

Integrated Nutrient Management in Dwarf Coconut Garden – a Rejuvenation Therapy

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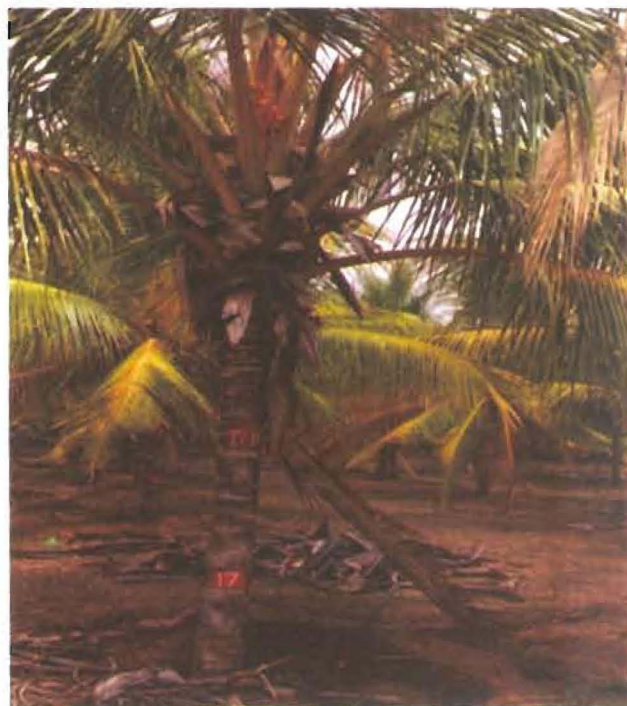
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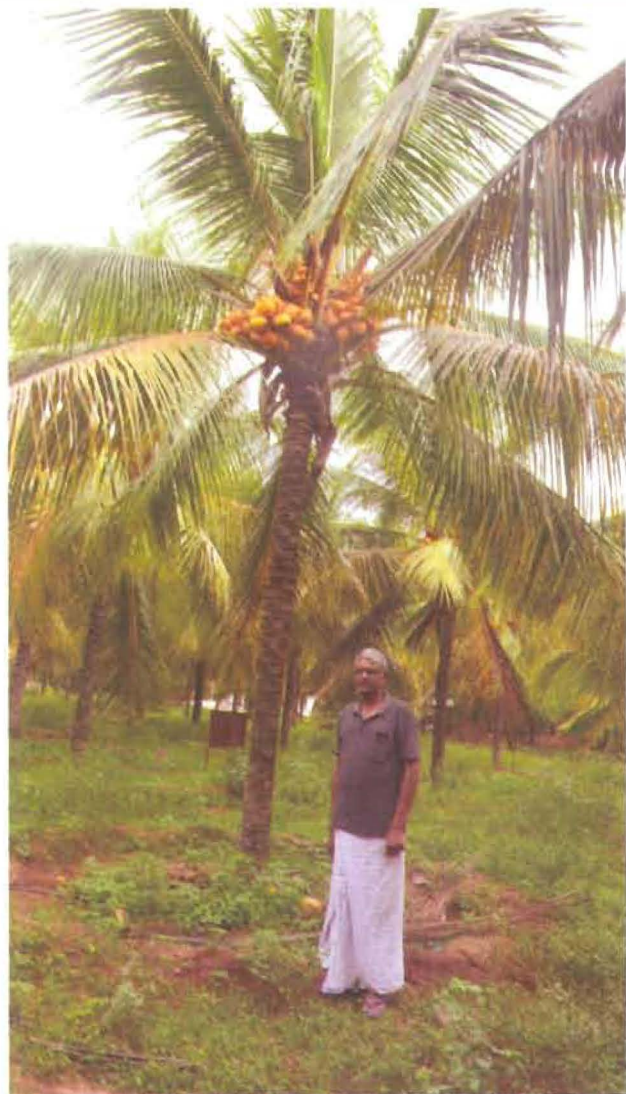
Coconut is one of the predominant horticultural crops of the state of Tamil Nadu spreading across 4.26 lakh hectares with a productivity of 12291 nuts per hectare. Dwarf coconut varieties viz., Chowghat Orange Dwarf, Malayan Green Dwarf, Malayan Yellow Dwarf, Malayan Orange Dwarf and Chowghat Green Dwarf are cultivated by the growers in account of the attractive prices of tender nut and occupies over 20% of the total coconut area of the state. Past history reveals that coconut is a succumb victim to an array of pests and diseases since 2000, with Eriophid mite, Red palm weevil, Rhinoceros beetle, Slug caterpillar, Leaf blight, Root(wilt) and Rugose Spiraling Whitefly ruling over the recent years. There had been a set back in the spathe emergence owing to the incidence of Rugose Spiraling Whitefly and more was the intensity of damage in case of dwarf varieties, and hybrids evolved with dwarf as the female parent. Climate change has turned out to be an unavoidable factor in cropping and dwarf coconut is a sensitive victim to receive the catastrophes of the drought events.

