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SHORT COMMUNICATION

EFFECT OF PACLOBUTRAZOL AND ETHEPHON ON LEAF NUTRIENT UPTAKE IN 'ALLAHABAD SAFEDA' GUAVA (*PSIDIUM GUAJAVA* L.) PLANTS

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The guava plants treated with paclobutrazol (PBZ) and ethephon assimilated significantly higher N, P, Zn and Fe content in leaves. However, the leaf K concentration was reduced with PBZ treatments and improved with ethephon treatments. The concentration of all nutrients in the leaves of treated plants was recorded highest after fruit harvest in the month of October except P and Fe, which was recorded maximum in the month of August and September, respectively under ethephon treatments. The nutrient assimilation was significantly affected in all treated plants but PBZ particularly 1000 ppm application markedly increased the overall nutrient assimilation.

Key words: **Ethephon, guava, nutrient uptake, paclobutrazol**

The plant growth, fruit yield and quality of guava is closely related with the nutrient assimilation by the plants. There are many evidences that the retardants which are natural growth inhibitors, favour accumulation of some mineral elements in fruit trees. Some work on exogenous growth retardant application and its effect on guava tree growth have been carried out but the effect on mineral uptake is still needed to be investigated. The present study aimed to trace the mineral nutrient uptake in guava trees in the condition of plant growth retarded by exogenous growth retardants such as ethephon and paclobutrazol. They directly or indirectly influence auxin metabolism and gibberellin biosynthesis in the plant systems. Atkinson (1986) reported that growth regulators produced greater modifications in the vegetative growth than in fruits, which implies demand for certain elements and additional decreases of others. It is also reported that PBZ treatment increased N, P, K, Ca, Mg, B and Zn content in the leaves of pear trees (Wang *et al*. 1985). On the other hand, the N, Ca, Mn, Zn and B contents increased under PBZ treatment while P, K, and Cu contents decreased in mango (Werner 1993). Triazols influence root growth and morphology, which can alter the mineral uptake and plant nutrition (Pequerul *et al.* 1997).

The study was conducted in Punjab Agricultural University, Ludhiana during the years 2007-08 to 2008-09 on 'Allahabad Safeda' guava plants by spraying paclobutrazol (PBZ), [(2RS,3RS)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1,2,4 triazol-1-yl) pentan-3-ol], a gibberellin-inhibitor and ethephon [(2-chloroethyl) phosphonic acid], a vegetative growth inhibitor and a ripening promoter @ 500 ppm and 1000 ppm, respectively during the month of March, the time of vegetative growth initiation during both the years. To determine the leaf status of macro (N, P and K) and micro (Zn and Fe) nutrients, five to seven month old mid shoots, thirty leaves per tree from all directions of experimental and control plants were collected from non fruiting terminals during the month of August to October, at the monthly interval during both the years. Then the leaf samples were analyzed after

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washing, rinsing with distilled water and oven drying at 65^{0}C for 48 hours. Nitrogen was analyzed with Kjeldhal's Method (A.O.A.C. 2000), phosphorus was determined with Ammonium–molybdate-vandate method (Chapman and Pratt 1961), potassium with Flame Photometer (Piper 1950) and Zn & Fe were determined with Atomic Absorption Spectrophotometer (Bradfield and Spancer 1965).

Results of leaf analysis revealed that the assimilation of N, P, Zn and Fe in guava leaves was found to be significantly higher under PBZ treatments. PBZ at 1000 ppm application resulted higher leaf N (Fig. 1) and P (Fig. 2) assimilation and lower leaf K during the month of August, September and October, respectively as compared to ethephon treated and untreated plants. Maximum foliar K was recorded in ethphon 1000 ppm treated plants (Fig.3) and PBZ 1000 ppm treated plants exhibited least foliar K in all sampled months. The Zn (Fig.4) and Fe (Fig.5) was also more in plants sprayed with PBZ 1000 ppm. The concentration of all nutrients in the leaves of treated plants was recorded highest after fruit harvest in the month of October except P and Fe, which was recorded maximum in the month of August and September, respectively under ethephon treatments.

Increased nutrient assimilation in treated plants may be due to growth retardants particularly PBZ induced attraction of elements as suggested by Atkinson and Crisp (1983) and restriction in tree canopy leading to reduction in competition for nutrient assimilation among leaves. Lower concentration of nutrients in the August samples might be due to more translocation of nutrients to the developing rainy season fruits during the summer months leading to lesser allocation in the leaves. However, after harvesting of rainy season fruits in the month of August, further improved the foliar nutrient allocation.

