

PLANTED AQUARIA

Owning your own planted aquarium can be one of the most rewarding hobbies - getting it right first time makes it even more rewarding though!



A Beginners Guide Straight to the point.

By Richard Cale

I felt it was about time that I wrote an Ebook that helps people who are beginning exactly what they should and should not be doing when it comes to planted aquarium.

Since the internet has appeared and now plays a huge role within most of our lives, information has never been easier to find, but the real problem stems from the fact that there is so much information out there and what do you believe?

You could visit forums and ask people for advice and as you will find out there are so many opinions but what is the best way? This Ebook will delve into the basics of what you should and should not do. I've been keeping planted aquariums for 15 years now and have been helping hobbyists professionally for 6 years so believe I am in a good position to advise.

One of the fundamental aspects of my business is that if you don't need a certain product then I won't recommend it. I want my customers to be happy, I also want them to come back and shop again and if I'm really lucky, tell their friends. Nobody likes the pushy salesman, or coming away from a shop only to have been sold something you don't really need. You will go away disappointed, slightly frustrated and you won't go back.

In this Ebook I will link to products and this will help you understand what I write. I am going to advise on what you need to get you going with your planted aquarium.

So what will we cover within the next 10 or so pages? We'll cover what you *need* to know:

- **Gravel/Substrates**
- **Water Conditioners**
- **Test Kits**
- **Filtration**
- **Lighting**
- **CO2**
- **Fertilisers**
- **Tools of the trade**
- **Plants**

And lastly if you find this Ebook useful, it would be great if you were able to write a short review on the site.

GRAVEL/SUBSTRATE

Choosing the best substrate can take a lot of stress out of setting up any planted aquarium. It does all the hard work for you and can provide a 'cushion' in cases of overdosing fertilisers.



So what are they all about? Nearly all plants need a type of gravel or substrate to grow in. It's required to anchor plants down and in some cases to provide nutrients to the roots of plants. It's also used aesthetically so when we look at our aquarium - it looks nice! Below I summarise what the difference between the two are and how they are used.

Gravel. There are hundreds of different types of gravels available to hobbyists and similarly the same with substrates but what is the difference between the two? Gravels are very much what you expect them to be. Rock particles which have a diameter of 3-25mm - if you're wanting to use it for your planted aquarium, the ideal size is 3-5mm. Any smaller than this (i.e. if you use sand) and you can get pockets of anaerobic areas where there's insufficient water flow.

Gravels come in all sorts of shapes and sizes but contain no nutrients; some need washing and some will only need rinsing depending on the instructions. Some will effect your water parameters (such as pH). On the whole I recommend you opt for natural gravels - one which hasn't been dyed in any way. Unipac does a great selection of natural gravels.

Be careful with gravels that look natural but are in fact coloured glass. Whilst they are safe for use within planted aquariums, fish which burrow or that skim along the gravel like corydoras will wear their barbels down. Natural gravels will not have that sort of effect. You can see our range of gravels [here](#).

Substrates. A substrate is very similar to a gravel but there is one fundamental difference and that is the nutrient

content. Substrates have minerals and nutrients embedded in them thereby providing plants with all the goodness they need from day one. This is the major advantage over gravels.

Substrates are produced in different colours and each will have a different effect on the water. On the whole most tend to lower the pH levels, along with KH (carbonate hardness) and GH (general hardness). This makes them ideal for using in planted aquariums as plants prefer slightly acidic water conditions where the pH is just under 7 (6.8 is perfect).

Substrates rarely require topping which means that once you place them in your aquarium, you won't need anything else on the base - typical examples of this are [Eco Complete](#), [Seachem Flourite](#) and [Naturesoil](#). Plants can be planted directly into the substrate with relative ease. The picture above demonstrates this perfectly - the dark coloured substrate (Naturesoil in this instance) has been used and plants become established quickly, grow rapidly, healthily with no algae.

As technology improves more and more manufacturers are realising the importance of substrates. The most popular type that is currently available is called [NatureSoil](#) by world famous Aquascaper Oliver Knott. If you want your plants to have the best start, this substrate comes highly recommended. Not only that but it's perfect for beginners to experts and requires no topping and sets your water parameters to the ideal levels. However if you do have a particular gravel that you want to use, opt for [Tropica Plant Substrate](#). Place this on the bottom of your aquarium and simply top with your chosen gravel.

