Far North Coast Bromeliad Study Group N.S.W.

Study Group meets the third Thursday of each month

Next meeting May 19th 2016 at 11 a.m.

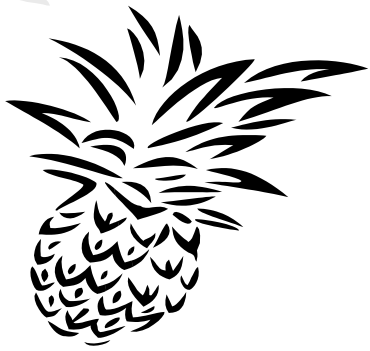
Venue: PineGrove Bromeliad Nursery

114 Pine Street Wardell 2477

Phone (02) 6683 4188

Discussion: April 2016

General Discussion



Editorial Team:
Kay Daniels
Trish Kelly
Ross Little
Helen Clewett

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Meeting 17th March 2016

The meeting was opened at approximately 11.00 am
The 17 members and one visitor present were welcomed.
A total of seven apologies were received.

General Business

The treasurer's report was tabled and showed that last month's raffle raised $80 and $107 was spent on the newsletter. Finances are going well thanks in part to auctions last year and the raising of the monthly attendance fee, this including the raffle covers our monthly expenses.

There is to be an Easter fun day at Coraki on Saturday 19th March which Ross will be attending and selling plants as part of the markets being held.

Show, Tell and Ask!

Ross showed a *Alcantarea* 'Silver Plum' flower head that he had been given but felt it had been cut off too early for viable seed. You should wait until the pods ripen and start to open naturally. Some did look mature enough therefore Trish is going to try sowing some following her great success with seed from Gloria. She sows her seed on a mixture of peat and vermiculite in a broad shallow pot 100mm deep x 300mm wide. This pot is placed into a larger container which has a small amount of water in it, the pot is set onto four small pots to raise it above the water level then covered with the lid of the larger container. This ensures constant humidity and no watering is required until after germination.

Trish also showed her *Vriesea ospinae* var. *gruberi* which is flowering. It had temporarily been placed in a pot without mix for potting at a later date, it also has no roots, yet it has decided to flower. This shows how tough these plants can be.

Marie showed her *Guzmania* 'Candy Corn' which she brought in to show last April. It had died back, almost rotted and had no roots. She packed it in sphagnum moss and brought it in to show us the result - a beautiful healthy plant with lots of pups.

Michelle from Casino told us about her garden where she utilizes what little shade she has as best as possible in this hot, dry area when setting plants about her gardens, many are under eucalypts. She has been growing Bromeliads for approximately seven years, Neoregelia, Hohenbergia, Canistrum and Aechmea being her favourite genera. She has very few Vriesea due to the lack of shade. Trish mentioned that her Vriecanterea has been acclimatised and is doing very well in full sun where she lives, albeit much closer to the coast, but worth a try.

Ross showed *Aechmea azurea* with flower petals - blue - which is correct. Many plants circulating in the 1990s had white petals which caused some confusion, however according to Luther - white is still accepted for this species.

Trish showed a variegated form of *Aechmea* 'Sangria' that she noticed in Ross' greenhouse with an albino pup. We will follow the progress of this plant to see if it has any more pups the same and perhaps pot this 'albino' off at some stage to see what happens. Often these 'albino' pups gain their true colour as they grow and mature into a variegated plant and flower quite normally.

We talked about watering our Bromeliads and having your water tested as pH is important, it is also important to see which other minerals are present. Some discussion was had in regards to the pH level of our town water supply, also the issue of copper pipes around our homes not being a problem to our Bromeliads. Several water sources at PineGrove were also tested for pH with varied results. A lot of water problems could simply be over-watering and not enough air circulation. As an experiment take 3 bromeliads that are the same. put one in the shade house, one in the garden and one 'throwaway' that gets no attention and see what difference your watering makes. The results can be amazing.

