

SOIL AND FOLIAR SAMPLING TECHNIQUE FOR DISCRIMINATORY FERTILIZER RECOMMENDATION FOR RUBBER

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INTRODUCTION

The use of fertilizers in the cultivation of rubber is an accepted practice. Good yields of rubber are sustained by the use of fertilizers. But optimum growth and yield of plants can be achieved only by properly balancing the nutrients according to the requirements of the tree and not by their indiscriminate application. Therefore the soil and foliar surveys of estates, undertaken by the Soils and Plant Nutrition Department of the Rubber Research Institute provide fertilizer and cultural recommendations specifically suited to local soil situations. This scheme had been thoroughly tested in all rubber producing countries including Sri Lanka and was introduced in Sri Lanka in the early 1970's (20 years ago).

Practical Aspects of Leaf Sampling

It is important that the planters are familiar with the practical aspects of leaf sampling in a foliar survey programme as it would become necessary for them to carry out foliar surveys on their estates. The following points must be strictly adhered to when taking leaf samples from fields. Failure to do so may result in abnormal values obtained during the chemical analysis or destruction of the sample due to bacterial or fungal action.

Time of leaf sampling:

Leaf sampling is normally done in the period June to October

Preparation of bags to collect leaf samples :

The polythene bag used for the leaf samples must be clean. In order to prevent the excessive build up of transpiration moisture where the sample has to travel a great distance, the polythene bag must be perforated. In general a perforated polythene bag of 15" x 10" is recommended.

Identification of leaf samples:

Before the sampling of a field commences, two identical labels (tags) should be written in such a way as to be unambiguous. One should be placed inside of the bag with the sampled leaves and the other should be tied to the outside of the bag after completion of sampling. The following details should be written on the label.

Estate:
Division/Field:
Year of Planting:
Sample No:
Sampling Date:

Selection of the trees within a sampling unit:

The number of trees which must be sampled from a given area is dependent on only to a small extent on the size of the area, but should have a minimum number of about thirty. Table 1 shows the number of trees that must be sampled for areas of different sizes; usually at the rate of 2 trees per ha. The intensity of leaf sampling is generally, one composite sampling for approximate every 10–15 hectares.

Table 1. *Number of trees sampled for different sizes of blocks*

Area	Number of sampling trees
Below 5 ha	10
5 – 10 ha	20
10 – 20 ha	40

Within a field, the sampling tree can be chosen in a number of different ways depending on whether the area is planted with straight line planting or hilly with contour planting (Fig 1). It is most important that the trees are selected at random and not chosen by inspection.

Selection of leaf to be sampled:

The sampled tree must not be flushing nor must it be showing any signs of primary or secondary wintering.

Since the "within row" distance is shorter than the "between row" distance when the canopies begin to close, each tree will have two shaded sides and two light sides. The leaf to be sampled is a "lower shade leaf". This leaf will be found on a branch situated in the middle third of the canopy from the position marked x (Fig. 2).

Small branches growing from the fork of the tree and branches in the sun must be avoided.

In mature rubber it is usually necessary to stand in the tree fork and cut down a few of the higher order branches on the main branch selected using either a hooked knife on a bamboo pole, or mounted on aluminium extension poles.

Having cut down a suitable branch two large lower leaves from a terminal whorl are taken for the sample. A second pair of leaves are then collected from the opposite side of the same tree in a similar manner. Fig. 3 illustrates a suitable shade branch cut from a tree and the arrows indicate the leaves required for the sample.

Sampling, Packing and Despatch:

- * The staff used for the leaf sampling should not have been applying or measuring out fertilizer prior to the sampling
- * The collected leaves must not be placed in the ground or in the back of a vehicle, but after picking from the branch, placed in the clean polythene bag.
- * Excessive moisture on the leaves at the time of collection *i.e.* dew must be wiped away using clean dry cloth, or this will add to the moisture build up in the polythene bag.
- * After closing the sample in the polythene or paper bag it is essential to send it immediately to RRI laboratory for drying and analysis.
- * The leaves must arrive at the laboratory for analysis within 24 hours of collection (unless refrigerator preservation has been used). Undue delay at this stage will cause rotting as the enclosed leaves transpire and the moist conditions created within the bag are ideal for bacterial and fungal growth.
- * If for any reason it is necessary to delay the sending of a leaf sample, the bag should be placed in a refrigerator, preferably in the freezing compartment. In this way samples may be kept for about 5 days. If the samples are placed in the normal cold portion of the refrigerator then it is inadvisable to keep them longer than 48 hours after sampling before despatch.
- * Samples sent by parcel post are usually unacceptable, as the delay in this case may be several days.

Soil sampling

The basic requirement of a soil sampling programme is the collection of soil samples that reflect accurately the true nutrient status of the field.

The following points must be strictly adhered to when taking soil samples. Failure to do so may result in abnormal values obtained during the chemical analysis.

1. The intensity of soil sampling is generally, similar to leaf sampling, one composite sampling for approximately every 15 hectares (Fig 1).
2. Two soil samples should be collected; one from 150 cm from the tree and the other from inter-row area (Fig.4), the two places bulked separately.
3. First soil sample should be collected at 03 places 150 cm away from the base of the tree (same tree used for collect leaf sample) (Fig.4) and should be bulked.
4. Second soil sample should be collected from inter row area (Fig.5).
5. Two composite samples should be made from these samples to represent approximately 15 hectares (Fig.6).
6. The soils should be collected at surface 0–15 cm using a 'alavangu'.
7. Large lumps should be broken up and the soil should be free of rocks, stones roots or any other extraneous matter.
8. The polythene bag used for soil samples must be clean. An old bag that has previously been used for the transportation of fertilizer must not be used.
9. The staff used for the soil sampling should not have been applying or measuring out fertilizer prior to the sampling.
10. Identification of soil samples should be done similar to leaf samples.
11. Soil samples of a particular field should arrive at the laboratory for analysis with the leaf samples of that field.

In general, soil analysis techniques, although not difficult to perform are time consuming. Because, a nutrient is present in the soil it does not necessarily mean that it is available to the plant. This may be because of the chemical form in which it is present or simply the soil may be too compacted or waterlogged for root penetration. Therefore, more attention is now devoted to the analysis of the plant, usually leaves.

