

Choosing plants

with Liz Hanson

Choosing the right plants to grow at the right time is the key to success.

- Step 1.** Educate yourself about growing – via books, internet, joining local groups. Build up your local knowledge.
- Step 2:** Know you live in the subtropics (much of the information you will read is about temperate climates). We have a hot and cool time – we can grow European plants in winter and Asian plants in summer. We also have a wet and dry season. So know your climate.

There are three key points in choosing plants for a successful harvest.

- 1. Soil** – get it healthy.
- 2. Origin** – learn where you plant is from.
- 3. Timing** – the plants origins will determine the right time to plant.

Then your plants will grow healthy and strong and they will not be stressed (stressed plants attract pests). And they will deliver a good crop.

Growing, pest management and harvesting

with Liz Hanson

Growing your plants

Five key points to get plants to grow fast and healthy:

The 3 Ms: **Minerals, Mulches, Manure**

And the 2 Ws: **Watering, weeding**

Minerals and manure are the building blocks for the plants.

I make liquid manures out of comfrey and kelp. And I use animal manures. Remember healthy animals produce healthy manures – so use get the best you can get; organic chicken and cattle manures, if possible.

You need a heavy layer of mulch on top of the soil, as the sun is hot and desiccating here in the subtropics. I combine manures with my mulch, and this creates healthy soil life – mulches help create living ecosystems in the soil.

Watering

With increased sunlight, you'll need more water for healthy plants. Timing for watering is best when the sun is gone; I prefer the mornings, it keeps water off the plants overnight and reduces fungi problem. You can use automatic watering systems, sprinklers, or hand held hoses – ensure your watering is Waterwise as possible.

After watering check whether plants are getting enough water – dig in under mulch and check soil is wet.

Weeds are plants out of place – they compete with your plants and steal nutrients. Nature will fill spaces, and mulches, as well as keeping soil cool and moist, will help keep weeds down in your garden.

If you are weeding too much – you have a garden design fault. Think of other ways to keep weeds at bay – perhaps use living pathways.

Once removed, weeds are a resource. You can put them compost, back as mulch, or in liquid fertilisers.

Pest management

Pests are attracted to stressed plants – so first ensure plants are happy, by increasing water and food.

Micro pests include cabbage moths, 20 spot lady beetles – if I have healthy plants, I don't worry about these.

For macro pests (e.g. parrots, bandicoots, scrub turkeys, kangaroos, fruit bats, fruit fly), exclusion is the key – use fencing or nets, bag your bananas.

Invite select wildlife in, and provide habitat for them. Nectar-eating birds also eat insects, as do frogs and lizards. So provide habitat for them: flowering native plants, ponds, birdbaths, leaf litter, and decaying logs.

Diversity in your garden is key – so plant a mix of herbs, vegetables, and flowering plants.

Harvesting

The fun part! Having a food garden changes your food habits – eating seasonally, means we cut transportation costs, green house gasses and reduces our need for supermarket foods.

Become one of the real healthy food people – see your garden as the new supermarket! Nothing is more satisfying than harvesting food from your garden and eating it.

Continuous planting will ensure continuous harvesting i.e. don't plant all your lettuces at once. You can also continually pick from outside of many veggies, e.g. celery, lettuce, broccoli. Cucumbers, tomatoes, eggplants, will fruit all season.

If you eat it – try and grow it. Make that your challenge! Start small, succeed, then expand.

So remember your 3 Ms and 2 Ws – and pest management will look after itself – and in the end you'll have a bumper crop for the table.

Planting seedlings

with Anne Gibson

Caring for seedlings is a bit like bringing a new baby home! Choose the right location by giving them their own personal space in their new home - the garden bed or pot. Then you have to meet their daily needs including enough food and water so they can grow up to be healthy. Follow these tips to sow and care for new 'plant babies.'

Timing

Seedling Variety – select a variety that suits the time of year you are planting. e.g. tropical vegetables in summer.