Ian suggested a working group to test various fertilisers. This group, like our Study Group, would be about sharing information. We don't want superficial information but details about, how, what and when you fertilise:
Do you foliar feed.
Do you use slow release fertilizer in your potting mix.
Do you use both fertilizing regimens.
Set up your own experiments and then report back to the group. Bring plants along to show different growth rates. You also need to be specific about such things as light and potting mix. We need more detail in the growers comments so that we can learn from each other.

Les commented that fertilisers use a lot of growth hormones. He told how he had a bonsai plant whose roots were dead. He scraped them away until he had some living tissue and applied a growth hormone to this area and was able to get roots to re-establish. Les then spoke on plants and pH and how this affects nutrient uptake in plants. A variety of substances were tested by members to ascertain their pH giving some varied results e.g:
PineGrove potting mix was found to have a pH of 6.0 which is ideal for the take up of plant nutrients.
A premium potting mix had a pH of 5.5.

Les has compiled some extensive notes on the topic of Plants, Minerals and pH this month beginning on page 10 of this issue.

Novice Popular Vote

1st	Ted Devine	*Aechmea* 'Little Harv'
2nd	Keryn Simpson	*Billbergia* 'Hallelujah'
2nd	Dave Boudier	*Cryptanthus warren loosei*

Open Popular Vote

1st	Kay Daniels	*Guzmania* hybrid ??
2nd	Gloria Dunbar	*Vriesea* 'Cracker Jack'
3rd	Les Higgins	*Cryptanthus* 'Ti'

Judges Choice

1st	Kay Daniels	*Guzmania* hybrid ??

Decorative

1st	Ted Devine	'Monstro Madness'

Comments from the Growers:

Kay purchased her original plant from Maclean markets 3 years ago. All her Guzmania are in the shade house and only fertilised when re-potted. There have been no pests or diseases and the plants have good air circulation.

Gloria's *Vriesea* 'Cracker Jack' which is a sport of *Vr*. 'Megan' was acquired from Dillings. It is grown under 70% shade cloth and has slow release fertiliser added in the potting mix.

Les purchased *Cryptanthus* 'Ti' from Margaret Patterson. It is a phenotype that has been modified by its environment. It is growing in a shade house with white shade cloth overlaid with green. Les uses his own fertiliser mix which varies with the season. His use of diatomaceous earth ensures he has no pests.

Ted has had his *Aechmea* 'Little Harv' for 2 years growing in his garden under deciduous trees. It has grown beautifully in these conditions with little fertiliser, just rain water and good air circulation. Ted also entered into the Decorative Section 'Monstro Madness' which consisted of mini Neos placed in the flower capsule of a Monstera - very creative!

Keryn's *Billbergia* 'Hallelujah' received as a pup had been kept it in the shade house but has now been moved out into the morning sun to improve its colour.

Dave won his Cryptanthus 6 months ago in the raffle. He feels it is in too much shade as it has lost colour so he will place it where it gets brighter light.

A Good Year for Puyas

by Doug Binns 2016

In my garden, 2015 was a good puya year. Apart from prolific flowering of a few regulars, two species which I have been growing for almost ten years finally flowered, both within a few weeks of each other. The first was *Puya chilensis*. This is a giant species which is commonly grown and flowered in temperate and Mediterranean climates, but perhaps less commonly in subtropical NSW. It is one of very few *Puya* species which have sterile (bare of flowers) ends on the inflorescence branches, presumably to provide convenient perches for the birds that do the pollinating. Of the eight plants which I originally planted, only one has survived long enough to flower. They have an unfortunate habit in my garden of growing vigorously for years, into almost mature plants, then suddenly dying. It is perhaps surprising that they grow at all in our summer-rainfall climate, since their natural distribution is winter-rainfall areas of Chile. The flowering event is worth the wait. Inflorescences are almost 4 mts tall and the relatively large (and numerous) flowers are an unusual shade of yellow-green.