WATERCONDITIONERS

Today there are literally hundreds of water conditioners to choose from, so the consumer is literally spoilt for choice!



Water conditioners. There are a wide range of water conditioners available today which look after your water quality. In the past the sole water conditioner was a dechlorinator which removed chlorine from tap water. Tap water is perfectly safe for use in a planted aquariums if a dechlorinator has been added.

Other water conditioners enable us to predetermine the water chemistry we so desire. Today there are liquid conditioners, filter media resins and some substrates which alter pH, absorb and bind specific chemicals. You can view our range [here](#).

In recent years major developments have been made to speed up the cycling process of an aquarium which has always been a big frustration for hobbyists. Some of you may already have working knowledge of what 'cycling' means - it takes about 6 weeks for ammonia (fish excrement) to be converted to nitrite and then the safer nitrate (cycling process). Can this cycle be sped up? It can to a certain degree using commercial products such as Nutrafin [Cycle](#) which reduces cycling down to 3-4 weeks. This type of water conditioner is always useful to have anyway, particularly after carrying out large water changes or adding new fish to your tank. Your filter can experience nitrite spikes and filter boosters can quickly get it back in shape.

In addition to liquid filter conditioners, there are various [filter media](#) that allow for safe removal of toxins such as nitrite. These tend to be more economical and quite convenient as once the media is in the filter you don't need to worry about adding more. It's worth noting though that some medias can release what they have stored which can become

problematic so the key is regular maintenance. Some medias are also renewable where others need replacing once they 'become full' - check the packet before use.

If you want total control of your water (as some do) the answer is to purchase an [RO Unit](#). RO is an abbreviation of reverse osmosis where tap water is passed through a membrane/s in order to purify and strip all minerals and impurities. The end product is pure water. However RO water is very unstable on its own and it's the 'impurities' that ironically provide stability. By adding a product such as [Seachem Replenish](#), specific minerals are added back to the water to make it more stable. RO kits can be purchased from £90 and up.

In planted aquariums, it's very important to try and work with the water which you have, i.e. that which comes out of the tap otherwise it can be an uphill battle to control your water variables. For example in hard water areas (high KH and GH), use a substrate which will set and stabilise your water parameters to the correct level. The best example of this is [Naturesoil](#) which we briefly mentioned in the Gravels/ Substrates section. In some parts of the UK, tap water has high levels of nitrate and phosphate and that is one exception where an RO Unit will be highly beneficial.

Chemicals. If you decide to use chemicals to alter your water parameters such as [Kent pH minus](#), whilst this is effective, there are many factors that can change water in a planted aquarium. I have personal experience of battling with tap water from all parts of the UK, and I never totally achieved what I wanted. Did this matter? No, but at the time I was very determined!

TESTKITS



Test kits are essential for understanding what is happening to your aquarium water. In the early days of keeping a planted aquarium you will find them invaluable.

Test Kits. If we never tested our water, how would we know exactly what is happening? Understanding water parameters is essential for planted aquariums and with hobbyists who are relatively inexperienced, they really help. It's too early to be guessing at what is happening within your tank just by looking at your plants and fish. So what should we test for and when should we test?

The main test kits that are important to planted aquariums are pH, KH, GH, PO₄ (phosphate), NO₃ (nitrate) and Fe (Iron). There are other test kits that are useful such as NO₂ (nitrite) and NH₄ (ammonia) but they are more useful at the beginning of setting up an aquarium or when adding new fish.

Which brand? There are a vast amount of brands available in today's market and there is no question of doubt that test kits vary enormously in not only accuracy but also price. It's fair to say that the cheaper the test kit, the less accurate it will be. For that reason we recommend test kits by [Precision Labs](#) - they supply dip test which means you literally dip the testing stick into your water for about 2 seconds and then remove it. They provide a very accurate result in a short period of time. If you prefer liquid tests where different solutions are used then try [Seachem](#) or [TMC](#).