Season – Plan to plant early in the season so you can harvest while the weather conditions are still suitable.

Moon planting – consider using a Moon Calendar for healthier plants that produce higher yields by benefitting from nature's rhythms during the month. There are optimal days that are better for planting different crops.

Best times to plant – early morning/late afternoon/cloudy conditions, especially in hot climates allows plants time to recover from being transplanted, and even better after rain. Avoid planting in the heat of the day.

Right Location – most vegetables and herbs require 5-6 hours of full sun/day. Some can tolerate semi-shade.

Maturity – if raising your own seedlings, only transplant when they have developed their first true leaves (2 larger leaves) and have been hardened off for 10 days (been exposed from the nursery to external conditions like the sun, wind, light frost) to help them adjust to the big wide world and microclimate they will be moving to soon.

Transplanting Tips

- Only plant out seedlings when you are able to provide regular watering and care to help them grow.
- Seedlings are plant 'babies' and need to be handled with care. They can experience stress or transplant shock when uprooted from one environment (punnet or pot) and moved to another location (planting hole).
- To prevent this, prior to planting soak the roots in a weak seaweed solution (10mls seaweed:1L water) and if possible, a few drops of Rescue Remedy an hour before transplanting. This also helps the seedling mix stick to the roots. Any leftover solution can be used to water in the seedlings after planting. Alternatively, dip the roots in the solution or at least spray them with seaweed solution before planting out.
- When handling, hold the seedling by the leaves not the roots or stem as these are both easily damaged.
- Use a Planting System
- Seedlings are plant 'babies' that need a suitable environment (garden 'bed') to thrive and grow in. They have four basic needs – sun, air, water and nutrients.
- Save time: keep all your materials together in a well-organised place – a flexible plastic carrying bucket is ideal.
- Make the most of your garden space. Check the distance apart each plant needs before planting to avoid gaps and minimise weeds. Check the mature height of a plant too – small herbs can be dwarfed and miss out on vital sunlight if planted too close to tall bushy plants like tomatoes that take up a lot of 'personal space!'
- Research varieties that suit your tastes and climate – excellent resources include: 'Easy Organic Gardening' – Lyn Bagnall; The Diggers Club: 'Australian Fruit & Vegetable Garden' - Clive Blazey; 'Organic Gardening in Australia' – Pauline Pears and 'Organic Vegetable Gardening' - Annette McFarlane.

Planting seedlings continued 1.

Tips to prevent Pest and Disease

- Plant small numbers of the same species together in blocks rather than rows.
- Interplant diverse plant varieties that have different shaped leaves, mature heights and fragrance.
- Include a wide variety of herbs and flowers (especially blue and white) in your vegetable garden.

Making the 'Bed'

You will need to prepare a 'bed' for your seedling or plant 'baby' that will give it the best chance of success. Provide a 'mattress' of compost and worm castings, a 'security blanket' of water crystals and kelp, 'tuck in' with a blanket of worm castings, give it a 'feed,' pull up a 'doona' of mulch and finally a 'drink' of seaweed!

