

Influence of nitrogen and potassium on yield, fruit quality and mineral composition of kiwifruit

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Abstract— Fertilization is one of the main factors affecting the yield and quality of kiwifruit (*Actinidia deliciosa*). Therefore, suitable cultural practices, including fertilization, should be studied in order to guarantee high production levels and the maintenance of fruit quality. On the other hand, physiological disorders during fruit storage are common, leading to important losses of marketable yield and can be strongly affected by the mineral composition of fruits. This study lasted for 3 years (2004 to 2006) and experimental data was obtained from a fertilizer trial arranged into completely randomized blocks, with three replications, installed in an orchard located in the Portuguese Region of Bairrada (central Portugal). This experiment was established in order to evaluate the influence of nitrogen and potassium fertilization on the yield and fruit quality of kiwifruit cv. Hayward. Three levels of nitrogen (30, 60 and 90 kg ha⁻¹ N) and four levels of potassium (0, 45, 90 and 135 kg ha⁻¹ K₂O) were used, arranged into 12 experimental treatments. Since 2004, nitrogen and potassium were applied annually. The total yield of each plot was evaluated and fruits were graded into six categories according to the weight and deformations: fruits < 65g, [65 -75g], [75 -85g], [85 -105g], ≥105g and deformed fruits. After harvest, fruits were stored in normal atmosphere at 0°C and 90-95% hygrometry conditions. After 50 days of storage, one sample of each experimental treatment consisting of 10 fruits from [85-105g] size was taken to assess some quality parameters namely, firmness of the pulp, titratable acidity, and soluble solids content, at harvest. Other

sample of 16 fruits of each marketable fruit size ([65-75g], [75-85g], [85-105g] and ≥105 g) was taken from each plot and analysed for its mineral composition (N, P, K, Ca, Mg, S, Na, Fe, Mn, Zn, Cu, and B). The present paper reports experimental results of a study with the main propose of establishing the effect of nitrogen and potassium fertilization on yield, fruit quality and fruit mineral composition of *Actinidia deliciosa* 'Hayward' at 50 days after storage, corresponding to the experimental period 2004 to 2006. Results showed a significant mean effect of interaction NxK fertilization on fruit yield. The annual mean application of 60 kg ha⁻¹ N, with the highest rate of potassium, 135 kg ha⁻¹ K₂O, led to the highest level of marketable fruit yield (19.1 tonnes ha⁻¹). The acidity and soluble solids contents of fruits were not affected by nitrogen and potassium content supply. However, both nutrients decreased the flesh firmness. The interaction NxK fertilization influenced fruit calcium concentration. The lowest level of calcium was observed with 90 kg ha⁻¹ N associated with 90 kg ha⁻¹ or 135 kg ha⁻¹ K₂O. Both N/Ca and K/Ca ratios increased with nitrogen and potassium supply.

Keywords - *Actinidia deliciosa*, fruit mineral composition fruit quality, nitrogen, potassium, yield.

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