The flowers overflow with nectar and honeyeaters love them (as they do most Puyas – I never tire of watching the hummingbird-like behaviour of Eastern Spinebills as they hover to sip nectar from Puya flowers) but the down side is that several honeyeaters fighting over nectar can damage the flowers. Although the plant is still alive, it remains to be seen whether it survives the flowering event in the longer term. In case it doesn't, I have planted another cohort of young plants which I can watch progressively die over the next ten years, in the hope there will be at least one more survivor to flower.

In contrast, the other species was a small species from subalpine paramos in Ecuador, at an elevation of around 3500 m. It belongs to a group of species with unusual woolly inflorescences and a very stout flower stem. The stem is so thick compared to the size of the plant that the inflorescence probably accounts for most of the plant's mass when it flowers. I expect the relatively low photosynthetic surface area of the leaves would work hard to maintain the growth of the inflorescence and there is not much storage of starch in stem or leaves as a back-up. I think flowering would be a fairly stressful activity for these plants. In my climate these small high-elevation Puyas are very much slower growing than large species like *Puya chilensis* and it doesn't help that they usually stop growing both in summer and in mid winter.

I was content to grow these for curiosity value and did not expect that they would ever flower in my climate, because the conditions are so different from what they experience in nature. However, a few months ago I first noticed a suspicious-looking slight swelling developing around the base of the rosette on several plants and a subtle change in leaf architecture. I thought it was either the beginnings of a future flowering event or a novel way for plants of this species to expire that they hadn't previously displayed (just to add to their already considerable repertoire), but when they were still alive a few weeks later, my hopes were raised. Sure enough, after many weeks of stasis, the swellings finally transformed into developing inflorescences. This happened at the time that we had some unseasonally hot weather with a couple of days in the high 30s after several weeks of equally unseasonal very mild weather. They were developing very slowly anyway and I was sure the inflorescences would show their displeasure with these dramatic changes in the weather by simply collapsing or refusing to grow any further, but I think once they had decided to flower, they were determined to see it through regardless of unfavourable weather.

Considering that the Ecuadorean bromeliad flora is relatively very well known, thanks to Jose Manzanares

and his colleagues, I found it surprisingly difficult to determine the identity of these plants from among the several similar species with compact, woolly inflorescences. I eventually decided they were *Puya compacta*, based on sepal length and other diagnostic characteristics, even though the scape bracts are narrow-triangular rather than ovate so the inflorescence doesn't closely resemble that shown by Manzanares in his book. However, I'm not certain and I'm very happy to accept alternative suggestions of identity. Although *Puya compacta* is one of the offsetting species, none of my plants have produced offsets (except a few which suffered damage to growing tips and haven't grown much at all) and I expect they are likely to die before doing so. I hope that at least some of the seeds in the developing capsules are not hybrids and that the plants last long enough for the seeds to mature.

In my opinion puyas are great garden plants, but if you in a subtropical climate you need to either choose a climatically tolerant species or just be prepared for a high mortality rate by planting more than you need. All species, but particularly those from high elevations, seem to grow better in the garden than in pots, possibly partly because of the free root run and because there is more even soil moisture and their roots stay cooler than in pots. If it is really hot and dry a little supplementary watering seems to help. Weeding can be a problem in the garden if you desire a neat weed-free garden, but if you have a 'semi-natural' garden as I do and are happy just to control the most rampant of the weed growth, judicious use of glyphosate can work well, depending on the types of weeds. Apart from the indestructable *Puya mirabilis*, which readily naturalises in the garden and is almost a weed itself (but a nice weed!) other species that I have found reliable, with low attrition rates, include *P. floccosa*, *P. aequatorialis*, *P. spathacea*, *P. venusta*, *P. boliviensis* and *P. lanata*.

Now all I need to do is wait for a few more years for *Puya raimondii* to flower!

