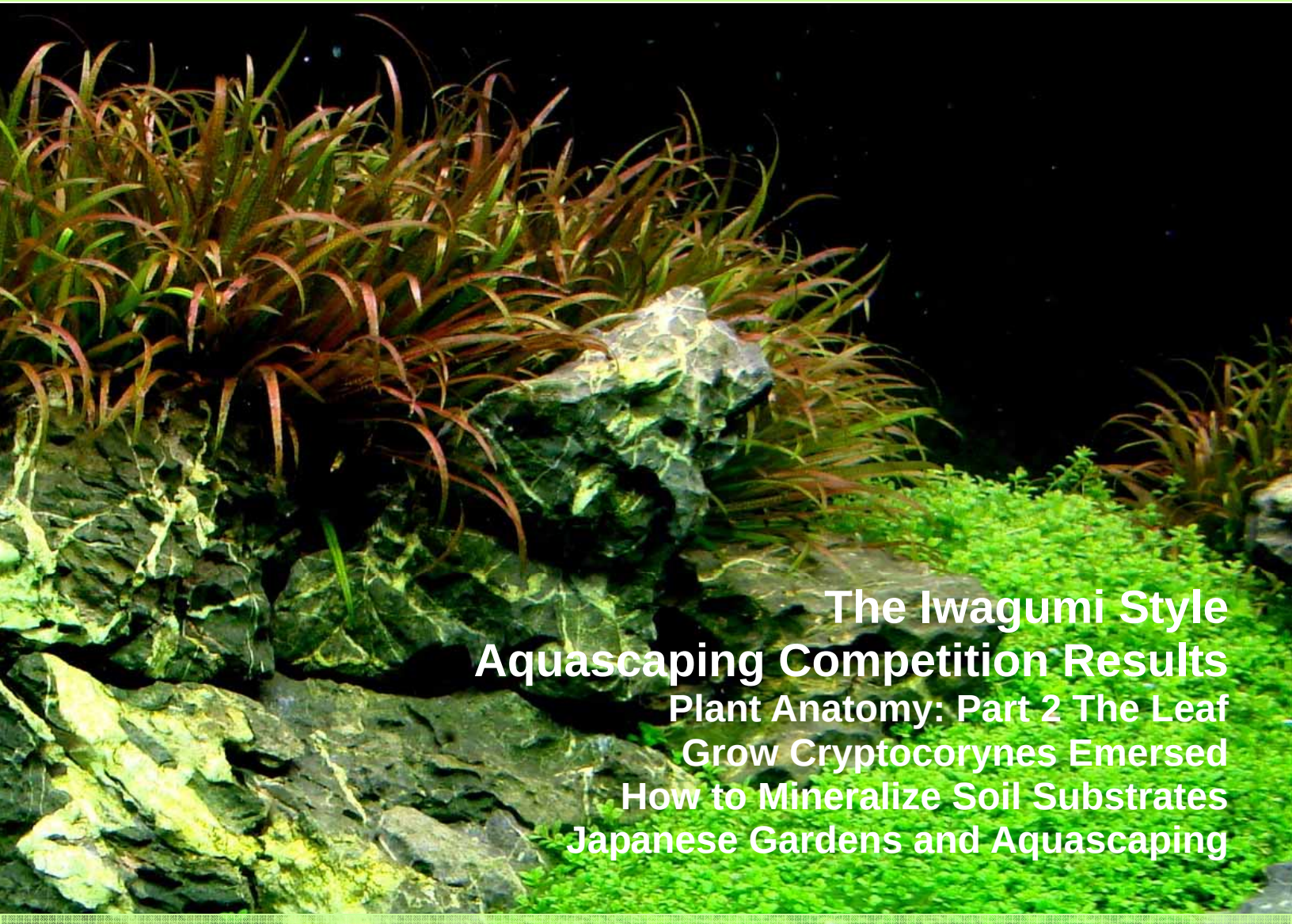
AquaScapingWorld

Making Magic In Glass Boxes



The Iwagumi Style Aquascaping Competition Results

Plant Anatomy: Part 2 The Leaf

Grow Cryptocorynes Emersed

How to Mineralize Soil Substrates

Japanese Gardens and Aquascaping

www.aquascapingworld.com

VOLUME 1, ISSUE 2
APRIL 2008

Letter from the Editor

Welcome to AquaScaping World Magazine!

On the heels of our debut launch last month, ASW brings you another jam packed special of aquascaping inspiration and tutorials.

This month one of our feature articles include an in-depth analysis of the Veni Vidi Vissie Aquascaping Competition Results by Marco Aukes who was a competition judge, and a premier expert in our aquascaping world. We also continue a scientific exploration of the Anatomy of Aquatic Plants where last month we took a look at the stem, now we are dissecting the leaf. And as always, we have our Aquascape In Focus interviewing Peter Kirwan who demonstrates an effective use of rocks to create an aquascape that is unique and powerful.

I would like this opportunity to thank all the contributing writers for creating such wonderful articles for all of us to enjoy. I would also like extend a BIG thank you to all the readers for supporting the magazine, and helping promote its existence all over the internet world. Your continued support and attention has given us a tremendous amount of personal value and satisfaction for all of us who have worked tirelessly to bring you this premiere resource.

Without further ado, please enjoy reading all the articles and may you find a new source of aquascaping inspiration!

John Nguyen
Editor in Chief
AquaScaping World Magazine

TABLE **OF** CONTENTS

The Iwagumi Style

By Roy Deki

Understanding the Techniques of Japanese Art

Many of you have heard the term Iwagumi, especially if you frequent some of the more popular "forum" based web-sites associated with our aquascaping hobby. Many truly do not know what this translates to in English. The Japanese word "Iwagumi" literally means "rock formation." In a Japanese rock garden, the rocks are the "bones" of the layout and usually consist of three rocks; one main or large rock flanked by two smaller rocks, but not of equal size. When the rock formation is placed properly, the rest of the layout will simply fall into place. In our hobby this has been taken far beyond three rocks but, the main principles should still be used.

Essential Iwagumi Principle

In an Iwagumi aquascape you should always use an odd number of rocks of various sizes, and they should consist of the same type of stone. This will add continuity and provide harmony for the layout.

One of the more difficult aspects of the Iwagumi Style is achieving visual balance through the aquascape. Many aquascapers follow the "golden triangle rule" which divides the layout into three equal segments from top to bottom, and from side to side. The focal point is where the different vertical and horizontal lines intersect. Placing rocks and groups of plants in theses areas will adds strength and focus to the Iwagumi aquascape.

The substrate sets the foundation for visual flow for the viewer. In Iwagumi aquascapes, the substrate should have

Hemianthus callitrichoides growing around carefully placed Seiryu-seki stones which are angled to point towards the opening.

contours and texture to keep the eye moving and drawn into all aspects of the aquascape. A strategically placed substrate will also help create an allusion of depth. Sloping upward from front to back is a great way to achieve this depth. You can also have one side or your aquarium substrate slightly higher than the other side. Each method will add more personality and depth to what seems like a simple design.

The substrate once covered with groundcover plants will create a sensation of fluidity and movement with green rolling hills and valleys.

Define Your Hardscape

When you start a layout you should always have more than enough hardscape material than you need. This gives you more options when your initially planning your design. You don't want to be limited by a small selection of rocks. I recommend having at least seven different sized rocks to select from. Find rocks that have character, the more nooks and crannies your stones have the more detailed and complex your layout will appear.

Some of the more popular stones to use are Seiryu-seki stone, Maten stone, or Shou stone. These rocks are excellent rocks to use for your hardscape, but your not limited to these types. The goal is to find group of rocks that share the same color scheme, but are different in their details, color patterns, shapes, and contours.

When put arranged in an aquascape the rocks will appear as a unified collection while still maintaining their own distinct characteristics. The arrangement of the hardscape should have a clear focus and dictate the viewers' perspective.

Select the Right Aquatic Plants

Iwagumi style should give you a feeling of tranquility and simplicity; therefore a limited number of plant species are used. An aquascape will usually consist of a single foreground plant like *Eleocharis acicularis* (Dwarf hairgrass), *Glossostigma elatinoides*, and *Hemianthus callitrichoides* to name a few commonly used species.

The background should also only consist of one plant species and can vary based upon the look and feel you want to obtain. The rocks are the focal point in an Iwagumi aquascape. So always use plants that will not over power the rock formation.

Harmony with Fauna

When selecting fish you want to emphasis simplicity, harmony, and unity between the fauna and the aquascape. Too many fish species can cause discord and

This angle view of the stones and plants are to show depth within this 15 gallon tank.

chaotic random movement among the fish, which distracts from the aquascape.

Instead use a single species of schooling fish to add fluid movement and contentment to the aquascape. The most common used species are Cardinal tetras, Rummy nose tetras, or Harlequin rasboras. It is important to use "schooling" fish and not "shoaling" fish. This helps to maintain a more tranquil environment.

Shrimp like the *Caridina japonica* (Amano Shrimp) are most often use in the planted aquarium and serve as an excellent clean up crew without distracting the aquascape. Their small size and clear coloration helps them blend well with the plants. Other shrimp varieties can be a distraction if they are too colorful or too abundant.

Not as Easy as it Looks

It is a common misconception that Iwagumi style aquascapes are easy to maintain due to its simplistic look. It is in fact a more difficult style mainly because the style involves only two plant species which require special attention. The plants mentioned previously are heavy root feeders, so dosing the water column should be done in moderation. It is more important to have a nutrient rich substrate to help these specific plants grow strong and healthy. Many hobbyists overlook the importance of a nutrient rich substrate, and may run into plant health issues later as the aquascape develops.

While attempting to create my first Iwagumi style scape, I fell victim to all type of algae know to aquarists. This was by far the most difficult tank to "balance" nutrient wise. With the help of Seachems Excel, I managed to kill all the algae but, unfortunately the *Heminathus callitrichoides* (H.C.) fell victim as well. I had to re-plant the H.C. and wait for it to fill in again.

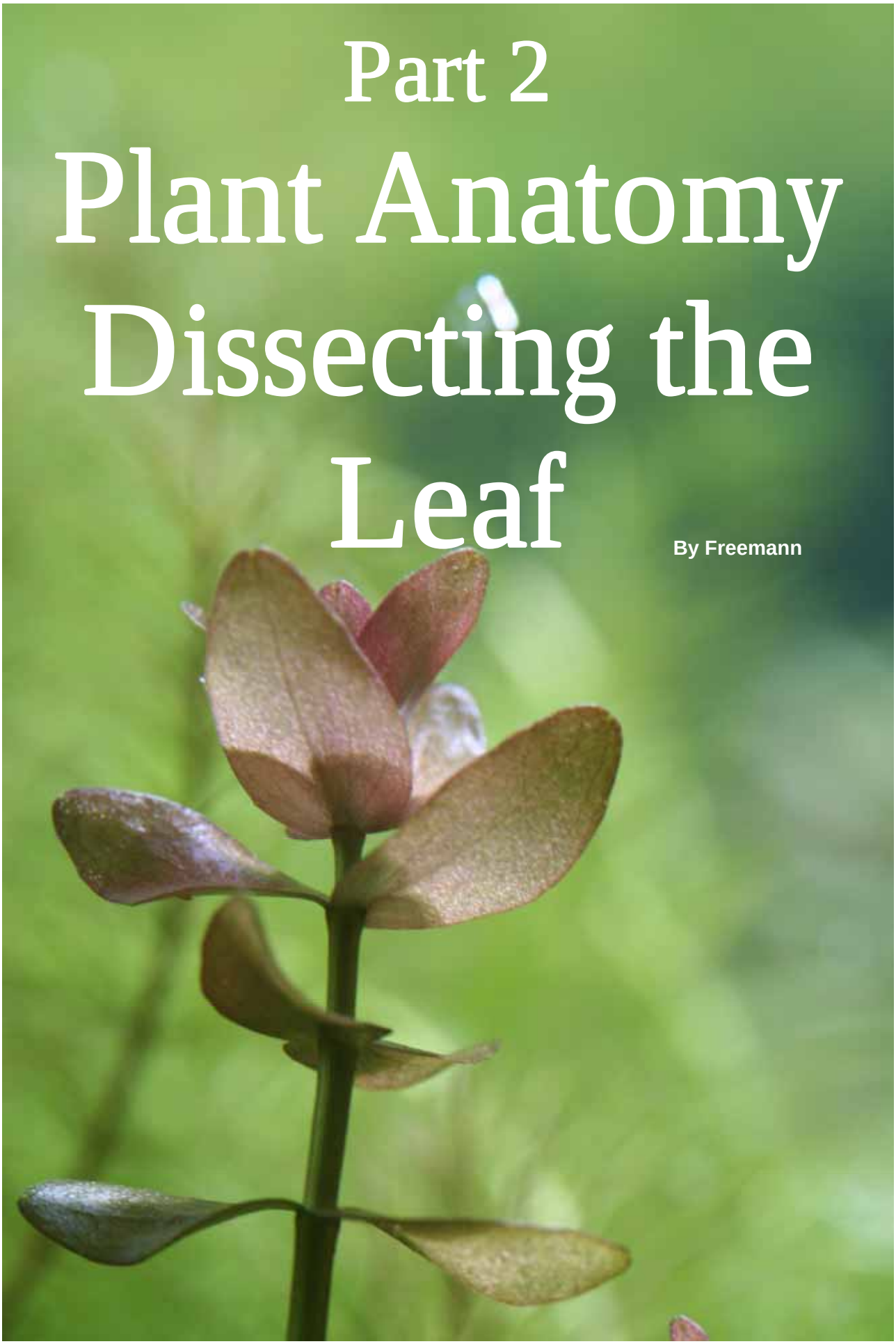
Aquascaping Achievement

After accomplishing a successful Iwagumi aquascape that emphasizes the style's main aquascaping criteria (serenity, tranquility and vibrant movement) I can honestly say I feel like I am no longer a novice in this hobby.

