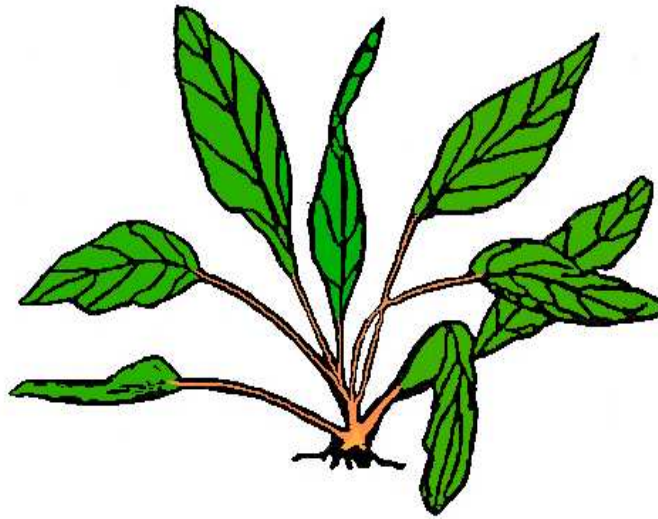
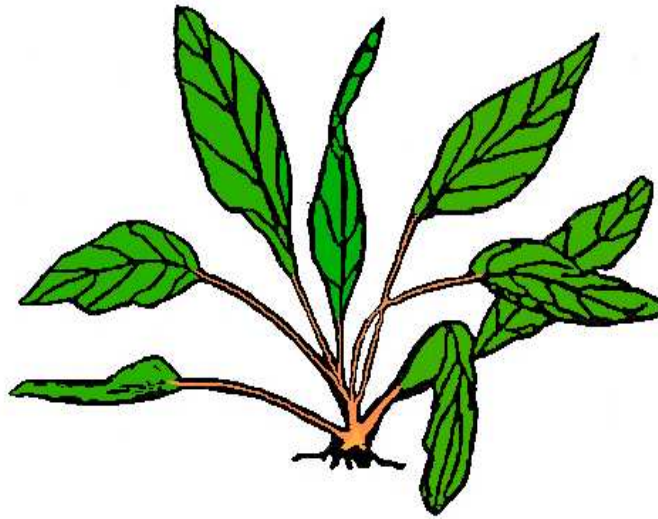


AQUATIC PLANTS NATIONAL STANDARDS & TECHNICAL INFORMATION

BOOKLET NO: 11

Third Edition

FEDERATION OF BRITISH AQUATIC SOCIETIES



AQUATIC PLANTS NATIONAL STANDARDS & TECHNICAL INFORMATION

BOOKLET NO: 11

Third Edition

FEDERATION OF BRITISH AQUATIC SOCIETIES

Book 11 The Aquatic Plant Book

The Plant Booklet is printed!
It has been updated and completely rewritten but has retained the same A5 format as its predecessor.

FBAS Judges will use this Booklet to judge Aquatic Plants.
If you judge or show Aquatic Plants, you need this Booklet.

To allow the Booklet to be available for the widest take up it has been produced as a pdf file and is a free issue to anyone that wishes to download it from the Federation's Website – www.fbas.co.uk - using Acrobat Reader.

Whilst the majority of the pages can be printed, on A5 80gm paper, those pages with colour are best printed on 100gm paper as a minimum, or 160gm as standard, to avoid bleed through.
You are advised to print a test page with your paper before printing off the coloured sections.

Pages have alternating margins so that when printed 'back to back', they can then be filed in an A5 loose-leaf binder.

The printing instructions are as follows.

First, check how the printed pages are to be loaded in your printer. For my printer (a HP C2080), the pages have to be stacked the side for printing down, the printed side up, and the top in and printed in reverse order.

Next, print off the odd pages, then restack them in your printer accordingly and print the even pages on the reverse sides.

Bob Esson,
Hon Sec FBAS J & S.

FOREWORD

The Federation's first Plant Book (Book Number 11) was printed in 1956 by the late sixties it was completely out of date and Ron Forder offered to up- date it. This he did and Sheila Esson put it into order and set it out and typed up the masters for printing. Her format has been maintained in this third edition, the second edition booklet has served us well but in 2009 it was long overdue for a further updating.

This third edition of Book 11, retains the same format as before as this has proved to be the easiest way for both judges and exhibitors to use it. The booklet is to be used as a means of showing and judging plants. It is not a catalogue of plants, it does not delve into their requirements or how they should be cultivated. Anyone considering taking up this branch of horticulture is best advised to purchase one of the many Aquatic Plant books available that deal with this subject in depth. We recommend three in the acknowledgements. Also buying aquatic plants can be a hit or miss problem as they are often misnamed and are presented in a container with other plants offered for sale, several of which can be pure marsh plants. Look at the leaves if they can stand erect out of water have they a submersed stage? If not, do not purchase them. In the acknowledgements page we advise you to see what is available and the cost from Tropica, see their website; their plants are also recommended.

Within the Federation Plants are exhibited as Class 'Z', with three sub-divisions. 'Za' Rooted Plants, 'Zb' Cuttings and 'Zc' Floating Plants. Unfortunately exhibiting aquatic plants is the poor relation of the showing fraternity, being a poor fourth after Furnished Aquariums and Aqua-Scapes. Most Open Shows cater for them although it is as the basic plant Class 'Z' so Rooted, Cuttings and Floating Plants are all shown together in a single Class. In most cases this is because the exhibitors do not support subdivided classes in sufficient numbers, not because the Show organisers are unwilling to provide the subdivisions for them. With few exceptions everyone who keeps fish keeps aquatic plants, so why not show them?

The means of increasing the number of Shows willing to provide all three plant Classes is in the hands of the exhibitors! First support the existing plant Classes and then ask for all the plant subdivided Classes to be provided.

As is so often the case, my thanks to Richard (Dick) Mills for both his support and contributions to the booklet. Also Malcolm Goss for lending me Tropica's Catalogue.

Bob Esson

CONTENTS

AQUATIC PLANTS: SHOW CLASSES & JUDGING INFORMATION

Aquatic Plants
Their needs and understanding them

Without plants - and I mean all plants embracing Trees, Shrubs, Flowers in general, Grasses, Ferns down to the Liverworts and Mosses as well as single cell Algae, in and out of the Oceans and Seas, there would be no life on Earth as we know it. For plants are the only producers of Oxygen on which all animal life depends.

OXYGEN – O_2

The green colouration that plants have in their cells is Chlorophyll, a substance that by using light, usually in the sun-lit hours in combination with water soluble chemicals and gases, enables the production of compounds of which plants are made and allows them to grow, reproduce and flourish.
In doing this when using illumination plants release Oxygen as a by-product; however during the night or dark conditions they go into reverse and absorb Oxygen and release Carbon dioxide. Oxygen production only occurs during photosynthesis.

Aquatic plants in an Aquarium use the illumination provided to carry out photosynthesis and in doing so release oxygen into the water and if in sufficient numbers absorb the carbon dioxide and waste products produced by the Fish (including any uneaten food) and contribute not only in trying to create a balance, they add to the overall visual effect of the Aquarium.

Aquatic Plants are somewhat different to land plants in that they have a system of airways that run throughout the whole plant including leaves that enables the plant to obtain buoyancy from the surrounding water. Therefore submersed plants do not need the fibrous material of land plants that hold them rigid unless they raise a part of the plant out of water and then only that part of the plant has the fibrous material supporting structure needed.

Some so called aquatic plants are in fact semi-aquatic marsh plants and have a period in the year in which they are completely out of the water, *Cryptocorynes*, *Echinodorus* with others fall into this group. These plants produce two types of stems and leaves, the soft airways type when they are submersed and firmer fibrous stems and leaves when they are out of the water.

Most truly aquatic plants are those called 'cuttings' by aquarists; it is a fact that many floating plants can survive quite well on wet earth. With cuttings they require to be fully submersed, their stems and leaves are often thin, pinnate and soft. Parts easily break away if roughly handled and many have the fine pinnate leaves set in whorls around a central stem with side shoots. *Elodea*, the *Myriophyllums*, *Cabombas* and *Ceratophyllum submersum* are typical of this type. Whereas although the leaves of plants like the *Hygrophila* group of plants are more obvious as leaves, they are also quite delicate and are easily bruised and damaged when handled.

If there is a lack of oxygen in the aquarium, this occurs in aquariums that are not well maintained and also if there is not enough light resulting in insufficient plant photosynthesis taking place. When the oxygen levels fall below 3 milligrams per litre of water the fish will be at the surface, not sucking in air

as some think but instead taking in the water on the surface that contains the most oxygen content. The fish will eventually die if nothing is done to resolve the problem. Also a filtering device that relies on aerobic (oxygen using) bacterial action to clean up the water will not be able to do its job, the bacteria will die and quite quickly releasing back into the aquarium water the chemicals it has absorbed to process. Again aeration is the quickest means to get some oxygen back into the water and dissipate the build up of the carbon dioxide, by increasing the water's ability to interchange these gases with the surrounding air. If this situation is not dealt with at once, and persists, you will lose all the fish and some of the plants and the aquarium will smell foul especially if you are using biological filtration. Change 25% of the water at once and improve on your Aquarium Maintenance.

On the other hand if there is too much oxygen in the water of an aquarium (above 10 milligrams/litre of water), fish can suffer from air embolism and die.
Water with such high levels of oxygen will not allow enough plant food to be absorbed by the plants. Again aeration can compensate for this by speeding up by release the excess oxygen into the atmosphere more quickly. **Always use Air Stones that give off fine bubbles, as these increase the gaseous exchange quicker than large bubbles.** To completely resolve this problem try reducing the timing or the strength of lighting the Aquarium is receiving.

CARBON DIOXIDE – CO_2

Carbon dioxide is a basic requirement of plants and this must be available in a sufficient amount if plants are to do well and grow, around 1 gram of carbon dioxide per 100 litres of water is required. Testing kits are available to measure the carbon dioxide content of aquarium water; these usually have small vials of chemicals that allow you to adjust the carbon dioxide content to a range suitable for both the plants and the fish, between 10 to 40 milligrams per litre. There is a system of measuring the carbon dioxide content by first ascertaining the pH value of the water and then the carbonate hardness and by using a chart where the two measurements intersect this tells you the carbon dioxide present in the aquarium water. My advice is purchase a test kit.

Where there is too much carbon dioxide present in the water this does not seem to have too much of an adverse effect on the plants. But if will have on the fish, unless dealt with at once they will start dying, with as always the most expensive ones dying first. Changing ¼ of the water and fine bubble aeration this will help by disperse the excess carbon dioxide into the air.

When there is a lack of carbon dioxide the plants will not be unable to photosynthesis properly, absorb carbon dioxide and give off oxygen. Even if the plants have sufficient lighting they will simply not grow and flourish.
In situations where the plants are the main requirement then carbon dioxide can be introduced from pressurised bottles complete with the correct discharging equipment. However the majority of aquarists need not go to this extreme, a carbon dioxide testing kit and vials of adjusting chemicals is all that is needed to resolve the problem.

WATER HARDNESS

Tap water can be either hard or soft depending on the chemicals introduced or extracted to make it safe for human consumption by your water authority. Remember all that they are required to do is supply water for human consumption, not for fish or aquatic plants. The main chemicals used by water authorities are Calcium Oxide and Magnesium Oxide and in some cases Zinc Oxide. Water with high amounts of Calcium Oxide and Magnesium Oxide are considered 'Hard' and with low amounts 'Soft'. Very few plants require soft water, with most of the *Aponogetons* falling into this group.

Aquarists usually measure hardness in degrees. 1° dH, this is equal to 10 milligrams of Calcium Oxide or Magnesium Oxide in 1 litre of water.
Most Plants and fish will be happy with a total hardness between 8° to 16° dH and to a Carbonate hardness between 3° to 10° dCH. If you are concerned, there are Test Kits available enabling you to measure dH and dCH.
The majority of tap water is hard, this can be softened by Ion Exchangers or by Reverse Osmosis units. However both, especially RO water should not be use entirely as this has had not only the chemicals you do not want removed, it removes all the chemicals including all those you do want, "sterile water" is of little use to plants. You can mix RO water with tap water until you have the balance you require for the plants and fish. If you soften water using an ion exchanger, with "domestic water softeners" these replace the hard water elements with sodium "salt" elements, it is advised that you allow this water soak for at least 24 hours in a good quality peat. This unfortunately colours the water light brown. If you see this as a problem, you can filter the water using standard home made wine filter pads from any Home Made Wine Outlet.

PH

What is pH? It is the measurement of the potential of hydrogen ions within a solution; a measurement by which you can tell the acidity or alkalinity of a solution equal to a common logarithm. All water before your water supplier treats it contains dissolved chemicals from its source that are either acid or alkaline. Water that has more acids is classified as soft, and more alkaline as hard, if there is an equal amount of acid and alkaline then water is said to be neutral with a pH of 7. that is the central starting point of the measurement of pH. Measurements above 7 are classified as hard and measurements below 7 as soft. As stated, remember the scale is logarithmic so each step either up or down from pH 7 is a multiple of 10. Therefore one step up - 7 to 8 - is 10 times harder (alkaline) than 7, the next step up to 9 is a hundred times harder and so on. Of course the scale works in the same way going down, from 7 to 6, is 10 times softer (acidic) than 7 and two steps down to 5 is 100 times softer.

Most plants will flourish in water with a pH value between pH 6·0 to pH 7·5. You can test the water about once a fortnight using a simple test kit. However it is important to test at the around the same time of day as the pH will alter depending on the amount of artificial light the plants are being given. Try this yourself; test first thing in the morning and then again after the aquarium lights have been on for a few hours, this will give you a slightly different result. Nevertheless wide differences in pH "the hardness reduction of Carbonates the pH readings" over 24 hours is not to the liking of most plants and can prove harmful to fish.

If there is a shortage of carbon dioxide because of the lowering of the ph value some plants are able to obtain carbon dioxide directly from the residual hardening chemicals in the water. They alter the Hydrogen carbonates into Carbon dioxide and Carbonates. This is called Biogenic decalcification and causes the water to become more alkaline - a pH test will show that the aquarium water has altered by up to a division or so. These insoluble carbonates precipitate out of the water and form gritty deposits on the gravel surface and on the leaves of some plants especially plants like *Vallisneria*, "you can actually feel the deposits on the leaves of *Vallisneria* by gently running your fingers along the leaves". If the aquarium is planted with an abundance of *Vallisneria* these can quickly absorb all the calcifying chemicals present in the water.
When photosynthesis stops working, when there is insufficient light, Biogenic decalcification also stops. Hydrogen carbonates and Carbonates are again available and water returns to its usual state and the pH reverses. However if this fluctuation of the pH becomes regular then both plants and fish will suffer. Continuous aeration can go a long way to compensate for this by extracting some Carbon dioxide from the atmosphere.

AMMONIA, NITROGEN, NITRATE & NITRITE

Although Nitrogen is a most important food for aquatic plants they do not absorb it in its gaseous state. Neither do they absorb Nitrate like land plants. They absorb it as Ammonium. Ammonium is only present in soft water (acidic). The amount of Ammonium in the majority of aquariums that are only slightly acidic is not likely to affect the fish. But if the water is only slightly hard (alkaline) then the Ammonium transforms in to Ammonia and this is quite deadly to fish. Both Ammonium and Ammonia can be changed into Nitrite by the bacteria on the surface of the gravel and more so in the filter and then Nitrite into Nitrate. Nitrite is deadly to fish, whereas Nitrate is comparatively harmless to fish. To achieve this transmutation of the chemicals oxygen is used. If the plants are unable to produce enough oxygen through photosynthesis, either through too many fish being present, or through poor maintenance (typically to0 few water changes, or the filter not being properly maintained) the transmutation of the nitrogen cannot take place at all or takes too long to achieve, and the Fish will die either of Ammonia or Nitrite poisoning. Change ¼ of the water and aerate the water with fine bubble aeration this will encourage the water to take up the oxygen present in the atmosphere. The presence of the nitrogen group of chemicals can be measured with test kits that are available from any good commercial fish or aquatic plant outlet.

TRACE CHEMICALS

Of all the chemicals found in water in minute amounts (but still maybe of needs to aquatic plant life) and often are, the most needed is Iron as it is one of the enzymes that are needed by the plants as an aid in the manufacturer of Chlorophyll. The lack of iron will result in Iron Chlorosis. Chlorosis will cause the leaves to turn yellow, feel brittle to the touch and finally disintegrate.
This is not to be confused with the normal odd leaf dying off and slowly turning yellow, such leaves will not feel brittle to the touch but soft and floppy. Other trace chemicals include Boron, Copper, Manganese, Molybdenum, Potassium, Sodium, Tin and Zinc.

In nature these chemicals leach into the water from the land surrounding the lake or from the river bank as soluble trace elements and are taken up by the plants as needed. If the water is too high in oxygen then the trace chemicals will tend to combine with the oxygen and become insoluble. Plants are then unable to absorbed them. Trace chemical kits can be used to measure these trace chemicals and if required they can be added to the water. Most tap water will contain these chemicals in the minute amounts necessary for plants. Sodium is likely to be present in minute amounts in most tap water and enough for plants.

POTASSIUM & SODIUM

Potassium and Sodium are in tap water but only in small amounts. The Sodium is usually sufficient for plant needs, however there is bound to be a scarcity of Potassium unfortunately this effects the plant's photosynthesis so small amounts of Potassium can be added to the aquarium water to resolve this.

PHOSPHORUS

Phosphorus is an unusual plant nutrient as it is only adsorbed as phosphate. Fortunately most aquariums have sufficient of this usually from uneaten fish food and fish excreta, However, excess phosphate will causes damage to the plants, and leads to an infestation of thread algae and other unwanted algae growth. Remove the excess Phosphorus together with other unwanted chemicals by regular water changes. From a 760mm x 380mm x 300mm Aquarium take nine litres (2 gallons) out every week then top up with tap water, treated if required to make it safe for fish and plants. Larger aquaria will of course require proportionately more water removed and replaced.

FEEDING FISH

Fish are polythermic, "Many Temperatures". This describes that they take their body temperature from the surrounding water which in nature can be, and is, subject to alteration. We are monothermic "One Temperature" and as such, we like all mammals use approximately 87% of our food intake to maintain our body temperature. Remember when feeding fish that they do not need that 87%. So feed fish sufficient but sparingly. It is a fact that many fishkeepers feed far too much food which is not eaten and fouls the aquarium water which leads to all sorts of problems. It is reckoned that more fish are killed by overfeeding and fouling the water than by any other action.
Overfeeding is also one of the chief reasons people stop keeping fish even when told not to overfeed; they will still insisted on over feeding their fish, "as the fish simply cannot survive on so little food".

'YES THEY CAN'

ILLUMINATION

Lighting is a major requirement when planting an aquarium not only for the plants but so the aquarium can be viewed. Most aquariums when purchased will come complete with a hood containing the lighting invariably a single fluorescent tube. These give an even overall illuminate to the aquarium and are usually tubes that give off an all-round effect for both fish and plants. Unfortunately the hood having

only the space for a single tube there is not the possibility to add or mix them, it is an all or nothing situation. Fortunately there is a wide variety of tubes available, each stating on the packaging a description of their intended use. From all-round colour enhancing Grolux, to Actinic Tubes designed for use with marines, there is a wide range to select from. Flora-glo for instance is one of several tubes designed to maximise plant growth. What is not made clear on the packaging of all tubes is the slow but continuous loss of their luminescence, up to half of a tubes luminescence in six months with normal use, around say eight to twelve hours a day and more rapidly if used for more hours a day. If this is of concern to you then you should replace the tube around every six months or so.

TIME SWITCHES

It is a good idea to install automatic time switches on the lighting system, to enable you to control the amount of light the aquarium receives. When setting the timer consider the amount of light plants have adapted to in nature over eons of time. Most of the plants used in aquariums are native to the tropical areas of the planet, where the light is more intense and longer than the northern climates enjoy. Most tropical plants receive around 10 to 12 hours of sunlight every day in the tropical areas, so your light timing should be set in consideration to this. Also there is little point in reducing the lighting hours if algae flourishes in your aquarium; the cause is not usually the amount of lighting but is caused by the amount of excess nutriments available within, remove these nutriments by better maintenance and the algae will not flourish. There is an old adage "If you cannot grow algae then you cannot grow plants".

WATER

There is not much more to say about water. With all the chemicals that are dissolved in it, it is a wonder that we drink it, and even when more chemicals are added to call it lager or beer! Seriously, the main thing to remember is that all your Water Authority is required to do is to make it safe for human consumption. It may or may not be safe to keep either fish or plants in.
You then become your fish and plants Water Authority. It is for you to make it safe for them to survive in. It has often amused me that we can be supplied with water that is unsafe in which to keep fish and aquatic plants, but is safe for us to drink. In the end however it is all Aqua Vitae.

PLANTING TECHNIQUES

Rooted aquatic plants when first purchased frequently have a good rootstock and a satisfactory number of leaves. Quite often then the plant is simply removed from the pot, and, having first picked off any tissue and cotton wool material from around the root system, and planted in the aquarium.
People then appear quite surprised when the plant dies back or dies.

Consider! When purchasing a land plant from a garden centre or DIY outlet: it is also in a pot. You remove it from the pot and plant it with the soil and roots intact. The undisturbed plant then continues to flourish and grow.

It is foolish to treat aquatic plants similarly. For a start the roots are not surrounded with any rooting medium that can be transferred into the aquarium's base material - usually ⅛ aquarium gravel which seldom contains any fertilising material. When inserted into gravel the first thing plants have to do is to establish their rooting structure that will enable them to support an upper leaf display. Simple isn't it? When you think about it!

So how best to go about planting new rooted plants, or even shifting existing plants to another location? The procedure for planting rooted plants is simple. After first carefully removing them from the pot and untangling the roots one from the other without causing damage to other plants if there is more than one plant in the pot, remove any tissue and cotton wool material remaining. Then take a good look at the plant from all sides, remembering plants have a back and front. Remove any damaged roots and pinch off any leaves that show signs of dying back or damage, however slight, right back to the rootstock. Do not pull leaves or petioles off from the rootstock or rhizome, pinch them off with your finger nails. It is better to leave a small piece of leaf or petiole attached than damage the rootstock.

Cryptocoryne, Echinodorus, Sagittaria and ***Vallisneria*** type plants have a clearly defined rootstock. Remove any damaged roots leaving the rest on the plant. Remove most of the leaves leaving no more than four undamaged leaves. Use a planting stick or two to spread out the roots when planting, a small lead weight will help with this and stop the plant floating to the surface. As soon as the rooting structure becomes established (two to three weeks) the plant will start putting out leaves. You may have to pinch off some of the leaves you left on as soon as new leaves appear if the original leaves show signs of dying back, you do not want the plant using energy trying to maintain dying leaves. Be careful when doing this not to disturb the roots. Use a small pair of nail scissors to cut of any redundant leaves as near to the rootstock as possible.