- Use a spacing tool to measure out the correct distance between plants and maintain a straight line. Use a popsicle stick to mark the position of your plants.
- Open mulch in the location where you are going to plant the seedling and water well, allowing it to drain away.
- Make the 'bed.' Add a large handful of compost as the 'mattress.' Make a 'well' in the centre for the seedling a bit larger than the pot or punnet cell and then line it with a small handful of worm castings.
- Lightly squeeze the sides of the pot (or push up on the bottom of a punnet cell). Turn the pot on its side, gently pick the seedling up by the leaves rather than damaging the tender stem and slowly remove the plant by tapping the base while supporting it with the palm of your hand. [Note: If potting mix falls apart completely and is not held together by the roots, the seedling has not made sufficient root growth for planting out.]
- Gently lower into the hole until the seedling is just below the soil level.
- Make sure it is deep enough to cover the first true set of leaves (these are part of the seed) so the additional roots that have the potential to form from the stem will be covered but the second set of leaves will be above ground.
- Take out an insurance policy for your seedling! Add about a tablespoon of 'Jelly Babies' (water crystals or coco-peat soaked in seaweed solution) as a security blanket to the space around the rootball in the hole not under the seedling. 'Tuck in' with more worm castings. Make sure the soil comes in contact with the roots to allow the plant to drink (water), feed (nutrients) and breathe (air). Press down firmly but gently so roots are not damaged.
- Sprinkle about a dessertspoon of fertiliser (Nutri-Store Gold/McLeod's Soil Conditioner) around the plant stem.
- Water in gently with diluted NatraKelp seaweed solution around the base of the seedling (not foliage) to settle the soil and remove excess air spaces.
- Provide protection – if the seedling is not planted in a raised garden bed, it may be vulnerable to slugs and snails. Add crushed eggshells around the base of the seedling to make it an uncomfortable, 'no-go zone' for pests or push down a clear plastic 'cot' or shield made from a recycled drink bottle about 1cm deep into the soil to provide protection from birds, wind and frost for the first week until established.
- Pull up a 'doona' of mulch around the seedling to help maintain soil temperature and moisture. Leave about 2-3cm airspace around the stem so the plant can 'breathe.'
- Add your plant label with the date, variety, seedling source and spacing distance then watch it grow!

Planting seedlings continued 2.

After Planting

- **Watering:** For the first two weeks after transplanting, unless there has been rain, water the seedlings lightly every day with a sprinkler or watering can to ensure the soil is just moist – not too wet or dry.
- Always water in the morning so the sun activates the water generating the food the plant will draw on during the day. Like us, plants need a good breakfast too!
- If not sure whether to water, use your finger to check the soil moisture – it should not feel dry or too soggy, just damp. After two weeks the seedlings will generally only need to be watered two or three times a week. Do not let them dry out.
- In hot weather, seedlings may benefit from the protection of a shade cloth cover until they are well established.

- **Feeding:** Keep a record on your calendar or diary when you feed your plants. A plant takes up to 2 weeks to use up all the nutrients from the food (fertiliser) before it needs more. If the leaves start to turn yellow, it may be crying out for food!
- Reapply liquid seaweed (NatraKelp) every fortnight. Plant food doesn't have to be purchased commercially. Plants respond well to being fed just like we do! They will have more energy for growth. Seedlings benefit from other organic fertilisers e.g. a drink of diluted 'worm juice' or liquid from a worm farm or 'compost tea' (mix a handful of compost or manure in a bucket of water and stir well until diluted).

- **Keep Planting:** Leave some space for succession planting. Continue to sow new seedlings little and often so you have a continuous supply.

Propagation and raising seedlings

with Rosina Buckman

For me, there is no greater fun in the garden than planting seeds and haunting the shade house every day to see if they have sprouted. The joy when they make their appearance makes me feel like a magician! Especially if those seeds have been saved from the previous season in my garden.

Why YOU should do this:

1. It's the start of any successful vegetable garden, when you can grow exactly the food you want to eat.
2. Beware, seed-raising can become addictive!
3. My handbag is often a receptacle of little tissue wrapped parcels...
4. It is creative and fun. Get the littlies involved. They love it!!!

What you will need and where you can get them & how to do it

1. Seeds. Buy, beg or grow them.
2. Seed-raising mix; half fine sieved potting mix & washed river sand.
3. Yogurt containers work well with holes made for drainage, used milk cartons, ditto drainage holes, small plastic pots.
4. Seeds come with their own nutrients for sprouting so leave the plant foods for the next stage when they are pricked out.
5. Three quarter fill your container with damp seed raising mix sprinkle on seeds and cover to desired depth, according to the size of the seed. (a good rule is seeds should be covered by double the thickness of the seed),
6. Gently water thoroughly.
7. Label, using an ice cream stick, (Being a serious seed- raiser I buy 500 at a time from the Cooroy drapery & Craft shop). Alternatively I have been known to cut up plastic milk bottles to make labels. You will also find a waterproof felt pen invaluable. Don't forget the date.
8. Most seeds should be up within 3 weeks. Don't be surprised if some only take a few days.
9. When the seedlings have developed a couple of leaves and are big enough to handle, prepare seedling punnets or little pots.

