total weight of this device is only 32 kg which can further be reduced by using aluminium alloy pipes. Initially it is placed near the tree either by pulling the device on its wheels or by lifting it on undulated fields. By manipulating the rope, the required pipe is lifted to the desired height and the rope is tied to its hook to keep the pipe in position. The rocker pump is operated and pressure is built up in the hose and with the help of regulator lever the pesticide is sprayed into the crown. The rocker sprayer used with this unit (Chatur Rocking Sprayer, Diwane Industries, Pune) will have a capacity of 1200 ml of water per minute when tested, in accordance with ISI standard and the volumetric efficiency will be around 80%. Thus a good sprayer will maintain the pressure for a long time and continuous operation of the lever of the sprayer may not be needed.

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The unit is found suitable for spraying purpose upto a height of 4.5 meters. As wheels are provided transportation becomes easy. Only two labourers are required to operate this unit. The cost of the unit will be approximately Rs. 450/–.

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Relative Assimilation Rate (RAR) in Coconut Palms

Growth analysis is a promising experimental approach for analysing the complex character of yield for crop plants and growth characteristics are uselful indices of yield capacity (Kvet et al, 1971). While the method has been widely adopted in several crop plants (Watson, 1947; Watson and Witts, 1959; Necas, 1968; Kvet et al, 1971), such information on cultivated palms of economic importance is meagre perhaps due to large size and the resultant complexity of growth. Rees and Tinker (1963) have applied this experimental approach to determine the dry matter productivity in oil palm. Since total destructive sampling is obviously impracticable, a sub-sampling

method adopted to study the assimilation rate in West Coast Tall (WCT) coconut palm is described here.

Ten 3 year old palms growing under identical conditions were selected for the initial study. From each palm six leaflets, three each from both sides of the middle portion of the leaf, were sampled. Thirty days later, a second set of leaflets growing opposite to the leaflets sampled earlier were collected. Samples from seven leaves of each palm were collected simultaneously. Soon after collection of the samples, the area of each leaflet was estimated using the regression equation $y=12.471+0.631\ x$ where x is the product of length and maximum width (Anonymous, 1977). The leaflets were then dried at 95°C and the constant dry weights determined.

Thereafter the dry matter increment was estimated using the formula

$$\frac{W_2 - W_1}{A_2 - A_1} \frac{(\text{Log } A_2 - \text{Log } A_1)}{t_2 - t_1}$$ (Watson, 1952).

Where W_1 is initial dry weight; W_2 is the final dry weight; A_1 is the initial leaf area; A_2 is the final leaf area; t_2-t_1 is the duration between the sampling.

Being a sub-sampling method, the amount of photosynthates translocated from the sampling leaf during the interval of sampling is not included by the final values and hence the term Net Assimilation Rate (NAR) is not used in this method. Instead, the term Relative Assimilation Rate (RAR) is used. This terminology has not been reported elsewhere.

The data on RAR in each of fronds, and mean for 10 palms are presented in Table I.

The youngest opened leaf had highest values with least CV and this leaf was chosen as the best reflected for determination of RAR. Earlier studies had shown that the rate of apparent photosynthesis was highest in youngest fully opened leaf than in other leaves of increasing maturity. (Mathew and Ramadasan, 1974).

In subsequent studies the area of leaflet was determined using an electronic leaf area meter (Model L_1 Cor-3000).

Employing the procedure of sub-sampling described, RAR was determined in 15-20 year old adult West Coast Tall (WCT) and Chowghat Dwarf Green(CDG) palms in different months of the year. The mean RAR values for 23 WCT palms ranged from 1.9 to 5.9 $g.m^{-2}$ $week^{-1}$ and for 20 CDG palms it ranged 1.2 to 3.9 $g.m^{-2}$ $week^{-1}$. The mean annual yield of nuts in the experimental adult WCT palms was 72.3 as compared to 45 nuts in CDG adult palms. Statistical analysis of the data revealed positive correlation of RAR with mean annual yield of nuts

Table I. *Relative assimilation rate in coconut fronds*

Leaf No.	1	2	3	4	5	6	7
RAR	3.69	2.24	1.57	2.17	1.96	0.81	0.96
CV(%)	22.8	49.5	58.9	65.7	44.8	108.6	116.3

(r=0.5813 for WCT and 0.5729 for CDG both being significant at 1% level). Mathew and Ramadasan (1975) reported significant correlation between the rate of apparent photosynthesis and yield.

The youngest unfolded leaf, soon after the unfolding is found to be most suitable for integrating area and dry weight in the estimation of RAR. Since the coconut palm has only a single growing point in the shoot apex and growth is exhibited mainly as growth of leaves in regular succession, the suggested choice of sampling is representative in character. Although this method suffers as it does not involve the photosynthates transported out of the leaf during the interval of the two samplings, the sub-sampling procedure adopted here is applicable for determining relative efficiencies.

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