If you leave too many leaves on the plant when initially planting, the root structure will try to maintain the leaves, the energy used to do this will certainly set back the plant.

Anubias and ***Aponogeton*** type plants have rootstocks known as rhizomes or tubers. Remove any damaged root filaments leaving the rest on the rhizome.
Again I would remove most of the leaves leaving no more than four or five undamaged leaves on the plant.

Use a planting stick or two to spread out the roots when planting, and do not completely bury the rhizome or it will rot, leave the top exposed and level with the aquarium's planting medium. A small lead weight lightly pinched on the underside of the rhizome will act as an anchor.

Crinum and similar plants have an onion or bulb type rootstock.
Again remove any damaged roots, leaving about four undamaged leaves attached to the plant. Spread out the roots when planting leaving the very top of the bulb/onion type rootstock slightly above the planting medium.

Finally, there are plants, such as Java Fern, that require rooting on rock or a piece of bog-wood. There are usually several plants in the group so spread these out on the rock or bog wood so that the plant will itself spread out to cover the planting medium much quicker than putting the whole clump in the middle of the rock or bogwood. Separate the plant with care do not just pull it apart. Attach the pieces of plant onto the rock or bogwood using green cotton or fine nylon fishing line do not tie them on too tight, just sufficient so that the plants are in contact with the rock or bogwood. When the plants are established on the medium you can remove the nylon line if it is visible; the cotton, being vegetable, will rot away in time.

You may have noted that both **cuttings** and **floating plants** have not been mentioned . This is because, in general, cuttings only put out root like appendances to anchor themselves, not to take up nourishment. If needs be cuttings can be anchored down with a small lead weight pinched on the bottom of the cutting and sunk in the bottom planting medium just out of sight. Whilst some floating plants do have a root structure that they used to take up nourishment these are in direct contact with water and do not use any rooting medium.

If you intend to exhibit a rooted plant it must be exhibited in a terracotta coloured plant pot, which maybe made either of clay or plastic. What most exhibitors appear to do is to uproot the plant a day or so before the exhibition and plant it in a pot filled with ⅛ aquarium gravel. This has a catastrophic growing consequence for the plant.

In planning to exhibit a plant, first fill a quarter of the plant pot with ¼" pebbledash shingle (from a builders merchant), then to within 15mm of the top with treated earth, that which is sold for used in ponds to pot up lilies (from a garden centre). Plant the plant in the earth not too deeply leaving some of the rootstock clear of the earth. Top off with sufficient ⅛ aquarium gravel leaving just the top of the rootstock visible. Place it in an aquarium deep enough to fully submerge all the leaves. Do this at least a month before the first exhibition and you will have a plant in tip top condition that you can exhibit throughout the year.

Exhibiting Aquatic Plants

The Federation of British Aquatic Societies (FBAS) places Aquatic Plants into the basic Class Z; this in turn is divided into three sub-divisions.

Za Rooted Plants: A rosette leaf or grass-like leaf configuration growing on a substantial root structure, reproducing by seeds, or by putting out runners that produce plants at intervals along the runner, or by plantlets formed at the tip of leaves or in the cleft where the leaf or petiole emerges from the stem. And, lastly, by root or rhizome division by the owner.

Zb Cutting Plants: A single or branched stem sometimes bearing aerial rootlets, reproducing by detaching branch sections off of the main stem, by plantlets formed at the tip of leaves or in the cleft where the leaf or petiole emerges from the stem.

Zc Floating Plants: Unattached free floating plants, some "*Riccia fluitans"* float just below the water surface, others the upper side of the leaf or thalli sits dry and level with the water surface. Some have no viewable root structure, others from one simple rootlet from a single thalli or roots emanating from several attached plants, or with large plants a complex root system somewhat similar to that of a rooted plant. Reproduction is by means of runners, by leaf division, seldom by seeds.

Unfortunately exhibitors wishing to show plants at FBAS Open Shows are often only offered the basic Class Z and not any of the three divisions, this means that all types of plants are shown together in a single class, whereas if the three subdivisions were available this would allow plants to be exhibitive and judged in common with like plants.

In this booklet plants are listed alphabetically in their exhibition divisions.
The expression used for plants grown out of water is **Emersed** and for those plants grown fully under water is **Submersed**. However, some plants we accept as aquatic are in fact Marsh or Bog Plants and cannot be kept submersed indefinitely. It is also a fact that many plants cannot be positively identified from their leaf form, shape or structure. *Cryptocorynes* are but one group of several that fall into this situation. The only positive means of plant identification is from a detailed examination of its flower. This has resulted in the some plants being given several names depending on the leaf structure when collected. Nevertheless exhibitors should, and Judges must, name a plant before it can be judged. If a Judge believes that a plant has been wrongly named, then the name given to the plant by the Judge is the name under which it has been judged. Furthermore some plants are known to have several synonyms; these will be judged in accordance with the name given in this Booklet.

PLANT GROUPINGS
When compiling the plant groupings, where any doubt existed as to the correct group into which a plant should be placed, careful consideration was given to the plant's main features and then to which grouping allows these features to be best displayed. It is accepted that some plants are not easy to classify whilst others are classified but are not shown to their best advantage in that group, in these cases we have placed the plants in the group where we feel the plant can be shown to its full advantage.

ROOTED PLANTS (Class Za)
These must be exhibited in terracotta coloured plant pots and can be shown with young plants or runners attached, small plants (Hair Grass) can be shown as a small group, in either case they will be judged as seen. To clarify: the exhibit will be judged as a whole the mother plant and any attached plantlets.

Where a plant is large enough to be exhibit as a single plant, it is advantageous to exhibit it as such. There are some plants that will flower in their submersed cycle, for example; *Barclaya*, *Vallisneria* and some of the *Echinodorus*, any plant of this habit will not be penalised if exhibiting buds, flowers or seeds.

CUTTING PLANTS (Class Zb)
Cuttings must be exhibited in a group of three separate cuttings, there is a tendency to exhibit short cuttings (75mm or so) these will be penalised, unless this is the nature of the plant. They must be of a reasonable length to enable them to be judged. 200mm is about right but if shown in a small Show container with the cutting wound around the Show container to get it all in this will be penalised. The Show container must be large enough to allow the plants to be shown upright to their best advantage.

FLOATING PLANTS (Class Zc)
There is a strong tendency when exhibiting the small floating plants to exhibit far too many, all that is required is to exhibit enough plants to give a true representation of them, so that they can be judged. Not more than 50% coverage of the water surface of the standard 100mm x 100mm Show container is about right. Overcrowding of floating plants will be penalised.
With the larger floating plants there is a tendency to exhibit them in Show containers that are not deep enough to allow the root structure to hang down correctly, this too will result in the plant being penalised.

PLANTS ATTACHED TO ROCK OR BARK
Attention is drawn to the Rule that allows plants that in nature attach themselves to a natural material. That these plants are to be exhibited attached to such material and they will be judged as a group or colony. However, if attached to unnatural materials, they will be subject to a points reduction.

SHOW CONTAINERS
Societies organising Open Shows sometimes provide a large Show container for exhibiters to exhibit their plants. Although this is provided with good intent, exhibiters are advised not to rely on the Show organisers to provide a Show container; take your own Show container to the Show and one of a size that is suitable for the plant. If a plant is exhibited in a Show container not suitable for the plant then it will lose points. Also there is always the risk of transferring Disease, Snails or other bugs when showing your plants in with other plants.

PLANT POINTINGS
Exhibition plants can be awarded a maximum of 100 points these points are divided into four 20s and two 10s. They are 10 for Size, 20 for Difficulty, 20 for Colour, 20 for the Leaves, 20 for the Condition and 10 for Presentation.
A full explanation of the pointing and what the Judge is to consider when awarding points is to be found on page 19-1 in the 2008 printing of the FBAS Constitution.

EXHIBITING ADVICE.
The following advice is offered to exhibitors and is also a guide as to what the Judge will looking for when judging plants.

- It is best to supply your own Show container to ensure that it is a suitable size for the plant; it is bad practice to exhibit more than one exhibit in a Show container.

- Set out to impress the Judge with your exhibit. Ensure your entry is in the correct Class and correctly named. Present the exhibit in a clean Show container in clear water; wipe all the outsides of the Show container to remove any water marks.

- Present a rooted plant in a clean terracotta coloured plant pot. Remove any algae that has taken up residence; ensure that the plant's crown is clear of the gravel or sand. If necessary scrub the outside of the pot with a nail brush using plain water, do not use soap or any other cleaner.

- With cuttings ensure you have three matched plants in a cutting exhibit, pinch a small piece of lead to the base of each plant and spread them out so they can be viewed with ease, do not clump them together.

- Ensure the front of the plant faces the front of the show container; most plants have a front, sides and rear.

- Do not cover the surface of the water in a Show container with the smaller floating plants, 50% is enough with a 100mm x 100mm container. Ensure the root systems of the larger floating plants can viewed and hang down in the show container and are not coiled around the base.

- Ensure there are no snails, snail spawn, leeches or bugs of any type of water life on the plants or in the Show container.

- Ensure there are no other plants in the Show container by accident; Duckweed etc.

- A large pinch of salt will prevent air bubbles forming in the water and attaching to the glass sides of the Show container or the plant.

- Finally take one last look at the exhibit before leaving, try to see it as a Judge. Remember the plant will be judged as a whole, runners, plantlets, good and bad points, it is best if possible to remove damaged leaves right back to the plant's crown.

TYPICAL FAULTS WHEN EXHIBITING ROOTED PLANTS.

- A common fault is simply poor presentation.

- Plant facing the wrong way, plants have a front, back and sides.

- Leaves twisted or bent and out of character with the plant.

- Plant not benched in a clean terracotta colour plant pot.

- Damaged or holed leaves (remove if possible).
- Plant crown planted too high or too low.
- Other plants present; Duckweed etc.
- Algae or strands of Blanketweed on the plant or plant pot.
- Snails, snail spawn or other bugs on the plant or in the Show container.
- Exhibited in dirty water or a dirty Show container.

TYPICAL FAULTS WHEN EXHIBITING CUTTING PLANTS.

- Cuttings too long or too short, 200mm is about right.
- Less than three cutting plants exhibited.
- Three cuttings exhibited but plants clumped together.
- Cuttings not standing upright twisted and deformed. Keep them a day or so before the Show under a light, this will encourage them to stand upright.
- Other plants present; Duckweed etc.
- An odd assortment of weights used.
- Algae or strands of Blanketweed.
- Snails, snail spawn or other bugs on the plant or in the Show container.
- Exhibited in dirty water or a dirty Show container.

TYPICAL FAULTS WHEN EXHIBITING FLOATING PLANTS

- Far too many plants exhibited with the small floating species 50% coverage of a 100mm x 100mm show container is about right.
- A discoloured or insignificant root system.
- A large plant exhibited in a shallow Show container so that the roots cannot be displayed as normal.
- Algae strands of Blanketweed or other plants present; Duckweed etc.
- Snails, snail spawn or other bugs on the plant or in the Show container.
- Exhibited in dirty water or a dirty Show container.

Plant Pointings

The Plants are listed into the three groups in which they are exhibited Za, Zb and Zc. The first group Za lists the rooted plants, the second group Zb the cuttings and the third group Zc the floating plants.

At the top of each page are three headings thus.

NAME **Diff** **POINTS FOR GROWTH**

The Heading; **NAME** is self-evident: it is the scientific name by which the plant is known. If the plant has a common name this is inserted below the scientific name on the bottom row.

There are specific points listed under the heading **Diff** for each plant.
These represent the Difficulty Points allotted to that plant in relationship to its difficulty to maintain and be able to exhibit the plant in a Show condition.
These points are not subject to amendment or alteration by the Judge.

The 15 points listed under **POINTS FOR GROWTH** are awarded to a plant as described. A superior plant will be awarded more points, an inferior plant will be awarded less points, according to the Judge's assessment of the plant.
These points are therefore subject to adjustment by the Judge.

Adding New Plants To The Lists

The last page of the plants index for each of the three exhibition categories is available for you to list the details of any new or unlisted plant that you see on the Show bench. Before listing a plant you must be reasonably sure that it is an aquatic plant. If convinced then list it so.

- First the name of the plant and the book or source that lists it.
- What points did you award it under difficulty and why?
- Describe how the plant should be presented for 15 points for growth to be awarded. For example; the height, the colour, the number of leaves their type, texture and length, as much information as possible. Also if possible take several digital photos, or ask anyone to do so for you, many Judges and Show organisers have digital cameras to hand.
- Finally please send all this information to the Secretary of the Judges & Standards Committee "The J&S". With your written description either printed or hand-written in block capitals please. All can be sent including Digital photographs by Email without any loss of quality (find the J&S Secretaries address and Email in the current Year Book or from the FBAS website www.fbas.co.uk

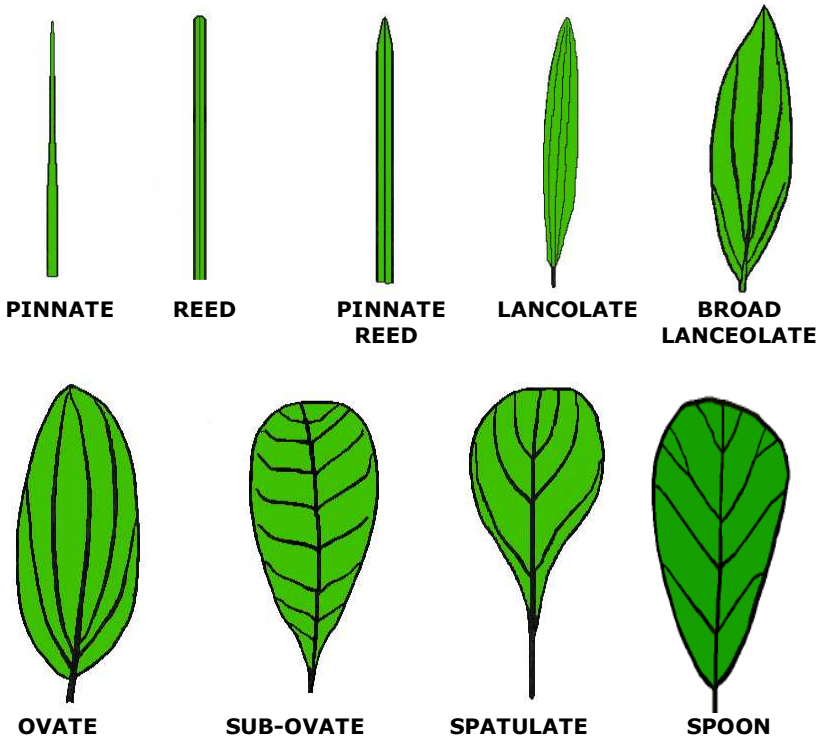
Examples of Plant Forms & Leaf Names

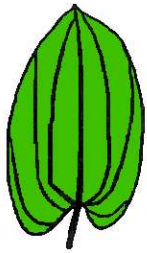
There are many excellent books available dealing with aquatic plants; what is unfortunate is that there does not appear to be any universally agreed names for the various plant forms, leaf shapes or patterns. One can appreciate that to be able to describe the leaf shape and the set of a plant is quite important, as are the pattern that the leaves take up.

Aquatic as well as terrestrial plants have leaf patterns that are easily distinguished in the way they are positioned from the stem, by clasp or petiole, whilst others grow from the root stock directly or from petioles.
The following pages show a selection of the most commonly seen on Aquatic Plants.

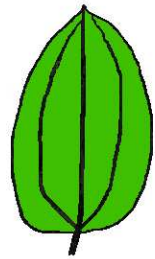
The Federation uses the following names for individual Plant Leaves or Leaf Patterns and shapes only to bring order to our book. It must be understood that these only describe general shapes and that individual leaves even on the same plant can differ to a lesser or greater degree. Often there is quite a difference between newly emerged young leaves than those that are mature.

Individual Leaf Names





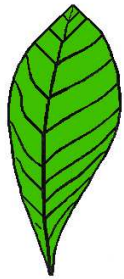
CORDATE



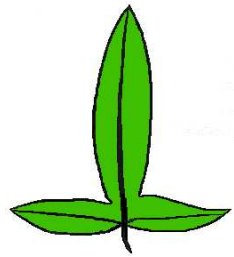
SUB-CORDATE

SPEAR

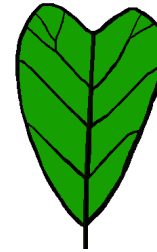
BROAD SPEAR



INVERTED SPEAR



HASTATE



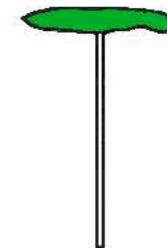
HEART

INVERTED PINNATE HEART

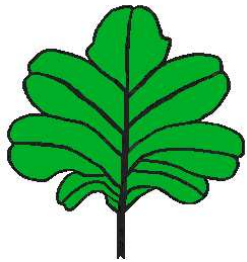
UNDULATED

SHIELD

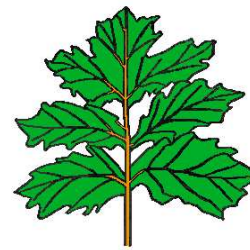
TWISTED



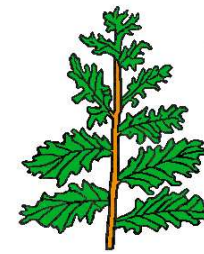
FLOATING THALLI



BROAD SCHISMATIC



SCHISMATIC



FILLICAL

ROSETTES

Rosette plants are seen in two basic forms. Those that have the leaves supported by petioles that sprout from the root base, these petioles are often as long or longer than the leaves themselves. The other Rosette form has leaves that sprout direct from the root base.

ROSETTE WITH LEAF PETIOLES FROM THE ROOT STOCK

ROSETTE WITH LEAVES DIRECT FROM THE ROOT STOCK

WHORLS

There are four basic types of whorls. Those that have fine filliform leaf which forms a tight circle around a central stem and those with a more open filliform leaves also forming a circle around a central stem.

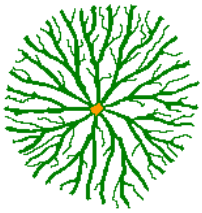
Second are those leaves that form a fine filliform in a circle off of petioles that are attached to the stem.

Thirdly there are the two whorls that for want of a better description we call Leaf Whorls, this is where several small leaves form the whorl, from a series of direct clasps off of the main and from side stems; and within this group a second forms a circle of leaves from petioles off of the main and side stems.

Lastly the fourth is not a complete whorl. It is more of a semicircle or partial whorl. *Cabomba* is a typical example of this type of whorl.

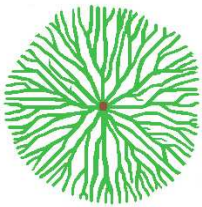
Except for a few exceptions like the *Bacopas*. Whorls should be spaced between 10mm to 12mm apart along the main stem. Where whorls are set more than 15mm apart these plants are deemed as being "leggy", usually caused by the plant being grown with too little lighting and/or nutrients being available. Such plants will be down pointed.

FILLIFORM WHORLS



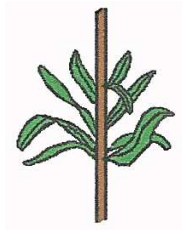
FILLIFORM WHORL AROUND STEM

FILLIFORM WHORL FROM A PETIOLE

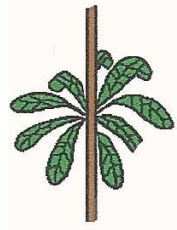


FILLIFORM WHORL AROUND STEM

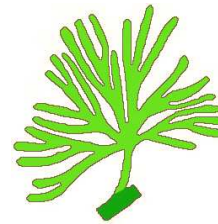
LEAF WHORLS



LEAF WHORL AROUND STEM



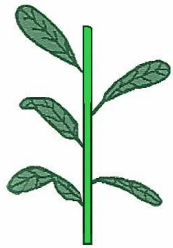
LEAF WHORL FROM PETIOLES



PARTIAL WHORL

LEAF PATTERNS

Plant leaves are often set in regular patterns from the main or side stems, these leaf patterns are quite distinct and are to be found usually with cutting plants. Note the examples shown below. The odd ones out are the Single Random Leaves, These are set from the stems in what appears to be a somewhat haphazard manner, whereas all the other combinations of leaf settings are to a greater extent fixed patterns.

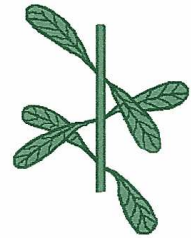


SINGLE RANDOM

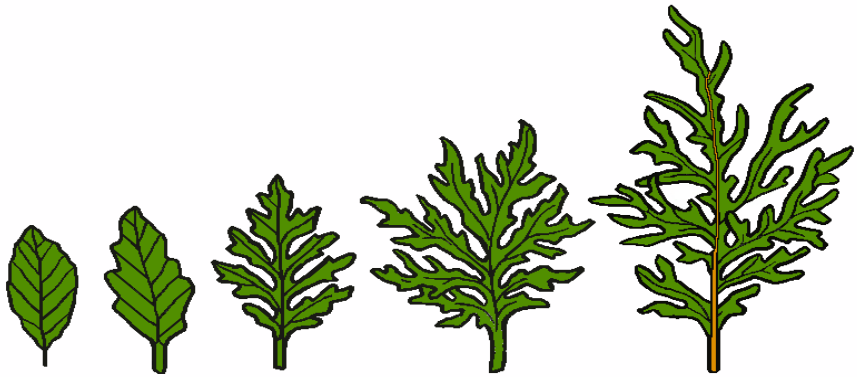
SINGLE OPPOSING

PAIRED

DECUSSATE



DECUSSATE PAIRED



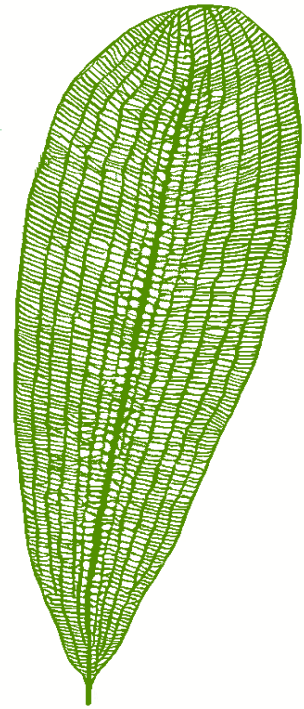
Hygrophila difformis is one of several plants both Aquatic and Terrestrial that have leaves that alter shape as they grow from Ovate (on the left) to Fillical (on the right).