I have learned so much creating this little piece of nature that it was well worth all the frustration. So, whether you are a novice or expert, everyone should experience the joys of successfully completing an Iwagumi aquascape.

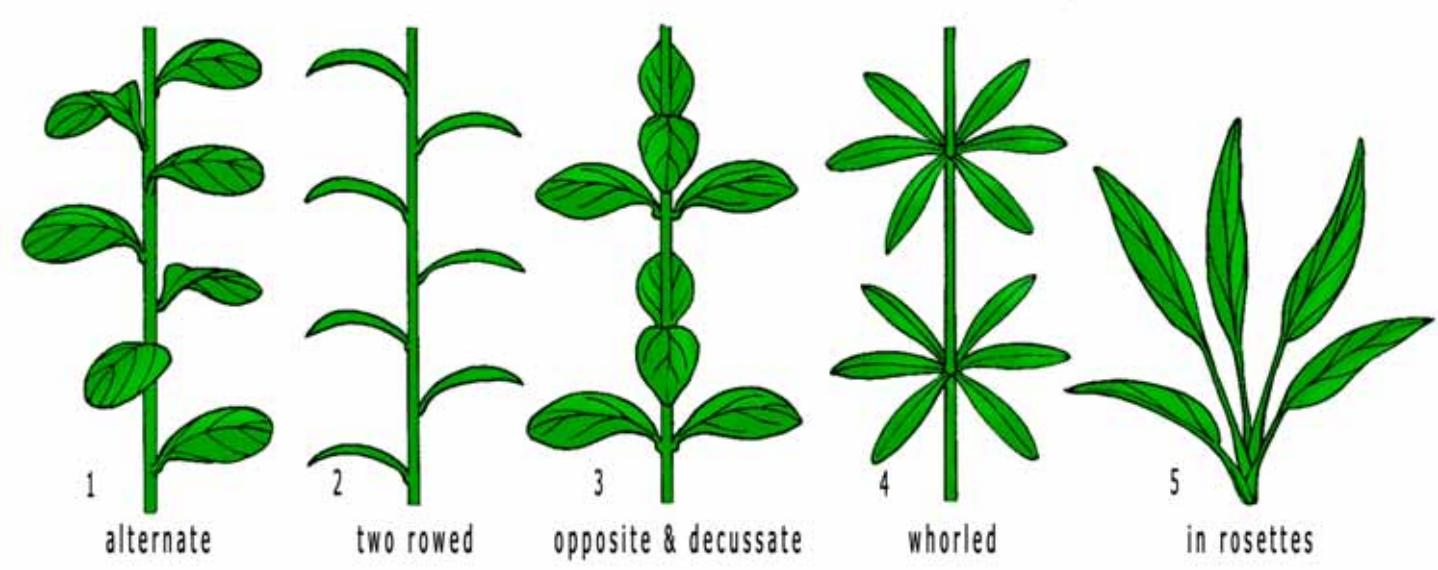
Passage Beyond 2007 by Roy Deki

Dimensions: 24”x12”x12”
Volume: 15 gallons
Light: Coralife 65 watts power compact (6700k) in the front,
Coralife NO T-5 28watt (6700k/10000k) over back
Photoperiod: 10 hours per day.
Filtration: Aqua clear 50 H.O.B.
CO2: Pressurized system with ceramic diffuser @ 3bps
Substrate: ADA Aqua soil with Power Sand Special, TourmalineBC added at start-up.
Fertilizer: Flourish comprehensive, Pfertz nitrogen and potassium
Fauna: 11 Neon Green tetras, 7 Siamese Algae Eaters, 7 Amano shrimp
Flora: *Blyxa japonica* and *Hemianthus callitrichoides*



Part 2
Plant Anatomy Dissecting the Leaf

By Freemann



Ill.1 Leaf Arrangement (phyllotaxis)

The leaf is a lateral line organ springing from the axis of the shoot; it is generally flat and its growth is limited. The leaves are essential tools for collecting sunlight to use in the process of photosynthesis and in emersed aquatic plant growth they regulate the loss of water vapor. They also have other functions such as food storage, and they may form reproductive cells.

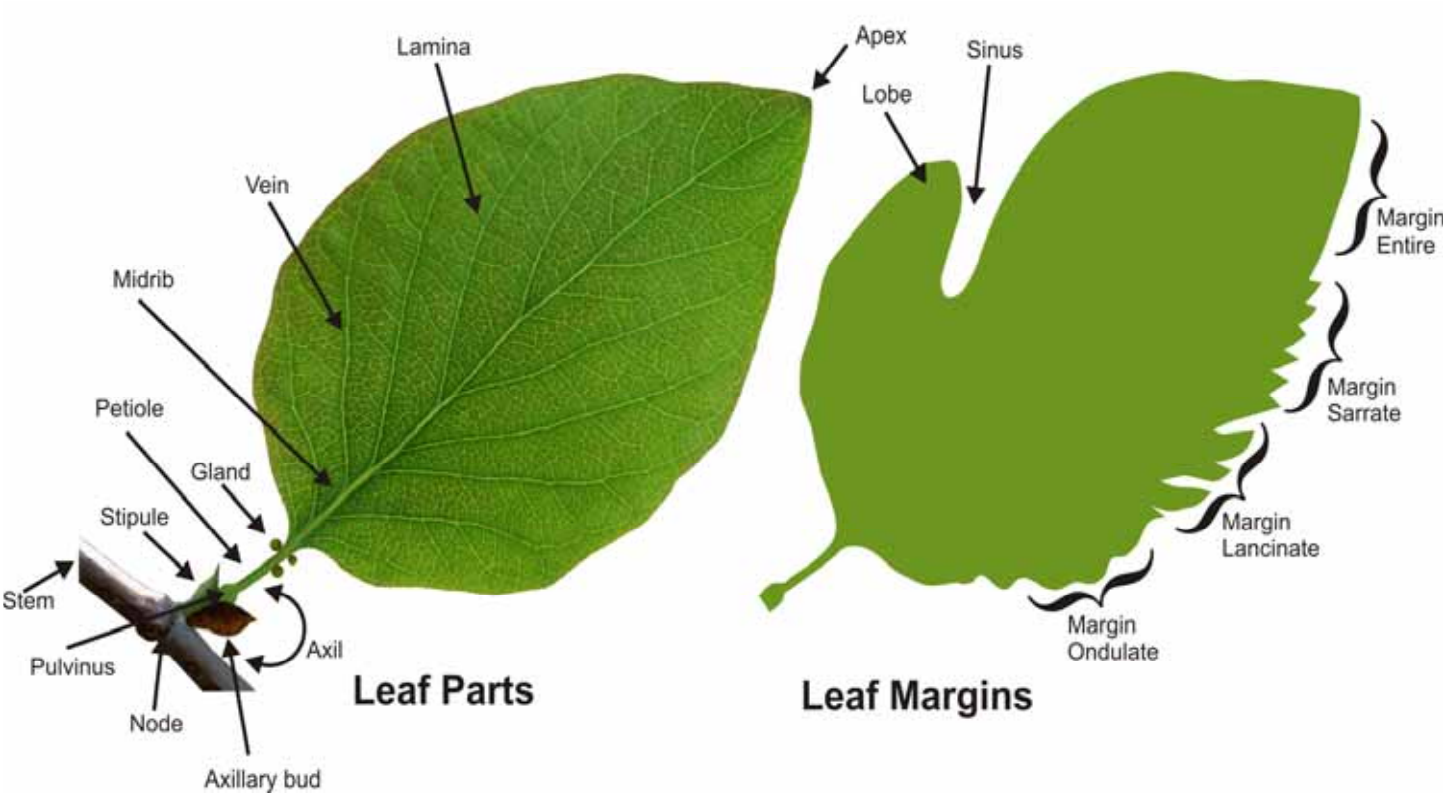
Phyllotaxis is the name given to the arrangement of leaves in the nodes of the shoot (Ill. 1).

On an elongated shoot axis the leaf arrangement shows an alternate pattern (Ill.1.1). Each node develops one leaf and the angle between the leaves of every two nodes is always specific, often two fifths of a plant's circumference. This alternate leaf arrangent is rare in aquatic plants, but it does occur, e.g. *Lobelia cardinalis.*

In two-rowed, alternate leaf arrangement (Ill.1.2) the angle between leaves of each two nodes is always 180°. The leaves are positioned on the shoot axis in two exactly opposite longitudinal lines as with *Potamogeton* species.

Many aquatic plants have a decussate and opposite leaf arrangement (Ill.1.3); each node produces two leaves, opposite to each other and forming an angle of 90° with the leaves of neighbouring nodes. Examples for a decussate and opposite leaf arrangement are found in the genera *Hygrophila* and *Ludwigia.*

If three or more leaves develop from one node they form a whorl (Ill.1.4), e.g. genus *Myriophyllum* and species of



Ill.2 Leaf Composition

Limnophila.

On a compressed shoot axis the leaves are positioned close to each other; they are arranged like rosettes (Ill.1.5).

The most common leaf , the foliage leaf occurs in a large variety of shapes and sizes. It is composed of three main parts: the leaf-blade or lamina; the stalk or petiole; the leaf base or sheath (Ill.2). The lamina is the actual leaf area and can have many different shapes (Ill.3).