Rieger and Scalabrelli (1990) demonstrated in peach trees that the foliar concentrations of N, P, K and Fe decreased slightly with PBZ application. Yelenosky *et al*. (1995) also reported higher concentrations of N and Fe in the leaves of all PBZ sensitive citrus rootstocks. However, leaf content of P decreased and Fe increased

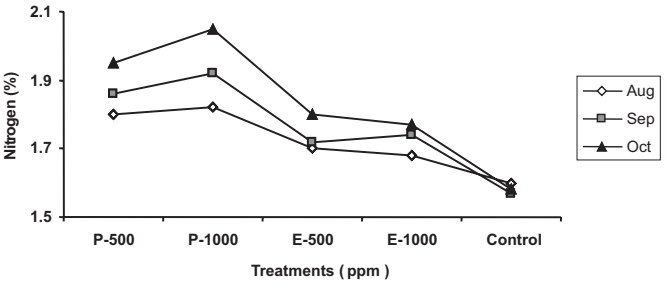

Fig. 1. Effect of paclobutrazol and ethephon on leaf nitrogen concentration of guava plants.

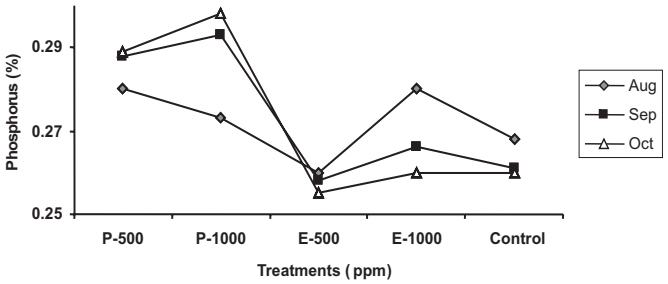

Fig. 2. Effect of paclobutrazol and ethephon on leaf phosphorus concentration of guava plants.

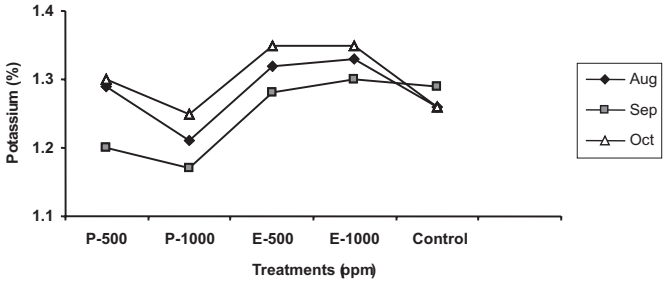

Fig. 3. Effect of paclobutrazol and ethephon on leaf potassium concentration of guava plants.

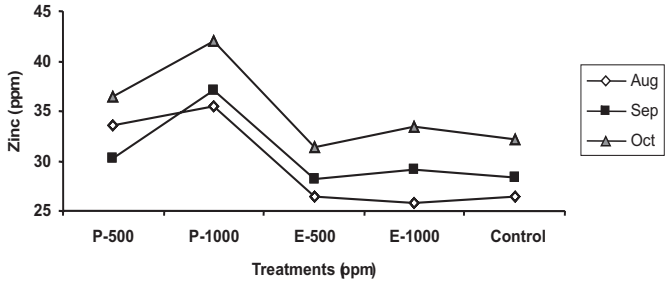

Fig. 4. Effect of paclobutrazol and ethephon on leaf zinc concentration of guava plants.

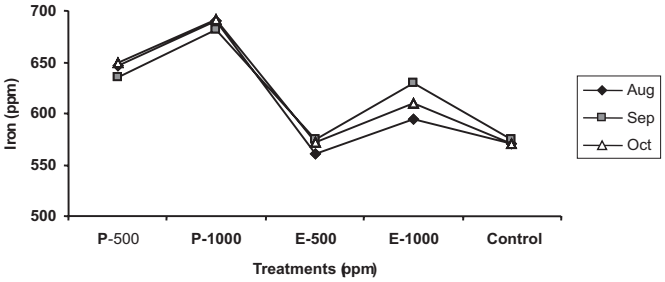

Fig. 5. Effect of paclobutrazol and ethephon on leaf iron concentration of guava plants.

in PBZ treated "Catherine" peach trees (Blanco *et al*. 2002). Similarly, Arzanil and Roostal (2004) reported that PBZ decreased leaf N whiles the P and K did not influenced in Apricot. The present finding are also in line with the Tadayon *et al*. (2003) who reported that the ethephon most likely induced chlorophyll concentration by increasing iron uptake in leaves of sour lime (*Citrus aurantifolia* Swing.).

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