The Lace Leaf

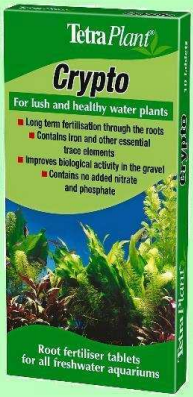
There are at least three Aponogetons with lace-like leaves, the two most common are *Aponogeton fenestalis* and *Aponogeton henkelianus,* the third is *A. bernierianus*.

However it is the first two that are sort after by Aquarists as these exhibit the maximum mesophyll loss from between the nervures of the developed leaves producing a truly lace effect.

Aponogeton bernierianus does lose some mesophyll from between the leaf nervures but these can be so few that they could be counted on each leaf a task that few would choose to attempt with the other two Aponogetons. Some have even suggested that this plant is an interstage between the first two, or an intermediate form.



Tetra



TAKE THESE THREE

TETRA STEPS

TO

PLANT SUCCESS

www.tetra-fish.co.uk

FLUVAL®
EDGE

ADD DESIGN TO YOUR LIFESTYLE

Fluval EDGE brings an exciting new look to aquatics, combining the most modern aquarium design with the beauty of nature. The result is an utterly stylish complement to any home or office space.

360º Viewing
Glass top for spectacular views from all angles and less evaporation for reduced maintenance

Clear Healthy Water
Easy to use cascading flow filter with 3 stage filtration for a healthy, oxygenated environment

Clean Lines
The filter and retractable lighting modules are hidden from view for a clean, modern look

HAGEN®
www.hagen.com

For more information visit www.hagen.com

INDEX OF COMMON NAMES

COMMON NAME	CLASS	SYSTEMIC NAME
Alligator Weed	Zb	Alternanthera philoxeroides.
Arrowhead.	Za	Any Sagittaria (species)
Amazon Sword.	Za	Echinodorus bleheri.
Amazon Sword Plant.	Za	Echinodorus paniculatus.
Anacharis.	Zb	Elodea canadensis.
Arrowhead	Za	Sagittaria (species)
Awlwort.	Za	Subularia aquatica.
Banana Plant.	Za	Nymphoides aquatica.
Bladderwort.	Zc	Any Utricularia (species).
Brazilian Waterweed	Zc	Egeria densa.
Brooklime.	Zb	Veronica beccabunga.
Burr Reed.	Za	Sparganium ramosum.
Canadian Waterweed.	Zb	Elodea canadensis.
Cape Fear Spatterdock.	Za	Nuphar sagittifolium.
Carolina Fanwort	Zb	Cabomba caroliniana.
Cellophane Sword.	Za	Echinodorus berteroi.
Chinese Waterfern.	Zb	Bolbitis herteroclita.
Club Moss	Zb	Lycopodium inundatum.
Common Bladderwort.	Zc	Utricularia vulgaris.
Common Cat-tail.	Za	Typha latifolia.
Coontail.	Zb	Ceratophyllum (species).
Creeping Burhead.	Za	Echinodorus cordifolius.
Crinkled leaf Onion Plant.	Za	Crinus natans.
Crystalwort.	Zc	Riccia fluitans.
Duck Potato.	Za	Sagittaria latifolia.
Duckweed.	Zc	Any Lemna (species).
Duckweed.	Zc	Spirodela polyrrhiza.
Duckweed.	Zc	Wolffia (species).
Dwarf Amazon Sword.	Za	Echinodorus magdalenensis.
Dwarf Bladderwort.	Zc	Utricularia exoleta.
Dwarf Rush.	Za	Acorus gramineus gramineus.
Dwarf Rush.	Za	Acorus gramineus pusillus.
Dwarf Variegated Rush	Za	Acorus gramineus verirgatus.
Fairy Moss.	Zc	Azolla caroliniana.
Fanwort.	Zb	Cabomba aquatica.
Floating Fern.	Zb	Caeratopteris (species).
Four Leaf Clover.	Za	Marsilea (species).
Frogbit.	Zc	Hydrocharis morsus-ranae.
Frogbit.	Zc	Limnobium (species).
Fox Tail.	Zb	Ceratophyllum (specie).
Giant Hygrophila.	Zb	Nomaphila stricta.
Giant Sagittaria.	Za	Sagittaria subulata (Var:).
Greater Duckweed.	Zc	Spirodela polyrhiza.
Grassy Arroewhead.	Za	Sagittaria graminea.
Green Water Rose.	Za	Samolus floribundus.

COMMON NAME	CLASS	SYSTEMIC NAME
Hair Grass.	Za	Any Eleocharis (species).
Hornwort.	Zb	Ceratophyllum (species).
Hudson Sagittaria.	Za	Sagittaria subulata.
Incombustible Water Moss.	Zb	Fontinalis antipyretica.
Indian Fern.	Zc	Ceratopteris (species).
Ivy Leaf Duckweed.	Zc	Wolffia arrhiza.
Japanese Rush.	Za	Acorus (species).
Java Fern.	Za	Microsorium pteropus.
Java Moss.	Za	Vesicularia dubyana.
Junior Sword.	Za	Echinodorus amazonicus.
Lace Plant.	Za	Aponogeton fenestralis.
Lace Plant.	Za	Aponogeton magdalenensis.
Lake Ball.	Zb	Ceratopteris pteridodes.
Lesser Duckweed.	Zc	Lemna minor.
Lesser Fairy Moss.	Zc	Azolla caroliniana.
Loosestrife.	Zb	Lysimachia nummularia.
Madagascar Lace Plant.	Za	Aponogeton magdalenensis.
Malayan Sword.	Za	Legenandra (species).
Mare's Tail.	Zb	Hippuris vulgaris.
Mermaid Weed.	Zb	Proserpinaca palurstris.
Needlegrass,	Za	Eleocharis acicularis.
Needle Plant.	Za	Eleocharis (species).
Onion Plant.	Za	Crinus thaianum.
Parrots Feather.	Zb	Myriophyllum brasiliense
Pennywort.	Zb	Hydrocotyle vulgaris.
Pepper Grass.	Za	Pilularia globulifera.
Pickereweed	Zb	Pontederia cordata.
Pillwort.	Za	Pilularia globulifera.
Pygmy Chain Sword.	Za	Echinodorus tenellus.
Quillwort.	Za	Isoetes (species).
Red Water Milfoil.	Zb	Myriophyllum hippuroides.
Ribbon Wapato.	Za	Sagittaria subulata.
Rootless duckweed.	Zc	Wolffia arrhiza.
Ruffled Sword.	Za	Echinodorus major.
Sagg	Za	Any Sagittaria (species)
Small Leaf Amazon Swordplant.	Za	Echinodorus brevipedicellatus.
Spatterdock.	Za	Nuphar japonica.
Spatterdock.	Za	Nuphar pumillum.
Starwort	Zb	Callitriche palustris.
Stonewort	Zb	Nitella flexilis
Striped Rush.	Za	Acorus gramineus variegatus.
Sumatra Fern.	Zb	Ceratopteris (species).
Sweet Flag	Za	Acorus calamus

COMMON NAME	CLASS	SYSTEMIC NAME
Sword Plant.	Za	Any Echinodorus (species)
Tooth-cup.	Zb	Rotala macrandra.
Tooth-cup.	Zb	Rotala rotundifolia.
Twisted Vallis.	Za	Vallisneria torta.
Umbrella Plant.	Za	Hydrocotyle verticillata.
Uderwater Rose.	Za	Samolus floribundus.
Vallis.	Za	Any Vallisneria (species).
Verigated Rush,	Za	Acorus gramineus variegatus.
Water Aloe.	Za	Stratiotes alismoides.
Water Arum.	Za	Calla palustris.
Water Chestnut.	Zc	Trapa natans.
Water Cress.	Zb	Rorippa amphibian.
Water Fern.	Zb	Ceratopteris thalictroides.
Water Fringe.	Za	Nymphoides peltata.
Water Hedge.	Zb	Didiplis diandra.
Water Hyacinth.	Za	Eichhornia azurea.
Water Hyacinth.	Za	Eichhornia crassipes.
Water Lettuce.	Zc	Pistia stratiotes.
Water Lobelia.	Zb	Lobelia cardinalis.
Water Meal.	Zc	Wolffia arrhiza.
Water Milfoil.	Zb	Myriophyllum (species).
Water Moss.	Zb	Fontinalis antipyretica.
Water Orchid.	Za	Spiranthes cernua.
Water Pennywort.	Zb	Hydrocotyle vulgaris.
Water Pimpernel.	Za	Samolus parviflorus.
Water Primrose.	Zb	Ludwigia repens.
Water Purslane.	Zb	Didiplis diandra.
Water Shield.	Zb	Any Cabomba (species).
Water Soldier.	Za	Stratiotes alismoides.
Water Sprite.	Zb	Ceratopteris (species).
Water Velvet.	Zc	Salvinia auriculata.
Water Violet.	Zb	Hottonia palustris.
Water Wisteria.	Zb	Synnema triflorum.
Waterweed.	Zb	Elodea cannadesis.
Willow Moss.	Za	Fontinalis antipyretica.
Wistaria.	Zb	Hygrophila difformis.

INDEX OF PLANT SYNONYMS

SYNONYM	CLASS	NAME
Achyranthes philoxeroides.	Zb	Alternanthera philoxeroides.
Acrostichum thalictroides.	Zb	Ceratopteris thalictroides.
Adenosma triflora.	Zb	Synnema triflorum.
Adenosma triflora pectinata.	Zb	Synnema triflorum.
Alisma cordifolium.	Za	Echinodorus cordifolius.
Alisma flavum.	Za	Limmocharis flava.
Alisma natans.	Za	Elisma natans.
Alisma nymphaefolium.	Za	Echinodorus nymphaefolius.
Alisma ranunculoides.	Za	Elisma natans.
Alisma tenellum.	Za	Echinodorus tenellum.
Ameletiapeploides.	Zb	Rotala indica.
Anacharis alsinastrum	Zb	Elodea canadensis
Anacharis canadensis	Zb	Elodea canadensis
Anacharis densa.	Zb	Elodea densa.
Anubias heterophylla.	Za	Anubias congensis.
Amblystegium riparium.	Za	Leptodictyum riparium.
Ambulea heterophylla.	Za	Limnophila heterophylla.
Ambulia heterophylla.	Za	Limnophila heterophylla.
Anonymos aquatica.	Za	Nymphoides aquatica.
Aponogeton undulatus.	Za	Aponogeton crispus.
Aromia aquatica.	Za	Orontium aquaticum.
Azolla densa	Zc	Azolla caroliniana.
Azolla mexicana.	Zc	Azolla caroliniana.
Brassenia peltata.	Za	Brassenia schreberi.
Brassenia purpurea.	Za	Brassenia schreberi.
Bulliardia aquatica.	Zb	Cassula aquatica.
Callitriche androgyna.	Zb	Callitriche palustris.
Callitriche vernalis.	Zb	Callitriche palustris.
Castalia alba.	Za	Nymphaea alba.
Caulinia fragilis.	Za	Najas minor.
Ceratopteris forma cornuta.	Zb	Ceratopteris thalictroides.
Ceratopteris parkeri.	Zb	Ceratopteris thalictroides.
Chara flexilis.	Zb	Nitella flexilis.
Columnea heterophylla.	Za	Limnophila heterophylla.
Commelina debia.	Zb	Heteranthera dubia.
Crucifera subularia.	Za	Subularia aquatica.
Cyperus racemosus.	Za	Cyperus alternifolius.
Cryptocoryne haerteliana.	Za	Cryptocoryne affinis.
Damasonium flavum.	Za	Limmocharis flava.
Damasonium Indicum.	Za	Ottelia alismoides.
Dantia palustris.	Zb	Ludwigia palustris.
Dortmanna lacustris.	Za	Lobelia dortmanna
Draba subularia.	Za	Subularia aquatica.

SYNONYM	CLASS	NAME
Echinodorus natans	Za	Elisma natans.
Echinodorus nymphaefolius.	Za	Echinodorus berteroi.
Echinodorus radicans.	Za	Echinodorus cordifolius.
Echinodorus rostratus.	Za	Echinodorus berteroi.
Egeria densa.	Zb	Elodea densa.
Elatine fabri.	Za	Elatine macropoda.
Eleocharis prolifera.	Za	Eleocharis vivipara.
Eleocharis rivularis.	Za	Eleocha ris acicularis.
Elodea latifolia.	Zb	Elodea canadensis
Fontinalis trifaria.	Za	Fontinalis antipyretica.
Heleocharis acicularis.	Za	Eleocharis acicularis.
Herpestes amplexicaulis.	Zb	Bacopa amplexicaulis.
Herpestes reflexa.	Zb	Myriophyllum brasiliense.
Heteranthera formosa.	Zc	Eichhornia crassipes.
Heteranthera graminea.	Zb	Heteranthera dubia.
Hippuris maritima.	Zb	Hippuris vulgaris.
Hippuris fluviatilis.	Zb	Hippuris vulgaris.
Hydrocharis spongia.	Zc	Limnobium spongia.
Hydrocleis humboldtii.	Za	Hydrocleis nymphaeoides
Hydrilla alternfolia.	Zb	Hydrilla verticillata.
Hydrilla dentate.	Zb	Hydrilla verticillata.
Hypnum antipyreticum.	Za	Fontinalis antipyretica.
Isnardia palustris.	Zb	Ludwigia palustris.
Isnardia pedunculata.	Zb	Ludwigia arcuata.
Isoetes macrocarpa.	Za	Isoetes lacustris.
Isolepis acicularis.	Za	Eleocharis acicularis.
Justicia polysperma.	Zb	Hygrophila polysperma.
Lagarosiphon muscoides	Zb	**Miscalled** Elodea crispa.
Lemna globosa.	Zc	Woliffia arrhiza.
Limnophila reflexa	Za	Limnophila heterophylla.
Limnanthemum aquatica.	Za	Nymphoides aquatica.
Limnanthemum nymphaeoides.	Za	Nymphoides peltata.
Hypnum riparium.	Za	Leptodictyum riparium.
Limnanthemum trachysperum.	Za	Nymphoides aquatica.
Limnanthemum peltatum.	Za	Nymphoides peltata.
Limnobium bosci.	Zc	Limnobium spongia.
Limnocharis commersoni.	Za	Hydrocleis nymphaeoides.
Limnochloa acicularis.	Za	Eleocharis acicularis.
Limnophila roxburghii	Za	Limnophila heterophylla.
Leptochilus decurrens	Za	Microsorium pteropus.
Limmocharis emargnata.	Za	Limmocharis flava.
Littorella juncea.	Za	Littorella uniflora
Littorella isoetoides.	Za	Littorella uniflora
Lobelia lacustris.	Za	Lobelia dortmanna.
Ludwigia apetala.	Zb	Ludwigia palustris.
Ludwigia repens.	Zb	Ludwigia palustris.

SYNONYM	CLASS	NAME
Luronium natans.	Za	Elisma natans.
Lysimachia repens.	Zb	Lysimachia nummularia.
Lysimachia rotundifolia.	Zb	Lysimachia nummularia.
Lysimachia repens.	Zb	Lysimachia nummularia.
Marsilea europea.	Za	Marsilea quadrifolia.
Marsilea quadrifoliata.	Za	Marsilea quadrifolia.
Menyanthes nymphoides.	Za	Nymphoides peltata.
Monniera amplexicaulis.	Zb	Bacopa amplexicaulis.
Monniera caroliniana.	Zb	Bacopa amplexicaulis.
Myriophyllum chiquitense.	Zb	Myriophyllum elatinoides.
Myriophyllum alterniflorum.	Zb	Myriophyllum alternifolium.
Myriophyllum japonicum.	Zb	Myriophyllum ussuriense.
Myriophyllum mexicanum.	Zb	Myriophyllum hippuroides.
Myriophyllum nitschei.	Zb	Myriophyllum scabratum.
Myriophyllum pinnatum.	Zb	Myriophyllum scabratum.
Myriophyllum proserpinacoides.	Zb	Myriophyllum brasiliense.
Myriophyllum quitense.	Zb	Myriophyllum elatinoides.
Myriophyllum scabratum.	Zb	Myriophyllum hippuroides.
Myriophyllum siculum	Zb	Myriophyllum alternifolium.
Myriophyllum spicatum.	Zb	Myriophyllum verticillatum.
Myriophyllum montanum	Zb	Myriophyllum alternifolium.
Myriophyllum quitense.	Zb	Myriophyllum elatinoides.
Myriophyllum ternatum.	Zb	Myriophyllum elatinoides.
Myriophyllum titikaense.	Zb	Myriophyllum elatinoides.
Myriophyllum viridescns.	Zb	Myriophyllum elatinoides.
Najas fllexilia.	Za	Najas microdon.
Najas fllexilia guadelupensis.	Za	Najas microdon.
Najas guadelupensis.	Za	Najas microdon.
Najas subulata.	Za	Najas minor.
Nasturtium amphibium.	Za	Rorippa amphibian.
Nasturitium japonicum.	Zb	Cardamine lyrata.
Nasturitium palustre.	Za	Subularia aquatica.
Nummularia officinalis	Zb	Lysimachia nummularia.
Nmphaeoides europea.	Za	Nymphoides peltata.
Nmphaeoides flava.	Za	Nymphoides peltata.
Ottelia lactucaefolia.	Za	Ottelia alismoides.
Ottelia lanceolata.	Za	Ottelia alismoides.
Ouvirandra bernieriana.	Za	Aponogeton bernieriaus.
Ouvirandra undulate.	Za	Aponogeton undulatus.
Ouvirandra undulate.	Za	Aponogeton crispus.
Parkeria pteridoides	Zb	Ceratopteris thalictroides.
Peplis indica.	Zb	Rotala indica.
Pilularia natans.	Za	Pilularia globulifera.
Plantaga uniflora.	Za	Littorella uniflora.
Pleopeltis pteropus.	Za	Microsorium pteropus.
Pliotrichum antipyreticum.	Za	Fontinalis antipyretica.
Polyodium pteropus	Za	Microsorium pteropus.
Pontederia aquatica.	Zc	Eichhornia azurea.
Pontederia azurea.	Zc	Eichhornia crassipes.
Pontederia elongate.	Zc	Eichhornia crassipes.

SYNONYM	CLASS	NAME
Pontederia sagittata,	Za	Pontederia cordata.
Potamogeteton gramineus.	Za	Potamogeteton heterophyllus.
Potamogeteton americanus	Zb	Potamogeteton lucens.
Potamogeteton fluviatilis	Zb	Potamogeteton lucens.
Potamogeteton malaianus.	Zb	Potamogeteton lucens.
Pteris cornuta.	Zb	Ceratopteris thalictroides.
Pteris quadrifolia.	Za	Marsilea quadrifolia.
Pothos ovata.	Za	Orontium aquaticum.
Rapuntium cardinale.	Zb	Lobelia cardinalis.
Rapuntium dortmanna.	Za	Lobelia dortmanna
Ricciella fluitans.	Zc	Riccia fluitans.
Ruellia triflora.	Zb	Synnema triflorum.
Sagittaria bracteata.	Za	Lophocarus guyanensis.
Sagittaria brevipedicellata.	Za	Echinodorus brevipedicellatus.
Sagittaria guyanensis.	Za	Lophocarus guyanensis.
Sagittaria macrophylla.	Za	Sagittaria latifolia.
Sagittaria radicans.	Za	Echinodorus cordifolius.
Salvina biloba.	Za	Echinodorus cordifolius.
Salvina hispida.	Zc	Salvina auriculata.
Samolus americanus.	Za	Samolus floribundus.
Samolus aquaticus.	Za	Samolus floribundus.
Samolus parvifolius.	Za	Samolus floribundus.
Samolus valerandi americanus.	Za	Samolus floribundus.
Saururus lucidus.	Za	Saururus cernuus.
Scipus acicularis.	Za	Eleocharis acicularis.
Scipus radicans.	Za	Eleocharis acicularis.
Scipus uliginosus.	Za	Eleocharis acicularis.
Serpicula occidentalis.	Zb	Elodea canadensis.
Scollera. graminea.	Zb	Heteranthera dubia.
Serpentaria repens.	Za	Saururus cernuus.
Sisymbrium amphibium..	Za	Rorippa amphibian.
Stratoites alismoides.	Za	Ottelia alismoides.
Stratoites nymphoides.	Za	Hydrocleis nymphaeoides.
Sparganium erectum.	Zb	Sparganium ramosum.
Thelanthera.	Zb	Achyranthes philoxeroides.
Tillaea aquatica.	Zb	Crassula aquatica.
Tillaea prostrate.	Zb	Crassula aquatica.
Trixis palustris.	Zb	Proserpinaca palustris.
Utricularia ambigua.	Zc	Utricularia exoleta.
Utricularia biflora.	Zc	Utricularia exoleta.
Utricularia elegans.	Zc	Utricularia exoleta.
Vallisneria torta.	Za	Vallisneria asiatica.
Veronica fontinalis	Zb	Veronica beccabunga.
Veronica rotundifolia.	Zb	Veronica beccabunga.
Villarsia aquatica.	Zb	Cabomba aquatica.
Woliffia michelii.	Zc	Woliffia arrhiza.

