

SPECIAL FEATURE

# Master the Beauty of Plant Cluster

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KIWA ME

Colorful stem plants planted in the background of Nature Aquarium – they are essential background plants to bring a bright and vibrant atmosphere to the aquascape. Stem plants can grow as a single stem, but their inherent beauty stands out when they grow in clusters.

The special feature of this issue introduces the layout techniques to grow clusters of stem plants to bring out the best of the plants' stunning perfection. Why don't you add a bright and colorful touch to your room with an aquascape having lush stem plants?

*Aquascape Photographs by Takashi Amano  
Text by Masatoshi Abe / Tsuyoshi Oiwa*



◆ Appealing Stem Plants  
THINK the Beauty of Plant Cluster

Among aquatic plants, there are particularly a wide variety of stem plants. Their greatest attraction is the beautiful colors including bright green and red, which cannot be seen in other aquatic plants. If we look at only a single stem, it is not so impressive, but on the other hand, it stands out when the stem plants thrive in clumps. It is what we call "the beauty of plant cluster". The trait of growing in clumps is the stem plants' strategy to occupy a wider area to perform more advantageous photosynthesis. What is interesting is that this trait of stem plants also leads to the fascinating appearance of a wonderful and beautiful stem plants in clusters and brings the best of their characteristics to your layout.

## the Beauty of Plant Cluster

What brings out stem plants the most is the dense vegetation. It is overwhelming to see the beautiful clusters of stem plants growing luxuriantly to fill the entire background. This section introduces some aquascapes with gregarious beauty in their backgrounds.

A

NA GALLERY

### Beautiful Clusters Flowing Down the Background

A large clump of *Microsorium* sp. (Narrow Leaf) is surrounded by thriving *Rotala rotundifolia* (Green) and *Hygrophila polysperma*.

Tank size: W180×D60×H60(cm)  
Shot on: November 2000



Main stem plants used: *Rotala rotundifolia* (Green) / *Rotala rotundifolia* / *Hygrophila polysperma*



B

NA GALLERY

### Stem Plants Arranged by Considering Color Effects

Dark red *Rotala macrandra* is planted slightly off the layout center to the right to keep the balance of the focal point.

Tank size: W90×D45×H45(cm)  
Shot on: December 2003

Main stem plants used: *Rotala macrandra* / *Rotala rotundifolia* / *Rotala rotundifolia* (Green) / *Nesaea pedicellata*



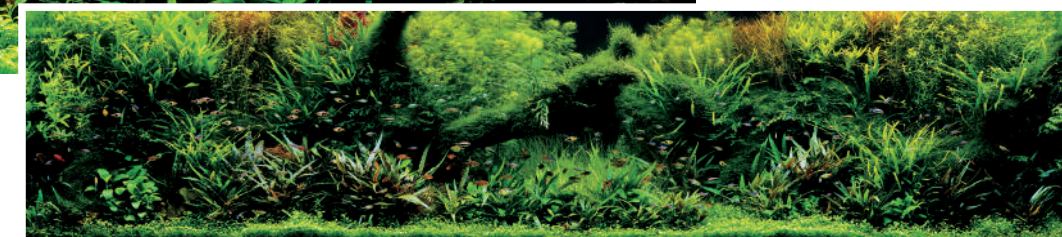
Red and green stem plants are planted alternately to add a different touch to the background to avoid monotonous aquascape.

Tank size: W240×D60×H60(cm)  
Shot on: October 2009

Main stem plants used: *Rotala rotundifolia* / *Ammannia gracilis* / *Nesaea pedicellata* / *Ludwigia arcuata* / *Rotala nanjean*

NA GALLERY

### Stem Plants Arranged Alternately in Different Colors



D

NA GALLERY

### Arrangement of Assorted Stem Plants

This layout is composed of stem plants alone from the midground to the background. The assorted stem plants add a cheerful touch to the aquascape.

Tank size: W60×D30×H36(cm)  
Shot on: September 1993

Main stem plants used: *Pogostemon stellatus* / *Pogostemon stellatus* / *Nesaea* sp. / *Ludwigia ovaries* / *Drymaria cordata* / *Lagarosiphon madagascariensis* / *Rotala wallichii* / *Hemianthus micranthemoides* / *Didiplis diandra*





# FEEL

SUIKEI GALLERY 2

“Beauty of Plant Cluster to Form a Composition”

## the Beauty of Plant Cluster

The composition framework of layout is formed by driftwood and stones. Stem plants play another important role there to flesh out the framework to form the composition. Enjoy the beauty of plant clusters creating various compositions.



NA GALLERY

**Color Gradation  
Presented by Stem Plants**



The layout shows color gradations by arranging *Rotala* sp. 'Ceylon', having the medium tone, between the red and green stem plants.

