



Variation in foliar macronutrient levels of carambola (*Averrhoa carambola* L.) as influenced by type of tree, position of leaf on shoot and months

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Abstract : The experiment was carried out in a farmers' orchard situated at Birbhum district of West Bengal during the period of April 2006 to March 2007 to compare the foliar composition of nutrients between sour and sweet types of carambola and to standardize leaf sampling technique on the basis of type of plant, season and position of leaf on shoot. The results revealed that no significant variations in foliar P level could be found between sour and sweet type trees and position of leaf on shoot. However, the accumulation of P in leaf tissue showed strong seasonal fluctuation and it was relatively stable during September to November. The leaves of sour type of tree had significantly higher concentration of foliar K content. The position of leaves on shoot did not have any marked influence on foliar K level. However, the variation in leaf K content did not show any distinct pattern. No significant variations in foliar Ca level could be visualized due to type of tree and position of leaf on shoot. The seasonal changes in foliar Ca content were significantly different with stable period during July-October. Conspicuous variation in Mg level in leaf tissue was noted due to type of tree. However, position of leaf on shoot did not have any significant influence on leaf Mg content. The foliar Mg status remained stable during November-February.

Key Words : Foliar composition, Leaf sampling technique, Carambola

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INTRODUCTION

Carambola (*Averrhoa carambola* L.), also known as the five corner fruit or star fruit or *kamrakh*, is an important fruit crop of tropical and subtropical areas of the world. It belongs to the family Oxalidaceae and native to Malaysia or Indonesia. The available types are divided into two groups *i.e.* sour and sweet types. Fruits of carambola are rich source of reducing sugar, ascorbic acid and minerals like calcium, magnesium, and phosphorus. The mineral concentrations varied with the process of development of fruits. Nutritional status of perennial tree is one of the important factors that govern the growth and bearing habit of trees. Leaf analysis is more useful than soil analysis in perennial trees, mainly because of the difficulty of determining with sufficient accuracy the root zones in which

deep rooting plants take up most of the nutrients (Marschner, 1986). The influence of age of leaf and/or season on foliar nutrient composition has been evaluated by some workers. Recently matured leaves are considered ideal for diagnostic and predictive purposes as the meristematic tissues are generally very rich in mobile elements (Bhargava and Chadha, 1993). Chander (1970) noted that leaves of same age, regardless of flush or sampling date were similar in chemical composition. On the contrary, a strong influence of month and growth flushes on the nutrient element composition of Khasi mandarin leaves has been reported (Sanyal *et al.*, 1994). The sixth leaf collected during the flowering peak period from August to October appeared ready to allow a nutritional diagnosis of carambola trees (Prado and Natale, 2004). In carambola cv. Arkin, George *et al.* (2002) observed that leaf

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