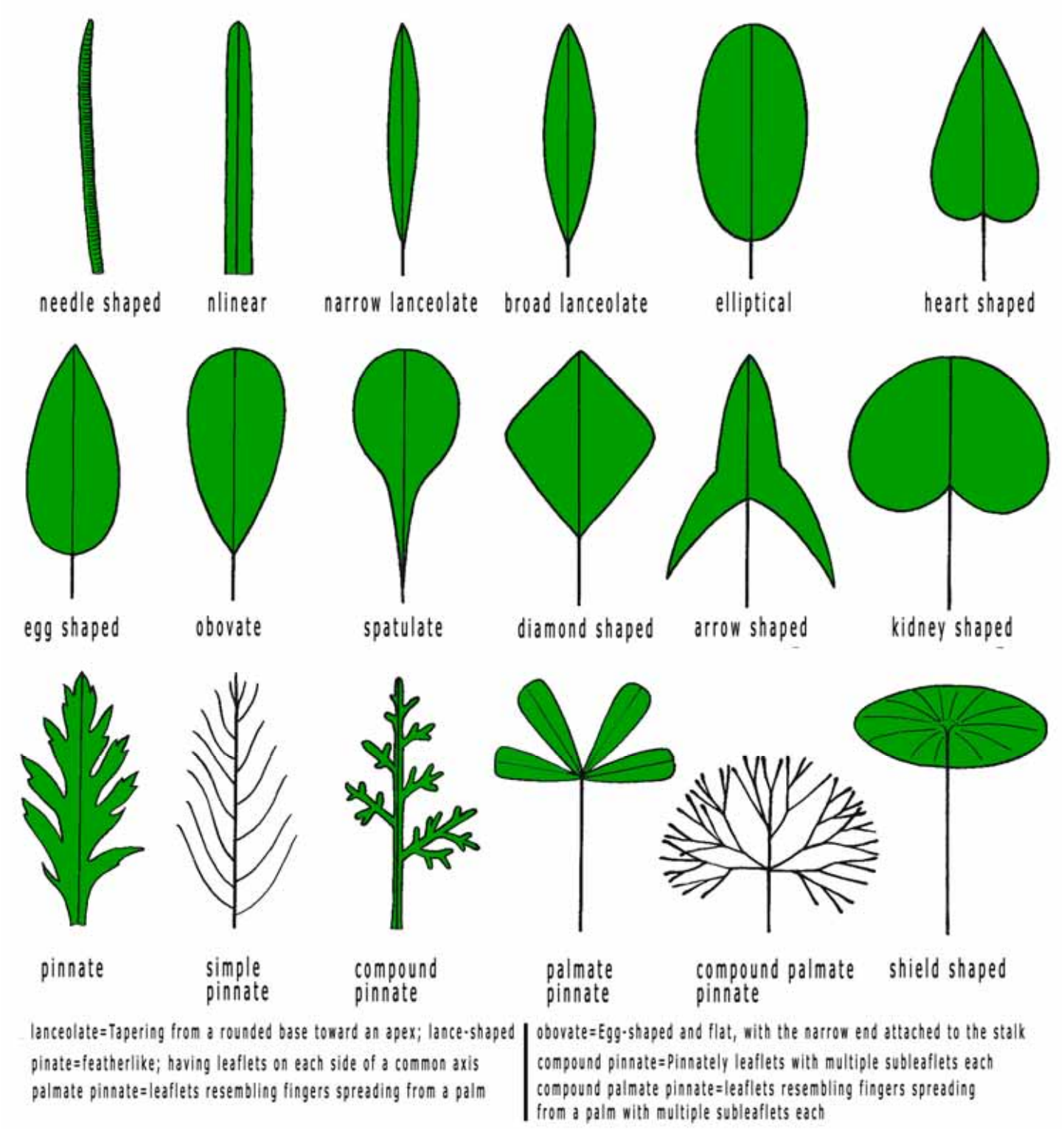
Apart from a characteristic outline, the lamina tips, edges and bases display marked differences and there are also variations in structure. A lamina may be tender and transparent; tough and flattened; wavy or bullate. If a lamina is wavy or bullate the upper and underside of the blade displays protrusions (usually fairly dense), e.g. *Cryptocoryne aponogetifolia.* There are also variations in coloration on the upper and undersides of the lamina. The leaf is traversed by a network of veins which encompass the vascular bundles.

In the group of plants possessing only one cotyledon a distinct midrib has parallel pronounced, longitudinal veins running on either side. In dicotyledonous plants, transverse veins branch off from the midrib. The length of the petiole can be very variable. It may be missing altogether in the leaves of some aquatic plants or, if the leaves are elongated and tapering at the base, the petiole may be just perceptible. A leaf without a petiole is often referred to as a sessile leaf. On the other hand, the leaf-base may be of minor importance and appear as an elongation and broadening of the petiole.

In some marsh and aquatic plants the leaf-base is so distinctly sheath-like in form that it is not always as discernible from the petiole as in *Cryptocoryne* species. Such sheaths also fulfil another function; they enclose and protect the succeeding young leaves for a time. The peltiphyllum is a special type of foliage leaf; its petiole is positioned approximately in the middle of the leaf underside. Examples for this type of leaf are seen in some *Hydrocotyle* species.

Some leaves are modified and deviate from the characteristic foliage leaf, e.g. scale leaves—often found on runners; bracts positioned near inflorescences; and—finally—the flower petals which are really transformed and modified leaves.

There is a definite link between the habitat of a plant and the structure of its foliage leaves. If an environment offers stable water conditions the leaves are usually composed of an upper epidermis, palisade and spongy tissue, and a lower epidermis. Dense, longish cells constitute the palisade tissue; the spongy tissue has a loose and porous structure. The cells of the spongy tissue are irregular in shape, and the tissue contains cavities. Chlorophyll is not present in either the upper or the lower

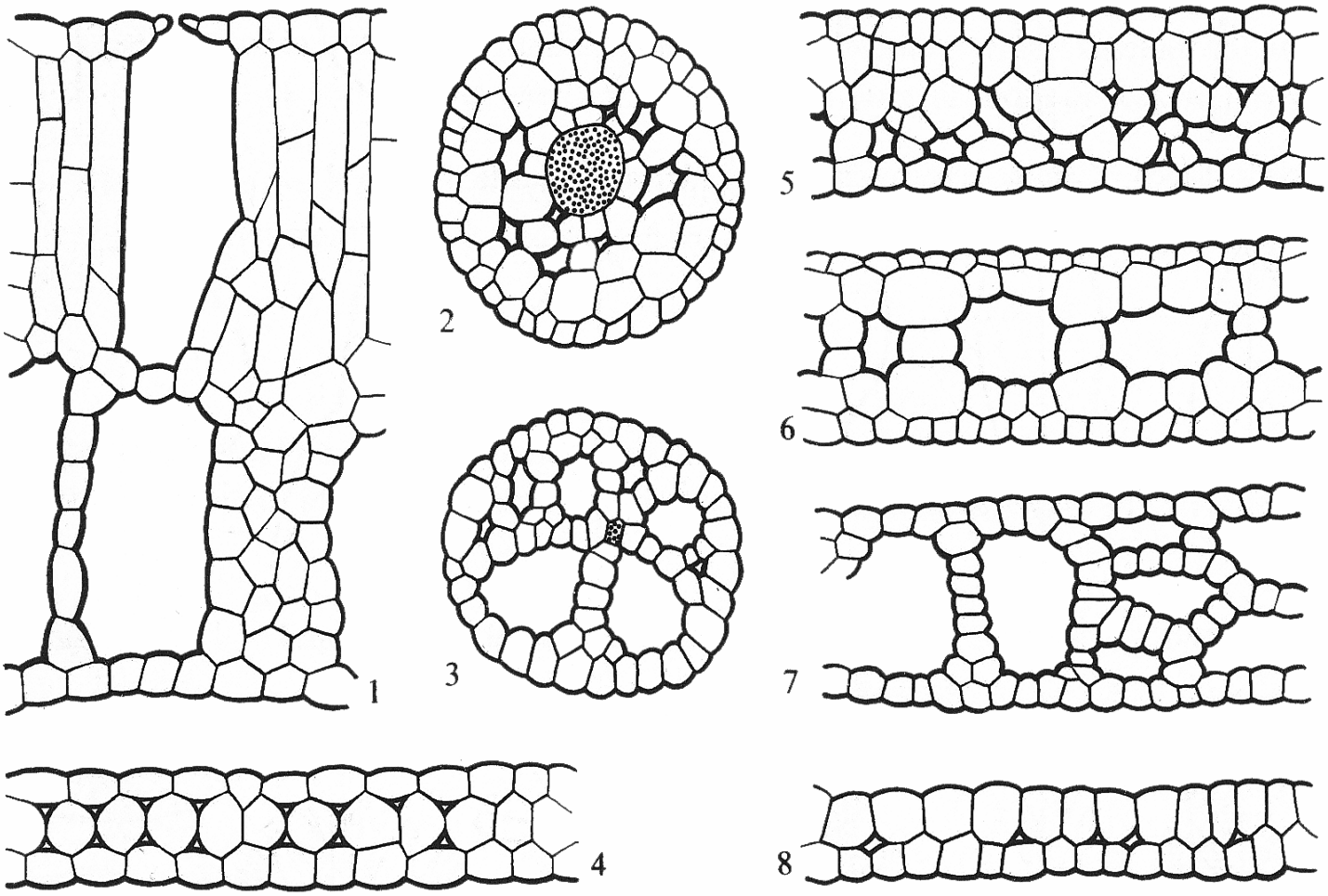


Ill.3 Form of leaf laminae

epidermis; the lower epidermis possesses some localised stomata. Some evidence of this structure is noticeable in floating leaves (although here the stomata are embedded in the upper epidermis) (Ill. 4.1.) and the water leaves of those plants which grow primarily in marshes (Ill. 4.4.).

Typical water leaves do not possess any stomata, but the cells of their epidermis layers contain grains of chlorophyll. The water leaves are thinner; their inner structure does not possess palisade and sponge parenchyma which gradually disappear in a metamorphosis to a simpler state. Only the two epidermis layers remain, e.g. the wa-ter-weed family (Ill. 4.8) but develop air spaces (Ill. 4.2, 4.3, 4.6. and 4.7).

Many marsh plants adapt well to a submerged habitat; it is characteristic for them that they are heterophyllous, meaning they are able to bear leaves of different



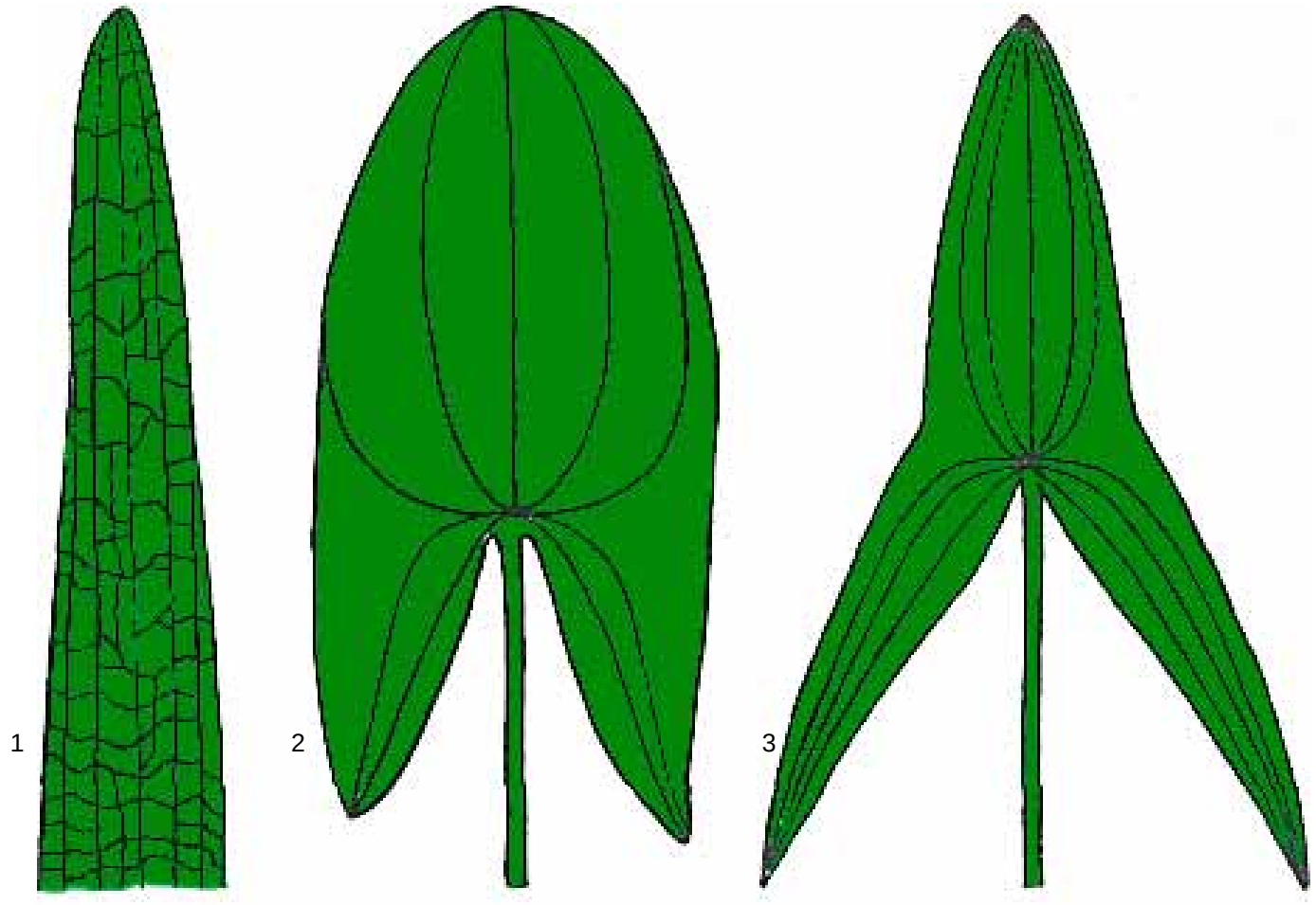
Ill.4 Inner structure of leaves, cellular

1 section of a lamina of floating leaf of *Potamogeton natans,*
2 pinna of a submerged leaf of *Myriophyllum spicatum,*
3 pinna of a leaf of *Utricularia* spec.,
4 section of a lamina of a submerged leaf of *Ludwigia repens,*
5 section of a lamina of a leaf of *Potamogeton gramineus,*
6 section of a leaf of *Vallismria spiralis,*
7 section of a submerged leaf of *Sagittaria subulata,*
8 section of a leaf of *Elodea canadensis*

forms depending on how they grow, i.e developing submerged, floating and aerial leaves in certain conditions.

