ■