Experiments were conducted in five farmers holdings at Puthalam village consecutively from 2006-07 to study the effect of root feeding of coconut tonic on nutrient concentration and yield of coconut. The soil was sandy loam in texture. The soil had a pH range of 7.7 to 8.0, EC of 0.41 to 0.90 dS m$^{-1}$, organic C 0.2 to 0.3 %, available N 78 to 88 kg/ha, available P 7.0 to 8.0 kg/ha, and available K 108 to 130 kg/ha. The treatments were: T$_1$: Control (Co fertilizers), T$_2$: Recommended chemical fertilizers (1.3 kg urea, 2.0 kg SSP and 2.0 kg muriate of potash), T$_3$: Root feeding of TNAU tonic without soil application of recommended chemical fertilizers, T$_4$: root feeding of coconut tonic and soil application of recommended chemical fertilizers. The palm west coast tall was tested. In each treatment 35 palms were tested and mean yield/tree/harvest was recorded. The soil application of recommended N, P, K and root feeding of coconut tonic resulted in highest K content (1.42 to 1.48%) compared to the other treatments. produced significantly more number of nuts (71.2 and 73.5 nuts/palm/year) compared to other treatments during 2007 and 2008, respectively. This was followed by the root feeding of TNAU coconut tonic alone (64.1 and 66.6 nuts/palm/year). The lowest yield was recorded in the control (48 and 48.2 nuts/palm/year, respectively).

**Key words**: Coconut, Fertilization, Soil, Tonic, Yield

In Kanyakumari district coconut is the major crop occupies an area of 25,000 ha in which more than 75 per cent of the holdings are below one ha. The average yield is 50-nuts/palm/year, which is only half of what is realized in experimental fields. The income and employment derived from such small holdings is quite insufficient to sustain the dependant families. Despite its importance and wide spread cultivation, the crop is not quite profitable, due to inefficient farming practices. In a situation where the coconut industries threatened with recurring uncertainties the need for the farm practice, timely and sustained transfer of technologies and extend of field adoption of the recommended practices that augments the coconut farming as a profitable venture becomes very essential and most urgent.

**MATERIALS AND METHODS**

Experiments were conducted in five farmers holdings at Puthalam village consecutively from 2006-07 to study the effect of root feeding of coconut tonic on nutrient concentration and yield of coconut. The soil was sandy loam in texture. The soil had a pH range of 7.7 to 8.0, EC of 0.41 to 0.90 dS m$^{-1}$, organic C 0.2 to 0.3 %, available N 78 to 88 kg/ha, available P 7.0 to 8.0 kg/ha, and available K 108 to 130 kg/ha. The treatments were: T$_1$: Control (Co fertilizers), T$_2$: Recommended chemical fertilizers (1.3 kg urea, 2.0 kg SSP and 2.0 kg muriate of potash), T$_3$: Root feeding of TNAU tonic without soil application of recommended chemical fertilizers, T$_4$: root feeding of coconut tonic and soil application of recommended chemical fertilizers. The palm west coast tall was tested. In each treatment 35 palms were tested and mean yield/tree/harvest was recorded.

The N, P and K were applied in the form of urea, single superphosphate and muriate of potash, respectively, in two splits viz., one half (50%) in May – June (beginning of south-west monsoon) and rest half in Sep. – Oct. (beginning of north-east monsoon). The fertilizers were applied by broadcast in circular basin of 1.8m around the palm and mixed with soil thoroughly. Root feeding of TNAU tonic was done at 4 to 5 months interval. The tonic consisted of all the essential nutrients except Ca and P. It also consists of growth regulators viz., auxin and salicylic acid.

The yield data was recorded regularly from all the palms and annual yield/palm was computed. Pre-treatment and post-treatment soil and leaf samples were collected from three palms in each treatment plot. Soil samples were drawn from the circular basin 1.0m away form the bole, at 0-25 cm depth using spade. The soil samples were air dried in shade, ground to pass though 2mm sieve and analysed for available N, P and K status by adopting standard procedures (Jackson,1973). The leaf samples were collected from index leaf (14th leaf) of the
palm by using a specially designed knife by cutting 4-5 leaflets from the middle of the frond on both the sides. The leaf samples were washed with distilled water, oven dried at 65°C for 72 hours and powdered using a whilley mill. The powdered fraction (0.5mm) of leaf sample was digested in diacid mixture HNO\(_3\) : HClO\(_4\) (3:1) and analysed for P and K content (Jackson,1973). The N content in plant samples was estimated according to modified Kjeldahl procedure as described by Jackson (1973) using Kjeltec auto analyzer.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been presented under following heads:

Coconut leaf nutrient composition:

It is evident from the results that the root feeding of TNAU coconut tonic alone could not bring about increase in the nutrient composition of coconut leaf (Table 1). However, the soil application of recommended N, P, K and root feeding of coconut tonic resulted in highest K content (1.42 to 1.48%) compared to the other treatments. This may due to the increase in the soil nutrient status apart from the direct in take of nutrients without any loss through the roots in to the palm system by root feeding. However, there was not much variation in the leaf content with respect to N and P.

Soil chemical properties:

The soil chemical properties under the treatment studied are presented in Table 2. The available N, P and K in the soil did not differ significantly among the treatments. The soil application of recommended dose of NPK resulted in increase of available N, P and K status of the soil. The root feeding of TNAU tonic alone did not show variation in the soil available nutrient status. The highest available N, P and K status with soil application of N, P and K has been reported by may workers in different crops (Balaguravaiah et al., 2005; Tiwari et al., 2002 and Bharadwaj et al., 1994). The extraneous application of N, P and K is required besides root feeding for replenishing the depleted nutrients and also to sustain the soil health.

Nut yield:

In general, over the years there was a progressive increase in the nut yield of palms (Table 3). Among the treatments, soil application of recommended N, P and K along with root feeding of coconut tonic produced significantly more number of nuts (71.2 and 73.5 nuts/palm/year) compared to other treatments during 2007 and 2008, respectively. This was followed by the root feeding of TNAU coconut tonic alone (64.1 and 66.6 nuts/palm/year). The lowest yield was recorded in the control (48 and 48.2 nuts/palm/year, respectively). The highest nut yield recorded with the root feeding has been reported to be due to the supply of the essential nutrients and growth
regulators directly into the sap of the plant system (Sharma, 2008). Further the soil application favoured the improvement in soil fertility, besides uptake of nutrients by the root system. This resulted in the increase yield of nuts.

**Conclusion:**

Form the above study it can be concluded that, soil application of recommended dose of manures and chemical fertilizers (1.3 kg urea, 2.0 kg SSP and 2.0 kg muriate of potash) and root feeding of coconut tonic could be recommended for sustaining higher yield. This also helps in maintaining soil fertility in coconut gardens.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Yield (nuts/palm/year)</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td>48.0</td>
<td>48.2</td>
</tr>
<tr>
<td>Recommended NPK</td>
<td></td>
<td>56.1</td>
<td>60.1</td>
</tr>
<tr>
<td>Root feeding of TNAU tonic</td>
<td></td>
<td>64.1</td>
<td>66.6</td>
</tr>
<tr>
<td>Recommended NPK + Root feeding of TNAU tonic</td>
<td></td>
<td>71.2</td>
<td>73.5</td>
</tr>
<tr>
<td>CD (5%)</td>
<td></td>
<td>5.4</td>
<td>6.5</td>
</tr>
</tbody>
</table>

**REFERENCES**


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