GLOSSARY OF PLANT TERMS

abyssinicus	Abyssinian, growing in the region of present-day Ethiopia.
acicularis	pointed, like a needle acuminate tapering leaf.
aerenchyma	tissues with intercellular spaces for buoyancy.
adscendens	ascending.
adventitious	root growing directly from stalk.
affinis	akin to, related to.
afzelii	named after the Swedish botanist Afzel.
alba	white.
albida	whitish.
alismoides	water-plantain like.
algae	tiny cryptogamous plants, treated as weeds.
aloides	aloe like.
alternate	describes leaves arranged in two, but not opposite rows.
amazonicus	growing in the region of the Amazon.
americanus	American, growing in USA.
amphibius	amphibious, living in water and on land.
amplexicaulis	stem-clasping.
anaerobiosis	existence in the absence of free (useable) oxygen.
anaerobic	not requiring oxygen.
angustifolia	narrow-leafed.
antipyretica	allaying fever.
apex	top of plant.
apical	at or near the leaf tip.
aponogetifolia	with leaves resembling species of (*Aponogeton).*
appendiculatus	with small appendages.
aquaterrarium	two-section aquarium displaying aquatic and terrestrial environments; in Britain known as, Aqua-Scapes.
aquatica	water, living in water.
arcuata	curved like a bow.
arrhiza	rootless.
aschersonianus	named after the German botanist Ascherson.
asymmetrical	without symmetry.
auriculata	furnished with ear-Iike appendages .
australis	southern.
austroamericanus	southern American, growing in South America.
autofertile.	self-fertilizing.
axil.	angle between leaf and stalk.
axillary.	located on axil.
azurea.	azure-blue.
balansae	named after the French botanist Balansa.

beckettii named after Beckett who discovered the plant.
berteroi named after Bertero, Italian physician and botanist.
Bifurcated forked into two branches.
bipartite divided into two at or near the base of the leaf.
blassii named after Blass, the German importer and plant breeder.
bleherii named after Frau Bleher, founder of the aquatic plants nursery 'Lotus Osiris', in Brazil.
Boivinianus named after the Canadian botanist Boivin.
brackish fresh water mixed with sea water.
bract. organ resembling a small leaf.
Brasiliensis Brazilian, growing in Brazil.
brevipes short-stemmed.
bulb collection of tightly-packed stored fleshy leaves.
bullate Tip of leaf ending in a blunt tip.
bullosa inflated, bladder-like.
calamus reed-like.
calyx the outer green whorl of a flower plant
cardinalis scarlet-red.
Caroliniana from Carolina (North America USA).
Chlorophyll pigment making plants green. Essential for photosynthesis.
chlorosive a plant disease causing the loss of chlorophyll.
ciliate fine hairs, fringed, as with eye lashes.
circinatus rolled circularly.
coloratus coloured.
cordata heart-shaped.
cordifolius with heart-shaped leaves.
coriaceous leather like leaves.
cornuta horned or spurred.
corm an onion type root.
Corymbosa arranged in corymbs, ie clusters.
costata ribbed, as in prominent leaf veins.
crassipes with thick stem.
crenata having rounded teeth like leaves.
crispatei wavy edges to the leaves.
crispus crisp - as in brittle, parts easily break off or come away.
cumlis with finely divided leaves (*Myriophyllum)*.
decussate (in a cross) four leaves in a cross from the stem or in pairs of opposite shoots at right angles to pair below.

demersum	submerged.
densus	dense – as in foliage.
dentate	dog teethed edge to leaf (fillical).
denticulate	edged with small serrations.
diandra	with two stamens.
difformis	differently formed.
dimorphism	two different leaves on the same plant.
discoidal	disc-shaped.
distachyos	with two spikes or ears.
distichous	leaves arranged in two vertical lines on opposite sides of stem.
diversifolia	with leaves of different shapes.
dubia	doubtful.
dubyana	named after Duby, Swiss theologian and botanist.
dystrophic	lack of nutrition (plant food).
echinatus	echinate, with numerous rigid hairs or spines.
elliptiform	ellipse-shaped.
elongates	elongated.
emersed	plant or leaves growing out of water.
epiphyte	plant which grows on another (but not a parasite).
erectum	erect.
filiformis	shaped like threads.
fluitans	floating, swimming.
fluviatilis	river, living in rivers.
foliar	of a leaf.
frond	fern like, name given to 'leaves' of ferns.
gayi	named after the French botanist Gay.
gibba	humped, hunch-backed.
gigantean	gigantic.
globulifera	bearing small globes (buds).
graminea, -us	grass-like.
glisebachii	named after the German botanist Grisebach.
guadalupensis	from Guadelupe, Mexico.
guillottii	named after the French botanist Guillot.
hederaceus	ivy-like.
heliophile	sun-loving.
helmsii	named after the Australian botanist Helms.
henkelianus	named after Henkel, a German nursery for aquatic plants.
heterophylla -um	having leaves of more than one kind on the same plant.
heudelotii	named after Heudelot, the collector of the plant.

hippuroides resembling horse's tail *(Hippuris*).
horemanii named after the British aquarist Horeman, collector of the plant.
Horizontali horizontal.
hottoniiflora resembling the flowers of the genus *Hottonia.*
humboldtiana named after the German naturalist Humboldt.
indica growing in India.
inflata inflated, floating bladders.
inflorescence arrangement of flowers.
internode space between two nodes.
japonica Japanese, growing in Japan.
laciniate irregularly divided into narrow segments.
lacustris living in ponds or lakes.
laevigatum smooth.
lamina wide part of leaf connected to stem by petiole.
lanceolate –um lanceolate, spear-shaped.
latifolium, -us with broad leaves.
legroi named after the Dutch botanist Legro.
leucocephala with white heads.
longifolia, -us having long leaves.
Longiplumolosus having a long plumula (shoot vegetation cone on the embryo in the seed).
lucens shining, glistening.
lutea yellow.
Iyrata lyre-shaped.
macrandra with large anthers.
madagascariensis from Madagascar.
maior, major large.
malinverniana named after Malinverni who discovered the plant.
mesophyll the part of the plant leaf between the vertical and lateral leaf nerves. (as in *Aponogeton fenestralis).*
Micranthemoides resembles the genus *Micranthemum.*
minima very small.
minor small.
monniera named after Monnier, French physician/botanist.
montevidensis growing near Montevideo (South America).
monticola growing on hills.
morsus-ranae Frogbit (an old plant name).
myriophylloides resembling water milfoil *(Myriophyllum).*
nana dwarf-like.

natans	swimming.
neotropicalis	neotropical, growing in South America.
nervure	a leaf vein.
nevillii	named after Nevill who discovered the plant.
node	emergence point of leaves.
nummularia	round and flat, like a coin.
nuttalli	named after the British botanist Nuttall.
octandrus	having eight stamens.
oligotrophic	lacking plant nutrients.
opacus	dark, with a dull surface.
osiris	named after the plant nursery 'Lotus Osiris', in Brazil.
palustris	bog, swamp loving.
papilla	hair like protuberance.
parva	small.
parviflorus	having small flowers.
parvula	very small.
pecinate	comb like, toothed.
peltata	shield-shaped.
perfoliatus	having the stem passing through the leaf.
petchii	named after the British botanist Petch.
petiole	thin stalk connection between leaf and stem.
phyllode	a petiole serving as a leaf.
piauhyensis	growing in the Brazilian state Piaui (formerly Piauhy).
pinnate	quill-feather like, pointed.
pinnatified	pointed and tooth like.
plantago-aquatica	plantain in water (an old plant name).
platyphylla	having broad leaves.
pleuston	mats of small floating plants.
plumiform	feather- or plume-shaped.
polyrrhiza	thickly-rooted.
polysperma	bearing many seeds.
pontederiifolia	with leaves resembling species of *Pontederia*.
portoalegrensis	growing near Porto Alegre (South America).
pseudacorus	false *Acorus.*
pteridioides	resembling the genus *Pteridium.*
pteropus	having a winged stem.
pulcherrima	most beautiful.
pumila	low or little.
purpurascens	turning purple.
purpurea	purple.
quadricostatus	four-ribbed.

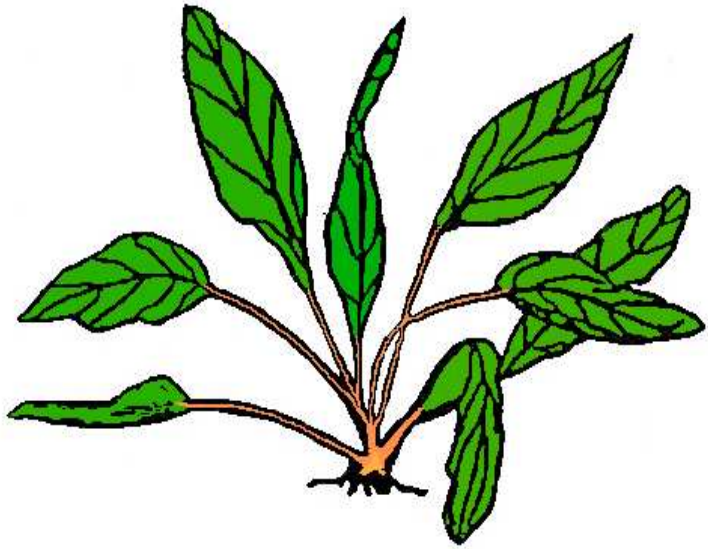
quadrifolius having four leaves or groups of four.
rachis the elongated axis of a compound leaf or flower.
radial arranged like rays.
radicle secondary root.
rhizoid the fulliments that anchor mosses to the bottom
ranunculoides resembling *Ranunculus.*
reineckii named after Reineck collector of the plant.
reniform kidney-shaped.
repens creeping.
retrospiralis coiled backwards.
rheophiles plants living in currents.
Rhizome subterranean or creeping stalk.
rigidifolius with stiff leaves.
rosette circlet of leaves around root neck.
rotundifolius with round leaves.
sagittifolia with arrow-shaped leaves.
salicaria willows, resembling *Salix.*
scabratum rough, sharp *schreberi* named after German botanist Schreber.
senegalensis growing in Senegal.
sessiliflora bearing sessile flowers.
sessilis sessile, lacking a stalk.
setacea bristly.
siamensis Siamese, growing in Thailand (formerly Siam).
spathe modified leaf surrounding flower.
spicatum spike-like.
spiralis coiled.
Spongia spongy.
stem a thick fleshy stalk connection between the leaf and root.
stolon creeping shoot.
stratiotes sword-shaped.
subulata slightly winged.
subulatus awl-shaped.
submesred growing under water.
submersum submerged.
symbiosis plants attached and living together.
tenellus very tender - soft.
teres cylindrical.

ternise	divided into three.
tetragona	four-sided.
thaianum	growing in Thailand.
thalictroides	resembling *Thalictrum.*
thallus	lower plant with or without roots, and simple leaves.
thwaitesii	named after the British botanist Thwaites.
trichophyllum	with hairy like leaves.
trifoliate	having three leaves or leaves in sets of three.
trisulca	with three grooves.
ulvaceus	resembling *Ulva,* a marine algae.
umbellatus	umbellate.
umbrosum	shade loving.
undulates	wavy edged leaves.
Utricle	bladder like single seed pod.
uruguayensis	growing in Uruguay.
ussuriense	growing in the river Ussuri.
valerandi	named after the botanist Valerand.
veins	fibrovascular groups forming the basic framework in leaves.
verticillata, -um	whorled.
vesiculosa	covered with little blisters or bladders.
virginica	growing in the North American State of Virginia.
vivipara	live-bearing, plantlets at leaf ends or from stalk nodules.
vulgaris	common, ordinary.
walkeri	named after the North American botanist Walker.
wallichii	named after the Danish botanist Wallich.
weatherbiana	named after the North American botanist Weatherby.
wendtii	named after Wendt, German aquarist and plant expert.
willisii	named after the Australian botanist Willis.
whorl	a circular fillimentos leaf surrounding the stem or petiole.
zosterifolia	leaves like Eel Grass *(Zostera).*
zosteriformis	Eel Grass-like *(Zostera).*

Federation of British Aquatic Societies

FBAS

JUDGES & STANDARDS COMMITTEE



AQUATIC PLANTS

SHOW CLASSES
&
JUDGING INFORMATION

FEDERATION OF BRITISH AQUATIC SOCIETIES

INTERESTED IN PLANTS?

Visit the annual

FESTIVAL OF FISHKEEPING WEEKEND

and view the Society and Individual Furnished Aquariums Competitions.

Alternatively, why not take a look at Malcolm Goss's presentation of

Aquatic Plants

available on DVD from the FBAS.

Details of all the Federation's services with FREE PUBLICATIONS downloads at

www.fbas.co.uk

INDEX OF AQUATIC ROOTED PLANTS

Hydrocotyle verticillata. Za22
Hydrocotyle vulgaris. Za22
Hypnum dubyana. Za22
Isoeties fllaccida. Za22
Isoeties lacustris. Za22
Isoeties malinverniana. Za22
Isoeties setacea. Za22
Isoeties velata. Var:sicula. Za22
Lagenandra koenigii. Za22
Lagenandra lancifolia. Za23
Lagenandra meeboldii. Za23
Lagenandra ovata. Za23
Lagenandra thwaitesii. Za23
Lagenandra toxicaria. Za23
Lagenandra ovata. Za23
Lilaeopsis brasiliensis. Za23
Lilaeopsis novae-zellandiae. Za23
Lobelia cardinalis. Za23
Lobelia dortmanna. Za23
Marsilea crenata. Za24
Marsilea exarata. Za24
Marsilea europea. Za24
Marsilea drummondii. Za24
Marsilea hirsiata. Za24
Marsilea minuta. Za24
Marsilea natans. Za24
Marsilea quadrifolia. Za24
Micrathemum umbrosum Za24
Microsorium pteropus. Za24
Nuphar japonica. Za24
Nuphar japonica.
Var: rubrotinctum. Za24
Nuphar luteum. Za25
Nuphar microphyllum. Za25
Nuphar pumillum. Za25
Nuphar sagittifolium. Za25
Nuphar rubrotinctum. Za25
Nymphea maculata Za25
Nymphoides cristata. Za25
Ophiopogon japonicus. Za25
Ottelia cordifolia. Za25
Ottelia kunenensis. Za25
Ottelia lanceolata. Za25
Ottelia mesenterium. Za25
Ottelia muricata Za26
Ottelia ulvifolia. Za26
Pilularia americana. Za26
Pilularia globulifera. Za26
Regnellidium diphyllum. Za26
Sagittaria eatonii. Za26
Sagittaria filiformis. Za26
Sagittaria graminea. Za26
Sagittaria graminea
graminea Za26
Sagittaria graminea
platyphylla Za26
Sagittaria graminea
teres Za26
Sagittaria isoetiformis. Za26
Sagittaria lancifolia. Za26
Sagittaria lorata. Za26
Sagittaria natans. Za26
Sagittaria platyphylla. Za26
Sagittaria pusilla. Za26
Sagittaria subulata. Za27
Sagittaria subulata
gracillima. Za27
Sagittaria subulata
kurziana. Za27
Sagittaria subulata
subulata. Za27
Sagittaria teres. Za27
Samolus floribundus. Za27
Samolus parviflorus. Za27
Spathiphyllum wallisii. Za28
Spiranthes cernua. Za28
Spathiphyllum grandifolis. Za28
Scirpus vivipara. Za28
Stelliera radicans. Za28
Stratiotes alismoides. Za28
Vallisneria aethiopica. Za28
Vallisneria americana. Za28
Vallisneria asiatica Za28
Vallisneria asiatica.
Var: biwaensis. Za28
Vallisneria gigantica. Za28
Vallisneria gracilis. Za28
Vallisneria natans biwaensis. Za28
Vallisneria natans natans. Za29
Vallisneria neotropicalis. Za29
Vallisneria spiralis. Za29
Vallisneria spiralis.
Var: portugalensis. Za29
Vallisneria torta. Za29
Vesicularai dubyana Za29
Xyris pauciflora. Za29

ADDING PLANTS

The last page of the plants index for each of the three exhibition categories is available for you to list the details of any unlisted plant that you see.
Before listing a plant however you must be reasonably sure that it is an Aquatic Plant. If convinced then list it so.

- First, the name of the plant and the book, catalogue or source that lists it. A photocopy of the page or catalogue would be helpful.

- What points did you, or would you, award it under **'Difficulty'** and why?

- Describe how the plant should be presented for 15 **Points for Growth** to be awarded. For example: the height, the colour, the number of leaves, their type, texture, length and width. Give as much information as possible. Also if possible take several digital photos, or ask anyone to do so for you, at Shows many Judges and Show organisers have digital cameras to hand.

- Finally please send all this information to the Secretary of the Judges & Standards Committee "The J&S". With your written description either printed or hand-written in block capitals please. All can be sent including Digital photographs by email without any loss of quality (the J&S Secretary's address and email from the FBAS website www.fbas.co.uk

NAME	Diff	POINTS FOR GROWTH

NAME	Diff	POINTS FOR GROWTH
Acorus gramineus gramineus.	15	15 for a plant with 8 200mm long 4mm wide reed like green leaves with acute tips.
Acorus gramineus verirgatus,	15	15 for a plant with 8 200mm long 4mm wide green and yellow striped reed like leaves acute tips.. Often grown emersed.
Acorus gramineus pusillus.	15	15 for a plant with 10 75mm long 4mm wide green reed like leaves acute tips.
Acorus intermedius.		No information available.
Aglaonema simplex.	16	15 for a plant at 250mm high with 7 mid-green leaves.
Amauriella auriculata.	15	15 for a plant with 8 300mm dark-green elongated cordate leaves.
Amauriella hastifolia.	15	15 for a plant at 300mm high with 8 dark-green hastate leaves.
Amblystagium riparium.	15	See Leptodichyum riparium.
Anubias afzellii.	15	15 for a plant with 8 250mm long dark-40mm wide green cordate leaves.
Anubias barteri.	15	15 for a plant with 8 dark-green 150mm long 30mm wide ovate leaves. Leaves have raised mid-vein with several lateral veins both sides of the mid-rib.
Anubias barteri. Var: angustifolia.	15	15 for a plant with 8 greenish-yellow broad lanceolate leaves 150mm long, 20mm wide. Leaves have raised mid-rib with several lateral veins both sides of the mid-rib.
Anubias barteri. Var: barterli.	15	15 for a plant with 8 dark-green sub-cordate leaves 200mm long, 100mm wide. Leaves have a raised mid-rib with several lateral veins both sides of the mid-rib.
Anubias barteri. Var: caladiifolia.	15	15 for a plant with 8 dark-green sub-cordate leaves 200mm long, 100mm wide. Leaves have a raised mid-rib with several lateral veins both sides of the mid-rib.

NAME	Diff	POINTS FOR GROWTH
Anubias barteri. Var: coffeefolia.	15	15 for a plant with 8 dark-green sub-cordate leaves 150mm long, 100mm wide. Leaves both arch and have slight undulations. The mid-rib has several veins branching from it both sides of the mid-rib.
Anubias barteri. Var: glabra.	15	15 for a plant with 8 green 100mm long 30mm wide lanceolate leaves with blunt tips, New leaves are brownish-red with a raised mid-vein with several lateral veins both sides of the mid-rib.
Anubias barteri. Var: Nana.	15	15 for a plant with 10 dark-green 100mm long 50mm wide broad lanceolate leaves with a blunt to rounded tip. Leaves tend to grow horizontally. The most common of the species.
Anubias barteri. Var: Nana 'Petite'.	17	15 for a plant with 15 mid-green 80mm long 40mm wide broad sub-cordate leaves with a blunt tips. Leaves tend to grow horizontally. The most common and smallest of the species.
Anubias congensis.	15	15 for a plant at 200mm high with 8 dark-green sub-cordate leaves.
Anubias gilletii.	15	15 for a plant at 150mm high with 8 dark-green 150mm long 75mm wide leaves variable from sub-cordate to a wide spear shape. Leaves have a distinct mid-vein with several 30^0 angled lateral veins from both sides of the mid-rib.
Anubias gracilis.	15	15 for a plant with 8 dark-green 100mm long 45mm wide sub-cordate leaves, tending to be more triangular in shape. Leaves have a distinct mid-vein with several 45^0 angled lateral veins from both sides of the mid-rib.
Anubias heterophylla.	15	15 for a plant with 8 mid-green 150mm long 30mm wide broad lanceolate leaves. Leaves with a semi-acute tip and lighter on the under side.
Anubias lancolata.	15	15 for a plant at 250mm high with 8 dark-green spear leaves.

NAME	Diff	POINTS FOR GROWTH
Aponogeton abyssinicum.	15	15 for a plant at 100mm high with 8 dark-green leaves, which although elongated have a basic ovate shape to them.
Aponogeton appendiculatus.	15	15 for a plant at 250mm high with 8 dark green petiolate leaves, edges slightly elongated wavy. Veins parallel to midrib.
Aponogeton bernerianus. False Lace Leaf.	17	15 for a plant at 280mm high with 6 mid-green sub-cordate leaves, which when past there prime turn light brown. Mature leaves with a few holes caused by the loss of some of the leafs mesophyll.
Aponogeton bolvianus.	17	15 for a plant at 300mm high with 10 dark green laqnceolate leaves with blunt tips. Leaves extremely bullate, with a very crinkled edge.
Aponogeton bulosus.	15	An Australian protected species should treat with doubt any specimen so named.
Aponogeton capuroni.		No description found, treat with extreme doubt any specimen so named.
Aponogeton crispus.	15	15 for a plant at 30mm high with 12 dark green leaves, which are tightly crinkled edges.
Aponogeton distachyos.	15	15 for a plant with 8 dark-green leaves 250mm long
Aponogeton echinatus.	15	15 for a plant with 15 300mm long brownish green leaves, that have an undulating edge.
Aponogeton elongatus.	15	15 for a plant at 300mm high with 12 olive-green leaves, which although they are elongated have a wavy edge to them.
Aponogeton fenestralis.		See Aponogeton madagascarienis.
Aponogeton guillotii.		See Aponogeton madagascarienis.
Aponogeton henkelianus. Lace Leaf.	18	15 for a plant at 280mm high with 6 mid-green cordate leaves, which when past there prime turn light brown. Mature leaves with many holes caused by the loss of most of the leaf's mesophyll.

NAME	Diff	POINTS FOR GROWTH
Aponogeton longiplumulosus.	15	15 for a plant with 10 light green lanceolate blunt pointed leaves, edges slightly wavy.
Aponogeton loriae.	15	15 for a plant with 8 light green lanceolate 200mm long 25mm wide leaves, new leaves often with a reddish hue. Leaf edges with slight undulations.
Aponogeton madagascarienis. Lace Leaf.	18	15 for a plant at 280mm high with 6 mid-green cordate leaves, which when past there prime turn light brown. Mature leaves with many holes caused by the loss of most of the leaf's mesophyll.
Aponogeton natans.	14	15 for a plant at 250mm high with 9 light green leaves floating leaves are seen in the summer.
Aponogeton rigidifolius.	15	15 for a plant at 300mm high with 8 olive green leaves. Leaves have leathery appearance to them.
Aponogeton stachyosporus.	15	15 for a plant at 200mm high with 8 leaves, the plant is viviparous and will sometimes have plantlets attached to mature leaves.
Aponogeton ulvaceus.	15	15 for a plant at 325mm high with 8 light green translucent undulating 65mm wide
Aponogeton undulatus.	16	15 for a plant at 350mm high with 10 light green translucent leaves. Similar to Aponogeton ulvaceus. but leaves are narrower and veined differently.
Aponogeton vallisnerioides.	17	15 for a plant at 180mm high with 8 leaves dark green ovate spear leaves, with blunt tips.
Armoracia aquatica.	15	15 for a plant at 200mm high. Young plants have individual leaves. Adult leaves alter to become similar to Synnema trifolrum.
Barclaya longifolia.	17	15 for a plant with 10 200mm 20mm wide leaves, depending on the variety the leaves can be from red to brown or olive-green. Leaves lanceolate with undulated edges and soft texture with bud or flower spike acceptable emersed.