For example, *Sagittaria* species often develop slender, linear submerged leaves, but their floating and aerial leaves are distinctly divided into petiole and blade (Ill. 5). The leaves of many dicotyledons tend to become pointed and feathery when floating; *Limnophila aquatica* is a good example.

Occasionally, plants produce leaves with different blades if they grow submerged, e.g. *Echinodorus berteroi* and *Hygrophila difformis*.



Ill.5 Different types of leaves
1 Tip of a submerged leaf
2 Lamina of a floating leaf
3 Lamina of an aerial leaf

Footnotes

- **Decussate**: arranged on a stem in opposite pairs at right angles to those above or below, resulting in four vertical rows.
- **Bullate**: having a puckered or blistered appearance.
- **Cotyledon**: a leaf of the embryo of a seed plant, which upon germination either remains in the seed or emerges, enlarges, and becomes green. Also called *seed leaf*.
- **Dicotyledon**: a flowering plant with two embryonic seed leaves or cotyledons that usually appear at germination.
- **Palisade**: Elongated, tightly packed cells in the upper region of the mesophyll of the leaf. This is where most of the trapping of light energy occurs by the chloroplasts
- **Lamina**: the expanded portion or blade of a leaf.
- **Leaf apex**: the tip of a leaf opposite to the petiole.
- **Midrib**: the the central vein of a leaf it is usually continuous with the petiole.
- **Vein**: the vascular structures on a leaf which arrangement is called venation.
- **Petiole**: the stalk or stem that connects the leaf to the plant, frequently with a basal enlargement called pulvinus (petiole are absent in sessile leaves).
- **Axil**: the angle between the upper side of the stem and a leaf or petiole.
- **Stem**: (also called the axis) from which the leaves arise.
- **Stipule**: the pair of small, appendages one on each side at the base of the petiole.
- **Pinna:** division of a usually pinnately divided leaf

References:
www.cactus-art.biz/note-book/Dictionary
The Complete Guide to Water Plants - Muhlberg

Veni Vidi Vissie 2007

Netherland Aquascaping Competition Results

The Veni Vidi Vissie recently announced their long awaited results of their 2007 Aquascaping Competition. This year's contest boasts over eighty-six aquarium submissions in seven different categories ranging from tank size categories to biotypes and paladariums.

According to Marco Aukes a judge for the competition and site administrator, most of the contest entries reflected "the old Dutch School of Aquascaping, with a slight influences of Takashi Amano's Nature Style here and there."

The Veni Vidi Vissie (VVV) is a Netherland based forum community that started over five years ago for Dutch and Belgian aquarium hobbyists. Some might remember, the original name of the forum as "Veni Vidi Vici", meaning "I came, I saw and I conquered". The word "Vici" was later replaced with "Vissie" meaning fishes in Dutch. Put together, the new title "Veni Vidi Vissie" literally means, "I came, I saw and I keep Fishes".

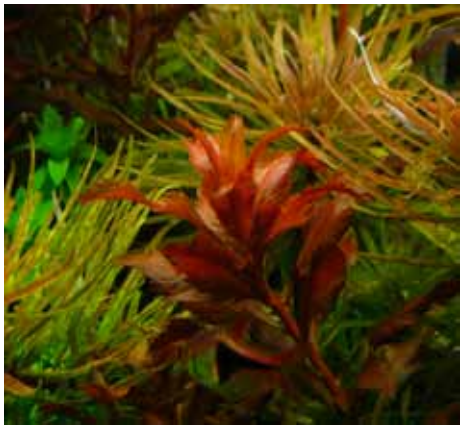
In the five years since the site started, the VVV has now grown to be the largest aquarium forum for the Netherlands and Belgium area with more than 5,000 active members. The annual aquascaping contest began two years ago, and were designed to showcase the talent of Netherland aquacapers. Unlike their Japanse aquascapers, the majority of the aquascapers in this area embrace the lush, Dutch style of aquascaping. Aquascapers stick to rigid techniques that include design an aquarium with many colorful plant species that are trimmed to perfection.

Aukes states the highly esteemed panel of judges (Christel Kasselmann, NBAT Judges: Ab Ras, Adrie van Holstein, Erik Prins and himself) looked for aquascapes that represented a large diversity of plant species that were in pristine health. The aquascaper who could accomplish maintaining these components demonstrated their expertise and mastery of designing aquatic plants in a Dutch influenced style. The judges also examined the selection and health of fish and other fauna as secondary criteria.

Besides healthy plants and species variety, many winning Dutch style aquascapes follow "De Gulden snede" meaning "The Golden Rule". This rule is often used in photography to divide a rectangular frame into thirds, from top to bottom, and left to right. Positioning the focal point in these zones engages the viewer and makes the composition more natural.

Each year, the winner of the completion receives the "Willem van der Klooster" Trophy, named after a man who ignited inspiration among aquascapers as a judge from the NBAT. This trophy is passed down to winner to winner.

Marco Aukes discusses the results and offers commentary on the winners on the following pages. You can see the completed results and all of the submitted aquascapes on the Veni Vidi Vissie site: www.vivariumbeurs.nl.



Willem van der Klooster 1st Place by Fluo

Dimensions: 170x70x70 cm
Volume: 700 liters
Light: 2 x Philips T5 - 80W - 830, 2 x Philips T5 - 80W - 865, 1 x Philips T5 - 80W - 840
Filtration: Overflow filtration
Fertilizer: Profilux Plus II controls addition of fertilizers, Seachem Excel, KN03, KH2P04, and traces
Fauna: 23 Sphaerichthys Osphromenoides, 80 Rasbora Heteromorpha, 25 Carnegiella Strigata, 3 Colisa Lalia 6 Colisa Chuna 15 Otocinclus Affinis, 7 Neocaridina Denticulata Sinensis sp.
Flora: *Glossostigma Elatinoides, Blyxa Novoguineensis, Eriocaulaceae sp. Type 2, Rotala sp. Green, Didiplis Diandra, Rotala Colorata, Ammannia Gracilis, Mayaca fluviatilis sp. Narrow, Alternanthera Splendida, Blyxa Vietii, Rotala macrandra, Tonina fluviatilis, Tonina belém, Rotala sp. Pink, Blyxa Japonica, Hygrophila balsamica, Proserpinaca palustris sp. Cuba, Ludwigia Inclinata sp. Cuba, Polygonum sp. Kawagoneum, Potamogeton Gayi, Vesicularia sp. Christmas*

Judge Marco Aukes: This tank won the best of show award and the Publics vote. Why? Simply because the tank is astonishing. If you look at the plants used, you can see they all are difficult to keep, but the aquascaper Fluo keeps them not just alive but glowing with health. The judges loved the form of the aquascape and the flowing lines in it. The foreground and groups in the front are stronger in contrast than the backside. The judges all agreed that the plant groups in the right-backside optically blend to much in each other, without good contrast. But than again, that was the only downside of the tank.

Willem van der Klooster 2nd Place by W v Wezel

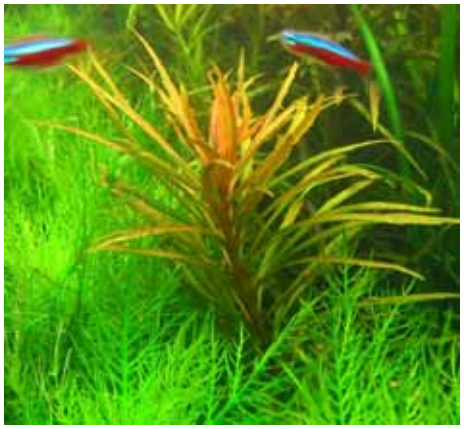
Dimensions: 180x55x55 cm
Volume: 450 liters
Light: 2 x Philips 58 - 830, 2 x Philips 58 - 840
Filtration: Eheim Pro 2028
Fertilizer: KN03, CO2, Iron with Reverse Osmosis water
Fauna: 12 Epyplatus dageti, 16 Rasbora heteromorpha, 22 Hemigrammus rhodostomus, 6 Red koraalplaatjes, 6 Ottocinclus affinus, 12 Corydoras panda,
Flora: Hygrophila guianensis, Bacopa amplexicaulis, Ludwigia glandalose, Glyceria maxima, Rotala indica, Saururus cernuus, Hydrocotyle leucocephala, Microsorium windelov, Vesicularia dubyana, Limnophyla aquatica, Monosoleum tenerum, Althernantera rosefolia, Althernantera specy, Cryptocoryne wendii, Hygrophila difformis,Nymphaea lotus green,Elatine diandra, Bacopa australis

Judge Marco Aukes: At this moment the best in traditional Dutch-style Aquascaping. Three times runner-up in the national championship, and now runner up in our contest. The judges all found the tank had good contrasts between the groups of plants. However, they also found the foreground a bit crowded. This point and the fact that most "streets" of plants are facing left, have cost him first place. High scores however for plant health.

1st Place in Category **(100- 400 liters, 3rd place Willem van der Klooster)** by Marlene

Dimensions: 160x43x50 cm
Volume: 340 liters
Light: 58 watts Arcadia Tropical, 58 watt Arcadia Freshwater Lamp, 58 watts Philips 840
Photoperiod: approximately 13 hours per day
Filtration: Eheim Pro 2028
Fertilizer: KNO3, KH2PO4, and traces
Fauna: 13 Dermogenys pusillus, 3 Betta Splendens, 3 Poecilia sphenops, 6 Xiphophorus maculates, 20 Celestichthys margaritatus, 20 Paracheirodon axelrodi, 5 Ottocynclus affinis, 5 Rhinogobius wui, 4 Pangio khulii sumatranus, 2 Atya Gabonensis, 2 Atya Moluccensis, Neo Caridina serrata var. bee
Flora: Riccia fluitans, Microsorum pteropus windelow, Microsorium pteropus, Anubias nana var. barteri, Hydrocotyle leucocephala, Ludwigia glandulosa, Myriophyllum brasiliensis, Hygrophila guianensis, Nymphaea lotus var. rurbra, Cryptocoryne wendtii brown, Vesicularia dubyana, Alternathera rosaefolia, Rotala indica

Judge Marco Aukes: An original layout, loosely based on the Dutch-style. Strong contrasts in height, color and leaf shape between the groups of plants. Here again: very good health of the plants. Breaking the straight line in the foreground would rank this tank even higher in the overall ranking.