Guzmania hybrid
1st Open and Judges Choice Kay Daniels

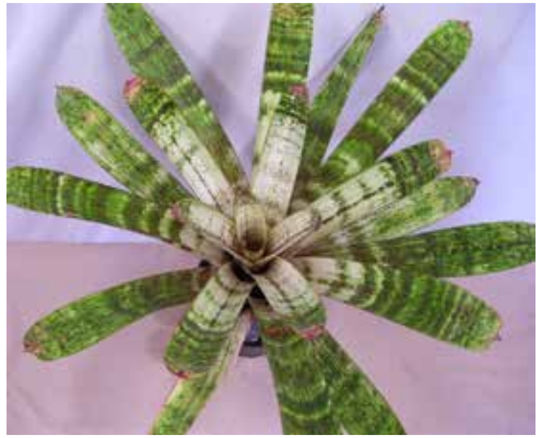
'Monstro Madness'
1st Decorative Ted Devine

Aechmea 'Little Harv'
1st Novice Ted Devine

Cryptanthus 'Ti'
grown by Les Higgins

Cryptanthus fosterianus
grown by Les Higgins

Aechmea azurea
grown by Ross Little



Vriesea 'Cracker Jack'
grown by Gloria Dunbar

A view of Michelle's garden area in Casino
which is gradually replacing the lawn

Cryptanthus warren loosei
grown by Dave Boudier

Photos by: Ross Little

It was Easter for
Laurie Mountford

Billbergia 'Hallelujah'
Keryn Simpson

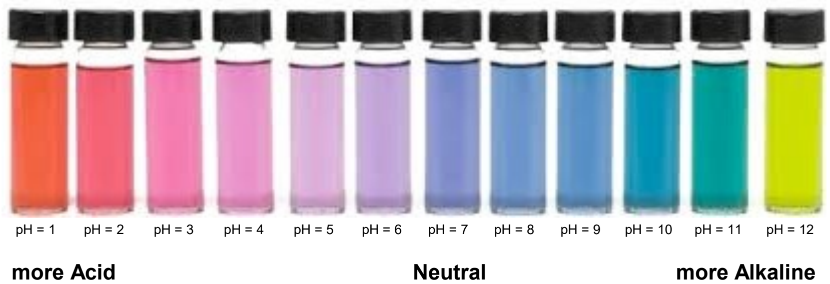
Plants, Minerals and pH

by Les Higgins 2016

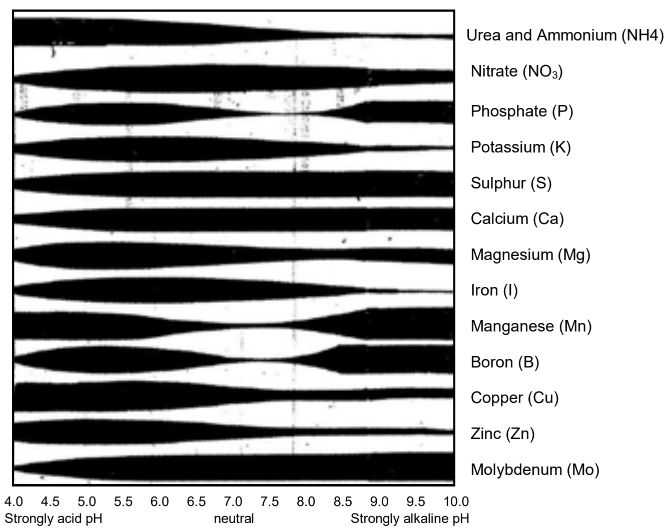
This is a basic article to be read in conjunction with Atomic Structure of Plant Nutrient that endeavours to give a scientific/technical explanation.

Rain water exits the clouds at neutral pH. As it falls through the air rain water combines with carbon dioxide to arrive on the N.S.W coastal farming village of Wardell at +5.0pH. Industrial cities and their surrounding areas experience 'Acid Rain' as a result of Sulphuric Acid contamination in the air. PineGrove Bromeliad Nursery bore water at Wardell is about pH 5. Tap water is universally considered to be pH 7 although its quality can be questionable.

Red Cabbage pH Indicator



Soil pH dominates the growth of roots and micro organisms. The Australian Standards for Potting Mix stipulates a pH between 5.3 and 6.5. This is a suitable pH range for the majority of plants. 'Acid loving' plants e.g. Boronia thrive in pH4 and there are food crops that grow best at pH8.5. Fungi predominate in low pH whereas bacteria become more prevalent at higher pH values. Liquids and solids applied to the plant can alter the pH of the potting mix.