One such case was witnessed in a farmer's garden at Avalchinnampalayam village of Pollachi (North) block of Coimbatore district, Tamil Nadu. The farmer Mr.Venugopal had been cultivating Chowghat Orange Dwarf variety of coconut over an area of four acres. The palms were planted by the farmer during 2009 and the yield stability was attained at the fourth year of planting. It is the field in which the crop production research project of the ICAR – AICRP (Palms) "Integrated Nutrient Management Technologies to Enhance the Productivity and Quality of Tender nut in Dwarf Coconut" was initiated during 2014-15. Soil analytical data of the experimental site revealed that the soil was neutral in pH, non saline in nature, low in KMnO₄-N, medium in Olsen -P and low in 1N NH₄OAcK. Organic carbon content was low (<0.5 %

in the soil. Micro irrigation system is being followed in the garden utilizing water from the open well of the farm. The farmer was enjoying a bumper yield of 200 - 250 tender nuts per palm per year from 2014 until his garden was worst hit by the drought of 2016. Rainfall received during 2016 was 40 % less than the mean annual rainfall of 800 mm of the region. This caused a severe setback in the spathe emergence in the dwarf coconut cultivar during 2017. The farmer who had been harvesting lorry loads of tender coconut was frustrated by the very few heaps of nuts he witnessed during 2017 and planned to abandon the garden because of its poor performance and to replace with tall variety of coconut.



Coconut Palm during 2017



Weather variables recorded in the Agro Meteorological Observatory of CRS, Aliyarnagar					
Year	Max. Temp (oC)	Min. Temp (oC)	Rainfall (mm)	RH (%)	Evaporation (mm)
2014	36.7	25.0	1054.9 (83)	90.8	5.9
2015	35.3	22.3	1073.7 (76)	92.4	6.5
2016	38.0	23.9	480.4 (31)	90.0	8.0
2017	36.8	24.2	748.1 (50)	93.4	5.6
2018	36.8	23.1	1085.5 (73)	96.8	4.8
2019	38.0	27.5	896.01 (67)	97.2	9.0
2020	37.5	21.5	644.9 (61)	94.2	4.8

(Figures in parantheses indicate the number of rainy days).

But the farmer was encouraged to continue basin management so as to keep rhizosphere alive and it was demonstrated in the research plots maintained over there. He was advocated to apply more of organic manures viz., farmyard manure @ 50 kg per palm, coconut frond mulching removing the basal portions, green leaf manuring with the available biomass around his fields, application of biofertilizers viz., Azospirillum and Phosphobacteria @ 100 g each per palm per year. On receipt of sufficient rains during 2017, application of NPK @ 560 – 320 – 1200 g was resorted to in two split doses during December and June, together with MgSO₄ @ 500 g per palm per year. A month after the application of macronutrients, ZnSO₄ was applied @ 200 g per palm per year in two equal splits. The same package was continued during 2018 with neem cake @ 3 kgs per palm per year to evade whitefly. During 2018, coconut palms were better than the previous years and during 2019, Integrated Nutrient Management registered its special imprint by giving out inflorescence stringed with buttons analogous to grape bunches. The yield graph started shooting up steeply which reverted smile in the face of the farmer. Regardless of Rugose Spiraling Whitefly visiting and leaving the dwarf palms, Integrated Nutrient Management technology started contributing for the betterment of the garden which showed great transition in the mindset of the farmer and others in the vicinity. The farmer who had been thinking of replacing the dwarf coconut palms with tall variety

because of drought and pest is enjoying lorry loads of harvested bunches in his field. He reaped 200 tender nuts per palm per year during 2020 with a net return of Rs.3,00,000 accrued per annum.

Basin management, an essential phenomena helped to retrieve the lost glory of the dwarf coconut palms. Soil is a living entity and a dynamic mix of minerals, organic matter, air and water which changes in response to crop management practices. Soil management is an inevitable part of land management. In the recent past, physical, chemical and biological quality of the soil has deteriorated due to imbalanced use of chemical fertilizers, poor recycling of farm wastes and depletion of soil organic carbon pool which restrain the capability of the crops to resist adversities. Scrupulous application of organic manures creates a favourable rhizosphere environment for microbial processes which include exudation, water uptake, nutrient mobilization, decomposition of soil organic matter and respiration. The role of soil microorganisms in nutrient transformation reactions is far beyond measurement. Microorganisms are often cited as the 'eye of the needle' through which organic matter passes more than once. Microbial generation can be triggered only through application of organic matter. The hidden half of coconut is always engaged in anchorage and acquisition of vital nutrients and water. Rhizospheric processes have control over the

biogeochemical cycles and mechanisms that signal resistance to biotic and abiotic stress mechanisms. Basin management affects the hydrothermal regime of the soil which facilitates the palms to perform better by regulating the thermal cycles in the rhizosphere. Under moisture stress condition, mulching helps in curtailing the evaporation losses and holding moisture for an extended period of time in soil. It paves way for soil resilience, the ability of the soil to resist adverse changes under a given set of ecological and land use conditions. This is what happened in the farmer's garden too.

Today, still there is Rugose Spiraling Whitefly and sooty mould on the dorsal surface but, the palms are yielding well. Thanks to rejuvenation therapy of Integrated Nutrient Management. Thus in coconut, basin management holds great promise in imparting tolerance to biotic and abiotic stress. Combined application of farmyard manure @ 50 kgs, green leaf manuring with daincha or sunhemp @ 35 kgs per hectare, recycling of coconut wastes, coconut frond mulching, application of biofertilizers Azospirillum and Phosphobacteria @ 100 g each together with soil test based application of macronutrients and critical micronutrients per palm per year can promote the root growth, keep the rhizosphere active and help the dwarf palms to tolerate the biotic and abiotic stresses as evinced from the research plot of the farmer's garden. ■

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