

Leaf Analysis as a Guide to Nitrogen Fertilization and Sampling Sites of Wax-apple Trees¹

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Abstract

This paper deals with the changes of mineral nutrients in leaves, the effect of N fertilizer on leaf N content and fruit production, and the development of sampling technique in order to find out the applicability of leaf analysis as an estimation of N requirements of Wax-apple orchards. Leaf samples were taken from field trial of N fertilizer, conducted in the Nai-pu area which is one of the major Wax-apple area in Taiwan.

The results show that N content in leaves were increased with the increasing of N fertilizer applied. Obviously, leaf N content largely increased at the amount of N fertilizer applied higher than 1.6 kg/plant/year, however, the increasing curve went smooth when N rates reach to 3.2 kg/plant/year. There is a significantly interaction between tree age and N rate, from which yield and fruit size significantly reduced at the application of N fertilizer higher than 1.6 kg/plant/year for six-year-old tree. The concentration of N in leaves were the highest in early winter, while the lowest in summer. Summer mature leaves apparently own the best response of leaf N content on N fertilization, compared with the autumn and spring leaves which showed no response for all treatments at the period from leaf age two-month to five-month. In addition, the coefficient of variation for summer leaves, 7.1%, was lower than spring leaves 9.8% and autumn leaves 9.5%; it means that N status in summer leaves was most stable, therefore, it is the best time for leaf sampling. Statistic analysis and linear regression has indicated that critical N content and standard deviation for summer mature leaves were 1.56% and 0.11%, respectively. Fertilizer N recommended could be calculated

as following equation: $Y=7.56-4.85X$, where X indicated summer leaf N content. There are an oppositely effect of N fertilization on the contents of K, and Ca compared with N in the summer leaves. The ratio $N/(K+Ca)$ 0.63 is a good indicator to diagnosis the balance of inorganic N status in leaves.

Keywords: Waxapple, Leaf analysis, Sampling position, Nitrogen requirement

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