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Research Paper :

Effect of soil K nutrition on mineral composition and fruit quality of apple (Red Delicious) under temperate conditions

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ABSTRACT

Four different levels of potassium (K) *viz.*, K_0, K_{750}, K_{1500} and K_{2250} g K_2O/tree as soil application were applied to estimate the effect on mineral composition and fruit quality of apple cv. RED DELICIOUS, subsequently it was observed that increase in K levels from K_0 to K_{2250} significantly increased the leaf K and Fe content, whereas it significantly decreased the content of P, Ca, Mn, Zn and Cu. Fruit quality parameters like fruit weight, length and diameter increased significantly with K application upto K_{2250} level and was at par with level K_{1500}. Fruit TSS and colour also showed increased trend with a simultaneous decrease in fruit acidity.

Key words : Soil potassium, Nutrient concentration, Fruit quality, Apple

Fruits are among the most cherished foods of the nature. Fruit industry in Jammu and Kashmir has achieved distinction in apple production. Apple is the most enterprising fruit crop of J&K state and it holds the national and international pride for its quality. Although the temperate conditions of J&K are congenial for apple production yet the productivity of quality fruit is far lower than that in European Countries. Of many reasons imbalance of K application is most important, as role of potassium in fruit production is often under estimated in comparison to nitrogen, because impact of nitrogen is more eye catching while that of K is of a silent performer.K is described as the quality element for fruit crop production and required by fruit plants for higher yield and better quality. In addition K nutrition also effects the mineral uptake and their distribution to different plant parts like shoots, leaves, fruits etc. Besides it improves fruit size, shape, colour and vitamin C content. Owing to the importance of K in fruit production, the present investigation was, therefore, undertaken to study its effect on mineral composition of apple leaf and fruit quality.

MATERIALS AND METHODS

An experiment was carried out on an orchard with medium nutrient status, silty clay loam texture and illitic mineralogy situated in the campus of SKUAST-K, Shalimar (J&K), Srinagar. The plants under treatment were fertilized with the fixed doses of N and P as per recommended dosage in the form of urea and SSP. In addition variable doses of K(0, 750, 1500 and 2250 gK_2O/tree) in the form of MOP was given to the plants under study. The mineral elements of leaf samples collected in the month of August were estimated following the standard procedures for K (Piper, 1956), Ca (Black, 1965) and N, P, Zn, Fe, Mn and Cu (Jackon, 1973). The fruit samples were collected as per the standard procedures given by Waller (1980). Average weight of fruits was calculated using a balance, total soluble sugar content was calculated with Refractometer. The titrable acidity was estimated in terms of per cent malic acid by titrating the sample against 0.1 N standard NaOH using phenolphithalin indicator. Fruit firmness was measured with the help of penetrometer and fruit length and diameter with vernier calliper. The experiment was conducted in randomized complete block design with three replications. The data collected was analysed statistically and evaluated using statistical software "Minitab".

RESULTS AND DISCUSSION

The application of different levels of K had no significant effect on leaf N, whereas P and Ca content of leaves were significantly decreased with the increased application of K, lowest content of P (0.09%) and Ca (0.44%) was observed with K_{2250} level *i.e.* K applied @ 2250 gK_2O/tree (Table 1). Leaf K and Fe content significantly increased with graded application of K. Highest content of K (1.89%) and Fe (162.35 ppm) being recorded at K_{2250} level while as the lowest content of K (1.29%) and Fe (121.30 ppm) was observed at K_0 level. On the other hand significant decrease was noticed in leaf Mn, Zn and Cu content but the decrease was not upto the extent the plants may show any deficiency