Tank size: W120×D45×H60(cm)  
Shot on: November 2008

*Main stem plants used: Rotala rotundifolia / Rotala nanjean / Rotala sp. 'Ceylon' / Rotala macrandra (Narrow Leaf) / Myriophyllum mattogrossense (Green)*



*Main stem plants used: Myriophyllum mattogrossense (Green) / Rotala nanjean / Rotala rotundifolia (Green) / Rotala rotundifolia*



NA GALLERY

**Magnificence Created  
by Fine Leaves**

Bushes arranged by several fine stem plants can give a larger impression of the aquascape. This produces a magnificent scale of the layout.

Tank size: W180×D60×H60(cm)  
Shot on: October 2013



NA GALLERY

**Stem Plants Arranged  
to Enhance the Red Color  
in the Center**

Large red leaves of *Alternanthera reineckii* planted in the center stand out in the layout by being surrounded by fine stem plants.

Tank size: W180×D60×H60(cm)  
Shot on: April 2010



*Main stem plants used: Alternanthera reineckii / Ludwigia arcuata / Myriophyllum mattogrossense (Green)*



NA GALLERY

**Convex Composition Emphasized  
by Bright Red Color**

The impression of the convex composition is emphasized by planting *Rotala rotundifolia* to the left of the layout center.

Tank size: W60×D30×H36(cm)  
Shot on: October 2010



*Main stem plants used: Rotala rotundifolia / Rotala sp. 'Ceylon' / Alternanthera reineckii / Ludwigia arcuata*



# FEEL

SUIKEI GALLERY 3

“Beauty of Plant Cluster Seen in Iwagumi Layout”

## the Beauty of Plant Cluster

Stem plants are not often used in Iwagumi layout. However, these plants are used to make a significant change to the aquascape by so-called “Sozo Haishoku” or to emphasize the perspective of the layout. Let’s have look at the beauty of plant clusters in Iwagumi layouts.



NA GALLERY

**Beautiful Clusters of Stem Plants in Harmony with Hakkai Stones**

Stem plants grown into a beautiful cluster wrap Hakkai stones from behind. They are harmonizing well with rounded Hakkai stones.

Tank size: W90×D45×H60(cm)

Shot on: August 2010

*Main stem plants used: Hygrophila polysperma / Rotala rotundifolia / Rotala rotundifolia (Green)*



NA GALLERY

**Beautiful Clusters of Stem Plants to Enhance Manten Stones**



Soft colors of stem plants in the background match the earth color of Manten stones and enhance their presence.

Tank size: W90×D45×H45(cm)

Shot on: December 2009

*Main stem plants used: Myriophyllum mattogrossense (Green) / Rotala sp. ‘Ceylon’ / Ludwigia arcuata / Rotala nanjean / Rotala macrandra ‘Green’ / Rotala rotundifolia (Green)*



NA GALLERY

**Bright Impression Created by Sozo Haishoku with Stem Plants**

The Iwagumi layout as if to represent rough rock reefs by using Ryuoh stones now shows a brighter and softer effect after the makeover by Sozo Haishoku with stem plants.

Tank size: W180×D60×H60(cm)

Shot on: April 2005



*Main stem plants used: Hemiantbus micranthemoides / Micranthemum unbrosium / Rotala macrandra ‘Green’*



NA GALLERY

**Perspective Expressed by the effect of clumps of Stem Plants**

Perspective is skillfully expressed by placing Ryuoh stones in the center to depict a distant view of a mountain and having a clump of stem plants in front to depict a forest.

Tank size: W120×D45×H60(cm)

Shot on: April 2010

*Main stem plants used: Hygrophila polysperma / Rotala rotundifolia*





◆ Beauty of Plant Cluster  
SEEN in Natural Underwater

Nature Aquarium defines underwater beauty found in the wild as a sense of nature and expresses into a layout. The elements that help to create a sense of nature include clusters of aquatic plants, together with many other things like stones, driftwood, sand and pebbles. Clumps of aquatic plants are essential for underwater ecosystem as they are not only beautiful, but also supply a large amount of oxygen into aquarium water and serve as ideal shelters for small and juvenile fish. Growing clusters of aquatic plants in a layout turns out to generate a sense of nature.