My recipe for stage 2 is:

- To half a bucket of best potting-mix add:
- A handful each of Mc Cleods soil- conditioner, Natramin and Gypsum.
- Mix this well and fill your containers with the mix. I then place the containers in a water bath for a few minutes, to thoroughly soak them.
- Using a fine bamboo skewer I lift out the previously dampened seedlings and separate them gently.
- Make a hole in the centre of each container with the skewer and holding the seedling ONLY by the leaves, transfer them one by one until your containers are full.
- Sprinkle them with a few pellets of Organic Xtra and water gently.
- Water daily and stand back!

When plants are strong enough plant them on to their final position MULCH...

Propagating and Seed Raising continued 1.

HARD Cuttings:

- To propagate hard cuttings, gently strip the outer skin from the joint you wish to put in the soil, with a sharp cutting tool. Remove leaves below soil level. 2/3 of the cutting should be under the soil. If there are any large leaves above soil level snip off about half to save transpiration. Dip the cutting in HONEY. I always have a jar of liquid honey on my potting table for this purpose.
- Next dibble a hole in the centre of your prepared container and push the cutting well into the hole and press the soil around it to make it stand firm. Water.
- Make a tent frame with fine wire and cover the whole pot with a plastic bag. You can use a rubber band or twine to secure the plastic around the pot.
- Cut a small hole in the plastic for air circulation.
- I usually stand the pot in a shallow saucer, so that when I water the shade-house they get watered too.
- LABEL with the name & the date
- I have had good results since I adopted this method.
- Have a go. Just remember to leave the cutting alone for a week or two.
- It's amazing what you can propagate when you try.

SOFT cuttings:

- Lots of leafy green herbs and vegetables grow easily and quickly from tip cuttings.
- Some will strike in water or in sand kept damp.

HINTS & PASSED-ON WISDOM

- Observation is the key here.
- Don't let your seedlings get too lanky, prick them out as soon as you can handle them.
- I plant leafy green seeds and things that grow above the ground from NEW MOON to FULL MOON.
- Seeds for root vegetables, radish, Daikon etc do best planted after FULL MOON.
- It is important to keep your propagating pots and punnets clean.
- SO, every now and again I give my collected used pots and punnets a good soak in a mild bleach solution after I have scrubbed the soil off them.

Seedsaving

with Rosina Buckman

I practise Permaculture principles in my garden. One of the most important jobs I take care to do, is the collecting, harvesting and saving seeds from the plants I have chosen to go to seed. The seeds that we save from our gardens are already acclimatised so they will produce healthier plants for your table at no cost except a little time.

Why YOU should do this:

1. A seed is a miracle, patiently waiting to be introduced to the right growing conditions to grow into a healthy plant which in turn nourishes the lucky eater.
2. We are a rich community if we have a diverse seed bank.
3. We can easily grow the varieties we like.
4. To share seeds with neighbours.

What you will need and where you can get them:

1. Some boxes and a good dry area to let the seed heads dry off. Old cardboard boxes will do or brown paper bags, label them & hang them up with string.
2. A sieve. I use a sieve often. Mine has 3 graduated inserts, fine, medium and course.
3. I recycle my medication plastic containers & cosmetic jars for storage.
4. Waterproof marking pen to label name and time harvested on the container.
5. Somewhere cool to store the saved seeds.