So now we know which test kits are needed and which brands are best, what levels should we be aiming for? The first thing to remember about planted aquariums are that your water parameters will change all the time. Do not focus too much on pH and how much that will swing from day to

day. There is no problem with pH swings - it's perfectly normal. The target reading is 6.8 but if you struggle to achieve this, don't worry too much. KH is a test to determine the carbonate hardness of your water; aim for about 3-4 kH. This level will also help stabilise your pH. GH will vary enormously and is also linked with pH. The target level for GH is 60ppm (parts per million) but plants are OK with higher levels. PO₄ in a non CO₂ aquarium is considered undesirable so aim for 1 ppm or less. NO₃ levels should remain between 10-50ppm (preferably closer towards 10ppm in a non CO₂ aquarium). Higher levels than this are undesirable and there are a number of [filter resins](#) that can be added to soak up excesses. Fe levels should stay low - iron is a trace element so the plants only require low levels. 0.1ppm is sufficient and it's worth noting that higher levels than this can cause undesirable algae growth.

Before you begin testing your aquarium water, it's best to know what levels you are working with before hand and the most simple way of this is to test your tap water. This way you understand the 'base levels' and know what to expect. It also gives you a good idea of what your plants are consuming and what levels are increasing as you feed your fish and nitrates and phosphates are produced. But don't forget although fish produce waste, plants absorb some of these excesses too.

FILTRATION



Filtration of any aquarium is the heart of the tank. Make sure it's big enough to perform the job in hand. Bigger is better in this case as it means cleaner water and less maintenance.



Filtration. In the 15 or so years that I have been involved in keeping planted aquariums, filtration ideas have only very recently changed. The common perception was filtration must be slow, maybe twice the turnover of the tank water per hour. The thinking behind this was that in the wild, water movement was relatively slow and as we are trying to replicate this in an aquarium, turnover in the tank must also be slow and consistent. Only in the last few years has this changed but it must be stressed that the new thinking comes from the high tech approach to planted aquariums where they use CO2 in order to push plant growth forward rapidly.

So what should your turnover be and what sort of filtration should be used? With beginners to this hobby, the best option is to buy the largest filter you can afford (but not so large it looks out of place). Bigger filters are able to clean your water better, they require less maintenance and you can choose which media you decide to place in them, but tank size must be a consideration. Filter flow rate should be a minimum of twice the turnover for a non CO2 tank. So if your tank is 100L, your filter must turnover a minimum of 200L per hour, but preferably 400L per hour.

There are two main types of filters available to hobbyists: Internal and External. [Internal filters](#) are inexpensive, simple and effective but are generally geared towards smaller aquariums. When maintaining them they can be a little messy when you remove them from your tank for cleaning. Internal filters sit on the inside of your aquarium and come in a variety of different sizes. They range from the very small (max tank size 20L) up to versions suitable for 200L tanks.

However they do take up space in any tank, often hold little media (just sponges on smaller types) and can be a little unsightly. Prices range from £10 and up so can be great if you're looking for a cheaper start up - have a look at our [Superfish Internal Filter](#) range. In recent months manufacturers are investing more technology into these filters, some have built in heaters and others are able to store larger amounts of media which helps to improve water quality, but unfortunately this also means they become bigger which means less aquarium space.

[Externals filters](#) are what I recommend - the less equipment that is visible in your tank the better (the focus then remains on your aquascape). External filters are simple to set up, easy to maintain and you can run an external on most tanks regardless of their size - modern brands have flow adjusters so you can set the output speed to whatever you want. These filters are more expensive than internal filters but well worth it.

The most popular brand of external filters are [Eheim](#). They have been the market leader for over 20 years, are reliable and have great functions particular the latest models which have electronic controls and notify you when it needs maintaining. Some also have built in heaters which is ideal for keeping more equipment out of the tank. The typical route for newcomers to this hobby is to start with an internal filter and then move onto an external filter. This was the route I went down and is a gradual introduction to the hobby but if you can afford it, consider buying an external filter from the beginning - you won't regret it.

LIGHTING



Lighting should be kept to moderate levels when beginning your first planted aquarium.

Lighting. With the vast choice in lighting, it can be difficult to know exactly what sort of lighting you should choose. This section explains all and sifts through any confusion.

It is generally accepted that [T8](#) and [T5](#) tubes are the most standard type of lighting in aquariums at the moment. T8 indicates the tube diameter which in this case is one inch. If you use T5 lights, the diameter is 5/16". The most popular brands are [Arcadia](#) and [Interpet](#). If you buy a Juwel tank for example, the chances are you have 2 x T5 tubes and you're able to swap these lights over should you wish.