This chart shows the degree of availability of nutrient elements at various substrate pH. The numbers are logarithmic. (pH is the –log [H+]). Each unit step is a multiple of ten.

A low pH favours the weathering of rocks and release of ions such as K^+, Mg^{2+}, Ca^{2+}, Mn^{2+}. A reduction in soil pH increases the availability of the salts of: Carbonate, Phosphate and Sulphate.
In arid regions the weathering of rocks can increase the soil pH.

Last month Gloria reminisced of German Peat (pH 4). Today's potting mix could be composed of pine bark and sawdust (pH 4.5) soaked in iron sulphate (pH 3) to make bark tannins insoluble, coir that contains sodium and all composted with humectants (heat dried human sewage). Heed the hazard warning on every bag of potting mix and remember Sulphate combined with Sodium makes the plant killer Sodium-sulphate.

We have two potting mixes to examine by using a soil pH Test Kit.

PineGrove Bromeliad Nursery Potting Mix = pH 6 is made from:
50% 11 to 20mm seasoned pine bark + 40% sieved coal ash + 10% styrene. Although it sets rather hard a very credible root system develops around the perimeter of the substrate.

Searles® Premium Potting Mix = pH 5.6 with the bag's description as:
Organic Compost, Peat and Zeolite. But what other substances does it contain?

Published formulae are not obliged to reveal all the ingredients nor their precise amount. Some manufactures understate the analysis to foil copying of their product. Two 'typical analysis' that declare a pH are:

Seasol™ - the label description is "Complete Garden Health Treatment" and "THE SEAWEED SOLUTION". This is not a plant nutrient. Seasol™ has a pH of 10.5 with a Specific Gravity 1.05. The declared nutrient quantity is extensive but the small quantity is unlikely to total pH10.5. Seasol Company explained the high pH as "undisclosed amino acids and growth stimulants". (Just for the record Powerfeed™ a combining nutrient with Seasol™ is also pH10.5)

Nutri-tech Black Gold™ - is a fusion fertilizer formulated for Biological Farming. Nutri-tech has a pH between 7 and 8 and Specific Gravity 1.32. (It's a black sludge) containing the powerful growth promotant —- triacontanol.
Non-Biological Farming with Black Gold requires at least the addition of nitrate, calcium and molasses.

The pH influences the anthocyanin pigments that give colour to bromelaids. In periods of unpolluted (pH 5) rain many Cryptanthus hybrids take on a "red" hue for example *Crypt*anthus 'Ti' becomes *Cryptanthus* 'Red Ti', a phenotype not a genotype and reverts back to *Crypt*. 'Ti'. Plants totally without anthocynanins remain green regardless of pH.

Three simple methods to determine the approximate pH of soils, potting mixes, liquids and chemicals are:

1. **Bromothymol Blue:** for testing pH of fish tank water.
2. **Paper Indicator Strips:** e.g. Merck Universalindikator pH 0 - 14.
3. **Soil pH test kit comprising:** Universal Indicator and Barium Sulphate.

Seaweed powder = pH 7
By 1980 seaweed was known to have over 40 essential or beneficial elements. As the pH is high1gram/1litre of water is the ideal maximum dilution.

Diatomaceous Earth (DE) = pH 7
This is a multiple insect killer effective for over 12 months. Incorporate into a potting mix at a minimum 150mg/Kg. Safe at a much higher dosage that seems to kill/deter earth worms.

Mollasses = pH 6
Source of soluble carbohydrate and trace elements. Use with fertilizers containing urea/ammonium to reduce carbohydrate loss in plants. Increases plant tolerance to hot and cold conditions. Helps plants with few chloroplasts (cream) to survive winter.

Mono-Calcium-Phosphate (Soft Rock Phosphate) = pH 7
A better choice than lime in a potting mix.