How to do it:

1. Rub dried seed heads over sieve, then, collect the seeds that drop through.
2. Gently blow off any dried casing etc and transfer the cleaned seeds to a container.
3. Label & store.
4. I sometimes sprinkle seeds that are 3 years old over a vacant patch in the garden to grow a green mulch to enrich the soil.

If you wish to save seeds from tomatoes, cucumbers or any other mushy centred fruit, place the seeds in a container, cover with about 3 times more of water and let stand stirring daily to separate the seeds. Eventually the seeds will drop to the bottom as the mush begins to ferment. Pour off the mush, rinse the seeds and spread out on paper to dry before storing as above.

Old wives tales, passed on wisdom and other tips to get it right:

1. It is best to collect seed heads when the plant is dry because seeds stored when damp could go mouldy.
2. Remember to label the drying boxes or bags as I can't tell you how many times I have looked at something I had saved and have absolutely no idea what it is so it ends up with a question mark? And the date harvested is useful in future searches for planting decisions.

Soil nutrition

with Robyn Cook

When we grow our own food we often use terms such as 'sustainable', 'organic', 'biological', 'natural' etc. But what do we mean by this? For me it means nurturing the soil to the point where it is able to grow nutrient-dense plants and not just maintain fertility but improve fertility with each crop grown.

It all starts and ends in the soil. Soil is a complex creature often referred to as The Soil Foodweb. A healthy living soil will be teeming with microbes, both beneficial and pathogenic, aerobic and anaerobic, including species of bacteria, fungi, algae, nematodes, protozoa, arthropods and earthworms. It will have balanced levels of clay, silt, sand, humus and a broad spectrum of minerals.

Fortunately we don't need an agronomy degree to use soil to grow our food. What is important though is to have an appreciation that soil is indeed alive and that we must nurture the soil so the soil can nurture us.

Food plants can be grown successfully in water and air using water soluble nutrients and soils that are deficient in minerals and trace elements, however, the questions for us are; What do we lose if we don't grow food in the soil or if we grow foods in mineral-deficient soils? Does that mean our food is mineral-deficient and if our food is mineral-deficient does that mean we are mineral deficient? I believe the answer is yes.

It helps to understand a few of the terms used to describe the various elements that make up our soils and understand the basic elements the soil needs to grow nutrient-dense foods.

MICROBES

Often we'll hear of a garden that is receiving the best of everything but still not thriving, something is not quite right. You could do a soil test to see exactly what nutrients are available in the soil or the problem could be a lack of beneficial soil microbes. How can this happen? There are a number of reasons for a lack of microbes including indiscriminate use of fungicides, biocides, herbicides, nematicides or fumigated landscaping soils and high salt fertilisers.

Microbes have the most extraordinary capacity to do good in the soil. Fix nitrogen, solubilising phosphorus, growth stimulants, remediate contaminated soils, and release polysaccharides to improve soil structure. Good quantities of microbes are present in composts, worm castings, fresh animal manures, molasses and yoghurts. People often talk about making compost teas as a way of brewing up microbes.

As a concept this is okay, however it can be a hit or miss affair because there is no way of knowing what microbes we are brewing and chances are there would be a fair amount of e-coli in the mix. There are microbe products on the market and I suggest you seek them out to ensure you brew up something really good. Another lifetime is needed to fully understand the role of microbes in the soil. For us now it is just important to understand that we need them in our gardens.

COLLOIDS, CATION AND ANIONS

These are the building blocks of soil. Colloid is the term used to describe a suspension and dispersal of tiny particles in a medium. In the soil we are specifically interested in the **clay colloid** and the **humus colloid**. Both have a negative electrical charge, in fact quite a number of negative charges encircle the clay colloid while the humus colloid has both negative and positive sites. Sand has no electrical charge.

Cations are positively charged minerals and **Anions are negatively charged minerals**. So as the clay colloid is negatively charged it can hold onto cations and as the humus colloid has both negative and positive charges it can hold onto both cations and anions.

