Guidance for Fertcare Accredited Advisors making phosphorus recommendations for Citrus industries in the Fertiliser Action Plan Policy area.

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1. The Policy Area will be defined in guidance issued by the Office of the Environmental Protection Authority.
2. Fertiliser recommendations should be made on the basis of annual leaf tests in conjunction with a good understanding of the orchards fertiliser history and general orchard condition. See Table 1.
3. Leaf samples are to be collected in mid February to mid March when leaves that emerged in the last spring flush (August to October) are 4 to 7 months old. Sample leaves from the middle of non fruiting spring flushes, avoiding those that have not gone on to produce further leaf flushes. All sides of the tree or hedge row should be sampled, sampling only healthy trees of the same age and variety. Collect a bulk sample of at least 120 leaves per block; sampling 30 to 40 trees in a systematic pattern (for example, by following two diagonals in an "X" pattern across the block). Samples should be taken at the same time each year.
4. Leaf samples should be analysed by a laboratory certified for leaf nutrient analysis by the Australasian Soil and Plant analysis Council (ASPAC). A list of laboratories can be found at http://www.aspacaustralasia.com/index.php?option=com_labproficiency&Itemid=126&analyte=59.
5. Regular (annual or every 2 years) soil tests are recommended to monitor pH and EC levels in the soil.
6. Phosphorus should not be recommended for application to soils with a pH below 5.5 as measured in calcium chloride without an accompanying recommendation for lime or other soil amendments to raise pH. Application of P to soils with a pH level expected to induce aluminium toxicity (<4.5) should be discouraged but may be recommended at the advisers discretion. Recommending additional phosphorus to overcome response limitations due to acidity should be avoided.
7. It is recognised that correct irrigation design and management is important to maximise efficiency of irrigation and to minimise P leaching due to over watering. Growers should follow industry best practice for irrigation management.
8. Phosphorus recommendations will be made in the context of the site specific requirements for other plant nutrients.

Recommendations

The below leaf test interpretation and phosphorus removal guides are for navel and Valencia oranges. Other varieties may have different nutritional requirements.

The analyses for each season should be compared and considered in relation to previous fertiliser applications, fruit yield and quality, as well as deficiency symptoms, general tree health and vigour. Nutrient levels vary slightly from season to season depending on crop size and environmental effects, so the clearest picture will come from examining trends over several seasons.

Table 1: Leaf test interpretation guide (as a percentage of leaf dry matter)

Leaf test level (% P)*	Recommended fertiliser action
Deficient <0.1	Levels in the deficient range can result in marked reduction in yield, deficiency symptoms, or both. P may need to be applied at high rates (> 100 kg P/ha),depending on soil type, to correct deficiency
Low (0.1 - 0.13)	The phosphorus level is too low. Low phosphorus can increase the risk of thick coarse rinds and low acid levels. For maximum fruit quality, size and good yields it is advisable to raise the leaf level into the range of 0.14 - 0.16% phosphorus. Extra P will need to be applied above that needed for crop removal depending on soil types.
Satisfactory (0.14 - 0.16)	The phosphorus level is satisfactory however application may be needed to maintain this adequate level. Continue replacing at least removal rates of P (see Table 2) and modify application rates according to tissue analysis trends.
High (0.17 - 0.3)	The phosphorus level is high which means that further application is not likely to be needed. Application of phosphorus needs to be minimised to avoid the level becoming excess which is detrimental to fruit production. Tissue analysis is the best guide as to when phosphorus is next needed. High levels of phosphorus can reduce zinc levels.
Excess (> 0.3)	The level is excess and because of this nutrient imbalances can occur. Leave off phosphorus application to avoid magnifying these imbalances, and adversely affecting tree health and production. Later tissue analysis will tell you when phosphorus will next be required.

* The right balance of nitrogen to phosphorus is important for good fruit quality. Aim for a N:P ration of 15-20:1 for oranges.

Source: Adapted from Citrus Nutrition, NSW Department of Primary Industry 2002 Agfact H2.3.11

Table 2: Phosphorus removal kg/ha from fruit and leaves

Yield T/ha	20	30	40	50	60	70
P removed kg/ha	7	9	10	12	13	15

Source: Steven Falivene, NSW Department of Primary Industries. Based on information provided by M.Treeby and R. Storey, CSIRO 2005