2nd Place in Category **(100- 400 liters)** by RPB

Dimensions: 120x50x50 cm
Volume: 300 liters
Light: 3x38Watt T8 (color 840, 865),1x54Watt T5 (color 830) 1x54Watt T5 (color 830)
Photoperiod: approximately 10 hours
Filtration: Eheim 2026 Professional II
Fertilizer: KN03, KH2PO4 and traces
Fauna: 40 Paracheirodon axelrodi, 4 Trichogaster trichopterus, 11 Carnegiella strigata, 2 Aplocheilus panchax, 4 Corydoras leucomelas, 3 Crossocheilus siamensis, 1Ancistrus dolichopterus, 7 Caridina japonica 100 Caridina serrata
Flora: Microsorium pteropus "Brazil", Rotala sp. Pink, Blyxa japonica, Blyxa novoguineensis, Nymphaea glandulifera, Hygrophila balsamica, Cryptocoryne balansae, Limnophila aromatica, Pogostemon stellatus "Broadleaf", Elatine triandra, Pogostemon stellatus “Green”, Echinodorus bolivianus, Fissidens fontanus, Ludwigia inclinata var. verticillata (sp. Cuba), Anubias barteri var. nana

Judge Marco Aukes: Just like Fluo's tank this aquascaper keeps the most difficult to keep plants healthy and thriving. Nice contrasts also in this tank, with the original wood with Fissidens element as an eye-catcher. The murky water and to many plant species (and therefore lack of serenity in the scape) cost him a higher ranking.

1st Place Paludarium by Hans7

Dimensions: 250x85x70 cm
Volume: 3600 liters
Lighting: 5 x 80 Watt P1Dulux, 6x50 Watt P1 Dulux color 84, 2 x 35 Watt MH
Photoperiod: approximately 12 hours
Fauna: 50 Paracheirodon axelrod, 20 caregiella strigata, 6 copella arnoldi, 8 aequidens maronii, 10 annastomis anastomis, 9 corydoras punctatus, 2 L121 worm line peckoltia, 3 L81baryancistrus sp, 8 dendrobate leukomela, 7 philobatus vitatus, 2 tinctorius oelemarie, 7 otocinclus affinis, 3 Lepidodactylus Lugubris
Flora: Nephentes bekerplant, Krulvaren, Fireball bromeliads, dwarf bromelias, Pleurothallis obovata, Scaphyalottis violacer, dwarf philodendron finger plant, tillandsia flabellate, Crypthantus zonata, Colunea hirta Tillandsia capitata, Vriesea scalifaris, Dischidia pectenoides, Polypodium formosanum, Pellionia deveauana, Syngonium rayii, Begonia schulzei, various ferns

Judge Marco Aukes: Our overall-champion of last year. The best of both worlds: both Aquarium and Paludarium. Judges all praised the natural look of the tank, both above the water as submerged. Not much room to improve, but better choices in animals with more in the jungle area and less in the aquarium was advised.

1st Place Biotope Aquarium by Fotobregman

Dimensions: 220x60x60 cm
Volume: 800 liters
Light: 4X58W and 1X15W fluorescent colors in the 830, 840 and 865
Photoperiod: 13 hours per day
Filtration: Biological Filtration System
Substrate: Filtersand and soil
Fertilizer: Profito and Easycarbo
Fauna: 11 *Discus aequifasciatus* , 60x Paracheirodon axelrodi, 7 *Corydoras sterbai*
Flora: *Hydrocotyle leucocephala, Echinodorus amazonicus, Najas guadelupensis, Ceratopteris thalictroides Nymphaea Glandulifera, Potamogeton gayi, Echinodorus uruguayensis, Hydrocleis nymphoides, Echinodorus magdalensis*

Judge Marco Aukes: An extremely nice Biotope. This aquascaper bred his own discus, and showcased them in a large group that the judges enjoyed . The back-wall with wood has a great natural look. This tank was still in the early stages of its development and the judges could see it. It needed more time to grow and would have ranked higher.

How to Mineralize Soil Substrates

By Aaron Talbot

Over the years dedicated aquatic plant hobbyists developed many different methods to maintain vibrant freshwater flora. After having tried almost all of the popular fertilization techniques, I have finally found one that produces consistently healthy aquatic plants. That fertilization method imparts essential nutrients by using mineralized topsoil as a substrate.

When I joined the Greater Washington Aquatic Plant Association about four years ago, I attended my first official meeting at the home of Sean Murphy. Sean is a Fisheries Biologist by trade and has been employing mineralized soil in his planted aquariums for nearly two decades now. He developed a “recipe” for the soil substrate during his collegiate studies of wetlands soils. It is his recipe that I have recently begun using with great success.

Using topsoil or potting soil as a substrate is not a new idea. Aquarists have been using this method to grow healthy aquatic plants for decades. However, this method does seem to pose some problems, namely algae outbreaks resulting from light intensity that is too strong. This is especially true when you first set up your aquarium with this type of substrate. The algae likely results

Top and Bottom Photos illustrate two aquascapes planted with a mineralizes soil base for their substrates.

from the excess nutrients that decomposing organic materials release in the soil. The decomposing organic materials are not bio-available to the aquatic plants. As the tank matures, the algae dissipate slowly as the organics in the soil finish breaking down.

Mineralizing the soil beforehand helps to speed the breakdown of organic materials in the soil. In turn the mineralized soil will help shorten the initial algae outbreak period that many aquarists experience when using a soil substrate. Soil mineralization occurs from exposing bacteria, enzymes and other soil microbes to oxygen in a moist environment. The microbes break down the organic materials in the soil into bio-available minerals. As an added bonus these new bio-available forms of nutrients are generally only available to plants and not to algae.

There are a few other components to the mineralized soil recipe. Clay provides a source of iron. The clay also serves to bind with the soil as a flocculating agent. When plants are uprooted or disturbed, the added clay will help the soil to settle back to the bottom of the tank. Adding Dolomite to the base of the substrate will provide plants with the necessary calcium and magnesium they need for healthy growth. The calcium and magnesium in the dolomite will also help to keep the soil from becoming too acidic. Lastly, add soluble potash for an initial potassium source.

It is still possible to use pressurized CO_2 and high lighting with this method of fertilization. I have setup four tanks using this method and all of them have been high-tech setups using CO_2 and high lighting. I rarely ever have to dose any supplements save for the occasional dose of potassium. Use caution when dosing and dose very little amounts at a time.

For those readers who would like to try the mineralized soil substrate method follow these step-by-step instructions.

Materials Needed

- Cheap topsoil
- Pottery clay
- Dolomite
- Muriate of potash
- Fine gravel or coarse sand
- Container for soaking soil
- Scrap wood
- Chicken wire
- Nylon screening material
- Large plastic tarp

Step 1

Open the bag of topsoil and distribute in the container of your choice for soaking purposes. I use large Rubbermaid containers that are readily available from any mega-mart. You will want to use cheap topsoil and not potting soil. Potting soil has additives to avoid such as fertilizers, vermiculite and peat moss.

Fill the tub with water so the water level is a few inches above the top of the soil. I like to stir it around a bit to help break up any big clumps and evenly distribute the water. Let this soak for a day or two. Come back and slowly dump the water off of the top. Now add in more water so the soil is well covered. This water changing process helps to "rinse" the soil of any possible fertilizers or other harmful water soluble chemicals.

Step 2

Pour the excess water out of the container as you did when changing the water. Lay out the large plastic tarp, preferably in direct sunlight. Dump out the muddy soil and spread it relatively thin over the tarp. Allow the soil to dry completely. This can take a day or two and depends greatly on how warm the temperature is where you are drying the soil. This part of the process could be done indoors. Though due to its messy nature, I suggest doing it outdoors if possible. When the soil is completely dry, add it back into the soaking container.

The drying process is the part that allows the microbes in the soil to begin mineralizing the nutrients. Exposing it to air oxygenates the soil.

Step 3

Repeat steps 1 and 2 three to four times. Repeating the steps is necessary to further mineralize the soil and remove any lingering fertilizers. The soil mineralizes the most during the time while it is still moist and exposed to air on the large tarp. By soaking it over again we reintroduce the needed moisture for this process to take place. When the soil is near fully mineralized it will have a very grainy texture. Another way to tell that the soil is ready is by smell. There will be virtually no smell coming from the soil once it is mineralized.

Step 4 (optional)

Screening the soil can help to remove any large organic materials that the short mineralization process employed thus far cannot remove. I have setup tanks where I skipped Step 4 and others where I used it. I have found that adding this step to the process helps to further eliminate algae issues after a tank is newly setup.

You can use a wooden frame with chicken wire stapled to four sides. Then place nylon screening material overtop. Place a few handfuls of soil on top and gently push the soil across the surface of the screen. Make sure to put a container underneath to catch the sifted soil. Below is a picture of the sticks, leaves and stones that can be removed during this step. The resulting sifted soil will feel like airy sand.

STEP 3: Mineralized topsoil in a separate container ready for preparation.

STEP 4: Screening setup made from scrap wood and chicken wire.

Step 5

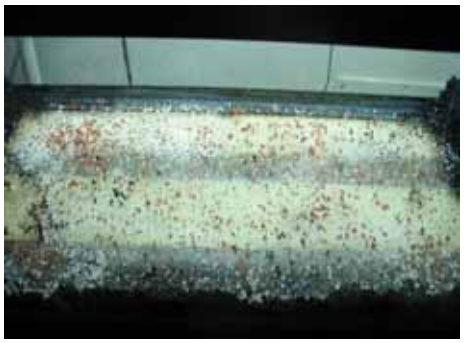
Now that you have a mineralized soil to use as the substrate, you will want to add in the aforementioned clay. Estimate how much clay you will need so that the resulting mixture of soil and clay is about 5% to 10% clay. If you prefer measurements I use about ¼ of a pound of clay per square foot of tank bottom.

To add the clay you soak it in a container of water to help emulsify it and make it easier to incorporate into the soil. A second option to add clay is to dry the clay in the open air and then crush it into a powder and add it to the soil. In either case you will want to eventually add enough water to the mixture to form a nice runny mud.

Step 6 (optional)

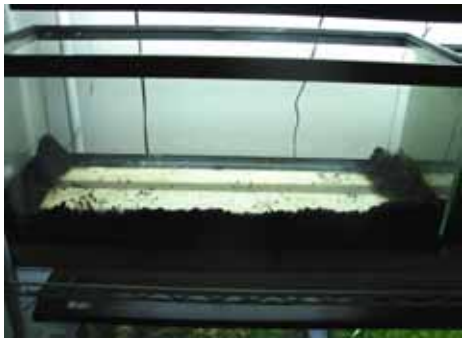
Now comes the fun part of setting up the aquarium. Add the gravel of your choice just along the front and side edges of the aquarium bottom. Wet it just enough that it holds a slope and

STEP 5: Mineralized soil mud mixed with clay.



STEP 7: Sprinkling of Dolomite and Potash.

STEP 9: Add gravel on the top layer and begin planting



STEP 6: Optional sand based layer on the sides serves as a retaining wall.

STEP 8: Add mineralized mud

press it up against the sides. Doing this step ensures that we will not see the different layers of substrate when viewing the tank from the front and sides. In this instance I have chosen to use 3M Colorquartz T-Grade Black Sand as a substrate top layer. I prefer this coarse sand for many reasons. It is very dense and holds a slope for a long period of time. The finer granules also allow for easy planting.

Step 7

Sprinkle a light dusting of both the dolomite and muriate of potash on the bottom glass of the tank. The bottom of the glass should still be somewhat visible.

Step 8

Fill in the borders you've created with the runny mud mixture of mineralized soil and clay. This layer should be anywhere from ½" to 1" deep.