But what are the key points to look out for with lighting? The first point is make sure it is suitable for planted aquariums - this will be apparent from the description on the packaging. Quite often manufacturers will have wonderful graphics on the packaging which should catch your eye. But the next question is which one should you buy?

Before I explain more about which lighting to choose, it's important to understand more about lighting. All light has colour and the colour temperature of light is measured in Kelvin, so when you see a description which states it has a particular K value (kelvin) it is referring to the colour of the light output. A low K rating would be 2500 and a high would be 18000. It is recommended that you aim for about 8000 K as this provides a pleasant colour output. But this is not to say that the lower K and higher K won't grow your plants (on the contrary), it's simply their light output is less desirable aesthetically to humans. A low K value is orange/yellow in colour - this tends to not do a great deal for the fish or plants

in terms of how they look. At the opposite end of the spectrum, are 18000K which is a very bright white. This light output will grow your plants just as well as lower K tubes but it can give the appearance of your tank looking washed out. So this is why if you aim for lights with a K of about 8000k - you will achieve a colour that is just about in the middle and normally the most pleasing to the eye. You can mix and match lights without any problems too so don't rule that out.

There can be a temptation to purchase more powerful lights such as metal halides but this is not something that is recommended when you're beginning. Higher lighting means everything in your aquarium needs to step up a level. By that we mean that your fertilising regime needs increasing, which in turn means you will be maintaining your tank more. In addition higher lighting requires the use of CO2.

Lighting Duration. An average tank needs approximately eight hours of light per day. Having your lights on longer than this is not necessary and it will help to keep most algae at bay. It's worth putting your lights on a timer and have them come on when you're at home to make the most out of it. When your tank is very new and plants are settling in, I recommend to only have six to seven hours of illumination for the first month or so and any changes need to be done slowly (perhaps half an hour extra per week).

The image above displays an [Arcadia luminaire](#) which is a great way to illuminate an aquarium. Also consider TMC [Aquabeam](#) LEDs which are small and economical LED lighting units which have become very popular recently - running costs are a mere £7 per year.

CO2

There are many benefits to CO2 in the aquarium but even without CO2 you can have a beautiful planted aquarium.



CO2. Knowing whether or not to use CO2 in a tank is a choice that many hobbyists go through. And the short answer to this is simple, it really depends how much time you want to spend on maintaining your tank. There is no doubt that in order to grow some plants successfully, you will need CO2. At the same time, there are many plants that do very well with limited or no CO2 input.

There are three types of CO2 available on the market - **Pressurised, Fermented & Liquid.**

Pressurised is the most stable type available to hobbyists, where gas is stored in a pressurised bottle. This is attached to a regulator which in turn has a bubble counter and diffuser attached to CO2 tubing. By using a pressurised system you are giving yourself 'gas on tap' so this means you have total control over CO2 input. This is very important because CO2 (when used properly) creates stability in a tank. Systems such as the [DD Complete CO2](#) set costs £125.99. You may also wish to consider a disposable bottle system (where the bottles are literally disposed of when they are empty) or a refillable bottle system (only suitable when you can actually get bottles refilled easily). Either way don't be frightened of CO2 - it's very easy and safe to use contrary to scare stories.

[Fermented systems](#) are a great introduction for hobbyists who are looking to try out CO2 for the very first time and costs from £25 and up. They provide a cheap set up specifically geared towards hobbyists looking for a cost effective solution for their planted aquarium.

The set up for all fermented systems (or DIY as it is sometimes known) is almost the same. Each brand of system

uses a combination of yeast and sugar provided in sachets they are mixed together and then placed within a container which allows fermentation to occur and CO2 to be produced (see image above). CO2 tubing is attached to the container which has a diffuser attached to the end. This sits in the aquarium and the gas is forced out of the fermenting chamber and is diffused into the tank. We recommend this type of set up, but it does require cleaning (due to the fermentation process) and CO2 levels can drop off, and are changeable according to the room temperature (this effects the fermentation rate).