NAME	Diff	POINTS FOR GROWTH
Barclaya motleyi.		No description available.
Barclaya rotundifolia.		No description available.
Blyxa aubertii.	15	15 for a plant at 300mm high with 15 mid-green pointed rush like leaves.
Blyxa echinosperma.	15	15 for a plant at 250mm high with 20 rush like leaves.
Blyxa japonica.	15	15 for a plant at 225mm high with 20 mid-green pointed rush like leaves.
Blyxa leiosperma.	15	15 for a plant at 200mm high with 20 mid-green rush like leaves.
Blyxa novoguinensis	15	15 for a plant at 200mm high with 20 rush like leaves.
Blyxa octanda.	15	15 for a plant at 300mm high with 15 light green pointed rush like leaves.
Blyxa radicans.	15	15 for a plant at 250mm high with 20 pointed rush like leaves.
Bolbitis heteroclita.	16	15 for a clump 225mm high and 200mm diameter. Leaves light green. Must be shown attached to a rock or bark etc.
Bolbitis heudelotii.	16	15 for a clump 225mm high and 200mm diameter. There are three leaf types with varied colour. Shown attached to a rock, bark or any other natural material.
Crinum calamistratum.	16	15 for a plant 8 dark-green leaves 180mm long 8 to 10mm wide basal lanceolate leaves with extreme crinkled edges and distinct midrib. Grown from a small bulb.
Crinum natans.	15	15 for a plant 8 pale green leaves 180mm long 10mm wide basel lanceolate leaves with crinkled edges and distinct midrib. Leaves lay on the substrate. Grown from a bulb.
Crinum natans. Var: Broad Leaf.	15	15 for for a plant 8 mid-green 180mm long 10 to 12mm wide basal lanceolate leaves with crinkled edges and a distinct midrib. Leaves often lay on the substrate. Grown from a bulb.

NAME	Diff	POINTS FOR GROWTH
Crinum purpurascens.	15	15 for for a plant 8 green leaves that have bluish tints 180mm long 10mm wide basal lanceolate leaves with a distinct midrib. Leaves often lay on the substrate. Grown from a bulb.
Crinum thaianum.	15	15 for for a plant 8 light green leaves 200mm long 15mm wide basel lanceolate leaves with crinkled edges. Leaves spread out on the substrate. Grown from a bulb.
Crinum "torifolia".		Not suitable for home aquaria.
Cryptocoryne affinis.		See Cryptocoryne haerteliana.
Cryptocoryne albida.	15	15 for a plant at 200mm with 8 green leaves, twisted upper leave with recurved tips, long red/brown leaf markins
Cryptocoryne aponogetifolia.	16	15 for a plant with 7 200mm long 40mm wide green lanceolate bullate leaves. Petioles are around a ¼ of the leaf length.
Cryptocoryne auriculata..	15	15 for a plant with 6 90mm long 30mm wide green ovate leaves. Top of leaf a blunt acute tip. Petioles green, thick and ¼ of leaf length.
Cryptocoryne axelrodi.		See Cryptocoryne willisi
Cryptocoryne balansae.		See Cryptocoryne usteriana
Cryptocoryne beckettii.	15	15 for a plant at 200mm with 7 pointed wavy edged leaves, from dark green to red. A very variable plant is known by many other names.
Cryptocoryne blassii.	18	15 for a plant with 5 200mm long leaves and 100mm stems. Upper side of leaf a dark green and red mixture, red on the underside.
Cryptocoryne bogneri.		See Cryptocoryne beckettii.
Cryptocoryne bullosa.	15	15 for a plant with 7 180mm dark green elongated oval wavy edged leaves, leaves very bullated.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne ciliata.	17	15 for a plant with 6 180mm long mid-green broad lanceolate pointed leaves. Top of leaf with an extended acute tip. Petioles thick and fleshy. The spathe has thread like growths, Hence the name.
Cryptocoryne ciliata. Var: latifolia.	17	15 for a plant with 8 175mm broad mid-green pointed broad lanceolate leaves. Top of leaf an acute tip. Underside of leaf a much lighter green than the upper side. Petioles thick and fleshy.
Cryptocoryne cordata.	15	15 for a plant with 6 150mm cordate leaves mottled green or red according to age, underside of leaf always red.
Cryptocoryne costata.	18	15 for a plant with 6 300mm red rusty brown laqnceolate leaves with many irregular violet markings on the upper side of the leaves showing through below.
Cryptocoryne crispatula.	16	15 for a plant with 10 500mm long 30mm wide mid-green thin lanceolate leaves, with much indented edges. Petioles ½ length of the leaf.
Cryptocoryne dieterici.		No description found maybe a trad name.
Cryptocoryne elliptica.	15	15 for a plant with 5 100mm leaves and 100mm stems. Leaves upper olive green red underside, slightly bullate, heavy veined wide and blunt tiped.
Cryptocoryne ferruginea.	15	15 for a plant with 8 80mm long 45mm wide cordate pale green-leaves, slight undulations on the leaf edges, tip bullate. Stems often longer then the leaves.
Cryptocoryne fusca.		Not suitable for aquarium use.
Cryptocoryne grandis.	15	15 for a plant with 5 100mm leaves and 125mm red/green stems that are longer than leaves. Heavy veined on upper side.
Cryptocoryne griffithii.	15	15 for a plant with 5 175mm light green leaves pink marbling and spots on underside.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne haerteliana.	15	15 for a plant at 175mm with 8 deep green upper side leaves underside red. Leaf veins prominent.
Cryptocoryne hansenii.		See Cryptocoryne albida.
Cryptocoryne hejnyi.		See Cryptocoryne purpurea.
Cryptocoryne johorensis.		See Cryptocoryne willisi.
Cryptocoryne johorensisica.	17	15 for a plant with 6 125mm cordate leaves, upper olive-green red undersides, leaves wide, heavy veined and bullate with 115mm long petioles. Tips blunt.
Cryptocoryne korthausae.		See Cryptocoryne albida.
Cryptocoryne legroi.	15	15 for a plant with 8 olive-green to brownish-green upper side, reddish under side, 100mm long 30mm wide lanceolate leaves with a rounded base, leaf tip acute. Stem reddish not as long as leaf. Leaf edges undulated.
Cryptocoryne lingua.	15	15 for a plant with with five 150mm fleshy light green leaves upper spathe elongated.
Cryptocoryne longicauda.	17	15 for a plant with 5 125mm mid-green wide bullate cordate leaves with 150mm stems.
Cryptocoryne longispathe.		See Cryptocoryne retrospiralis.
Cryptocoryne lucens.	15	15 for a plant with 10 100mm long 6mm wide green leaves tapering from the slightly cordate bottom to the acute tip. Petioles reddish brown often as long as the leaf.
Cryptocoryne lueta.	15	15 for a plant with 7 green 105mm high leaves with red veins underside often spotted with fine pink dots. The petioles red and at least 1½ the length of the leaf Underside of leaves turn yellow with age.
Cryptocoryne minima.	15	15 for a plant with 7 50mm long 20mm wide broad lanceolate leaves that widest at the bottom. Leaves a flat mat green upper surface purple on underside, very slightly undulated leaf edges.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne moehlmanni.	16	15 for a plant with 8 pale green 110mm long 45mm wide green sub-cordate leaves with green stems up to 100mm long. Leaves are both slightly bullate and undulating edged.
Cryptocoryne nevillii.	16	15 for a plant with 6 olive-green lancelote leaves 70mm long 15mm at their widest stems as long or longer than the leaves, and are a lighter green than the leaves. Often mistaken as C. willisi. The leaves of nevillii never turn brown with age.
Cryptocoryne nurii.	18	15 for a plant with 5 100mm long 10mm wide bronzish dark-green lanceolate leaves. Many dark red striations on the leaves which have slight undulated edges.
Cryptocoryne parva.	16	15 for a plant with 7 short narrow olive green leaves at 100mm high. Spathe length 50mm.
Cryptocoryne petchii		See Cryptocoryne beckettii.
Cryptocoryne pontederiifolia.	15	15 for a plant with 5 large dark green cordate leaves at 250mm high with irregular violet spots and dots.
Cryptocoryne pseudobullosa.		See Cryptocoryne affinis..
Cryptocoryne purpurea.	15	15 for a plant with 6 broad mid-green spear shape leaves 275mm high, upper leaf covered with small irregular violet markings, below light green with light red veins upper markings showing through.
Cryptocoryne spiralis.	16	15 for a plant with 6 pinnate mid-green leaves 225mm high 1.5mm wide. The leaves can be very slightly wavy and are often twisted clock-wise. This plant is often confused with ether Echinodorus brevipedicellatus and Vallisneria spiralis.
Cryptocoryne retrospiralis.	16	15 for a plant with 6 pinnate mid-green leaves 180mm high 1mm wide. The leaves can be very slightly wavy and are often twisted anti-clock wise. This plant is allso confused with ether Echinodorus brevipedicellatus or Vallisneria spiralis.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne rosanrevis.		Only this known. Dark green leaves with red and white striped veins.
Cryptocoryne sarawacensis.	18	15 for a plant with 6 ovate yellow/green 150mm high wavy edged leaves, with irregular violet spots and dots.
Cryptocoryne schulzei.	18	15 for a plant with 6 violet to brown, spear leaves, 60mm long 25mjm wide, upper leaf light-brown to red interspersed with darker patches, under side light-brown. Stems, and veins pale red.
Cryptocoryne siamensis.	18	15 for a plant with 5 broad and pointed 100mm high leaves, with upper side a mixture of dark green and red, and with light red under-sides.
Cryptocoryne spiralis.	16	15 for a plant with 8 150mm long ·5mm wide lanceolate leaves, brownish-red, lighter underside. Leaves with undutating edges and a acut tip
Cryptocoryne somphongsii.		See Cryptocoryne usteriana.
Cryptocoryne sulphurea.		See Cryptocoryne pontederiifolia.
Cryptocoryne thwaitesii.	18	15 for a plant with 8 wide ovate olive-green 150mm high saw edged leaves, tinted violet with age.
Cryptocoryne tonkinensis.	17	15 with a plant with 10 pale green leaves 200mm long 5mm wide ribbon leaves, leaf upper from reddish-brown to dark-green with smooth edges, tips acut.
Cryptocoryne tortillas.		No information available.
Cryptocoryne undulata.	15	15 for a plant with 8 100mm long 10mm wide red lanceolate undulating leaves, with the upper side having thin dark slanted markings. Reddish-brown stems up to a third the length of the leaf. Leaves taper both ends, the tip a blunt acute.
Cryptocoryne usteriana.	16	15 for a plant with 6 long lanceolate slightly bullate mid-green 400mm high leaves, lateral veins lay prominent above the leaf surface.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne versteegii.	16	15 for a plant with 6 light green leaves fleshy triangular leaves 75mm high.
Cryptocoryne walkeri.	16	15 for a plant with 7 green leaves with a violet tint 150mm high, leaves have a wavy edge reddish veins and many fine pink dots on underside of the leaves.
Cryptocoryne wendtii.	16	15 for a plant with 6 120mm long 1.5mm wide spear slightly undulated leaves. Upper a yellowish-green under green. Stem a light-brown, up to 1½ times the length of the leaf
Cryptocoryne wendtii. Var: "brown".	16	15 for a plant with 8 green to brownish 160mm long 10mm wide lanceolate slightly undulated leaves with a inverted shallow V base and a bunt tip. Upper leaf muddy brownish-green, underside a reddish-brown tint. Stem brownish and up to length of leaf.
Cryptocoryne wendtii. Var: "green".	16	15 for a plant with 8 light-green leaves with a yellow tint, 160mm long 10mm wide lanceolate undulated leaves with an acute tip. underside mid-green-brown. Stem a yellowish brown and up to or longer than leaf in length.
Cryptocoryne wendtii. Var: jahnelii.	16	15 for a plant with 8 120mm long 1.5mm wide lanceolate bullate undulated leaves. Upper a deep reddish-brown, with dark black-green cross pattern. under side lighter coloured. Stem dark red- brown up to the leaf in length.
Cryptocoryne wendtii. Var: karuteri.	16	15 for a plant with 8 130mm long 15mm wide lanceolate undulated leaves a rounded base and acute tip, tapering at both ends. Upper leaf olive-green to reddish-brown, under side mid-brown. Reddish veins. Stem dark red-brown and up to the leaf in length.
Cryptocoryne wendtii. Var: 'Mi Oya'.	16	15 for a plant with 8 green 160mm long 10mm wide lanceolate undulated leaves with an acute tip. Upper leaf green with a red under side. Leaves have small dark marking on both the upper and under sides. Stem reddish-brown up to and longer than the leaves in length.

NAME	Diff	POINTS FOR GROWTH
Cryptocoryne wendtii. Var: nana.	16	15 for a plant with 10 70mm long 10mm wide lanceolate undulated long spear leaves with a cordate type base, Upper leaf olive-green to a deep reddish-brown with clear with a dark pattern, under side light-brown. Stem dark red-brown and up to leaf size in length.
Cryptocoryne wendtii. Var: rubella.	16	15 for a plant with 8 green to brownish 160mm long 10mm wide lanceolate undulated leaves with a inverted shallow vee base and acute tip. Upper leaf olive-green with a reddish tint with clear with a clear wavy darker cross pattern, under side light- brown. Stem brownish and up to the leaf in length.
Cryptocoryne willisii.	15	15 for a plant with 7 narrow olive-green 50mm long 7mm wide spear green smooth edged leaves, turning to light brown with age.
Didiplis diandra.	12	15 for a clump of plant that fills a 100mm pot'
Echinodorus amazonicus.	16	15 for a plant with 10 light-green 200mm long 20mm wide lanceolate leaves and 150mm stems, will often have runners attached.
Echinodorus amphibius.	16	15 for a plant with 10 light green 180mm lanceolate leaves and stems, Leaves wavy edged. Prominent midrib with a single vein along each side.
Echinodorus angustifolius.	17	15 for a plant with 12 pale green very narrow leaves pointed 180mm leaves and stems. Leaves elongated oval shape with a blunt point
Echinodorus 'Aquartica'	16	15 for a plant with 12 green 75mm long 30cc wide light-green ovate leaves with well rounded tips. The Petioles as long as the leaves. A compact plant.
Echinodorus argentinensis.	16	15 for a plant with 10 green 160mm long 12cc wide lanceolate leaves with an acute tip.
Echinodorus ashersonianus.	16	15 for a plant with 10 green 180mm leaves and 150mm stems, Leaves elongated oval shape with an acute tip.

NAME	Diff	POINTS FOR GROWTH
Echinodorus aureobrunata.		See Echinodorus osiris.
Echinodorus austroamericarus.	16	15 for a plant with 10 light green 100mm smooth edged leaves without stems. Often seen with runners.
Echinodorus barteroi.	18	15 for a plant with 8 light-green yellowish 180mm long 30mm wide lanceolate leaves. The leaf veins are yellow. Cordate leaves or a flower spike indicates the plant grow emersed.
Echinodorus bleheri.	16	15 for a plant with 10 dark-green 250mm long 6mm wide lanceolate leaves, acute at both ends with prominent veins.
Echinodorus bolivianus.	16	15 for a plant with 10 light-green ribbon leaves 100mm long 5mm wide with an acute tip. Petiole short and reddish at base.
Echinodorus brevipedicllatus.		See Echinodorus amazonicus.
Echinodorus cordifolius.		See Echinodorus macrophyllus.
Echinodorus glaucus.		Not suitable for the Aquaria.
Echinodorus gracilis.	15	No complete description found except it is either very small, or a Dwarf species. Treat any named with caution.
Echinodorus grandiflorus.	17	15 for a plant with 8 mid-green 150mm long 80mm wide ovate leaves with a slightly acute tip and rounded base. Petioles emerging from the base as long or longer than the leaf.
Echinodorus grisebachii.		See Echinodorus malgdallenensis.
Echinodorus horemani.	16	15 for a plant with 10 deep green 200mm lanceolate leaves and 150mm stems. leaves smooth edged with prominent veins.
Echinodorus horizotalis.	18	15 for a plant with 8 deep green 150mm broad oval leaves with pointed tips Leaves carried Horizontally.
Echinodorus intermedius.		See Echinodorus malgdallenensis.

NAME	Diff	POINTS FOR GROWTH
Echinodorus isthmicus.		Known but no information available. except it is a small Echinodorus with a typical rosette form. Treat with caution, if convinced award it (15 Dif points.) and make a note of the description and send it to the FBAS J&S.
Echinodorus latifolius.		See Echinodorus malgdallenensis.
Echinodorus leopoldina.		See Echinodorus major.
Echinodorus longifolius.		See Echinodorus angustifolius.
Echinodorus longiscapus.	15	15 for a plant with 8 green 80mm long 40mm wide spoon to ovate leaves with fleshy petioles, which can be longer than the leaves.
Echinodorus longistylus.	17	15 for a plant with 8 mid-green cordate leaves, lighter on the underside. Petioles which are four to five times longer than the leaves grow from the root stock.
Echinodorus magdalenensis.		See Echinodorus latifollus.
Echinodorus major.	17	15 for a plant with 10 light green 200mm long 30mm wide lanceolate leaves with short petioles. Leaves with wavy edges and prominate veins.
Echinodorus marophyllus.	17	15 for a plant with 10 mid-green 200mm broad oval leaves and 150mm stems. Leaves carried Horizontally.
Echinodorus martii.		See Echinodorus major.
Echinodorus muricatus.		See Echinodorus marophyllus.
Echinodorus nymphaeifolius.		Very little information available, treat with caution. Is known to be sold under another name.
Echinodorus opacus.	16	15 for a plant with 8 dark green 125mm lanceoate leaves with 80mm stems. Leaves smooth edged. This is a compact plant.

NAME	Diff	POINTS FOR GROWTH
Echinodorus osiris.	17	15 for a plant with 10 mid-green sometimes light red, 200mm long 25mm wide lanceolate leaves acute both ends with 150mm stems. Leaves with slight undulations to the edges. The 3 main leaf veins yellow. New leaves are reddish-green. Ovate leaves indicate the plant has been grown emersed.
Echinodorus osiris rubra.		See Echinodorus osiris.
Echinodorus ozelot	16	15 for a plant with 10 100mm long 50mm wide ovate leaves, olive-green on the upper surface red on the under side. There is dark marbling on both sides of the leaves. Petioles from the root stock, light-brown and can be up to twice the length of the leaves.
Echinodorus ozelot Var: "green"	16	15 for a plant with 10 100mm long 50mm wide spear leaves, with blunt tips. Green on the upper surface light-reddish-brown on the under side. Both sides have dark marbling and very slight wavy edges. Petioles from the root stock are dark-green and at least as long as the leaves.
Echinodorus palaefolius.	16	15 for a plant with 8 mid-green 100mm long 75mm wide oval leaves and short stems.
Echinodorus ozelot Var: 'Red Flame'	16	15 for a plant with 6 100mm long 10mm wide spear leaves. Mid-green on the upper surface light-green the under side. Both sides have dark marbling and very slight wavy edges. Petioles from the root stock are light-green and at least as long as the leaves.
Echinodorus palaefolius Var: latifolius.	16	15 for a plant with 8 mid-green 175mm sub-cordate leaves, the leaf vains are prominate on the upper side. The stems mid-green and can be twice as long as the leaves.
Echinodorus paniculatus.		See Echinodorus bleheri.
Echinodorus parviflorus.	16	15 for a plant with 10 green 150mm long 30mm wide broad lanceolate leaves. The stems can be as long as the leaves.
Echinodorus parvulus.		See Echinodorus tenellus.

NAME	Diff	POINTS FOR GROWTH
Echinodorus patagonicus.		See Echinodorus berteroi.
Echinodorus pellucidus.		Although the plant has been named there is no description available.
Echinodorus portolegrensis.	16	15 for a plant with 10 deep-green 150mm leaves and 150mm stems. Leaves slightly twisted and deeply veined.
Echinodorus quadricostatus.	16	15 for a plant with 10 mid-green 150mm spear shape leaves and 150mm stems.
Echinodorus radicans.		See Echinodorus macrophyllus.
Echinodorus rangerei.		See Echinodorus bleheri.
Echinodorus ranunclioides.	15	15 for a plant with 10 light green 100mm pointed lanceolate in a rosette form. A single vein runs close to the edge of each leaf.
Echinodorus rostratus.		See Echinodorus berteroi.
Echinodorus rubra.		See Echinodorus osiris.
Echinodorus scaber.	16	15 for a plant with 6 olive-green 200mm long 150 wide cordate leaves with 11 longitudinal veins, the tip is only slightly acute. Petiole as long or longer than the leaf. New leaves often have reddish speckles.
Echinodorus subalatus.	17	15 for a plant with 8 mid-green 50mm oval slightly pointed leaves with long stems that have vertical ridges running down them.
Echinodorus tenellus.	14	15 for a plant with chain of 10 connected plants light-green 100mm long 2mm wide pointed lanceolate leaves
Echinodorus tenellus tenellus.	14	15 for a plant with chain of 10 connected dark-green plants 100mm long 2mm wide pointed lanceolate leaves
Echinodorus tocantins.		See Echinodorus parviflorus.
Echinodorus tunicatus.		Not described a point of sale name. Treat with caution.
Echinodorus undulatus.		See Echinodorus horemanii.

NAME	Diff	POINTS FOR GROWTH
Echinodorus uruguayensis.	17	15 for a plant with 10 very dark green 200mm elongated spear leaves with very slight wavy edges and 150mm stems. Leaves sometimes have a tinge of red.
Echinodorus xinguensis.		See Echinodorus quadricostatus.
Elatine macropoda.	15	15 for a plant with a chain of 10 connected plants 17mm long 3mm wide light-green small sub-cordate leaves. With an obtuse tip and a pronounce central vein. This is a low creeping plant.
Eleocharis acicularis.	15	15 for a plant with 10 dark green 200mm acut leaves. A distinct central vein and two indistinct outer veines Leaves will often have brown tips.
Eleocharis minima.	15	15 for 15 for 10 dark green 200mm acut very thin ·5mm wide leaves. A distinct central vein and two indistinct outer veins Leaves will often have brown tips.
Eleocharis parvula.	15	15 for a plant with 10 mid-green 80mm long acute very thin ·5mm wide leaves. A distinct central vein and two indistinct outer veins Leaves with no brown tips.
Eleocharis vivipara.	18	15 for a plant with a well matched plants, will often have brown tips and small plantlets attached to the leaves.
Fontinalis antipyretica.	15	15 for a 100mm clump of dark green plants. Shown attached to rock, bark or any other material.
Glossadelphus zollingeri.	14	15 for a dark green bunch 150mm across. With strong upright rounded fronds free from blanket weed. Shown attached to rock, bark or any other material.
Eleocharis prolifera.		See Eleocharis viviprar
Glossostigma diandra.	17	15 for a plant with a chain of connected plants with green sub-ovate 8mm long 4mm wide green leaves, whose base narrows into a petiole as long as the leaf.
Glossostigma elatinoides.	17	15 for a plant with a chain of connected plants with green spatulate 8mm long 4mm wide green leaves, whose base narrows into a petiole as long as the leaf.