Step 9

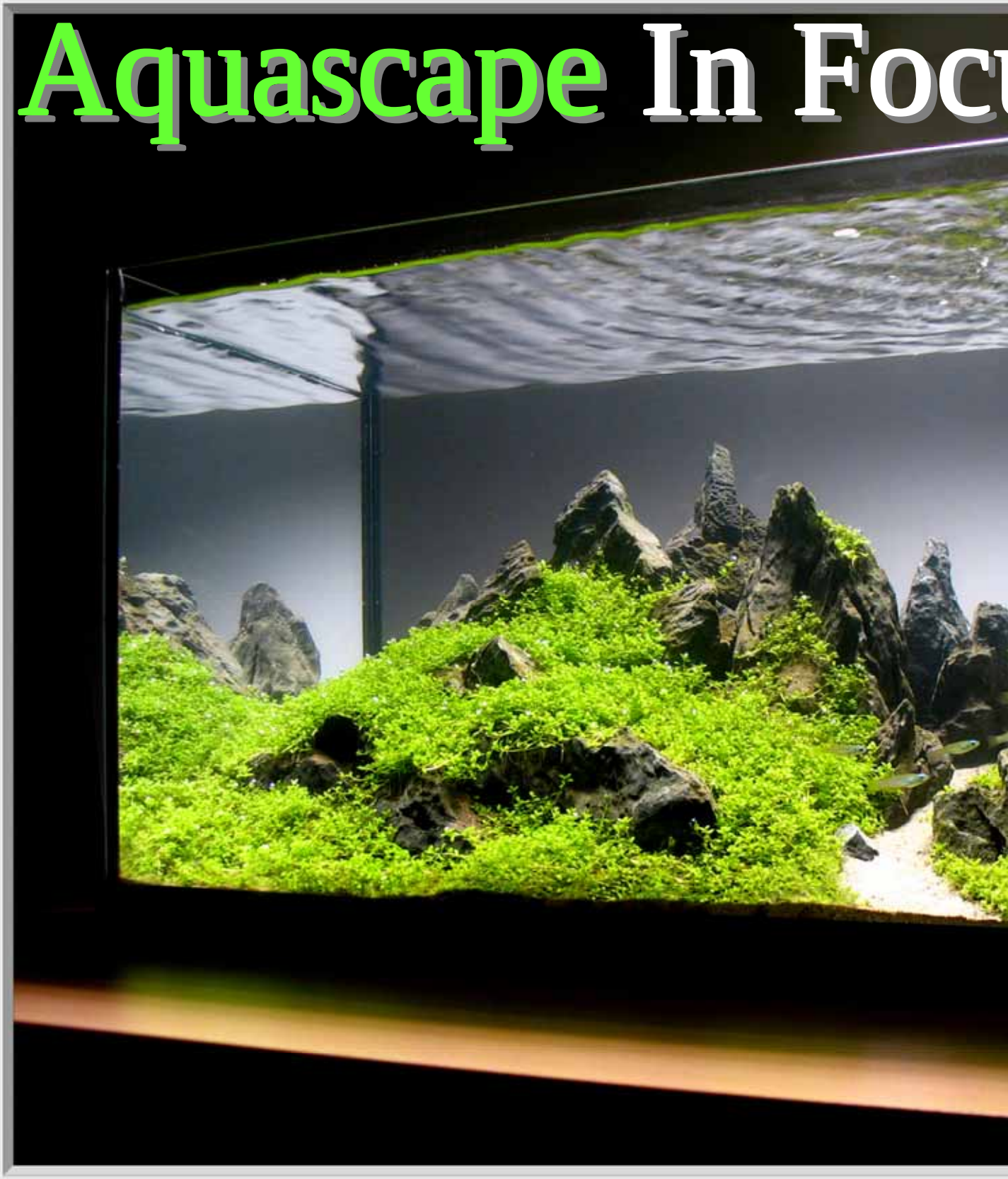
Cover the mud with more of the same border gravel from step 6. If you skipped step 6 then simply cover over the mud with the gravel of your choice. Cover the mud by about 1" in the front to 2" in the back of the tank to create a nice sloping substrate effect.

Step 10

Begin planting and filling the aquarium as you would any other planted aquarium. Use caution when filling the tank with water. Go slowly to avoid disturbing the substrate and uncovering the soil.

I hope this has inspired you to try something new. I know I had wanted to try mineralized soil for some time after seeing Sean's beautiful aquariums. I finally got up the courage to set up a small 20 gallon tank last year and now I'm hooked. With a little patience and trial and error, I think you'll be pleased with the results.

Aquascape In Focu



"Mountainscape"

An Interview with Peter Kirwan

Overcoming aquascaping boundaries and limits, Peter Kirwan shares with us how he mastered creating the intricate hardscape seen in his featured aquascape entitled "Mountainscape".

Q: Tell me about yourself and how you got into planted aquariums.

A: My name is Peter Kirwan, I am 44 years old and I am from Ireland. About 3 years ago I became interested in the planted aquarium hobby. During these three years I have learned a tremendous amount of information, and with practice have accomplished some nice aquascapes. When I was younger, I had kept aquariums on and off but these were fish only aquariums. I had always imagined plants as being too difficult attempt so I never really bothered too much with them. Then one day while browsing the web I came across some pictures of beautifully aquascaped planted tanks and they intrigued me, how had these been done I wondered.

After investigating a bit further I discovered a whole new world opening up for me, a new passion had begun. I found a whole scene dedicated to aquatic plant and aquascaping. I found forums with aquascapers evolving the art of aquascaping in a way that I never imagined existed. The more I looked at the journals and photos of these aquascapes the more I wanted to get involved. From looking at some the pictures on the web and I knew almost immediately that I wanted my own piece of nature in my living room.

Q: Looks like you got bitten by the planted aquarium bug! How did you start out learning the art of aquascaping?

A: Well like many other beginners, I set out to grow aquatic plants as fast as I could. I put larger amounts of lighting over the tank that I had, put in a few plants and within a short space of time had lots of algae. I did not let algae defeat me though. I persevered and spent some time learning the basics. Once I managed growing healthy plants, I then started my first real attempts at aquascaping. Its been an enjoyable journey since then.

Q: Now all your perseverance and developing skills landed you a spot as our Aquascape in Focus. How did you come up with the idea for this aquascape?

A: My main idea for this aquascape was take a small tank and give it a grand sense of scale and perspective. I wanted

the make the aquascape resemble a real mountain scene. I knew that given the size of the tank, the planting options would be limited and better off kept simple with just one plant type. I imagined the mountain scene would have the feel of being off in the distance somewhere like looking at a picture of the Alps in spring or summertime.

I could go on to describe how I was inspired by some beautiful landscape but this wasn't the case here. The inspiration came in part from a couple of rocks in my possession. I tend to do a lot of dry runs with different rock layouts, for future aquascapes, and it was during one of these exercises that the idea came to me of doing the mountainscape. These rocks had nice pointed features to them and after configuring them in different arrangements, I could see the potential for a mountain type scene. Once I came across the idea I knew immediately I wanted to try and portray a mountain scene in an aquascape.

Q: What types of rocks did you use and how did you manage to create the sloping effect in your aquascape?

A: The rocks used here are Seiryu rocks or mini landscape rocks that I have collected over the last couple of years. I would buy maybe 5kg's here and there until I had built up about 25kg's of rocks in total for my collection. In this layout I would say I have used about 20kg's of rock.

The substrate is ADA Aquasoil, but it is basically mud at this stage. I used it in so many different rock layouts before this one, and because of my rough handling, the aquasoil has broken down, but it still grows plants fantastically well. For this aquascape the compacted

(Top) *Initial hardscape design with high peaks and valleys*
*((*Middle) *Small stems of Hemianthus callitrichoides "Cuba" cover the open areas*
(Bottom) *One month later, the HC has spread and engulf the hills in green.*

Aquasoil was perfect for me to use as I was able to tightly pack the mud around the rocks. I found if you let it dry out a little before adding water it becomes the right consistency for shaping and usually retains that shape under water. This allowed me to create the nice high slopes that I wanted.

Underpinning the aquascape are a couple of large rocks against the tightly packed ADA Aquasoil mud. I didn't have to use anything else to hold the foundation together. Although it only happened once, the only issue with using the Aquasoil mud was water clouding when rearrange rocks and plants. But a a quick water change would put it right. Other than that, the slope grade has held its shape magnificently.

Q: Many aquascapers have tendencies to fiddle with their aquascape. How did much of the aquascape developed on its own as opposed to you intervening?

A: The aquascape was built up over the course of a few weeks. As the HC grew in, the front planted section with the large frontal rocks stayed intact the whole time; I didn't change anything here. The rocks at the back section were swapped and changed around a few times as I tweaked the aquascape to find the best combination of rocks for the scene. I would make changes and leave it for a couple of days and then come back and make more changes. It took quite a few goes to come up with the best combination. To finish off the rockwork I broke up a couple of rocks in my collection with a hammer and chisel to fill in some of the smaller pieces, this worked quite well for me.

The HC was originally planted about a centimeter apart in small bunches, at week 4 it had fully carpeted the tank and at this stage I trimmed it back hard and about two weeks later I took the photographs.

Q: In a tank of your size, you must have encountered some challenges, no?

A: The greatest challenge was the rock layout itself. This was challenging in a small tank and sometimes I wished I had used a larger aquarium. The depth of the tank from front to back was the most limiting for me at only 30cm so I made life hard for myself in that respect. Every centimeter of retail space counted as I tried to achieve the feeling of depth and scale in the aquascape.

Other than that, maintenance on the tank was rather easy. I used a good amount of light over the tank during the grow out period which kept the HC compact. I also performed 50%

Clouding of ADA Aquasoil during a water change causes a beautiful mist resembling low lying clouds descending through the Mountainscape.

water changes on this tank every 3-4 days during this time. Though changing the water this frequently is excessive, I wanted to avoid any potential algae issues.

Because of the intense lighting scheme, and frequent water changes I was able to avoid algae problems throughout the lifespan of the scape. Though I cannot say for certain that water changes kept algae at bay, it certainly did not do any harm either way.

Q: What is in stored for the future of this aquascape?

A: Since these photos were taken I have moved this aquascape into a bigger tank and hopefully I have made some improvements to it as well. The size of the original tank limited the ability to place the rocks and plants. Now that it's in the larger aquarium, I have made a few improvements to the aquascape . Depending how it turns out I may enter the "Mountainscape" version 2 into this year's ADA competition. Time will tell though. I only moved the aquascape a few weeks ago.

Lock stock and barrel, I moved everything, made the changes and replanted the HC. It is still early in the aquascape to see if it will work out the way I would like it to. The new larger tank certainly gives me a lot more room to design more rock formations and patterns.

Q: After a successfully completing your aquascape, how has your aquascaping tool belt and outlook changed?

A: I tend to look at nature in a different way now than I did before I took up the aquascaping hobby. I think once you get into the spirit of aquascaping, nature takes on a different persona. You become more aware of your surroundings, and notice the finer details that provide inspiration for the next scape.

I would say that I am hooked on the aquascaping hobby. I started off with one tank but now I have four tanks of of all sizes! I usually only manage time for two smaller aquascapes at a time though. This hobby can definitely grow in more ways than one if your not careful!

I admit the hobby does have its frustrating moments, but with patience the final product is very rewarding.

“Mountain Scape”

Tank Dimensions: 60 x 30 x 30 cm
Volume: 54 liters
Lighting: 3x24W Osram 6500k T5
Photoperiod: 8 hours
Filtration System: Eheim 2211
Water Parameters: Softwater with low KH and GH
Fertilization: 2ml Tropica Plant Nutrition+ added daily
C02 Supplementation: Pressurized CO2, off when lights are out
Diffusion Method/Rate: Rhinox 2000 Glass Diffuser 1 bubble/sec.
Substrate: ADA Aquasoil

Plant Selection
Hemianthus callitrichoides "Cuba"

Fauna Selection
Aplocheilichthys normani

The Estimative Index

Fertilization Method

By Tom Messenger

The Estimative Index, or EI for short, is a reasonably new method of dosing fertilisers in a planted aquarium. The basic idea involves dosing more nutrients than the plants actually need, but in such a balance that algae cannot take advantage. This includes the micro as well as macronutrients, and works best for aquaria with high lighting and very dense planting.

Wait a minute. Doesn't excess nutrients in the water column led to increased algae growth? Well no, not really. Remembering that it is an imbalance of nutrients, rather than an excess which causes algae. In order for algae to proliferate it needs other excess components such as lighting and C02 to consume the abundance of nutrients supplied by this fertilization method.

EI is based on the effects of high lighting and stable CO2 injection at around 30ppm. C02 saturation levels can either be checked by comparing the pH and KH readings, or by investing in a CO2 Drop Checker. The latter is far more accurate and shows real time results with color changes based on low, medium and high CO2 levels.

How does EI work?

A standard EI schedule works around a 7-day week, which makes it easy enough to work out. On the Monday (the first day), you would add your Macros, and on the Tuesday you could safely add the Micros without the fear of losing the Iron through a reaction with the Phosphate. The dosing continues like this on alternate days, until Sunday where you would do a 50% water change. This resets the nutrient levels in the aquarium, and makes sure that the excess nutrients are removed. The cycle starts again on the Monday with the Macros. This schedule can obviously be adjusted to suit your needs, but these are the basic principles.