To help understand how the cations and anions are held on the colloid in the soil we can think of the I like a carpark. The negative or positive sites available on the clay or humus colloid are like the car spaces and the minerals are like the cars. If there are only small numbers of colloids in the soil then there is no-where for the cars to park and they keep driving through like minerals leach out of the soil.

CARBON

Carbon is vital in soil health. It has a number of names, comes from a variety of sources and has a wide range of benefits. It is a vital key in your soil and plant nutrition management.

Raw organic matter can come in the form of mulch like sugarcane, lucerne and woodchip, garden and kitchen waste, grass clippings, animal manures and pretty well anything that was once alive. Some mulch such as lucerne, barley or sugarcane is great to help retain soil moisture, provides some food for cellulose digesting fungi, imparts some nutrients, adds bulk and improves aeration and drainage in the soil. Kitchen scraps are good to add to compost piles but your worms or chooks will probably enjoy them more.

Humus is what comes from layering those raw organic ingredients into a pile and leaving it to decompose for a time and is beneficial to the garden by improving soil structure and water retention, releasing nutrients, feeds soil microbes and earthworms, releases vitamins, hormones, antibiotics and other soil biota. This list of benefits is just a selection so it is vital to realise the importance of humus.

OXYGEN

Oxygen is essential for root growth, water and nutrient uptake. Most beneficial soil microbes and other organisms require good levels of oxygen to thrive. Oxygen filled soil is referred to as aerobic and oxygen deprived soils are said to be anaerobic or what we often say as 'sour'. We improve soil oxygen by light tillage; lifting the clods and gently shaking (never turning thick clods over), ripping the soil, encouraging earth worms, leaving roots behind to break down in the soil when harvesting produce and composting.

WATER

This may seem obvious but since **plant tissue is made up of 80 to 90 percent of water** it has a role greater than just hydration. Water dissolves and carries nutrients and oxygen through the soil and into the plants. The amount of water a garden bed can carry and how much of that water is available to the plants depends on the soil type.

NUTRIENT INPUTS

We know we should add nutrients but how and when? Where do we find nutrients to add to the soil?

Manures contain nutrients in varying quantities. Most animal manure, particularly chicken, has good levels of Nitrogen, Phosphate and Calcium with other nutrients such as Magnesium and the trace elements also in reasonable quantities.

Rock dusts or commercial 'complete fertilizers' can be purchased. Plant or 'green' manures have nutrients comparable to the soil in which it grew and mushroom compost has generally less nutrients but good levels of organic matter. Products such as Blood and Bone also have good levels of Nitrogen and the other major minerals but read the analysis to check for trace elements.

Compost making is the ideal way to add nutrients to the soil as the resulting humus has a buffering effect on nutrients and has plenty of soil microbes to dissolve and act as a 'bridge' for the plants to access nutrients.

MINERALS

Nitrogen, Phosphorus and Potassium are primary nutrients and the ones most heard about with Calcium, Magnesium and Sulphur being secondary nutrients but no less important. Trace Elements include Boron, Chloride, Copper, Iron, Manganese, Molybdenum and Zinc. The following list is not exhaustive. **Balanced amounts of minerals are vital to the proper functioning of plants, animals and humans and these minerals are delivered to us via a healthy soil.**

Soil Nutrition continued 2.

A word about balance. Minerals have the capacity to 'lock up' in soils that have an abundance or absence of particular minerals. It is possible for plants to exhibit a magnesium deficiency in soils high in magnesium. This is often due to a lack of calcium. Refer to the Mulders's Chart to get an idea of the interaction of minerals.

I have not touched on the role of vitamins in soil and plant health. This is not due to a lack of importance but because plants are able to produce vitamins themselves in the presence of good mineral and microbial availability. Please refer to the bibliography for suggested reading and undertake your own research. You will soon appreciate just how vital these nutrients are.