NAME	Diff	POINTS FOR GROWTH
Hydrocotyle leucocephala.	14	15 for a plant 200mm high, leaves kidney shaped with many small indentations around the edges. Grows towards the light source with rootlets extruding from every stem nodule.
Hydrocotyle americana.		No information available. Treat so named plants with caution.
Hydrocotyle verticillata.	12	15 for a group of 8 well matched plants 30mm long on one runner. Leaves kidney shape with many small indentations around the edges. The leaf veins extend from a center hub which is indented giving a saucer effect.
Hydrocotyle vulgaris.	12	15 for a group of 8 well matched plants on one runner 30mm long pelate mid-green leaves with many small indentations around the edges. The leaf veins extend from a center hub which is indented giving a saucer effect.
Hypnum dubyana.		See Vescularai dubyana.
Isoetes flaccida.	14	15 for a plant with 10 dark green quill like and acut tapering leaves, rectangular in section.
Isoetes lacustris.	14	15 for a plant with 10 dark-green acute needle leaves, 180mm long ·3mm wide, round in section. Tip of leaves with a hook like seta may not be present on tip of aquarium plants
Isoetes malinverniana.		See Isoeties velata var: sicula.
Isoetes setacea.	14	15 for a plant with 10 light-green 180mm quill like acute leaves, round in section. Tip of leaves with a hook like seta may not be present on tip of aquarium plants.
Isoetes velata. Var: sicula.	15	15 for a plant with 10 dark mid-green 250mm acute quill like leaves, triangular in section. Leave rise with a slight spiral and are semi-translucent.
Lagenandra koenigii.		No description available.

NAME	Diff	POINTS FOR GROWTH
Lagenandra lancifolia.	16	15 for a plant with 6 mid-green lanceolate leaves 150mm long 4mm wide with an acuminate tip. Petiole approximately the same length as the leaf.
Lagenandra meeboldii.	16	15 for a plant with 8 mid-green l350mm long 12mm wide lanceolate to ovate leaves that are acute at both ends. Thick fleshy petiole approximately the same length as the leaf. Basal leaves folded or curled shut. Only suitable for the large Aquarium.
Lagenandra ovata.	16	15 for a plant with 10 mid-green lanceolate 100mm smooth edged leaves. Thick fleshy petiole. Basal leaves folded or curled shut.
Lagenandra thwaitesii.	16	15 for a plant with 10 100mm light-green laqnceolate rough silver edged leaves. A thick fleshy petiole approximately the same length as the leaf. Basal leaves folded or curled shut.
Lagenandra toxicaria.	14	15 for a plant with 10 80mm mid-green lanceolate leaves, Petiole approximately the same length as the leaf. Basal leaves folded or curled shut. Leaves wider than with Lagenandra ovata.
Lagenandra ovata.	17	15 for a plant with 8 400mm long 150mm wide mid-green lanceolate to slightly ovate leaves that are acute at both ends. Petiole approximately the same length as the leaf. Only suitable for the large Aquarium.
Lilaeopsis brasiliensis.	16	15 for a chain of 10 connected plants with green thin grass like lanceolate 100mm long 5mm wide leaves with obtuse tips, whose base narrows into a short petiole.
Lilaeopsis novae-zellandiae.	16	15 for a chain of 10 connected plants with green grass thin lanceolate 100mm long 5mm wide leaves, whose base narrows into a short petiole.
Lobelia cardinalis.	14	15 for a plant with 10 mid-green soft leaves. Hard leaves indicates plant grown emersed.
Lobelia dortmanna.	16	15 for a plant with 10 mid-green soft or invert cordate shape leaves. Hard leaves indicates plant grown emersed.

NAME	Diff	POINTS FOR GROWTH
Marsilea crenata.	12	15 for a plant with a chain of 10 mid-green plants with 100mm stems, on one runner. Leaves divided into four equal triangular segments with rounded outer edge.
Marsilea europea.		See Marsilea crenata.
Marsilea exarata.	12	15 for a plant with a chain of 10 light-green plants with sub-ovate 5mm leaves on one runner. Petioles up to 30mm long.
Marsilea drummondii.	12	15 for a plant with a group of 6 green 110mm long stems on one runners root system. Stems topped with leaves divided into four equal triangular segments with toothed outer edges.
Marsilea hirsiata.	12	15 for a plant with a chain of 10 mid-green plants with 100mm petiolate, on one runner. Leaves divided into four equal triangular segments with curved outer edge.
Marsilea minuta.		See Marsilea crenata.
Marsilea natans.		See Marsilea crenata.
Marsilea quadrifolia.	15	15 for a plant with 8 floating mid-green leaves, no immersed leaves.
Micrathemum umbrosum.	18	15 for a plant with a chain of 8 mid-green plants 100mm high on one runner. Small 5mm plus circular leaves in opposite pairs on a main stem.
Microsorium pteropus.	16	15 for a plant with 10 deep green leaves which have dark brown or black marks in the leaves. Should have several offshoots. Shown attached to rock, bark or any other natural material.
Nuphar japonica.	17	15 for a plant with 5 125mm long 50mm wide cordate leaves. Varied leaf colours on same plant from light and dark green to light brown.
Nuphar japonica Var: rubrotinctum.japonica,	17	15 for a plant with 5 125mm long 50mm wide cordate leaves. A variety of Nuphar with red-brown leaves.

NAME	Diff	POINTS FOR GROWTH
Nuphar luteum.	16	15 for a plant with 6 125mm light green soft cordate leaves. on long stems. Leaves with a wavy edge and without Coarse rhizomes.
Nuphar microphyllum.	16	15 for a plant with 6 125mm light green soft round cordate leaves on long stems.
Nuphar pumillum.	14	15 for a plant with 6 125mm mid-green cordate leaves on long stems. Leaves wavy edged without coarse rhizomes.
Nuphar sagittifolium.	16	15 for a plant with 6 125mm mid-green soft pear shape leaves on long stems.
Nuphar rubrotinctum.	17	15 for a plant with 6 125mm mid-green soft long 50mm wide cordate leaves. Varied leaf colours on same plant from light and dark green to light brown.
Nymphea maculata.	17	15 for a plant with six or more wavy edged purple leaves on dark brown 300mm stems.
Ophiopogon japonicus.		A grass like plant with leaves that curl over and down at the top. No other information available at this time.
Ottelia alismoides.	17	15 for a plant with 8 100mm long 45mm wide light-green sub-cordate leaves with petioles as long as the leaves. The base slightly saw edged. Several veins run the length of the leaf with the leaf between them convex bullate. Leaves often curled at the edges.
Ottelia cordifolia.	18	15 for a plant with 8 100mm dark-green ovate leaves with petioles fleshy petioles.
Ottelia kunenensis.	18	15 for a plant with 8 250mm dark-green lanceolate leaves without petioles and smooth edges.
Ottelia lanceolata.	16	15 for a plant with 8 150mm light-green cordate leaves with petioles as long as the leaves. Leaves often curled at the edges.
Ottelia mesenterium.	18	15 for a plant with 10 150mm dark-green lanceolate leaves with 75mm fleshy petioles. Leaves with very crinkled wavy edges.

NAME	Diff	POINTS FOR GROWTH
Ottelia muricata.	18	15 for a plant with 10 250mm light-green lanceolate leaves, leaves without petioles and with saw edges and much crinkled edges.
Ottelia ulvifolia.	17	15 for a plant with 10 150mm dark-green to brownish-green broad lanceolate leaves. Petioles 25mm long thick and fleshy.
Peplis diandra.		No information available.
Piularia americana.		See Piularia globulifera.
Piularia globulifera.	18	15 for a plant with a chain of 10 light-green plants 80mm long 1mm wide pinnate leaves on one runner.
Regnellidium diphyllum.	18	15 for a plant with a group of 6 green stems 120mm long 1mm wide from a running root stock, each stem topped with a pair of leaves like the open wings of a butterfly.
Sagittaria eatonii.		See Sagittaria graminea.
Sagittaria floribundus.		See Sagittaria subulata gracillima.
Sagittaria foliformis		See Sagittaria subulata gracillima.
Sagittaria graminea.	16	15 for a plant with 10 200mm long 10mm wide light-green thin pinnate-reed leaves with blunt tips.
Sagittaria graminea platyphylla.	16	15 for 10 a plant with 200mm long 20mm wide mid-green pinnate-reed leaves with blunt tips.
Sagittaria teres.	16	15 for a plant with 8 200mm long 20mm wide mid-green pinnate-reed leaves with blunt tips. One of the smallest of the genus
Sagittaria isoetiformis.		See Sagittaria graminea.
Sagittaria lancifolia.		See Sagittaria subulata
Sagittaria lorata.		See Sagittaria subulata.
Sagittaria platyphylla.		Sagittaria graminea platyphylla.
Sagittaria pusilla.		See Sagittaria subulata.

NAME	Diff	POINTS FOR GROWTH
Sagittaria subulata.	16	15 for a plant with 8 150mm long 15mm wide light-green pinnate-reed leaves with blunt tips. Leaves with a yellowish tint that are spread out almost horizontal.
Sagittaria subulata gracillima.	15	15 for a plant with 8 300mm long 10mm wide light-green leaves with a yellowish tint. This is a large plant with leaves often up to 1metre in length. Requires a high container and much trimming.
Sagittaria subulata kurziana.		Not suitable for aquariums or exhibition.
Sagittaria subulata natans.	18	15 for a plant with 8 250mm long 30mm or more wide mid-green pinnate leaves. Lower part of leaf curled to form a small petiole like stem.
Sagittaria subulata pusilla.	16	15 for a plant with 8 200mm long 5mm wide dark-green pinnate-reed leaves with a blunt to rounded tip. Leaves grow from the root stock.
Sagittaria subulata subulata.	16	15 for a plant with 8 250mm long 5mm wide mid-green pinnate-reed leaves. leaves with a blunt to rounded tips.
Sagittaria teres.		See Sagittaria graminea teres.
Samolus floribundus.		See Samolus parviflorus.
Samolus parviflorus.	15	15 for a bushy plant with 12 light green 90mm long 40mm wide, soft spatulate leaves forming a rosette.
Scirpus vivipara		see Eleocharis vivipara
Selliera radicans.	15	15 for a plant with a chain of 10 connected plants 50mm long 15mm wide spatulate light-green leaves. The leaf stem will be at least twice the length of the leaf. This is a low creeping plant.
Spathiphyllum grandifolis.	15	15 a plant with 8 dark-green 200mm long 40mm wide, inverted spear slightly undulated leave edges. With a petiole that can be as long or longer than the leaf.

NAME	Diff	POINTS FOR GROWTH
Spathiphyllum wallisii.	14	15 for a plant with 8 75mm long 15mm wide dark-green pointed spear shaped shiny leaves and mid-green petioles, leaf edge slightly undulated.
Spiranthes cernua.	16	15 for a bushy plant with 10 80mm high light green soft inverted spear leaves forming a rosette.
Stratiotes alismoides.		See Ottelia alismoides.
Vallisneria aethiopica.	15	15 for a plant with 10 220mm long soft thin 5mm wide pinnate-reed leaves with blunt tips. Leaves can be twisted two or three times.
Vallisneria americana.	15	15 for a plant with 10 200mm light to mid-green soft thin 8mm wide ribbon lanceolate leaves. Leaves are twisted several times.
Vallisneria asiatica.	16	15 for a plant with 8 250mm long 10mm wide dark-green ribbon like pinnate-reed leaves with blunt tips with some serration on the upper part of the leaves. Leaves are corkscrew twisted anti-clock wise.
Vallisneria asiatica. Var: biwaensis.	16	15 for a plant with 8 250mm long 10mm wide mid-green pinnate-reed leaves with blunt tips. All leaves are completely twisted into a corkscrew shape with no straight leaves at all.
Vallisneria gracilis.	15	15 for a plant with 8 100mm long 5mm wide dark-green pinnate-reed leaves with acute tips. Leaves strait not twisted.
Vallisneria gigantica.	17	15 for a plant with 8 400mm dark green thin pinnate-reed leaves with blunt tips. 10 to 12mm wide and straight. Only suitable for a large aquarium.
Vallisneria natans biwaensis.	15	15 for a plant with 10 200mm long 5mm to 10mm wide light to mid-green soft thin pinnate-reed leaves with blunt tips. Leaves with a light twisted screw formation.

NAME	Diff	POINTS FOR GROWTH
Vallisneria natans natans.	15	15 for a plant with 8 200mm long 5mm to 10mm wide leaves, light to mid-green soft thin pinnate-reed leaves with blunt tips. Generally with straight leaves, some times with a very slight twisted screw formation.
Vallisneria neotropicalis.	17	15 for a plant with 8 450mm long 25mm wide dark-green to reddish often with red stripes running horizontally across the leaf. Leaves pinnate-reed with blunt tips. Leaves often with serrated edges.
Vallisneria spiralis.	16	15 for a plant with 8 300mm long 15mm wide dark-green to reddish often with red stripes running horizontally across the leaf. Leaves pinnate-reed with blunt tips with serrated edges.
Vallisneria spiralis. Var. portugalensis.	16	15 for a plant with 8 280mm long 15mm wide light-green pinnate-reed leaves with blunt tips and serrated edges, all twisted anti-clock wise.
Vallisneria torta.		See Vallisneria natans biwaensis.
Vesculararai dubyana.	13	15 for a dark green bunch 150mm across, with strong fronds free from blanket weed. To be shown attached to a rock or bark.
Xyris pauciflora.	15	15 for a plant with 12 200mm brownish green straight thin lanceolate 5mm wide rush like leaves.

PLANT ILLUSTRATIONS
ROOTED PLANTS

Page 31

Anubias barteri
Var. nana
Anubias barteri
Var. nana 'petite'
Anubias barteri
Var. angustifolia
Anubias barteri barteri

Page 32 **Page 37**

Aponogeton boivinianus.
Aponogeton crispus.
Aponogeton ulvaceus.
Aponogeton longiplumulosus.

Page 33

Vallisneria asiatica spiralis.
Vallisneria spiralis.
Vallisneria americana.
Vallisneria spiralis
portugalensis.

Page 34

Sagittaria subulata pusilla
Sagittaria subulata natans
Sagittaria subulata gracillima.
Sagittaria teres.

Page 35

Cryptocoryne retrospiralis.
Cryptocoryne spiralis.
Cryptocoryne lutea.
Cryptocoryne wendtii.

Page 36

Cryptocoryne wendtii.
'Tropica'
Cryptocoryne wendtii.
'Green'
Cryptocoryne wendtii.
'Mi Oya'
Cryptocoryne wendtii.
'Brown'

Cryptocoryne willisii.
Cryptocoryne undulata
'Broad Leaf'
Cryptocoryne undulata.
Cryptocoryne pava.

Page 38

Cryptocoryne nevillii.
Cryptocoryne affinis.
Cryptocoryne beckettii.
Lagenandra lancifolia.

Page 39

Echinodorus ozelotus
Echinodorus osiris
Echinodorus 'Aquartica'
Echinodorus barthii

Anubias barteri Var. nana

Anubias barteri Var. nana 'Petite'

Anubias barteri angustifolia

Anubias barteri barteri

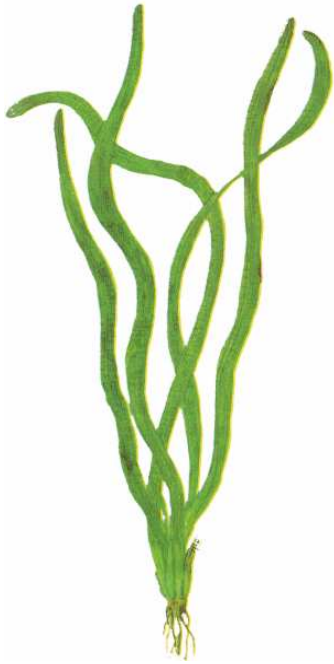
Aponogeton boivinianus

Aponogeton crispus

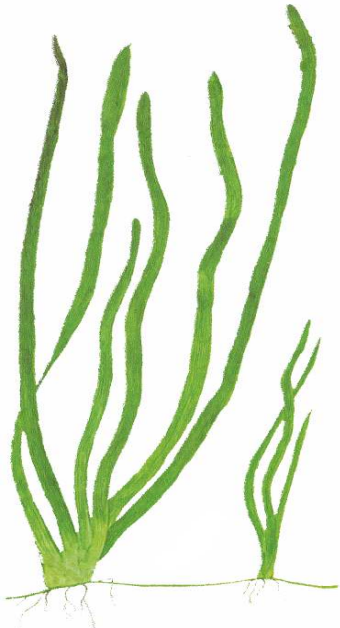
Aponogeton ulvaceus

Aponogeton longiplumulosus

Vallisneria asiatica spiralis

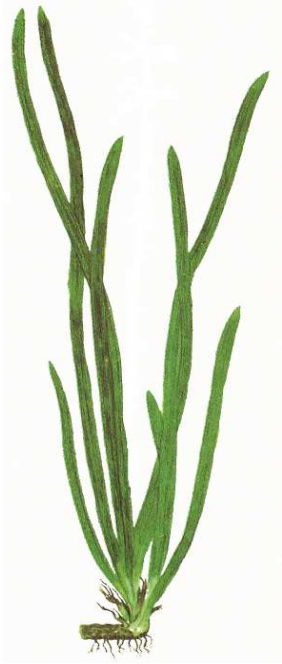


Vallisneria spiralis

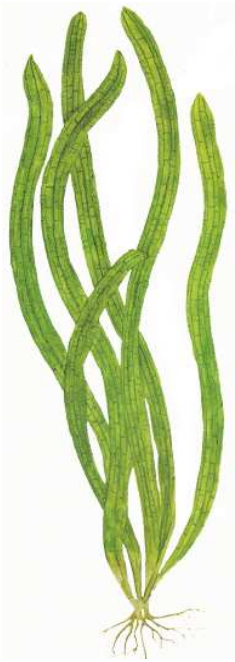


Vallisneria Americana

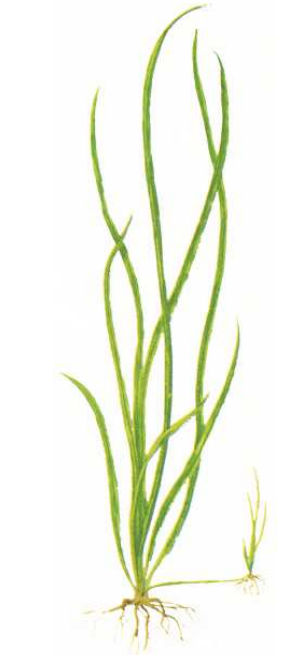
Vallisneria spiralis portugalensis



Sagittaria subulata pusilla



Sagittaria subulata natans



Sagittaria subulata gracillima

Sagittaria teres

Cryptocoryne retrospiralis

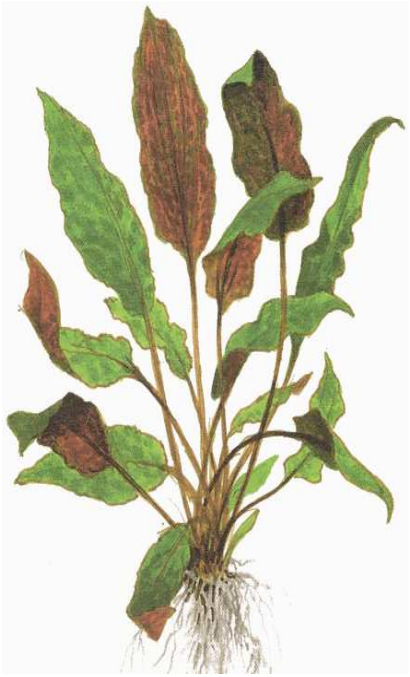
Cryptocoryne spiralis

Cryptocoryne lutea

Cryptocoryne wendtii

Cryptocoryne wendtii 'Tropica'

Cryptocoryne wendtii 'Green'



Cryptocoryne wendtii 'Mi Oya'

Cryptocoryne wendtii 'Bown'

Cryptocoryne willisii

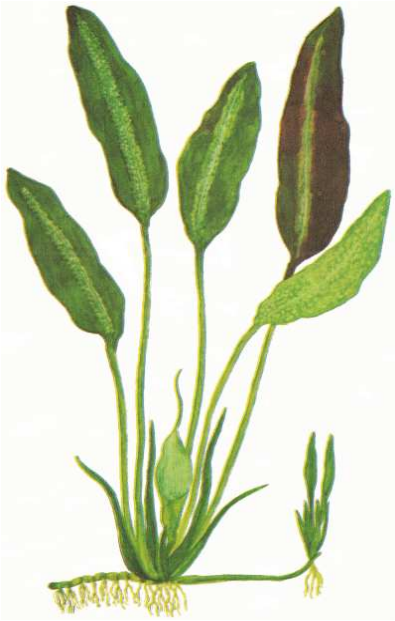
Cryptocoryne undulata 'broad'

Cryptocoryne undulata

Cyptocoryne pava

Cryptocoryne nevillii

Cryptocoryne affinis



Cryptocoryne beckettii

Lagenandra lancifolia

Echinodorus ozelotus

Echinodorus osiris

Echinodorus 'Aquartica'

Echinodorus barthii

INDEX OF AQUATIC CUTTING PLANTS

Najas kingii.	Zb11	Potamogeton octandrus.	Zb12
Najas marina.	Zb11	Potamogeton perfoliatus.	Zb12
Najas microdon.	Zb11	Potamogeton zosteriformis.	Zb12
Najas minor.	Zb11	Proserpinaca palustris.	Zb12
Nesaea crassicaulis.	Zb11	Ranunculus limosella	Zb13
Nesaea pedicellata	Zb11	Ranunculus macropus	Zb13
Nitella capillaris.	Zb11	Rotala indica.	Zb13
Nitella gracilis	Zb11	Rotala macrandra.	Zb13
Nomaphila stricta.	Zb11	Rotala rotundifolia.	Zb13
Potamogeton cheesemanii.	Zb12	Rotala wallichii.	Zb13
Potamogeton coloratus.	Zb12	Saururus cernuus.	Zb13
Potamogeton crispus	Zb12	Synnema triflora	Zb13
Potamogeton densus.	Zb12	Synnema triflorum.	Zb13
Potamogeton filiformis.	Zb12	Telanthera philoxerroides.	Zb13
Potamogeton gayi.	Zb12	Trichdronis rivularis.	Zb13
Potamogeton lucens.	Zb12	Veronica beccabunga.	Zb13
Potamogeton natans.	Zb12	Zosterella dubia.	Zb13

ADDING NEW PLANTS

The last page of the plants index for each of the three exhibition categories is available for you to list the details of any new or unlisted plant that you see on the Show bench. Before listing a plant you must be reasonably sure that it is an Aquatic Plant. If convinced then list it so.