The last option which is the most simple is a liquid form of carbon. Available by manufacturers such as [Seachem](#), [Easy Life](#) and the [AE Design label](#), it offers a product that provides a liquid carbon source (roughly 25% strength of pressurised CO2). The liquid carbon is packaged in a bottle and dosage is very simple but must be done daily. Another major advantage is that it works as an algacide - it is well known for ridding many types of algae in the aquarium such as hair algae.

It is quite common for liquid carbon to be used in conjunction with DIY CO2 or pressurised CO2 systems, almost like a complimentary product. Either way when you are growing plants, it is important to have at least one source of carbon in your aquarium so at a bare minimum use a liquid carbon.

FERTILISERS



Use the right fertilisers for the right job is key to success. Remember it's not the fertilisers that cause the algae!

Fertilisers. The vast number of fertilisers on the market can be quite bewildering, so what is the best option? The main factor to consider is if you are using CO₂ or not. If you are, you'll need to choose a variety of fertilisers but we'll come onto that shortly.

What you need to look for in a fertiliser for a non CO₂ tank is one that will not add any macro nutrients (nitrate and phosphate). These macros which although are essential for plants will be produced by fish waste. So buying a fertiliser with macros will just cause you problems in the form of algae. Some excellent fertilisers are [Seachem Flourish](#), [Tropica Plant Nutrition](#), [Easy Life Profito](#) and [AE Design Aqua Nourish](#). All of these are particularly suitable for non CO₂ tanks as they provide trace elements only. Those of you already using or are considering using CO₂ it's important to choose your fertilisers carefully because you will probably need more than one bottle. When buying fertilisers it is important to stick with one brand - by mixing them it can cause more trouble than it is worth so decide on one you like and stick with it.

With a brand such as Seachem which is very popular with hobbyists, you are given the option of using a variety of fertilisers to give complete control over the important nutrients which are essential for solid plant growth. The individual nutrients they provide are trace, phosphorus, nitrogen, iron and potassium. By using their range you can add as much or as little as you need according to what your plants require.

For some hobbyists, they are looking to reduce the number of bottles to dose to make life a little simpler. This is the primary reason why some manufacturers have designed 'all in one bottles'. The latest product on the market is [Tropica Plant Nutrition](#) - although strictly speaking it's not a new product but more of a rebranded one. Tropica Plant Nutrition supplies the nutrients plants easily run out of. These remaining nutrients (nitrogen and phosphorus) are excreted via fish. We therefore recommend Tropica Plant Nutrition for aquariums with few plants and a relatively large number of fish. It's no surprise that this product has become very popular and for those of you who are using CO₂ we recommended their + version. [Tropica Plant Nutrition+](#) contains all the essential nutrients needed including nitrogen and phosphorus (macro nutrients) so it makes it suitable for tanks with high levels of plants relative to the number of fish.

It's important not to be frightened by fertilisers and a common misconception is adding fertilisers cause algae - this is not the case. In the past when algae develops (and I regularly hear this), people stop fertilising. They decide nutrients are causing the problem. Starving your plants of nutrients, having a low flow filter rate and lighting on for excess periods causes algae, not the fertilisers. By making sure you do not limit the nutrients in your aquarium, you provide your plants with what they need, and as a result they repay you by looking great and growing fast. For those of you who are forgetful when dosing fertilisers I recommend [AE Design Aqua Nourish and Nourish+](#) - these are designed to be dosed daily (perhaps when you feed your fish).

TOOLS OF THE TRADE

Good quality tools will make your job of maintaining your planted aquarium much easier.



Tools of the Trade. Without these our maintenance regime would be considerably more difficult. But what exactly do we mean by tools? Tweezers, scissors, glass cleaners, gravel cleaners - these are some of the tools you should always keep in your cabinet. Below is a selection of tools that most hobbyists should use.

When planting an aquarium, traditionally hobbyists used their fingers which although was functional was somewhat cumbersome. Today we use [tweezers](#) (curved or straight tipped) - the major benefit of this is the ease in which plants can be picked up and delicately placed into your substrate. Not only that but tweezers are also useful for picking up plants or removing debris from your tank.

[Scissors](#) are also available in curved or straight tip. Curved tends to be more popular and is very useful when trimming foreground plants - the curved section allows you to cut a better angle. Nevertheless a good pair of sharp scissors are excellent for keeping your plants in good shape. The scissors available are normally 12" long so you can reach a good distance and are very useful if you need to trim the base of any plant that is hard to reach.