Nitrogen (N)

Nitrogen (N) is found in every living cell and is vital in the healthy production of amino acids in plants. N circles Mg which forms the basis of the chlorophyll molecule which drives photosynthesis responsible for lush green leaf growth. However without other supporting minerals like sulphur, excess N can form nitrates which can increase a plant's vulnerability to insect attack and lead to a plant lacking in complex nutrition.

Deficiency Symptoms: Older leaves yellow with a characteristic V shape at the lower end of the leaf.

Phosphorus (P)

Soil: By world standards Australian soils are generally low in P. Native plants have adapted to this but exotic food crops require supplementing of this essential energy nutrient. P is most available to plants in a 6-7 pH range.

Plants: This energy mineral is used in virtually every aspect of plant growth including photosynthesis, and the formation of plant sugars and starches. Promotes vigorous early root and stem growth and flowering. Good for root vegetables.

Potassium (K)

Soil: Easily leached from sandy soils K will need the little and often approach to this soil type. Heavier soils generally have higher levels but will become deplete through successive planting unless nutrient loss is addressed.

Plants: K acts as a catalyst and is involved in regulating around 50 enzymes in a plant. Plants have a higher requirement of K during the fruit and seed fill stage. K helps plants to build disease resistance and buffer temperature extremes. Builds cellular strength and regulates the opening and closing of stomata.

Deficiency Symptoms: K is highly mobile in the plant so symptoms will first appear in older leaves. Leaves often look scorched. Fruits and seed are small with shrivelled appearance and lacking in flavour.

Calcium (Ca)

Soil: Major element responsible for opening the soil allowing necessary air and water circulation, improving structure. Feeds microbes and earth worms, helps make other nutrients available.

Plants: Often referred to as 'the trucker' of minerals for its role in mobilising other minerals. Ca promotes root, stem and leaf growth. Supports cell division and cell strength. Particularly useful in early stages of plant growth.

Deficiency Symptoms: Stunted root system, leaves and stems. Blossom-end rot in zucchini, internal blackening or browning of celery, potatoes, Brussel sprouts.

Magnesium (Mg)

Soil: Acts to bind soil particles, beneficial in sandy conditions. Generally well available in our soils however lock-up can occur in high magnesium soils or where other minerals, such as phosphorus, are in oversupply. Mg can become insoluble so plants cannot access magnesium and therefore present Mg deficiency symptoms. Gypsum is often useful in these situations or foliar feeding Mg can be helpful.

Plants: As Mg is at the centre of the chlorophyll molecule it plays a vital role in the photosynthesis process. Activates plant enzymes and encourages plant sugar and starch production.

Deficiency Symptoms: Mottled yellow or white between veins on older leaves. Pre-mature leaf drop.

Soil Nutrition continued 3.

Sulphur (S)

Soil: While elemental S is often used in lowering high pH soils it is perhaps better to balance high pH soils through building soil carbon with humus to buffer the soil alkalinity. S helps to break open high Mg soils allowing greater air and water penetration.

Plants: S is a structural element in the development of proteins, amino acids, enzymes, flavours and odours in plants. A catalyst for chlorophyll production.

Manganese (Mn)

Soil: More available in low pH soils and can be tied up in soils with high iron or phosphorus.

Plants: Strongly supports seed germination. Important for nitrogen metabolism.

Boron (B)

Soil: As an anion, Boron is easily leached from soil

Plants: Often referred to as the 'steering wheel' boron is a synergist for calcium and plays a role in regulating flowering, fruiting and cell division in plants.

Deficiency Symptoms: Hollow stems in brassicas, woodiness in strawberries, flower drop and poor seed set.

Molybdenum (Mo)

Plants: Supports nitrogen fixation and nitrate conversion into plant proteins.

Copper (Cu)

Plants: Protein nutrient and essential for chlorophyll production, sugar synthesis and root metabolism.

Zinc (Zn)

Soil: Critical for soil organisms.

