

Root to fruit – why isn't it growing?

There's a tendency when you notice plant not thriving to fertilise. It's better to compost – and better yet, **check the pH**.

Soil pH is a measure of the concentration of hydrogen ions – whether soil is acidic or alkaline.

If the pH is **incorrect**, plants can't take up the right minerals such as calcium, magnesium, boron, nitrogen. pH will either lock or unlock the minerals in the soil. You might have noticed stunted growth, leaf colouration, tip burn, rot in the core or at base of fruit.

Get a test kit for pH from hardware or garden centres. You want the 7 range. pH is measured on a logarithmic scale so the difference between 6 and 7 on the scale is in fact 10x acidity, and the difference between 7 and 5 is 100x acidity. A neutral pH will unlock those minerals required for growth, flowering & fruit set.

Acid soil: 1-6 on the scale. Acid soils between 6-4 are deficient in calcium, magnesium, phosphorous, potassium. Below 4 have toxic levels of aluminium & manganese.

Lime and dolomite increase the pH. Both lime & Dolomite have calcium. Dolomite has magnesium. Use garden lime – never “builder's lime”. Pindan is acidic. Blueberries & Pineapples like acidic conditions. Thus, right plant for the soil type.

Alkaline soil: 8-14. Above 8 deficient in iron, manganese, copper, zinc, boron. Sulphur reduces the pH and brings it back towards neutral. Lavender likes alkaline soil.

Neutral: Gypsum adds **calcium** without changing pH

Various indicators of incorrect pH: Stunted growth, failure to thrive, leaf or leaf vein colour, failure to set fruit, malformed fruit, tip burn on leafy greens, rotten cores.

What to do:

Test soil pH (in all different parts of your garden and pots!)

Correct soil pH

Maintain optimum balance

Add additional trace elements for fruit & vege.

Plants can tell you what's wrong:

Nitrogen deficiency: Spindly yellow plants or yellow leaves, sometimes with pink tints.

Potassium deficiency: Yellow or purple leaf-tints with browning at the leaf edge and poor flowering or fruiting

Phosphorus deficiency: slow growth and dull yellow foliage.

Magnesium deficiency: Yellowing between the leaf veins. Common in tomatoes and citrus.

Manganese and iron deficiencies: Yellowing between the leaf veins with browning of leaf edges on acid-loving plants.

Boron deficiency: Stunted growth, tip dieback on lettuce, brown cracks in celery.

Calcium deficiency: rotten centres of Kale or Chinese cabbage, limp celery, rotten base of tomato fruit (also caused by irregular watering)

Never put lime and nitrogen fert on together as it creates ammonia.

Seaweed also contains boron. Beetroot, kale, broccoli, pawpaw love boron.

Phosphorus is in chook poo. Moderately in cow poo and little in horse.

Beware using ammonium as the nitrogen source – reduces calcium absorption, manganese & potassium, but increases uptake of phosphorous & nitrogen.

If pH is fine look for other soil problems – perhaps there's chemical, paint, cement, fuel dumped below your plants. Water repellent (hydrophobic soils), other tree roots will stealing your vegie crops'

nutrients and water. Or **Allelopathic** plants like Eucalypts, Artemisia, peas or millet send out chemicals that inhibit growth of nearby plants.

Popular plant needs:

Citrus: greedy feeders & thirsty. Alternate type of feeding in different months. A young tree needs 4 to 8kg of well-rotted manure. A mature tree needs 20-40kg per annum. Feed in March, July & November. Use lime and trace elements in April, September. Keep all mulch and manure well clear of trunk. Don't let grass grow under. Water a lot. On citrus Magnesium deficiency is a yellow edge and green centre on older leaves - correct by using Epsom salts (magnesium sulfate) dissolved in water - 2 teaspoons of Epsom salts per litre of water. For a quicker result, an Epsom salts solution as a foliar spray.

Passionfruit: needs plenty of well-rotted manure, compost every 2 months during dry season & additional trace elements along the whole root line to encourage fruit set. Needs lots of water. Use paintbrush to transfer pollen between flowers to assist pollination. Fruits on new wood so you must prune every year at end of Dry – laterals back to 2 buds. Replace plant in 5 years. Flowers falling off indicates lack of trace elements /lack of pollination.

Pumpkins & melons: female flowers have bulb at base of stem. Pick off male flower and pollinate female flowers. Tip prune laterals to encourage female flowers.

Corn: prefers hot weather. Heavy feeder, thirsty. Plant in close block to assist pollination from neighbouring silks.

Bananas: hungry & thirsty. Monitor carefully grey water's effect on soil and if pH has changed or trace elements lacking. Needs potassium. Loves 1kg chook poo per square metre in August.

The influence of heat & day length:

Plants respond to day length, night length, spikes in temperature, the mean daily temperature, the drop-in night temperature, and how hot it is overall. You might notice your crop becomes bitter or bolts after sustained low or high temperatures.

When it's too hot or the light is too intense plants stop photosynthesizing – that means they stop growing.

Hot overnight temperatures mean that plants **respire** constantly - that means they're using up carbohydrates instead of putting them into growth/fruit.

25 degrees is optimum for majority of western-style veg melons love 35...

In our area, shade from the intense light and UV is needed for many crops. The southern or English method of facing crops north with wide rows and space to access light is not needed here. (Also, beware books/websites written for English conditions & information)

High humidity causes heat stress even if your plants are watered adequately. Watering too late in morning/afternoon increases humidity to the detriment of most vegetables.

The plant's stomata are wide open but if air is saturated the water won't evaporate from the leaves and *plants can't cool down or take up nutrients*.

Temperature also influences fruit set or seed germination....

Tomato seeds germinate between 15-35 degrees. Pollination or fruit set fails above 30 degrees/below 20. Optimum is 18-24.

Capsicum germinates when soil temp is above 20. And above 30 to ripen fruit.

Generic name of Asian greens - Chinese cabbage wong/wom bok, tatsoi, pak choi, tsoi lum ... don't assume it means veg that loves heat

& humidity! Chinese cabbage family prefers 16 to 18 degrees, with the maximum being 25 and the minimum 7.

Chinese Cabbage – from sowing seed it takes 8 to 10 weeks to mature. Optimum temperature for growth in the first 40 days is 18-20 degrees, then for Heading is lower 10-13 degrees. Productivity of Chinese cabbage decreases when grown above 25 degrees & leaves become bitter and rot increases. Interestingly, calcium concentration of inner leaves (thus a good crisp cabbage head) increases when humidity is raised at night, by spraying heads with water.

This doesn't mean you can't grow these vegies in Broome but be prepared for a shorter season and less yield. Increase your chances by planting heat tolerant cultivars of vegies and understand seasonal mean temperatures.

Choosing varieties best suited to climatic conditions helps success – e.g: planting open lettuce not heartening lettuce (needs colder night temps), or **not** planting a fruit tree that requires a Chill Factor to stimulate blossom or fruit – chill factor is duration of cold overnight temperatures. Citrus has no chill factor. Pomegranate, grape or fig need a minimum of 100 hours of 7 degrees overnight for good crop.

Other common problems:

Bacterial wilt: a tropical soil bacteria. Plant wilts even though watered, crack open stem to find browning. Leave fallow & practise crop rotation, don't put affected plants in the compost.

Pruning: Correct pruning at the correct time. E.g mulberries fruit on new wood, as do passionfruit.

Pests: Fruit piercing moth. Fruit fly.