[Spatulas/Rakes](#) are used primarily for smoothing gravels and substrates. Often when plants are moved about or indeed planted for the first time, substrates can become disturbed. A spatula or rake is a flat shaped and is unique in its design and purpose.

[Magnetic glass cleaners](#) are a wonderful tool that are used for cleaning algae off the inside panes of your aquarium. Algae can build up quite quickly on glass so using

magnetic cleaners once a week keeps things clean. This tool is separated into two sections - a rough side on one and a smooth on the other. The rough side sits on the inside pane and the smooth on the outside. A top tip when cleaning is to make sure no gravel gets stuck on the inside as it is easy to scratch the glass. The added benefit is that the inside piece floats so if you dislodge it when cleaning, rather than it sinking to the bottom and you having to hook it out, it floats to the surface.

The last piece of equipment which is extremely important to a planted aquarium is a [gravel cleaner](#). Although strictly it's not used for what it was initially designed for (at least not in a planted aquarium). Rather than plunging the cleaner into the substrate it's a better idea to hover slightly above it, only suctioning debris such as dead plant matter and fish excrement. Of course while this is being performed you are removing tank water as well. It's really important to replace water regularly (minimum of 30% per week in a non CO2 tank), as not only is this better for the fish, but it helps to reduce any excesses that may have built up. In tanks which use CO2 these water changes need to be increased and 40-50% once or twice a week. By not performing these types of water changes you invariably end up with issues.

Lastly if you're looking for a useful tool set, that has scissors, tweezers and a rake then I highly recommend the [Aqua Essentials 3 piece tool set](#). It comes packaged in a neat leather case with a zip to keep your tools in one place and costs only £24.99.

PLANTS

Perhaps the only reason you became interested in the hobby! Choose them correctly and you will be charmed by their beautiful colours.



Plants. The exciting part and the one reason that you became interested in this hobby. These wonderful aquatic plants make your aquarium come alive with lush colours of green and red. Now the difficult part of choosing what plants to grow!

It's important to do your homework before you choose which plants you keep in your tank. By doing some research you save yourself both time and money. Many hobbyists make the mistake when they go into a fish shop and are amazed by certain plants that look beautiful, may be a lovely red colour or a certain shape or size. They take them home and gradually they deteriorate. You're left puzzled and confused as to why they didn't grow and flourish.

Not all plants are suitable for aquariums. I've been in countless shops that sell non aquatic plants, so no matter how good your conditions are these plants will always fail. Shops only sell these plants because they know as soon as they are placed in your aquarium they begin to die - they hope rather than do your research you will come back and buy some more. I've never understood that concept and surely it's better to educate customers so that they come back and buy a much broader variety of plants as their skills expand. So just beware of what plants are aquatic prior to purchase.

There are a huge amount of plants available for people in this hobby. There are 3 major growers of plant in Europe and they are [Tropica](#), [Aquaflour](#) and Dennerle. Most plants will have labels on them indicating different requirements from a plant. They always state their Latin name, what size they grow to, their lighting requirements and normally where

you should place them in your tank. Some will have other information on the labels such as how easy they are to grow. As you are at the early stages of this hobby, it will be best to opt for plants that are easy to grow. These types of plants will not require lots of light (this is key!) and normally flourish in the most basic conditions. A small sample of these plants are:

[Crinum Thaianum](#), [Echindorus Parviflorus](#), [Java Moss](#), [Lilaeopsis Novea-Zealandie](#), [Marsilea Crenata](#), [Micromanthemum Umbrosum](#), [Microsorium Pteropus](#), [Nuphur Japonicum](#) [Red Spatterdock](#) and [Vallis Spiralis](#).

There are many others that are suitable simply check the label and marry that up against your tank set up. If a plant requires high light you can be sure it needs CO2 - this is typical of red plants. [View the range of plants here.](#)

Most plants are grown in pots - make sure they have roots. When you get them home remove the pot and rockwool carefully and split into about 6 plants. Tall plants must always be planted at the back of your aquarium are are ideal for covering up filters or heaters. Medium sized plants are most suitable for the midground and small plants are typically suited for the front of the tank to avoid obstructing the plants behind. Foreground plants often the most sought after because of the way they look and grow. They also spread rapidly given the right conditions and can really transform an aquascape.