Citric Acid = pH 1
Plants release citric acid to facilitate Iron take-up. Use to lower pH

Vinegar = pH 2
Used to lower pH of liquids

Bi-carbonate of soda = pH 8
Used to raise the pH of liquid.

Vinegar mixed with Bi-carbonate of soda makes CO_2
Useful in bags to stimulate plants in wilt condition.

The following are some of the chemicals that are used as plant nutrients and in fertilizers:

Urea = pH 5   N 46%
Plants must take-up urea whenever available. It makes big, soft growth.
Used at temperatures below 20^0C it rots roots.
Urea added to herbicides increases efficacy.

Calcium nitrate = pH 5   Ca 24%, NO_3 17%
Ca is number three in bromeliad nutrient. (K.N.Ca.Mg.P.S).
NO_3 is the natural form of nitrogen.
Foliar spray is the best way to apply ½ teaspoon/8L

Magnesium Nitrate = pH 7   M 9.48% N 10.54%
Plants absorb more Mg as Magnesium-nitrate than as Epsom Salt = pH 5.5
Green colour often intensifies and the yellow variation may reduce.

Magnesium sulphate (Epsom salt) = pH 5   Mg 9.48%, SO_4 10.94%.
Applied singly as a foliar nutrient, ½ teaspoon/8L

Potassium Nitrate = pH 5   K 39%, NO_3 14%
A ubiquitous chemical.

Potassium Chloride = pH 5
Chloride is not essential for Bromeliads. Use it to convert Sodium in coir into Sodium-chloride hopefully allowing the Sodium to be washed away as a saline solution.

Mono Potassium phosphate = pH 4.45   K 29%, P 23%
A valuable autumn/winter nutrient. Potassium looks after health while Phosphate induces maturity.

Di-Potassium-Phosphate = pH 9.0   K 45%, P 18%
Used to make a pH specific nutrient.

Tri-Potassium-Phosphate = pH 11.0   K 55.25%, P 14.59%
Insoluble but useful to stabilize pH in "In vitro"

Potassium silica = pH 12
Stiffens the sieve tubes reducing the possible entry of insect piercing and sucking mouthparts. Must be constantly applied to be effective, (every 2 weeks?)

Iron Sulphate = pH 3   Fe 36.77%, SO_4 21.10%
Bromeliads use iron in greater amounts than most other plants. Excess use of Iron Chelates can result in Ethylenediametetracetic Acid (EDTA) within the plant migrating to calcium and manganese preventing their utilization.

Manganese Sulphate = pH 2
Lack of manganese results in an emerging white coloured leaf.
A recommended concentration is 1 atom to 1,000 nitrogen atoms

Boron = pH 9 (Borax)
This element is needed in the greatest amount of all trace elements.
A suggested concentration has a ratio of 2 Boron atoms to approximately 1,000 atoms of nitrogen however the availability of boron depends on pH. Plants that evolved on volcanic soil have higher requirements for boron than plants of sandy soil. Boron has the potential to make some self-sterile plants become self-fertile. Early experiments with Cryptanthus suggest boron stimulates flowering and offsetting. The pH chart reveals:

1. Boron at pH 9 becomes toxic.
2. Between pH 7- 8 Boron up-take is limited.
3. The best Boron absorption appears to be pH 5 to 6.

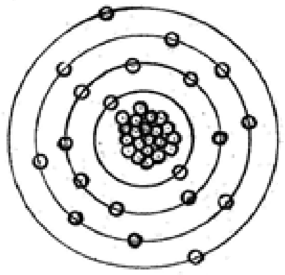
<u>Conclusion:</u> The pH range 5.0 to 7.0 is considered suitable for bromeliad growth. Good practice is to ascertain the pH before using a dilute liquid. pH determines how the plant uses minerals and other substances. pH, together with light and heat can influence the colour of many genera.

Disclaimer: pH numbers as per product tests performed on the meeting day.