Plants: An energy micro-nutrient essential for phosphorous uptake, regulates plant sugars

Bibliography and suggested reading:

Agronomy

The Biological Farmer – Gary Zimmer

Hands-on Agronomy – Neal Kinsey

Human Health

Good Health in the 21st Century – Dr Carole Hunderford

Wild Fermentation – Sandor Katz

Composting

with Sonya Wallace

Ingredients

Nitrogen – green, new to death – one pile of fine nitrogen (eg fresh, newly cut lawn clippings), one pile of coarse nitrogen (eg freshly chopped up Queensland Arrowroot stalks)

Carbon – old, dry – one pile of fine carbon (eg old sawdust out the chookhouse), one pile of coarse carbon (chopped up old dry banana leaves)

Activators – molasses (diluted), kelp (diluted), liquid worm castings (diluted to the colour of weak tea), (mix up in a couple of watering cans and have ready to go on nitrogen layers), sour milk, old compost, herbs (comfrey, yarrow, stinging nettles)

Rockdust – to increase the mineralisation of your soil

Water – have a hose ready to water in the carbon layers

The recipe

1. Start on bare, level soil
2. Add some sticks to the base to improve air flow – prunings, cuttings, small branches
3. Nitrogen coarse
4. Carbon coarse
5. Water
6. Nitrogen fine
7. Add activator
8. Carbon fine
9. Water
10. Nitrogen coarse
11. Carbon coarse
12. Water
13. Nitrogen fine
14. Add activator
15. Carbon fine
16. And so on and so on...

- Add a handful of minerals about half way through and again on the top layer of nitrogen.
- Keep mixing and matching the layers
- Alternative nitrogen with a carbon layer
- Add the activators to every second nitrogen layers
- Add water to the carbon layers to keep dust to a minimum

Tips on successful composting

- Keep going until the bin is **completely full**, do this all in one hit.
- Finish with a carbon layer – this will keep smells and flying pests to a minimum
- Leave your bin for a few days to get activated – no peeking!
- ** note; build each layer out to the sides of the compost bin (don't end up with a small pile in the middle). Make each layer about 8cm deep – except if you are using sawdust (carbon) or lawn clippings (nitrogen if new, carbon if old) then keep those layer thinner to stop them acting as a barrier to air and water.

Designing your compost area

When you are designing your garden, why not plant useful compost plants – eg herb activators like comfrey or yarrow and bulk biomass plants like Queensland Arrowroot nearby for easy top ups.

No-dig gardening

with Leonie Shanahan

Constructing a no-dig garden is the best way to create a growing medium that is full of organic material, that as it breaks down, creates the best environment for your veggies to thrive. No-dig gardening is a great way to save your back and is the perfect solution to tough or poor soils and can be created on virtually any surface, be it rocky soil or heavy clay, even over lawn and concrete.

This recipe uses more materials than others but it has been proven to produce outstanding results, so it's worth the extra effort in gathering all the materials required.

Preparation

1. Water ground preferably the night before
2. Soak newspaper in water
3. Add weeds, manures and rock minerals (Natramin) to where you are going to be setting up your garden
4. Place wet newspaper where your garden is going to be, make sure papers are overlapping. Approx 10 pages thick.

Process (once newspaper laid)

1. Inside the edging add manures
2. Sprinkle rock minerals (Natramin)
3. Lucerne (green hay) – approx 10cm thick biscuit
4. Water lightly
5. Compost 3cm
6. Grass hay mulch (approx 20cm) biscuit
7. Organic Xtra sprinkle
8. Worm castings - sprinkle
9. Water thoroughly
10. Compost
11. Lucerne loose layer
12. Minerals, - *NTS Nutri store gold, sprinkle
13. Compost
14. Organic Xtra pellet – sprinkle
15. Hay mulch loose layer 4cm
16. Water in well, 1 tsp *NTS SeaChange to 9 litres water
17. Finished.

Wait for 2 weeks before planting