First the name of the plant and the, if possible, the book or source that lists it.

If judging it what points did you award it under difficulty and why? If not what do you think it's worth.

Describe how the plant should be presented for 15 **Points for Growth** to be awarded. For example; the height, the colour, the number of leaves, their type, texture and length, as much information as possible. Also if possible take several digital photos, or ask anyone to do so for you, many Judges and Show organisers have digital cameras to hand.

Finally please send all this information to the Secretary of the Judges & Standards Committee "The J&S". With your written description either printed or hand-written in block capitals please. All can be sent including digital photographs by Email without any loss of quality (you will find the J&S Secretary's address and Email from the FBAS website www.fbas.co.uk

NAME **Diff** **POINTS FOR GROWTH**

NAME	Diff	POINTS FOR GROWTH
Alternanthera lilacina.		See Alternanthera sessilis.
Alternanthera philoxeroides	15	15 for 3 well matched plants, light green lanceolate leaves 75mm long 15mm wide set in pairs on a mid-green stem which has lines of small hairs. The leaves will turn a light reddish-brown with plenty of light.
Alternanthera reineckii.	16	15 for 3 matched plants, broad lancolate leaves, 75mm long 10mm wide, leaves yellowish-brown on the upper surface reddish-brown below, leaves set in pairs on a stem which is fine hairs all round. Requires plenty of light.
Alternanthera reineckii. Var: "pink".	16	15 for 3 matched plants, ovate leaves, yellow-brown upper surface red under leaves in pairs on a stem which is hairy all round. Requires plenty of light.
Alternanthera roseafilia.	15	15 for 3 well matched plants, bright red narrow lanceolate leaves 70mm long 8mm wide, in pairs on a green stem which has lines of small hairs.
Alternanthera rubra.	15	15 for 3 well matched plants, light green to reddish-brown narrow lanceolate leaves 70mm long 8mm wide, set in pairs on a green stem which has lines of small hairs.
Alternanthera sessilis.	15	15 for 3 well matched plants, brownish-red lanceolate narrow leaves 75mm long 10mm wide, set in random pairs on a stem which has lines of small hairs. Only with plenty of light will the leaves turn a light reddish-brown.
Alternanthera versicolor.		See Limnophila sessiliflora.
Ambulia indica.		See Limnophila sessiliflora.
Ambulia sessiliflora.		See Limnophila sessiliflora.
Ambulia rotundifolia.		See Rotala rotundifolia.
Ammania senegalensis.	15	15 for 3 well matched plants, light green to reddish-brown straight or drooping 30mm spatulate leaves set in pairs and decussate on a light green stem.

NAME	Diff	POINTS FOR GROWTH
Bacopa amplexicaulis.	15	15 for 3 well matched plants, with light green sub-cordate leaves 25mm long 15mm wide, set in decussate pairs and clasped on a light green fine hairy stem t there are no leaf petioles.
Bacopa australis.	16	15 for a small bunch of plants. With shield shape mid-green 12mm wide leaves growing in random pairs from leaf clasps, set on mid-green stems. A good amount of root anchors on the bottom and side shoots from the stems.
Bacopa caroliniana.	15	15 for 3 well matched plants, ovate dark-green leaves set in decussate pairs on a fleshy stem up to 30mm apart rootlets below leaf nodes, new cuttings from leaf axis.
Bacopa heudelotii.	15	15 for 3 well matched plants, ovate dark-green leaves set in decussate pairs on a fleshy stem up to 30mm apart rootlets below leaf nodes, new cuttings from leaf axis.
Bacopa longipes.		No information. Trade Name? Judge as Bacopa caroliniana
Bacopa monniera.	15	15 for 3 well matched plants, ovate mid-green spatulate leaves set in decussate pairs up to 40mm apart on a fleshy stem. Aerial rootlets below leaf nodes, new cuttings from leaf axis. Leaves smaller and wider spaced on stems than above species.
Bacopa najas.		See Bacopa monnieri.
Bacopa reflexa.		No information. Trade name?
Bacopa rotundifolia.	15	15 for 3 well matched plants, pale green sub-cordate leaves set in decussate pairs up to 400mm apart on a fleshy stem. Aerial rootlets below leaf nodes, new cuttings from leaf axis. Leaves larger than Bacopa caroliniana.
Cabomba aquatica.	17	15 for 3 well matched plants, mid-green leaves very finely segmented, spaced on a narrow stem. Arial rootlets below a few leaf nodes.

NAME	Diff	POINTS FOR GROWTH
Cabomba caroliniana.	17	15 for 3 well matched plants, mid-green segmented leaves spaced not more than 10mm apart on a narrow stem. Arial rootlets below a few leaf nodes.
Cabomba piauhyensis.	18	15 for 3 well matched plants, red leaves very finely segmented, spaced not more than 10mm apart on a narrow stem. Arial rootlets below a few leaf nodes.
Cardamine lyrata.	15	15 for 3 well matched plants, light-green soft leaves alternate from the stem on short petiolates rounded cordate.
Cardamine prorepens.		No information, judge as Cardamine lyrata.
Cardamine variabilis.		No information, judge as Cardamine lyrata.
Ceratophyllum demersum.	15	15 for 3 well matched plants, dark green coarse segmented leaves, spaced not more than 10mm apart on a narrow stem. Some aerial rootlets below leaf the nodes.
Ceratophyllum echinatum.		No information judge as Ceratophyllum submersum.
Ceratophyllum submersum.	15	15 for 3 well matched plants, mid-green segmented leaves, spaced not more than 10mm apart on a narrow stem. Some few aerial rootlets below leaf nodes.
Crassula helmsii.	15	15 for 3 well matched plants, small green spatulate leaves in pairs from off a multi-branched stem. Aerial rootlets forming at each leaf branch.
Crassula recurva.		See Crassula helmsii.
Egeria densa.		See Lagarosiphon madagacariensis.
Elatine macropoda.	16	15 for 3 40mm well matched plants on one runner, leaves set in pairs on an upright stem.
Elodea canadensis.	15	15 for 3 well matched plants, mid-green with 10mm curled spatulate leaves set in 3 to 6 whorled groups on an upright light green stem.

NAME	Diff	POINTS FOR GROWTH
Elodea crispa.		See Lagarosiphon major.
Elodea densa.	15	15 for 3 matched plants, with 10mm mid-green spatulate leaves, curled both up and down set in two to four whorled groups on upright mid-green stems. Often mistaken for Lagarosiphon major.
Elodea nuttallii.	17	15 for 3 matched plants, light-green thin pinnate leaves slightly curved upwards set in threes on a thin light green upright stem. Often with aerial roots from the bases of daughter off shoots.
Elodea occidentalis.	15	15 for 3 matched plants, with 10mm mid-green partially curved spatulate leaves set in haphazard pairs on an upright light green stem.
Groenlandia densus.		See Potamogeton densus.
Gymnocoronis spilanthoides	16	15 for 3 200mm well matched mid-green plants with sub-cordate leaves 50mm long and 25mm wide with a distinct mid-rib and aerial roots.
Hemianthus micranthemoides.	16	15 for 3 200mm well matched mid-green plants with sub-cordate leaves 25mm long and 15mm wide with off shoots and aerial roots.
Heteranthera dubia.		See Zosterella dubia.
Heteranthera graminea.		See Zosterella dubia.
Heteranthera zosterifolia.	15	15 for 3 150mm well matched mid-green plants with lanceolate leaves 50mm long and 4mm wide set on a mid-green stem by leaf clasps with side shoots and aerial roots.
Hippuris vulgaris	17	15 for 3 well matched plants with mid-green 10 to 20mm leaves set in whorls of 10 to 15. leaves 50mm long 3mm wide on a stout light green stem. Aerial leaves dark green robust.
Hottonia palustris.		See Hygrophila difformis.
Hydrilla lithuanica.		See Hydrilla verticillata.

NAME	Diff	POINTS FOR GROWTH
Hydrilla verticillata.	15	15 for 3 well matched mid-green 15mm spatulate leaves set in 6 to 8 leaf whorls 8 to 10mm apart on a darker green stem.
Hydrolythum wallichii.		Rotala wallichii.
Hydrotriche hottoniflora	15	15 for 3 well matched plants with pale-green thin pinnate leaves set in whorls 60mm across of 10 to 14 leaves. Spaced not more than 10mm apart on a stem.
Hygrophila augustifolia.		See Hygrophila guyanensis.
Hygrophila corymbosa.	16	15 for 3 well matched plants, pale-green 60mm leaves set in pairs with 30mm petiolates on a light brown stem. Aerial rootlets below leaf nodes.
Hygrophila corymbosa. Var: compact.	16	15 for 3 well matched compact plants, 60mm long leaves set in pairs, pale-green above silver-white below. with 8mm petiolates on a light-green stem. Aerial Roolets below leaf nodes.
Hygrophila corymbosa. Var: red.	16	15 for 3 well matched plants, lancolate leaves set in pairs, greenish-red above light-red below up to 60mm long on 5mm petioles on a light reddish-brown stem. Aerial roolets below leaf nodes.
Hygrophila corymbosa. Var: siamensis.	16	15 for 3 well matched plants, light-green broad lanceolate leaves 60mm long 20mm wide set in pairs on 10mm petiolates on a light-brown stem. Aerial roolets below leaf nodes.
Hygrophila difformis.	15	15 for 3 well matched plants with mid-green leaves above lighter below, leaves pinnatified. set in pairs on a mid-green stem. Aerial rootslets below leaf nodes.
Hygrophila guianensis		See Hygrophila corymbosa.
Hygrophila guyanensis.	16	15 for 3 well matched pale-green plants with 60mm leaves set in pairs with 30mm petiolates on a light brown stem. Aerial rootlets below leaf nodes.

NAME	Diff	POINTS FOR GROWTH
Hygrophila polysperma. Var: rosanervig.	16	15 for 3 well matched plants, with cordate leaves, the lower leaves on the plant green, the upper leaves red, leaves set in pairs with 10mm petioles on a green stem. Aerial rootlets below leaf nodes
Hygrophila salicifolia.		See Hygrophila guyanensis.
Hygrophila stricta.		See Hygrophila corymbosa.
Hygrophila triflorum.		See Hygrophila difformis.
Lagarosiphon madascariensis.	14	15 for 3 well matched light green plants with 10mm straight spatulate leaves set in whorls of 3 to 5. Stem light green.
Lagarosiphon major.	14	15 for 3 well matched dark olive green plants with 10mm tight recurved spatulate leaves set in 3 to 5 whorled groups. Stem olive green.
Lagarosiphon muscoides.		See Lagarosiphon major.
Limnophila aquatica.	16	15 for 3 well matched plants, leaves light green above very pale green below, finely segmented pinnate and bi-pinnate sessile leaf whorls 3 to 6 40mm across. Not more than 10mm apart on the stem, Aerial rootlets below leaf nodules.
Limnophila heterophylla.	17	15 for 3 well matched plants, leaves dark green above light green below, very finely segmented pinnate and bi-pinnate leaves in whorls 6 to 8 leaves 20mm across. Not more than 6mm apart on the stem, Aerial rootlets below leaf nodules.
Limnophila indica.		See Limnophila sessiliflora.
Limnophila sessiliflora.	15	15 for 3 well matched plants, leaves olive green above lighter below, segmented pinnate and bi-pinnate but with blunt tips, leaves in sessile whorls of 3 to 6 25mm across. Not more than 10mm apart on the stem, Aerial rootlets below leaf nodules. Beware the sap from this plant is reported to be poisonous to fish.

NAME	Diff	POINTS FOR GROWTH
Lindernia rotundifolia.	15	15 for 3 well matched plants, with pale green, ovate leaves set in pairs off a light green stem. Aerial rootlets from below leaf nodes.
Lobelia cardinalis.	15	15 for 3 well matched plants, light green ovate leaves with a tapered base and set alternatively from off a fleshy stem.
Ludwigia arcuata.	15	15 for 3 well matched plants, leaves light green above lighter below, 20mm spatulate leaves set in pairs and decussate on a fleshy stem with short petioles. Flower buds in the axis of alternate leaves indicate grown emersed.
Ludwigia natans.		See Ludwigia repens.
Ludwigia palustris.	16	15 for 3 well matched plants, leaves light green above lighter below, 15 to 20mm lanceolate leaves set in pairs on the main stem and branches by short petioles. Stem and branches light-green with roots in the axis of some leaves. Flower buds in the axis of alternate leaves indicate grown emersed.
Ludwigia repens.	15	15 for 3 well matched plants, leaves dark green dark red below. 30mm ovate leaves with tapered base, set in pairs and decussate on a fleshy stem with 5mm petioles. Flower buds in the axis of alternate leaves indicate grown emersed.
Ludwigia repens. Var: rubin.	15	15 for 3 well matched plants, leaves dark green dark red below. 30mm ovate leaves with tapered base, set in pairs and decussate on a fleshy stem with 5mm petioles. Flower buds in the axis of alternate leaves indicate grown emersed.
Microsorium pteropus	16	15 with ten mid-green 200mm long 20mm wide lanceolate leaves, with several offshoots. Must be shown attached to either bark, rock or another natural material.
Microsorium pteropus var wendilov.	16	15 with ten dark-green 150mm long 15mm wide leaves with brown markings, should have several offshoots. Must be shown attached to either bark, rock or other natural material.

NAME	Diff	POINTS FOR GROWTH
Myriophyllum alterniflorum.	16	15 for 3 well matched plants, mid-green pinnate leaves set in whorls of four, not less than 5mm or more than 10mm apart, on a stem that is slightly darker than the leaves.
Myriophyllum aquaticum.	15	15 for 3 well matched plants, light-green finely branched and pinnate leaves, set in 50mm wide whorls, of 4 to 6 leaves set more than 15 to 20mm apart.
Myriophyllum brasiliense.		See Myriophyllum aquaticum.
Myriophyllum elatinoides.	15	15 for 3 well matched plants, light-green leaves, finely branched and pinnate. Set in decussate form on a mid-een stem not more than 8mm apart
Myriophyllum hippuroides.	15	15 for 3 well matched plants, leaves olive green to brown tinted finely branched and pinnate, set in 50mm wide whorls, of 4 to 6 leaves set 15 to 20mm apart.
Myriophyllum proserpinacoides.		See Myriophyllum aquaticum.
Myriophyllum scabratum.	15	15 for 3 well matched plants, leaves mid-green finely branched and pinnate, branches of leaves set in 40mm wide whorls, of 3 to 5 leaves 10mm to 15mm apart.
Myriophyllum spicatum.	15	15 for 3 well matched plants, leaves green finely branched and pinnate, branches of leaves set decussate on a green stem not less than 5mm or more than 15mm.
Myriophyllum verticillatum.	16	15 for 3 matched plants, pinnate leaves dark-green and finely branched, set in pairs or trio's of whorls on a dark-green stem not more than 8mm apart.
Najas guadalupensis.	15	15 for 3 well matched plants, leaves mid to dark-green with multi-branched stems and four finely pinnate leaves set decussate 20mm long 2mm wide approximately 15mm apart on thin green stems. Leaf edges intermitted toothed. Can be left as free floating where they will form a mat of plants.

NAME	Diff	POINTS FOR GROWTH
Najas indica.	15	15 for 3 well matched mid-green plants with multi-branched stems spatulate leaves set decussate 25mm long 20mm wide, 20mm apart on thin light green stems. Can be left as free floating where they will form a mat of plants.
Najas kingii.		Judge as Najas indica.
Najas marina.		Judge as Najas guadalupensis.
Najas microdon.		Judge as Najas guadalupensis.
Najas minor.		Judge as Najas guadalupensis.
Nitella capillaris**.**	16	15 for 3 well matched plants, with 20mm light-green pinnate leaves, leaves set in haphazard pairs, ends of leaves forming into partial whorls from light-green thin main and side stems. Flower buds in the axis of alternate leaves indicate grown emersed.
Nitella gracilis	17	15 for 3 well matched plants, with mid-green stems and pinnate leaves, leaves forming partial quarter whorls around both the main and branched stems. Leaves much divided at their ends. Flower buds in the axis of alternate leaves indicate grown emersed.
Nomaphila stricta.		See Hygrophila corymbosa.
Potamogeton cheesemanii.		No information available,
Potamogeton coloratus.	17	15 for 3 well matched plants, with reddish brown 60mm long 5mm wide broad lanceolate leaves, which grow from petioles attached to the stem by a sheath set alternatively on a reddish brown stem.
Potamogeton crispus.	17	15 for 3 well matched plants, with reddish brown 50mm long 10mm wide broad lanceolate undulating leaves, leaves grow in pairs direct from reddish stem.
Potamogeton densus.	17	15 for 3 well matched plants, with pale green 40mm ovate leaves 20mm wide, leaves grow direct from the stem almost in pairs.

NAME	Diff	POINTS FOR GROWTH
Potamogeton filiformis.	18	15 for 3 well matched plants, with pale green thin lanceolate leaves up to 40mm long 3 to 4mm wide, set randomly on a stem sheath set alternatively on a pale-green thin stem. Reproduces by runners.
Potamogeton gayi.	16	15 for 3 well matched plants, with olive green 60mm lanceolate leaves 4mm wide, leaves with brownish streaks and 4 distinct veins which grow from a stem sheath set alternatively on a pale green stem.
Potamogeton lucens.	16	15 for 3 well matched plants, with pale green 25mm lanceolate leaves 5mm wide, Leaves grow from a stem sheath set alternatively on a pale green stem.
Potamogeton natans.	15	15 for 3 well matched plants, with mid-green 100mm lanceolate leaves 8mm wide, which grow from a stem sheath set alternatively on a pale green stem.
Potamogeton octandrus.	17	15 for 3 well matched plants, with pale green 80mm lanceolate leaves 25mm wide with 4 distinct veins. Leaves grow from a stem sheath on a short petiolate alternatively on a light green stem.
Potamogeton perfoliatus.	15	15 for 3 well matched plants, with dark green 50mm elongated oval leaves 25mm wide with 4 distinct veins. Leaves grow from a stem sheath alternatively on a light green stem.
Potamogeton zosteriformis.	17	15 for 3 well matched plants, with dark green 100mm lanceolate leaves 5mm wide. Leaves grow from a stem sheath set alternatively on a pale green stem.
Proserpinaca palustris.	15	15 for 3 well matched plants, lower leaves light-green, many upper leaves light-red all leaves finely branched with fine pinnate, leaves on a short petiole set randomly off a light-green stem not more than 8mm apart.
Proserpinaca pinnatum.	15	15 for 3 well matched plants, leaves light-green finely branched and pinnate, many middle and upper leaves red, leaves set randomly off light-green stems not more than 8mm apart.

NAME	Diff	POINTS FOR GROWTH
Ranunculus limosella.		No information Available.
Ranunculus macropus.		No information Available.
Rotala indica.	16	15 for 3 well matched plants, with pale green leaves, lanceolate with blunt tips set in pairs on a light green stem.
Rotala macrandra.	16	15 for 3 well matched plants, with a mixture of mid-green, yellow and red leaves, leaves cordate with oval base, set in pairs on a light green stem.
Rotala rotundifolia.	16	15 for 3 well matched plants, with pale green spatulate leaves, above pale green and pale green to light red below, set in pairs from a mid-green stem.
Rotala wallichii.	16	15 for 3 well matched plants, with leaves olive green above, reddish below, straight or drooping 15mm thin spatulate leaves arranged in whorls 0f 6 to 9 leaves around a the central green stem.
Saururus cernuus	12	15 for 3 well matched plants, with large cordate leaves olive green above, pale green below, leaves show heavy veins and grow from a stem sheath on a petiolate. Leaves set alternatively on a strong light green stem.
Synnema triflorum.		See Hygrophila difformis.
Telanthera philoxerroides..		See Alternanthera reineckii.
Trichdronis rivularis.	16	No information available. Treat plants so named with caution.
Veronica beccabunga.	16	15 for 3 well matched plants, with light green ovate leaves, growing in pairs from the stem without a petiole. Glossy dark green leaves indicates plant grow emersed.
Zosterella dubia.	15	15 for 3 well matched plants, mid-green lanceolate leaves 60mm long 5mm wide with a distinct mid-rib.

PLANT ILLUSTRATIONS

CUTTINGS

Page 14

Elodea occidentalis.
Hygrophila polysperma.
Elodea canadensis.
Elodea nuttallii.

Page 15

Lagarosiphon muscoides
Myriophyllum scabratum.
Myriophyllum verticillatum.
Myriophyllum brasiliense.

Page 16

Myriophyllum alterniflorum.
Myriophyllum spicatum.
Myriophyllum elatinoides.
Proserpinaca palustris.

Page 17

Hydrilla verticillata.
Hottonia palustris.
Nitella gracilis.
Nitella capillaris.

Page 18

Ludwigia natans.
Ludwigia arcuata.
Ludwigia palustris.
Hygrophila augustifolia.

Page 19

Elodea densa.
Rotala indica.
Lobelia cardinalis
Nomaphila stricta.

Page 20

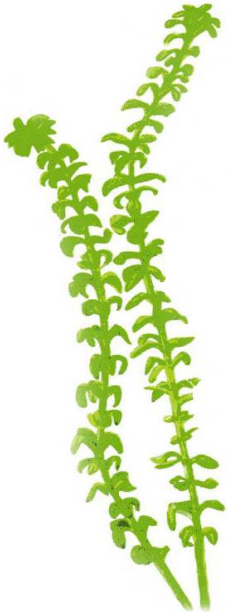
Bacopa monniera.
Bacopa amplexicaulis.
Cabomba aquatica.
Cabomba caroliniana.