Atomic Structure of Plant Nutrients

by Les Higgins 2016

One Atom of Calcium



20 proton in the Nucleus
2 Electrons shell 1
8 Electrons shell 2
8 Electrons shell 3
2 electrons shell 4

Plant nutrients are molecules formed from atoms. Neutrons and positively charged protons make up the nucleus. Negatively charged electrons orbit the nucleus at various distances in rings called a shell.

The Periodic Table of Elements lists Bromeliad nutrient atoms as:

Hydrogen (H)	1 electron circling one proton.
Carbon (C)	2 electrons in the first shell and 4 in the second.
Nitrogen (N)	2 electrons in the first shell and 5 in the second.
Oxygen (O)	2 electrons in the first shell and 6 in the second.
Magnesium (Mg)	2 electrons in first shell, 8 in the second shell and 2 in the third shell.
Phosphorus (P)	2 electrons in the first shell, 8 in the second and 5 in the third shell.
Sulphur (S)	2 electrons in the first shell, 8 in the second and 6 in the third shell.
Potassium (K)	2 electrons in the first shell, 8 in the second, 8 in the third and 1 in the fourth shell.
Calcium (Ca)	2 electrons in the first shell, 8 in the second, 8 in the third and 2 in the fourth shell.

It is the electrons in the outer shell that interact during chemical reactions. Atoms will gain, lose or share electrons to fabricate a full outer electron shell. The number of electrons that an atom can give in a chemical reaction is called the valency. Written in superscript and immediately following the symbol for a chemical element is the valency. One “+” indicates that there is one electron the atom can give away or share. Two “++” or 2+ means two electrons are available. When two or more atoms share electrons a covalent bond is formed.

Water: Two hydrogen atoms can each share their one electron with one oxygen atom that has a deficiency of two electrons in the outer shell. The result is each atom has a full outer electron shell and one molecule of water (H_2O) is formed.

Carbon dioxide: Carbon has 4 electrons in the outer shell. Carbon has a valency of 4 (either + or -) and can share 4 electrons with two Oxygen atoms (which need 2 electrons each) so that each atom has a full outer shell and one molecule of carbon dioxide (CO_2) is formed.

When a soluble salt is dissolved in water the ions separate, the solution contains cations and anions which can join up with other available ions e.g.:
Mono-calcium phosphate (Soft rock phosphate) $Ca(H_2PO_4)_2$. As the phosphate is saturated with calcium no further reaction takes place. Soft rock phosphate dissolves in water to give calcium ions (Ca++) and twice as many di-hydrogen-phosphate ions (H_2PO_4). An introduction of calcium carbonate (lime) ($CaCO_3$) forms di-calcium-phosphate ($CaHPO_4$) and carbon dioxide (CO_2) and water (H_2O). Repeating the introduction makes tri-calcium-phosphate $Ca_3(PO_4)_2$ again releasing carbon dioxide and water, resulting in insoluble “Rock phosphate”.

Rock phosphate and superphosphate: The major minerals of the “Rock phosphate” in the fertilizer industry are Hydroxylapatite $Ca_5(PO_4)_3OH$ and Fluorapatite $Ca_5(PO_4)_3F$ and Chliorapatite $Ca_5(PO_4)_3Cl$. Rock phosphate is insoluble and has stood for centuries as a Rock. Sulphuric acid is required to break the bond between calcium and phosphate to make superphosphate. To use superphosphate in the proximity of calcium (lime) allows recombination and that explains why there are thousands of tonnes of insoluble (rock) phosphate in Australian agricultural soils. To use superphosphate on a pot plant whose substrate includes lime makes insoluble rock phosphate within the pot.

Single Superphosphate obtained from the H_2SO_4 treatment of typical rock phosphate contains about:
30% Mono-calcium phosphate $CaH_4(PO_4)_2$ (Water soluble)
10% Dibasic calcium phosphate $CaHPO_4$ (Citrate soluble)
45% Gypsum ($CaSO_4$).
Also trace elements and poisons including iron oxide, silica, lead and cadmium. The term “Citrate Soluble” indicates the need for alcohol or rotting vegetation before it becomes soluble.

