An evaluation of the rationale for fertiliser management of tropical fruit crops

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Abstract

Sustainable fertiliser management involves maximising production, preventing on-site soil degradation and minimising off-site movement of nutrients. In the past, fertiliser management has been driven by the need to maximise production. Fertiliser costs are generally less than 10% of the variable production costs in horticultural enterprises and this has often led to excessive application of nutrients.

Fertiliser experiments have not generally provided calibrated soil or leaf test data because of their short-term nature, the biennial or variable production of many tree crops, their narrow focus and the difficulty in demonstrating yield responses because tree crops have relatively low rates of nutrient removal over long periods of time. Nutrient balance is a basically sound approach to developing fertiliser recommendations and can be easily estimated from crop nutrient removal data. This approach has been used successfully for crops such as low-chill stonefruit (Huett and Stewart 1999) and a simplified approach is presented for passionfruit, mango and avocado based on nutrient uptake by well-managed, mature, productive orchards.

Macronutrient removal by a 20 t/ha passionfruit crop was (kg/ha) 55 nitrogen (N), 78 potassium (K), 6 phosphorus (P), 6 sulfur (S), 5 calcium (Ca) and 4 magnesium (Mg). For a 10 t/ha mango crop it was (kg/ha) 11 N, 15 K, 2 P, 1 S, 2 Ca and 2 Mg. For a 10 t/ha avocado crop it was (kg/ha) 41 N, 61 K, 8 P, 4 S, 7 Ca and 8 Mg. Passionfruit, in contrast to tree crops, is generally a 3-year crop and nutrient uptake by developing leaf, vines and roots will inflate nutrient uptake by a factor of 2–3. Nutrient losses due to leaching, runoff and fixation will further inflate fertiliser requirements. However, the inclusion of these additional factors still means that nutrient application rates will be substantially less than current fertiliser recommendations.

Keywords: passionfruit, avocado, mango, nutrient removed.

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