

Standardization of Leaf Sampling Technique in Arecanut Palm

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Abstract

In perennial crops with extensive root system soil sampling and analysis for predicting plant nutrient supply are problems. In such cases leaf analysis is adopted as one of the alternative methods for diagnosing the nutrient requirement. Proper selection of leaf is of utmost importance. A method for selecting leaf part for analysis of arecanut is discussed.

Introduction

It is well established that the composition of a particular plant species is profoundly influenced by the composition of the soil. In perennial crops where extensive root systems mine the plant nutrients from large soil mass, soil sampling is a problem. If tissue analysis is standardised on a well laid out field trial this would compliment soil analysis for computing the nutrient status and nutrient requirement. In tissue analysis a well defined plant part, time of sampling and age of the tissue should be fixed. Leaf analysis has distinct advantages over soil analysis in perennial crops for diagnostic purpose. Meaningful soil samples are difficult to take in situations where manures/fertilisers were applied in narrow bands around the trees. Yadava et al., (1971) studied the leaf sampling technique in arecanut palm. They have suggested the collection of leaflets from different leaf numbers for different nutrient element and second leaf for composite analysis.

Because of certain limitations in the suggested sampling procedure a reexamination was done.

Materials and Methods

The treatment $N_2P_2K_2G_2$ * from the NPK Experiment laid out at CPCRI Regional Station, Vittal was selected. Thirteen palms were used for sampling. The samples were collected in the month of February.

In the present study the leaves were numbered serially from top to bottom. The latest fully opened leaf is taken as leaf number one and counted down in the sequence of maturity. For analysis purpose leaflets were collected from each leaf from three positions i.e., base, middle and top. From each side of main rachis leaflets were collected on either side. From each position two to three leaves were adequate to give enough samples for

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- * N_2 - Nitrogen, 100 g / palm / year
 - P_2 - Phosphoric acid, 80 g / palm / year
 - K_2 - Potash, 140 g / palm / year
 - G_2 - Green leaf, 14 kg / palm / year

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analysis. Immediately after field collection the samples were washed in tap water, rinsed with distilled water and processed as per the standard methods.

The following procedures were adopted for laboratory analysis

Nitrogen : Kjeldhal method (Jackson, 1967).

Phosphorus : Vanado - molybdo phosphorie yellow colour method using Klett summerson colorimeter (Jackson, 1967)

Potassium : Flame photometer (Jackson, 1967).

Calcium and Magnesium : E. D. T. A. titration. (Heald, 1965).

Phosphorus, potassium, calcium and magnesium were estimated from the aliquot obtained by wet digestion of plant sample using nitric and perchloric acid. From the data the coefficient of variations and table of rank for cv(%) have been computed for selecting the leaf position for sampling purpose.

Results and Discussion

From the result, it is evident that the fourth leaf has the lowest rank sum for N,P,K. The sixth leaf has the lowest rank sum for Ca, Mg. This shows that for

NPK analysis, leaf number 4 is suitable and for Ca and Mg, leaf number 6 is suitable. Similarly co-efficient of variations were ranked for leaflet position for all the leaves. The table of ranks is given in Table 1a and 1b.

The rank sum figures show that the lowest value is for leaflets collected from the top portion of leaf number 6 and leaflets collected from the bottom portion of leaf number 8. The next higher figures is for top portion leaflets in leaf number 4.

The fourth leaf was found suitable for sampling in the earlier conclusion. The difference in rank sum is negligible. Hence it can be concluded that leaflets collected from the top portion of leaf number 4 are suitable for NPK analysis.

The rank sum figures for Ca and Mg values show the lowest in bottom leaflets of leaf number 4. The next higher value is obtained for leaflets collected from all the three position of leaf number 6. So it can be concluded that for Ca, Mg analysis it is desirable to collect separate sample either from the bottom leaflets of leaf number 4 or leaflets at any position in leaf number 6.

Acknowledgement

The authors are thankful to Shri K. Shama Bhat, Agronomist. who kindly permitted to use the palms in the NPK experiment for this study. Our sincere thanks are due to Shri S. Bhagavan and Shri B. P. Nair who assisted in statistical interpretation.

Table 1a. The rank and rank sum for N,P,K in different leaves.

Leaf No.	1	2	3	4	5	6	7	8
Constituent								
N	8	3	1	5	2	6	7	4
P	8	6	3	1	7	2	4	5
K	5	4	8	3	7	6	1	2
Rank sum	21	13	12	9	16	14	12	11

Table 1b. The rank and rank sum for Ca and Mg in different leaves.

Leaf No.	1	2	3	4	5	6	7	8
Constituent								
Ca	4	6	8	3	7	1	2	5
Mg	3	7	5	4	6	2	8	1
Rank sum	7	13	13	7	13	3	10	6

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