Double Super Phosphate: Is made by separating the gypsum ($CaSO_4$) from the single superphosphate and reacting the rest with phosphoric acid (H_3PO_4).

Phosphoric Acid: Three hydrogens can each share their one electron with one phosphate ion (PO_4---) to form phosphoric acid (H_3PO_4) and all the atoms have a full outer shell.

Phosphate: One phosphorus and four oxygens form covalent bonds to make phosphate, but they still need three more electrons to all have full outer shells. Phosphate is a polyatomic ion with a valency of -3(PO_4—-)

Calcium Nitrate: Nitrogen (N) has 5 electrons in the outer shell. Nitrogen needs to gain 3 electrons to have a full outer electron shell. Oxygen (O) has 6 electrons in the outer shell. Oxygen needs to gain 2 electrons to have a full outer electron shell. One nitrogen and three oxygens can share electrons with each other (covalent bonds) but they still need one more electron to have full outer electron shells. Nitrate is a polyatomic ion with a valency of -1(NO_3). Calcium has 2 electrons in the outer electron shell so one calcium can donate an electron to each of two nitrate ions forming the compound calcium nitrate $Ca(NO_3)_2$ and all of the atoms have a full outer electron shell. $Ca(NO_3)_2$ dissolves in water to give calcium ions (Ca++) and twice as many nitrate ions (NO_3-)

Nitrogen Atomic weight: Ammonium (NH_4) weight is N = 14+Hydrogen weight of 1 x 4 (14 + 4) = 18. .
Nitrate (NO_3) weight is N = 14 + Oxygen weight of 16 x 3 (14 + 48) = 62.
Passive transport system of plants easily adsorbs ammonium but is unable to pick-up nitrate when the barometric pressure is low.

Sulphate: One sulphur and four oxygens form covalent bonds to make sulphate but still need two more electrons for all atoms to have full outer electron shells. Sulphate is a polyatomic ion -2(SO_4--).

Potassium Sulphate: Potassium has one electron in its outer electron shell (valency of +1). Two potassiums can each donate one electron to one sulphate forming the compound K_2SO_4 and all of the atoms have a full outer shell.

Magnesium Sulphate [Epsom Salts]**:** $MgSO_4$ dissolves in water to give magnesium ions (Mg++) and equal sulphate ions (SO_4--).

Magnesium Nitrate [Home Made]**:** Molecule disassociation occurs in water containing calcium nitrate and magnesium sulphate. Calcium ions and sulphate ions combine as calcium sulphate. Each calcium sulphate molecule precipitates with two water molecules becoming the mineral gypsum ($CaSO_4$-H_2O). What remains in the solution is the magnesium ions and the nitrate ions and they combine. Evaporate the solution and magnesium nitrate Mg $(NO_3)_2$ crystals appear.

WARNING: Magnesium Nitrate crystals in contact with atmospheric moisture quickly becomes a concrete eating slop. Make Magnesium Nitrate and promptly use it!

A chemical equation is a summary of the reaction. Ions that don't take part in the reaction, intermediary steps and the solvent are usually not included.
For example, the equation to make magnesium nitrate [$Mg(NO_3)_2$] and gypsum ($CaSO_4$) from calcium nitrate and Epsom salt is written:

$Ca(NO_4)_2$ + $MgSO_4$ ---> $CaSO_4$+$Mg(NO_3)_2$

instead of:

$Ca(NO_3)_2$ plus $MgSO_4$ plus H_20 ---> Ca++& NO_3- & NO_3- & Mg++ & SO_4-- & H_20
----> $CaSO_4$+$Mg(NO_3)_2$ & H_20

Note to Readers: We understand that some readers may find these articles a bit too technical for their liking, however we find quite a number of our readers appreciate such articles and gain great value from them. We try to maintain a balance of technical and general articles to suit all levels. We do prefer original articles written by you the readers. At times we reprint articles relevant to a topic discussed at our meetings. Moral here is, if you want more gardening / general Bromeliad related articles please put pen to paper and forward to the Editors. ☺