Powdered fertilisers are most commonly used when using the EI method because they are easy to administer.

Primary Fertilizers

The primary macro elements consists of Nitrate (found in KNO3), Phosphate (found in KH2PO4), and Potassium (found in both of these compounds as K). The other primary class of elements is lumped in what is known as micro elements which is a mixture of different minerals i.e. iron, magnesium, boron, etc.

Sometimes, but not necessarily, people will add Magnesium Sulphate (MgSO4) to help with the buffering capacity of the water (measured as KH). When using R/O water or any water with a low buffering capacity, this will aid against pH crashes overnight due to CO2 build-ups (which can sometimes form an excess of carbonic acid). Nitrates will also form nitric acid, which will try and push the pH down as well. Even with the relatively high Nitrate levels used in EI, the acidifying effect is not as noticeable as it is with CO2 injection. You can use a solenoid on a timer to turn off the CO2 supply at night which can help to keep things stable. It should be turned on again an hour or two before the lights come on again in the morning to give the CO2 levels a chance to build up again.

Proper Mixture Ratios

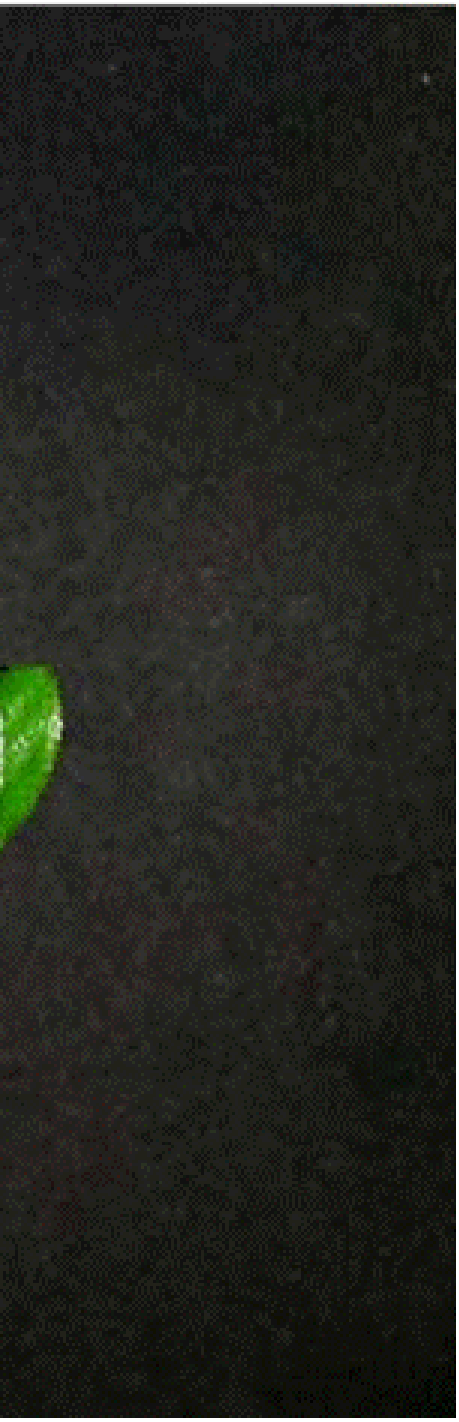
Having separate solutions for NO3, PO4 and Micros will allow you to alter the concentrations of each parameter, which is helpful when fighting algae or certain nutrient deficiencies.

Generally it is accepted that a ratio of 10:1 NO3 and PO4 works well, but again, it differs for each plant species used. You should look at around 20-30ppm of NO3, and so 2-3ppm of PO4. The Potassium (K) can be kept the same as NO3, and the CO2 should be kept at a constant 30ppm.

	10-20 Gallons (38-76 liters)	**20-40 Gallons** (76-152 liters)	**40-60 Gallons** (152-227 liters)	**60-80 Gallons** (227-303 liters)	**100-125 Gallons** (380-473 liters)
Dose Three Times Per Week	1/8 tsp KNO3 1/32 tsp KH2PO4 1/32 tsp K2SO4 1/32 tsp traces	1/4 tsp KNO3 1/16 tsp KH2PO4 1/16 tsp K2SO4 1/16 tsp traces	1/2 tsp KNO3 1/8 tsp KH2PO4 1/8 tsp K2SO4 1/8 tsp traces	3/4 tsp KNO3 3/16 tsp KH2PO4 1/4 tsp K2SO4 1/4 tsp traces	1 1/2 tsp KNO3 1/2 tsp KH2PO4 1/2 tsp K2SO4 1/2 tsp traces
50% Water Change on Day Seven					

Growing Cryptoc

corynes Emersed



By Jose María Romero León

The cryptocorynes are plants of the aroid family whose distribution extends through most of Southeast Asia, from India to the Philippines and New Guinea. This plant species is often found in rivers, streams, artificial canals, and swampy jungles. Many plants from this species spends a greater part of the year in emergent growth. In the midst of the end of the wet season, when water levels are low, cryptocorynes species begin to flourish with striking shapes, flowers and colors.

Only a few species like *crispatula*, *aponogetifolia, cordata* and a few others can be found with flowers while mostly submerged. For this reason, to get the full flowering beauty from the cryptocorynes family , it is important to have the grow emersed so that they can achieve their blooms.

Another advantage of emersed grown cryptocorynes is they grow easier and require less maintenance their submerged counterparts which require an aquarium habitat suitable for them with substrate, CO2, fertilization and so on. Not to mention some species are nearly impossible to cultivate in a submerged aquarium.

For cryptocorynes enthusiasts, growing emersed plants is a great way to maintain a large collection of species without all the complications and care required to grow them in a submerged environment. Emersed grown Cryptocorynes has the advantage when it comes to sexual and asexual reproduction (blooms and pollination). They will reproduce in greater numbers and in less time. Most importantly, an emergent crop and the consequent flowering is the only reliable form of cryptocorynes identification in most cases.

What do cryptocorynes need to grow emergent?

While for many who are familiar with aquatic plants, this question may seem obvious. But then again emergent growing conditions are slightly different then a full blown planted aquarium. Let's first investigate the main factors influencing the growing a crop in emergent conditions.

Humidity

The regions where these plants are found are typically in the tropics where there is constant rainfall and warm

Cryptocoryne cordata growing its natural habitat in Sri Lanka

weather. The vast majority of crypt species live in deep jungles with extensive vegetation cover, which provides protection against the sun. The combination of shade, heat, and constant rainfall creates an optimal growing environment of over seventy percent humidity.

Rich Soil

Providing nutrient rich soil is a crucial factor for growing a healthy crop of emergent cryptocorynes. As a heavy root feeder, the soil is where the cryptocorynes will get the most nutrients for their survival.

In the cryptocorynes their habitats are developed in a wide range of soils, clay, sand, drop litter, and decaying plant matter. It is important to find an ideal composition for the soil if you want the Cryptocorynes to flourish. Generally, you want to mimic the composition of the soil of origin, but we must bear in mind that the living conditions in the wilderness, are not the same as in a pot. With that said, copying the origin's soil composition will work in most cases, but sometimes you must also mimic the full environment.

The main features of a great soil consists of a slightly acidic pH, and a soil that is able to retain and drain water well at the same time. The grain size is not as important, but personally I prefer a particle size average.

What types of soils and substrates can you use?

Silica Sand is an inert substrate that adds nothing to the plant, and that only serves a base for the soil. It does not retains a lot of water with only a small portion retained in the composition by capillary action. This type is seldom used as a single substrate (except if we are to cultivate a hydroponic) and is usually found as part of a mixture with other elements. Its pH tends to be neutral or slightly acidic, and there is a remarkable presence of nutrients.

Compost is a general term for this man-made soil. Most often it consists of composing plant matter, bark, leaves etc. Compost has a lot of nutrients, but the vast majority gives the soil a neutral pH. I also have used compost with some success both alone and mixed with other ingredients. A substrate mixture which has been proven great for most cryptocorynes species is a half and half combination of silica sand and compost.

Peat is formed by decomposing plant debris with an limited oxygen supply in an acid medium. There are two types of peat white and black. The white form is made by decomposing Sphagnum mosses. While the black form is made up of slowly decomposing plant vegetation found in marshes.

In both cases, these peat forms are found naturally in flooded areas, or places that remain wet all the time with high humidity. The top portion of peat begins to dry while the bottom layer keeps on forming deeper layers of decomposing plant material. This whole process enriches the peat, and makes it an ideal material to use.

The white sphagnum peat presents a very low pH, around 4, and provides very few nutrients in its composition and degrades slowly. The black peat presents a pH higher, around 5 and 6, and provides more nutrients and is more mineralized. In both cases, the nutritional contribution is negligible.

The black peat mixed with other soils should help facilitate water movement because of its small pore structure. You can mix it with a variety of other substrates such as clay and sand add acidity to the overall soil composition.

Humus Hayas of forest (*Fagus sylvatica*) is a substrate highly recommended both by Jan D. Bastmeijer and Niels

Flowering *Cryptocoryne willisii*

Cryptocoryne wendtii growing in a coconut fiber based substrate.

Cryptocoryne walkerii root bundle wrapped around Akadama, a clay soil from Japan.

Jacobsen who are research experts in cultivating crypts. According to Jacobsen, the accumulation of leaves in deep layers and their subsequent decomposition makes the composition of humus extremely rich in humic acids which is one of the favorable conditions for crypts soils.

This type of soil encourages a more vigorous development and better long-term plants than in substrates without. The pH of this type of soil, it is usually quite low, ranging around 4-5. It can be used alone or mixed with soil minerals, clays and sands.

Humus forest Castaño (*Castanea sativa*) is the Spanish version of the humus from the forest floor. It is the most accessible in the Spain (where I live) and it is also sold in large garden centers as a substrate for acidophilic plants.

Coconut Fibers is a substrate that I've had very satisfactory results with. It is a very inert substrate, consists primarily of lignin from coconut shells and fibers grounds. The fibers presents characteristics well suited to our purposes and has the capacity to retain water very well, but at the same time allows for draining and water movement through the material. The pH ranges from 5.5-6.5. I have noticed the plants have wonderful growth and have produced healthy white root bundles.

Akadama it is a clay soil from Japan in a region of the same name. It is extracted by removing the top organic layers, and is found to be very granular with a great resistance to desegregation in its grain. It has a slightly acid pH and roots develop magnificently in this substrate.

Cryptocoryne yujii planted in a live moss based substrate that is common practice by Asian crypt hobbyists due to its superior growing abilities.

The porosity of the akadama soil allows a large amount of water and nutrient movement. around the roots. Healthy white roots indicators of great substrates.

There is a variant of the more acidic akadama called kanuma, which is harvested from the same area, but at greater depth in the earth. My experience with this clay is satisfactory when mixed with coconut fiber and humus chestnut.

Sepiolit Clay is a mineral widely used in the industry as an absorbent (marketed as absorbent sand for cats). It has a great capacity for ion exchange and high water-holding capacity. It is very grainy with the grains resisting dissolving or breakups. However, the pH is slightly basic, so the use is limited to cryptocorynes which are easy to cultivate and in a blend of soils.

Other types of clay found in home garden centers or locally can be used. Most varieties are more neautral in pH, but can easily be mixed with other materials. It is important to look for pesticide free soils.

Vermiculite is a mineral laminar very close to the mica. It is created by baking the mineral at high temperatures. This allows the final structure to become very porous with the capacity to retain water and move water. It is completely inert, and contributes limited nutrients including magnesium. The pH is neutral. When mixed with other soils this makes a great composition for a substrate.

Moss is becoming increasingly popular among Japanese growers as a substrate base because it offers a low pH and offers good aeration. I have tested with live moss beds (Vesicularia dubyana), to encourage the growth of new seedlings in pieces of rhizomes of different species (*aponogetifolia, wendtii, walkerii, becketii, pontederiifolia, spiralis, balansae, x willissi*) with considerable success. You can find live mosses in stores that specialize in reptiles.

Other substrates out there that are not mentioned but could be used include rock wool, pine bark, flakes beechwood, and plant mulch to name a few.