Page 21

Potamogeton gayi.
Potamogeton lucens.
Potamogeton filiformis.
Potamogeton perfoliatus.

Page 22

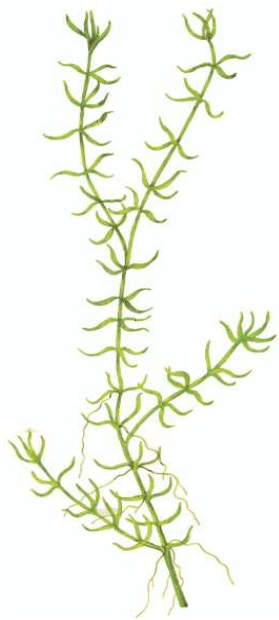
Potamogeton coloratus.
Potamogeton crispus.
Ceratophyllum demersum.
Ceratophyllum submersum.



Elodea occidentalis

Elodea densa

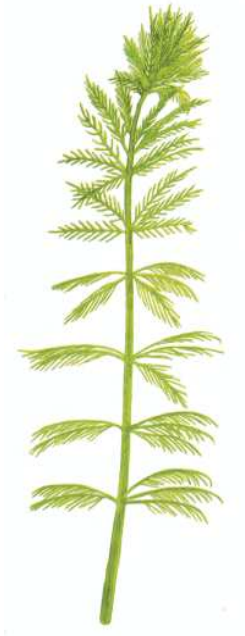
Elodea canadensis



Elodea nuttallii

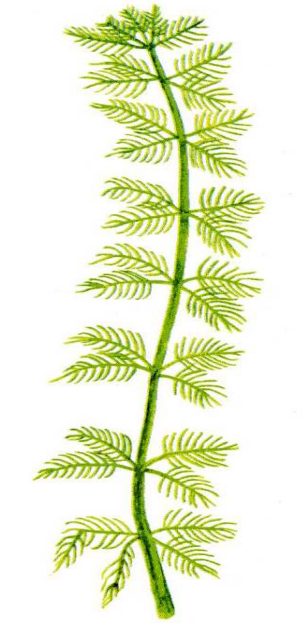
Lagarosiphon muscoides

Myriophyllum scabratum

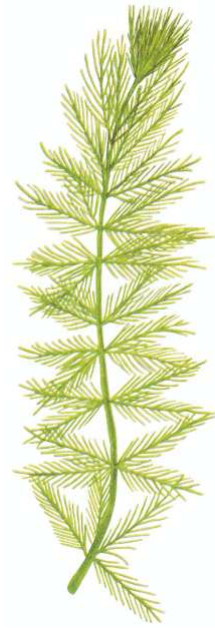


Myriophyllum brasiliense

Myriophyllum verticillatum



Myriophyllum alterniflorum



Myriophyllum elatinoides

Myriophyllum spicatum

Proserpinaca palustris

Hydrilla verticillata

Hottonia palustris

Nitella capillaris

Nitella gracilis

Ludwigia natans

Ludwigia arcuata

Ludwigia palustris

Hygrophila angustifolia

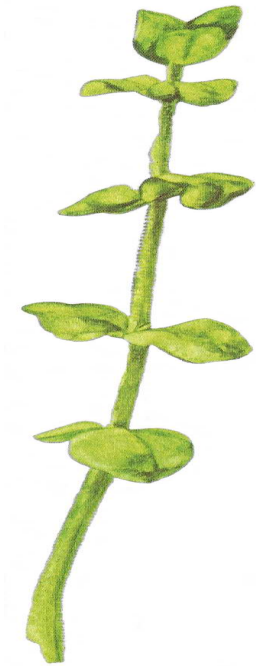
Hygrophila polysperma

Rotala indica

Lobelia cardinalis

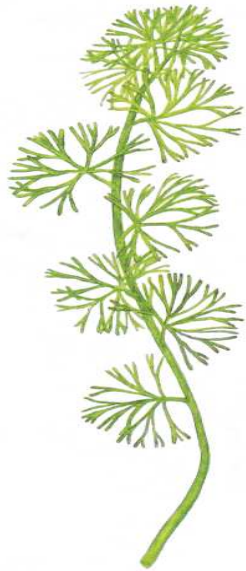
Nomaphila stricta

Bacopa amplexicaulis



Bacopa monniera

Cabomba aquatica



Cabomba caroliniana

Potamogeton gayi

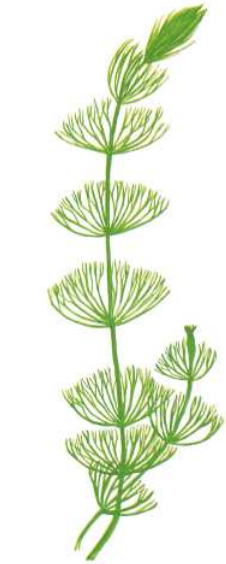
Potamogeton lucens

Potamogeton filiformis

Potamogeton perfoliatus

Potamogeton coloratus

Potamogeton crispus



Ceratophyllum submersum

Ceratophyllum demersum

INDEX OF FLOATING AQUATIC PLANTS

ADDING NEW PLANTS

The last page of the plants index for each of the three exhibition categories is available for you to list the details of any new or unlisted plant that you see on the Show bench. Before listing a plant you must be reasonably sure that it is an Aquatic Plant. If convinced then list it so.

First the name of the plant and the if possible the book or source that lists it.

If judging it what points did you award it under difficulty and why? If not what do you think it's worth.

Describe how the plant should be presented for 15 **Points for Growth** to be awarded. For example; the height, the colour, the number of leaves, their type, texture and length, as much information as possible. Also if possible take several digital photos, or ask anyone to do so for you, many Judges and Show organisers have digital cameras to hand.

Finally please send all this information to the Secretary of the Judges & Standards Committee "The J&S". With your written description either printed or hand-written in block capitals please. All can be sent including digital photographs by Email without any loss of quality (you will find the J&S Secretary's address and Email from the FBAS website www.fbas.co.uk

NAME	Diff	POINTS FOR GROWTH

NAME	Diff	POINTS FOR GROWTH
Azolla caroliniana.	14	15 for a portion of plants with small clusters of overlapping scale like 2-3mm velvet bluish-green leaves with light brown markings on upper surface which also have minute papillae each cluster of plants with many dark brown rootlets.
Azolla filiculoides.		No information available, treat as above.
Azolla nilotica.	14	15 for a portion of plants with small clusters of overlapping scale like 3-4mm velvet like leaves, either blue-brown or reddish-brown on upper surface which also have minute papillae on them, each cluster of plants with many dark brown rootlets.
Azolla pinnata.		No information available, judge as Azolla caroliniana.
Ceratopteris cornuta.	15	15 for a 250mm diameter plant with leaves that are both partial segmented and broadly pinnate, light green on upper surface greenish white below. Small plantlets along leaf edges. An abundance of long finely divided white.
Ceratopteris pteridodes.	15	15 for a 200mm diameter plant with leaves that are both partial segmented and broad rounded. Mid-Green on upper surface greenish white below. Small plantlets along leaf edges. An abundance of long finely divided white roots.
Ceratopteris thalictroides.	15	15 for a 250mm diameter plant with multi-segmented deeply divided fern like leaf fronds blunt tip leaves. plantlets along leaf edges. An abundance of long finely divided white roots.
Cladophora aegagropila. Lake Ball.	17	15 for a mid-green circular round ball 75mm across not oval or misshapen. Clear of any attached detritus. This plant is a ball of algae that sits on the bottom of the container. This neither floats or has roots. For exhibiting we have placed it in Class Zc.
Eichornia azurea.	18	15 for a plant with 6, 50mm glossy olive green rounded surface leaves, spatulate mid-green submerged leaves. Petiolates swollen into globular floats. An abundance of long finely divided feather like brown roots.

NAME	Diff	POINTS FOR GROWTH
Eichhornia crassipes	17	15 for a plant with 6, 50mm glossy olive green ovate surface leaves pale green under side. Petiolates swollen into globular floats. An abundance of long finely divided feather like brown roots.
Glossostigma cleistanthum.		No information available.
Hydrocharis spongia		See Limnobium spongia.
Hydromystria stoloniferum.		See Limnobium laevigatum.
Hygrorhyza aristata.	18	15 for a group of plants with 60mm glossy mid-green elongated cordate leaves with distinct veins, often with light-brown markings. This plant floats with the aid of inflated leaf sheaths. An abundance of long finely divided feather like brown roots.
Lemna gibba.	14	15 for a portion of plants with 4mm oval mid-green thalli with many white 50mm long rootlets which have rounded tips. Thalli are sometimes in pairs.
Lemna minor.	14	15 for a portion of plants with 4mm oval mid-green thalli with many white 50mm long rootlets which have pointed tips. Thalli are sometimes in pairs.
Lemna paucicostata.	14	15 for a portion of plants with 4mm oval mid-green thalli with many white 50mm long rootlets which have rounded tips. Thalli are sometimes in pairs.
Lemna trisulca.	16	15 for a portion of plants with 1·5mm oval olive-green ovate thalli, aattached in groups by thin stems from sides or ends of thalli in cruciform settings. No rootlets.
Limnobium laevigatum.	16	15 for a plant with 12 mid-green rounded cordate 30mm leaves set in groups of 3 to 5. Leaves at intervals along a light brown stem, leaves often overlap. Long white rootlets extend from each leaf grouping.
Limnobium spongia.	16	15 for a plant with 12 mid-green rounded cordate 10mm leaves set in groups of 3 to 5. Leaves set at 70-100mm along a light brown stem. Long white rootlets extend from each leaf grouping.

NAME	Diff	POINTS FOR GROWTH
Limnobium stoloniferum.		See Limnobium laevigatum.
Marsilea natans.		See Salvinia natans.
Phyllanthus fluitans.	16	15 for a portion of plants with 10mm ovate brownish-green to brown/red velvet leaves with distinct veins, leaves crowed together and overlapping. Rootlets light brown roots.
Pistia stratiotes	16	15 for a 250mm diameter plant with 8 75mm mid-green velvet leaves that often have a bluish tint Leaves ovate with square ends and longitudinal corrugations. Many 200mm finely divided light brown roots.
Pseudowolffiella hyalina.	16	15 for a portion of plants with 2mm circular mid-green saucer shape thalli with a flat upper surface, floating singly or in pairs. This plant has no roots.
Riccardia graeffei.	16	15 for a portion of plants attached to bog - wood, Leaves mid-green 6mm long 3mm wide.
Riccia elvitans.	16	15 for a portion of plants with mid-green multi-branched thalli forming a small mat of plants which float just below the surface. This plant has no rootlets.
Riccia fluitans.	14	15 for a portion of plants with mid-green multi-branched thalli forming a mat of plants which either float just below the surface, or are attached to Bogwood rock, or any other acceptable material. This plant has no rootlets.
Ricciocarpus natans.	15	15 for a portion of plants with dark-green broadly branched thalli forming a small mat of plants which float just below the surface. This plant has no rootlets.
Salvinia auriculata.	16	15 for a group of plants with dark-green to brownish-green 30mm ovate leaves, upper surface covered with short velvet hairs, leaves often curved up or standing clear of water. Many long feather like divided brown roots.
Salvinia cucullata.	17	15 for a group of plants with mid-green 20mm funnel shape leaves, the upper surface covered with short velvet hairs. An abundance of finely divide light brown roots.

NAME	Diff	POINTS FOR GROWTH
Salvinia laevigata.		See Limnobium laevigatum.
Salvinia natans.	17	15 for a group of plants with mid-green 20mm ovate shape leaves, upper surface covered with short velvet hairs. Leaves often creased along central vein which causes the edges of the leaves to stand clear of the water. With an abundance of finely divide light brown roots.
Salvinia oblongifolia.	16	15 for a group of plants with mid-green 60mm spatulate leaves, the upper surface covered with short velvet hairs the tip of the leaves indented, leaves tend to lay flat to the water surface. An abundance of finely divide light brown roots.
Salvinia rotundifolia.	16	15 for a group of plants with green 25mm spoon shape leaves that are more ovate, set in pairs from 4mm petiols on a much branched floating stem that has pale yellow roots from the leaf notches.
Spirodela polyrrhiza.	14	15 for a portion of plants with 6mm ovate dark-green thalli with a hint of violet on upper surface, red or violet on under surface. Thalli in groups of 3 to 6 each thalli with several 50mm white rootlets.
Trapa natans.	15	15 for a 200mm diameter plant with 10 20mm mid-green lanceolate leaves light red below in a dense rosette, leaves with serrated edges. A long light brown root stem with many braches and fine hairs.
Trianea bogotensis.		See Limnobium laevigatum.
Utricularia exoleta.		See Utricularia gibba.
Utricularia gibba.	14	15 for a portion of plants with fine mid-green pinnate thalli off of thin stems, small bladders or vesicles around the edge of the plant used to capture microscopic aquatic invertebrates. This plant has no roots.
Utricularia vulgaris	15	15 for a portion of plants with fine mid-green pinnate leaves off of thin leaf stems which in themselves are from off the main stems, small bladders or vesicles around the edges of the stems are used to capture microscopic aquatic invertebrates. This plant has no roots.

NAME	Diff	POINTS FOR GROWTH
Wolffia arrhiza.	15	15 for a portion of plants with 1mm circular mid-green thalli with a flat upper surface floating in pairs or singly. This plant has no roots.
Wolffiella lingulata.	16	15 for a portion of plants with 2mm elongated circular mid-green thalli with a flat upper surface floating on the surface in pairs or singly. This plant has no roots.
Wolffiella microscopia.	16	15 for a portion of ovate mid-green floating thalli from ·5mm to 1mm diameter, with a flat upper surface floating in pairs or singly on the surface. This plant has no roots.
Wolffiopsis welwitschii.	16	15 for a portion of plants with 2mm ovate mid-green very slightly curved thalli, floating in pairs or singly on the surface. This plant has no roots.

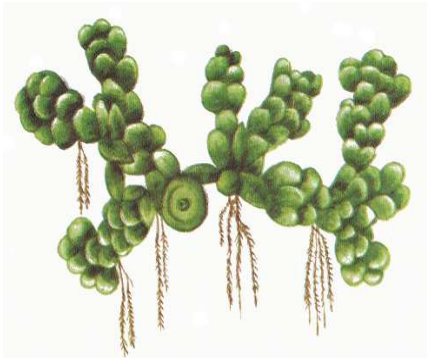
PLANT ILLUSTRATIONS
FLOATING PLANTS

Page Zc-9

Azolla caroliniana.
Azolla filiculoides.
Azolla pinnata.
Salvinia auriculata.
Salvinia cucullata.
Salvinia oblongifolia.
Salvinia natans.
Salvinia rotundifolia.

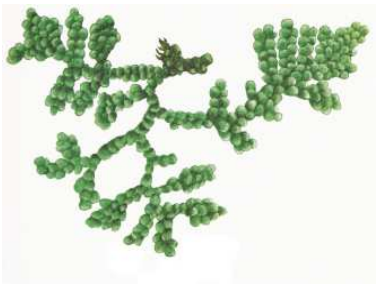
Page Zc-10

Lemna minor.
Lemna trisulca.
Riccia fluitans.
Wolffia arrhiza.
Pistia stratiotes.
Eichhornia crassipes.
Cladophora aegagropila.
Utricularia vulgaris.

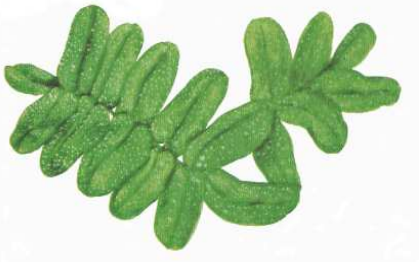


Azolla caroliniana

Azolla filiculoides



Azolla pinnata

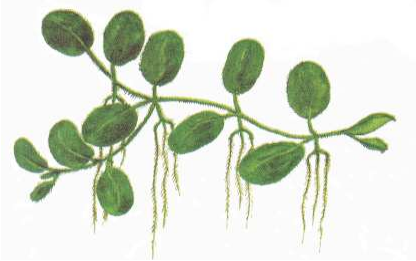


Salvinia auriculata

Salvinia cucullata

Salvinia natans

Salvinia oblongifolia



Salvinia rotundifolia

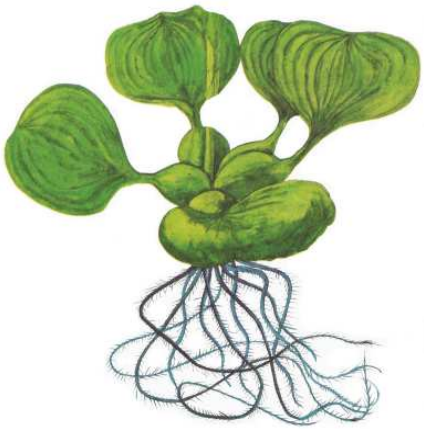
Lemna minor

Lemna trisulca

Riccia fluitans

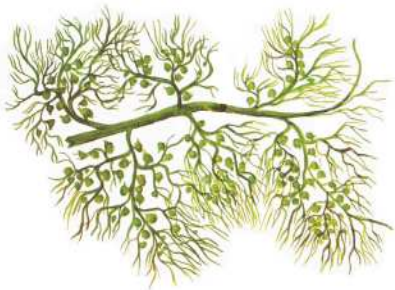
Wolffia arrhiza

Pistia stratiotes



Eichhornia crassipes

Cladophora aegagropila



Utricularia vulgaris

Acknowledgements

Three books dealing with Aquatic Plants were consulted as a reminder and a Plant Producers Catalogue's drawings were use to reproduce most of the plant pictures.

The Catalogue first; this is printed by "**Tropica® Aquarium Plants**". Mejibyvej 200, 8250 Ega. Denmark. As already said many of the photos and drawings used were copied from it (with Permission of course). Anyone with an interest in obtaining quality plants that are correctly named we recommend that they should contact this company first. You can look at their product line on the web at www.tropica.com the plants from this producer are of a guaranteed quality and are highly recommended. When purchasing plants they arrive in pristine condition complete with instruction on the plant and its requirements.

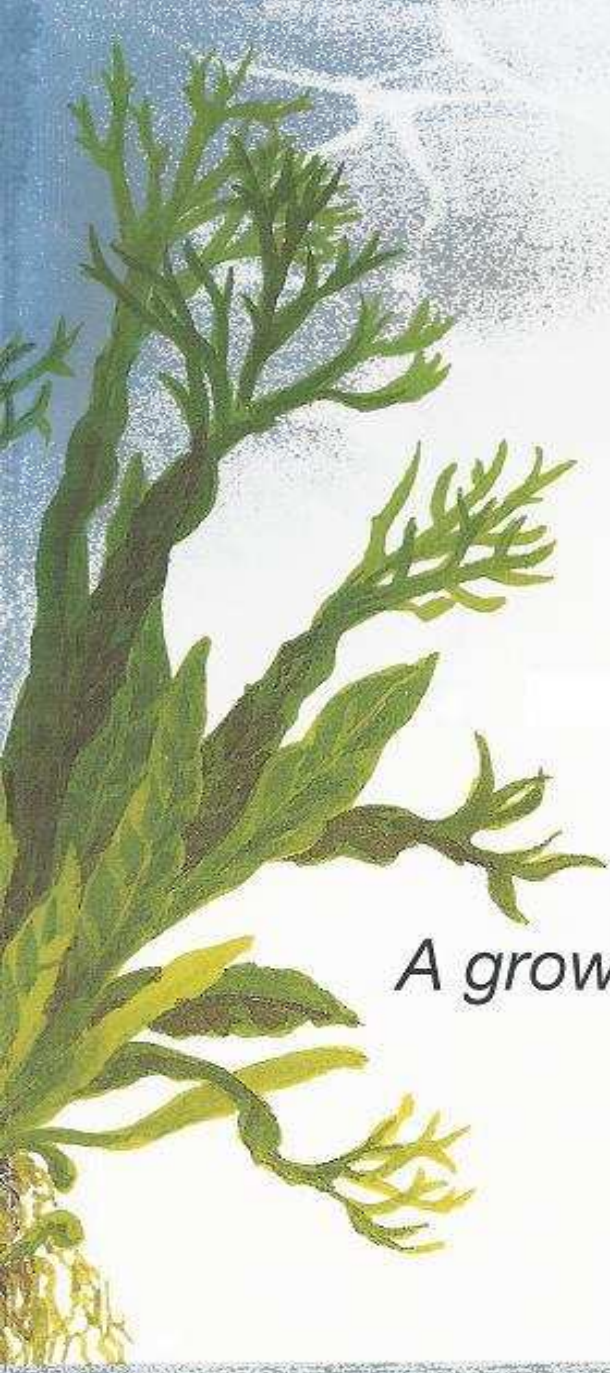
The first book used is **"The Complete Guide to Water Plants"**. By Helmut Műhlberg. This deals with plants in detail, has 112 Black and white and 109 coloured photographs together with 59 coloured illustrations. The book is published by EP Publishing Ltd. The ISBN number is 0 7158 0789 7. For anyone wishing to obtain a copy of this book the preceding information should be sufficient. As said this book deals with plants in detail but is an easy read for readers with an interest in aquatic plants, but are without any formal academic training. This is the book for the keen amateur, and comes highly recommended.

The second of the books consulted was **"Encyclopedia of Water Plants"**.
by Dr. Jiri Stodola, ISBN: 0876661694.
Whilst the information dealing with plants is an easy read, the main attraction of this book is the 200 coloured plant illustrations by Mirko Vosatka which are excellent drawing giving good representations of the plants depicted. The book is one of many published in the TFH range of books dealing with pets and their environment.

The third book consulted was "**Aquarium Plants**" written by Niels Jacobsen, with 134 coloured drawings by Verner Hancke. This is a Blandford Press publication. Anyone interested in this book is first advised to try your local book outlet, the ISBN number is 0 7137 0865 4.

This book, whilst smaller than what has come to be normal book size, can easily be carried in the pocket when out on a plant-buying expedition. Whilst smaller than usual this takes nothing away from the coloured drawings or information provided. Deals with many plants seen in furnished aquariums and offered for sale as such, there are also line drawings, all of which are good representations of the plants concerned. This booklet does not deal with the plants in any vast detail but is still a useful addition in recognising the plants you already have or wish to obtain. An excellent booklet also highly recommended.

We also thank **Tetra** and **Rolf C Hagen** for their support for this Booklet.



tropica®

A growing success...

Tropica Aquarium Plants,
Mejibyvej 200,
8250 Egå,
Denmark.

Tel. +45 86 22 05 66
Fax. +4586 22 84 66
Email. tropica@tropica.dk
www.tropica.com

tropica AQUARIUM PLANTS