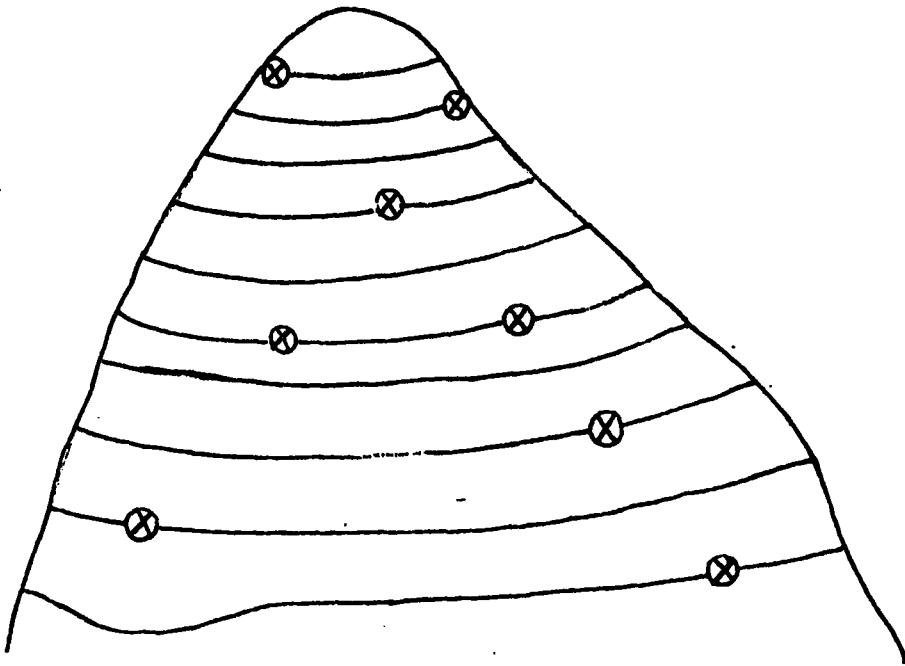


Fig. 1 Selection of plants for sampling

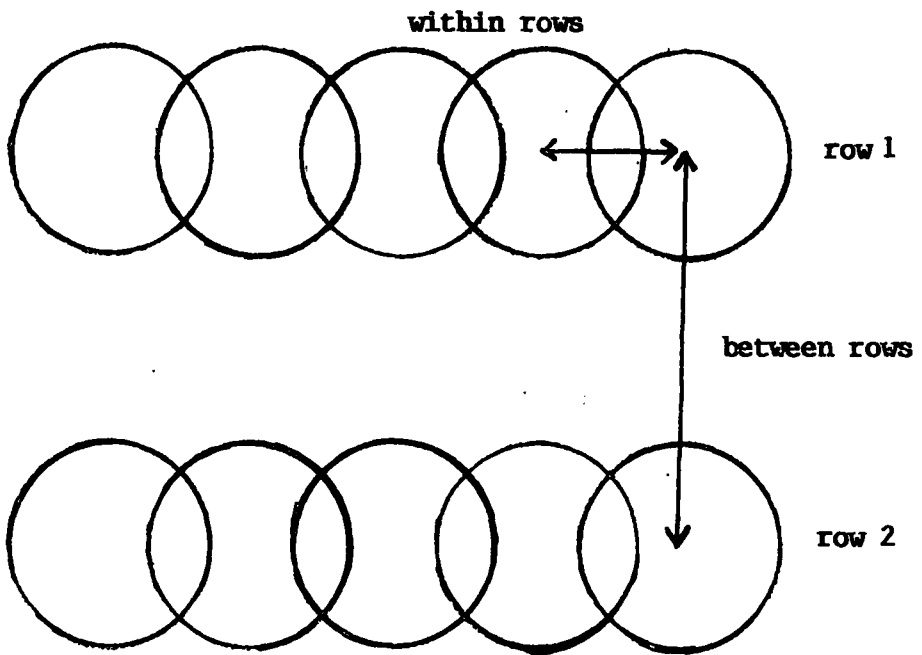


Fig. 2 Position of the sampling leaf



Fig. 3 Suitable shade branch for sampling leaf

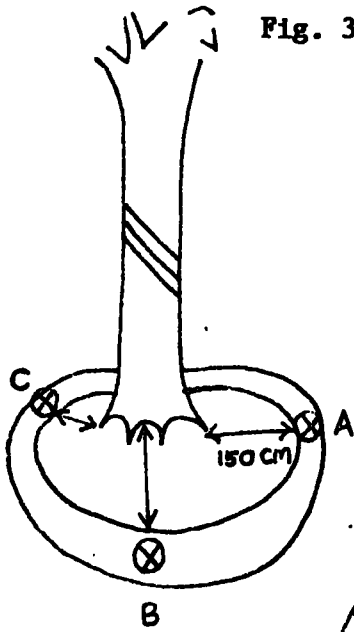


Fig. 4 Soil sampling around the tree

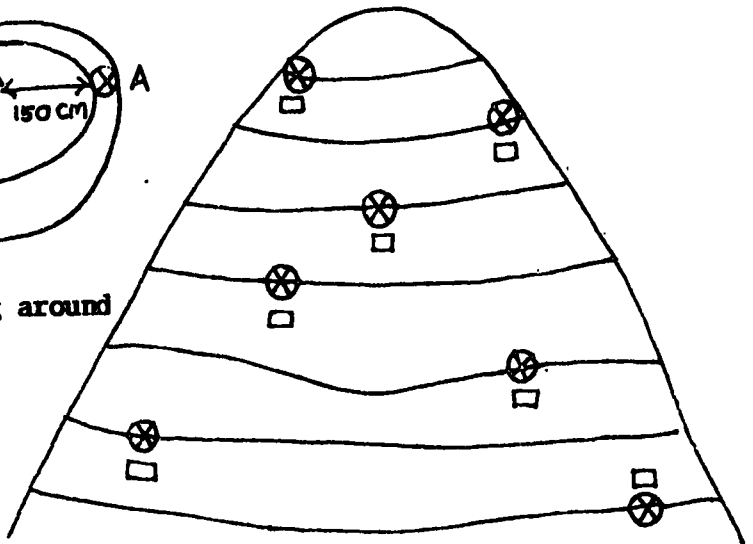


Fig. 5 Soil sampling from inter-row areas