Importance of Water

Water as discussed previously is an important aspect of the creating a high humidity environment. The best way to maintain this high humidity, is to have a layer of water covering part of the containers that the plants are growing in. This helps decrease evaporation and increases humidity. The sheet of water will also be the location where the roots will absorb many nutrients.

The water must be as soft and acid since many crypt species prefer softer water. We can use water for reverse osmosis water meets our needs, but we can also lower the pH by adding dry leaves in the water which will release humic acid. Adding a small pump will help circulate this layer of water, which helps circulate nutrients and encourages root growth.

Do not forget we also must also pay attention to water temperature, because in hot climates the water temperature

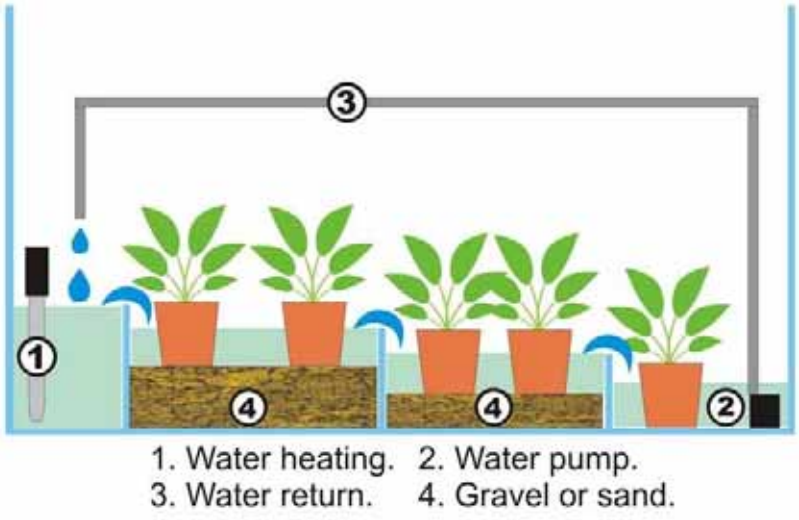


Diagram illustration of adding a water pump to a minigreen house. The idea here is to keep the flow of nutrients circulating around the base of each plant to encourage healthy root growth.

(Right) Mini Greenhouses made from boxes and a plastic cover help retain a high humidity and moisture for the

will determine by the ambient air temperature and raise the temperature rapidly. Maintain the water temperature at around 20 degrees Celsius.

Nutrients and additives

As explained above, water is a very important nutrient transportation system. If our substrates are not very rich in macro nutrients, we need to add some into the water. It is also important to provide enough nitrogen, potassium and phosphate, as well as micronutrients, specifically iron.

I use a conventional fertilizer for houseplants, but with a dose less than that recommended by the manufacturer. Also once or twice a week I apply the same fertilizer with doses much more diluted directly to the leaves with a misting spray bottle.

Making a Greenhouse

Building a small greenhouse to grow cryptocorynes is easy.. You will need an airtight container that can open and close, and can have a cover to shield sunlight. An old aquarium works very well. Place a few inches of water to cover the crypt pots slightly. Then, take a submersible pump and position it so that it circulates the water properly. And lastly, if you are not growing the crypts outside, you will need to find a lighting fixture to supply light energy.

An outdoor setup is harder to maintain due to fluctuating temperatures outside. You want to keep the temperature about 20 degrees Celsius, so you may need a heater or foam insulation to help retain heat. A opaque cover will help block direct sunlight and help regulate temperature as well. Select a shaded area for your system, and remember the sunlight can increase the interior temperature quite rapidly, so choose your location wisely.

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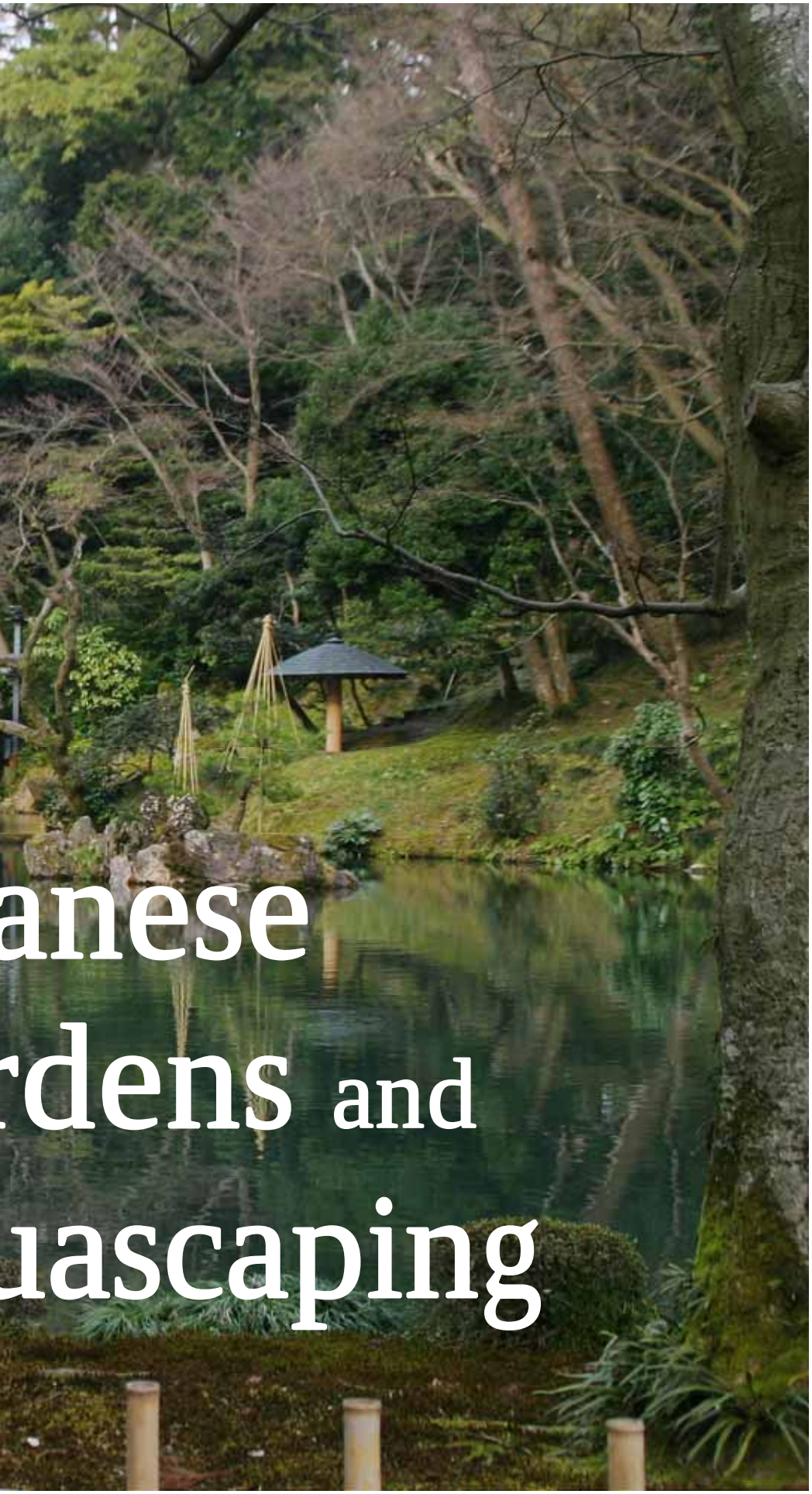

anese rdens and uascaping

By Steven Chong

Ohayou~san!! Mina moukari makka? "Morning!! How are you all doing?" in Kansai Dialect. Since the beginning of March I have been touring around western Japan, staying with various relatives in Kansai and Okayama Ken, though spending the most time in Kyoto. I spent most of my free time touring places with great gardens and scenery-- searching for aquascaping inspiration.

When it comes to Japanese temples, shrines, and their gardens, Kyoto is rightfully well renowned. Outside of Kyoto though, I also made my way out to Kanagawa and Okayama in order to see 2 of the "3 Great Large Gardens" of Japan called Kenrakuen and Kourakuen respectively. (The 3rd is Mito's Kairakuen in Kantou, eastern Japan). Of course I also took the chance to take plenty of photos. Omoroi kara, mina ni misetaru de! (It's been a blast so I'll show y'all!)

Looking through the photos of the Japanese gardens the first thing you will notice is the lack of grass and instead an abundance of mosses. The primary ground cover is moss, and there is a large variety of moss species, liverworts, and allies cultivated in the gardens. These delicate plants are maintained by careful gardeners who can be seen wearing leather boots with softened rubber soles to avoid excess damage to the ground cover. Their brooms are even

made with light tree twigs in place of a standard iron rake to avoiding injury to the mosses. Daily they sweep fallen leaves from the moss to ensure it will not be covered and killed.

Aside from rocks and sand, a number of trees and bushes form the other visual elements of the garden. Matsu (pine), takei (bamboo), sakura (cherry), kaede (maple), and momo (plum) take the place of stem plants. The tough and stiff Matsu with needle leaves is resembles twisted moss-covered wood in our aquascapes. Kaede and softer trees remind me of Rotalas and Ludwigias species. Ferns, smaller bushes and a number of other plants find their places. While Aquascaping and gardening are obviously different disciplines with obviously different available elements, it is clearly visible how they can be connected.

Aquascaping design guides and tutorials from the planted aquarium community cover similar features found in Japanese gardening. Aquascapers frequently references visual techniques that include an off-set positioning of rocks and the use of negative space. I noticed that while the basic composition (types of plants and materials used) are clearly different in Japanese Gardens and our aquascapes, the basic artistic principles are essentially the same. The elements used in both fields serve to present a variety of contrasting textures/impressions to the viewer.

For instance, the wide and spacious areas in the Kenrakuen Garden consists of few plants outside of moss, pines, ferns (growing on their own), and small bushes. There are only a few areas designated for displaying showier trees like ume. Despite this lack of variation in plant

types, contrast is built in the overall layout, much like in the aquarium. Similarly to how Japanese-style Aquascapes are designed considering the need to trim stems, and thus rely on the hardscape to provide the overall shape, in a real garden the same hardscape and foundational structures maintain the overall shape of the garden. Even when a certain tree is not in perfect bloom or autumn color, the overall impression of the gardens remains the same. A Japanese Aquascape or Garden is designed a similar way to showcase the overall beauty of the scape despite not having all the aquatic plants trimmed or the in full show.

However not all elements found in Japanese gardens

coexists with aquarium aquascapes. While many aquascapes rely on plants like Anubias and Cryptocorynes to break up the monotony that results from using only small leaved species, Japanese gardens thrive by using a variety of small leaf plants that do not require a large center piece plant or tree. I thought that was strange.

In terms of building contrast though, the more levels of differentiation one can make in the aquarium, the more visual interest is possible. For instance, if one has a sand foreground, than adding a small plant like *Hemianthus callitrichoides* (HC) can build one more level of variation to the scape. You can continue to build upon the contrast levels. For example, sand > HC > Hair grass > Crypts > Hardscape > Background Plants. The more levels that are possible, the more contrasting points of interests can be achieved.

Real Japanese gardens have water, sand, and moss that resemble what we use as our foreground plants. The difference is garden plants, despite their size, these terrestrial plants appear to have less presence than their comparative aquatic plant counterparts. HC or mosses attached to driftwood take up more space in an area, but their impact is not as dramatic as small maple trees consisting of small leafs found in gardens.

There are some garden elements absent in aquascapes that could be incorporated to reinvent aquascaping as we know it. One example that comes to mind is the use of thin branches, which is usually not present in aquascapes but abudnant in Japanese Gardens. This is the point where an aquascaper should consider what he can do to imitate the things he feels, because it may require innovation from the norm, and the invention of a new way of presenting aquatic plants.

Japanese gardening and aquascaping are different art forms with different resources, but the visual rules and doctrines are shared by both and can give rise to ingenuity in artistic design. It is up to the aquascaper of how much and how to follow. The best way to understand and appreciate is to see it for oneself. Itsuka Kansai he asonde kite na~. Honma shizen de kandousuru ya wa. “Come hang out in Kansai! You’ll truly be touched by the nature there.”

www.aquascapingworld.com