# 1 CREATE

## Visual Impact and Planting of Stem Plants

### the Beauty of Plant Cluster

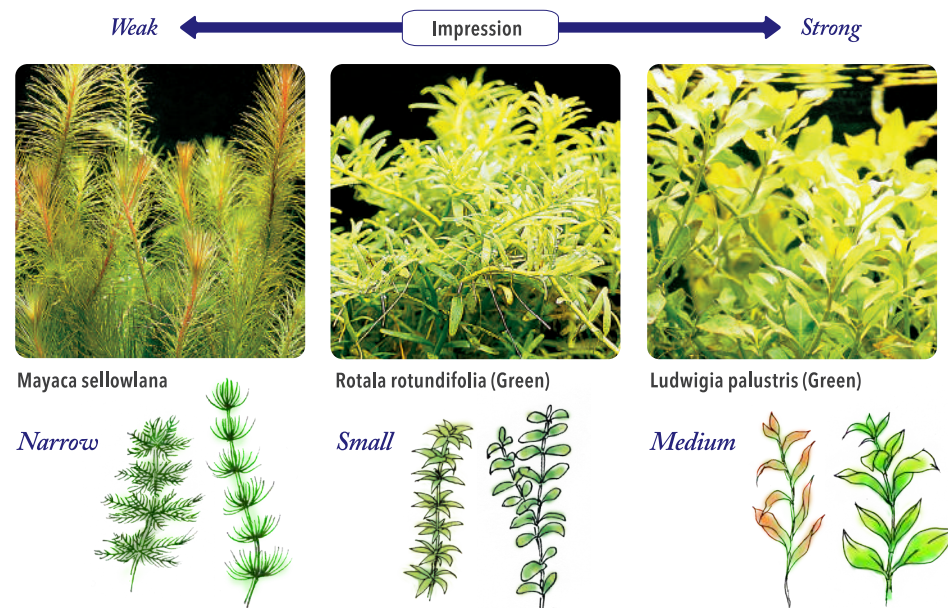
To create a beautiful cluster of stem plants, it is necessary to think of planting patterns and to plant them densely and carefully. This section introduces the visual impact and the planting methods of stem plants based on their leaves and their colors.



#### GUNSEI-BI

##### Select the Appropriate Shape and Size of Leaves

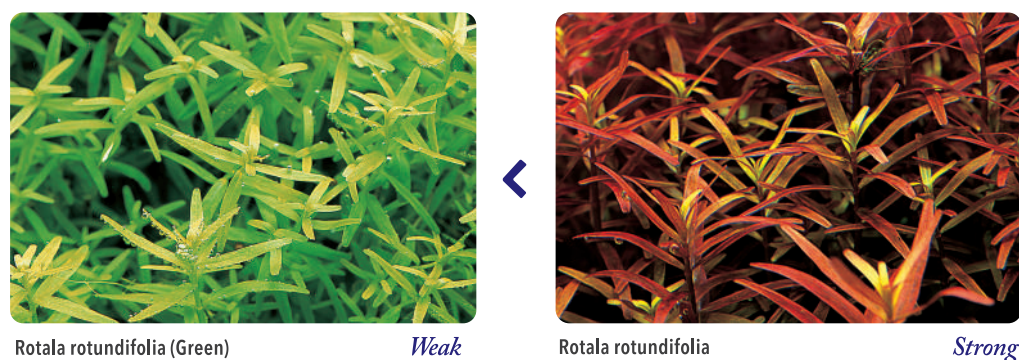
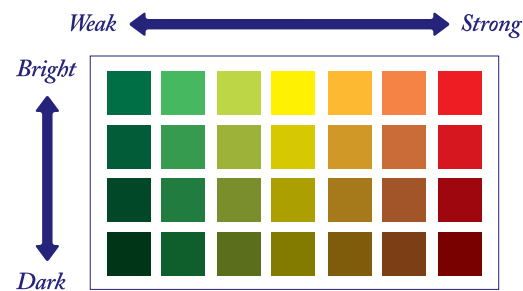
Stem plants come in various leaf colors, shapes and sizes. If you select only a similar type of leaves, the cluster may look organized but it often becomes monotonous. Avoid excessive use of large leaves or the cluster might look flat.



#### GUNSEI-BI

##### Know the Different Impressions of Colors

Color impact varies depending on the leaf color. Red plants have a stronger impression than green plants. Taking that into consideration, let's work on the plant arrangement suited for the center set on the layout composition (refer to C on the next page).



##### Complementary color effect:

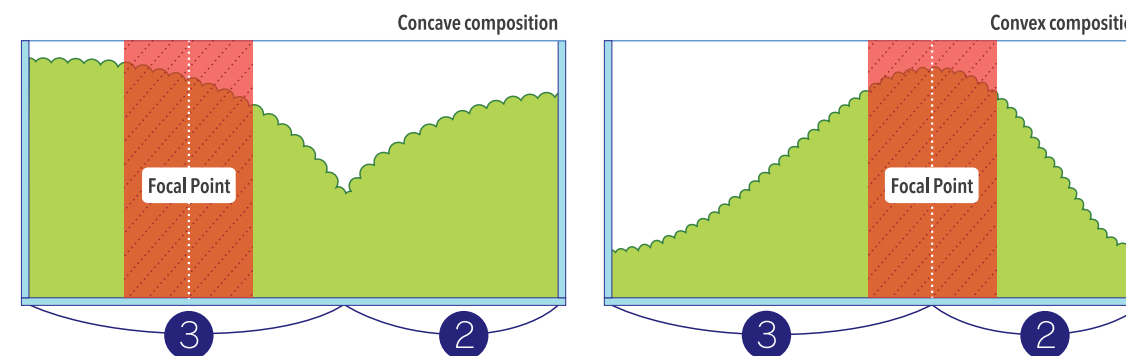
Green complements red. Thus a red plant stands out when it is placed among green plants as an accent.



#### GUNSEI-BI

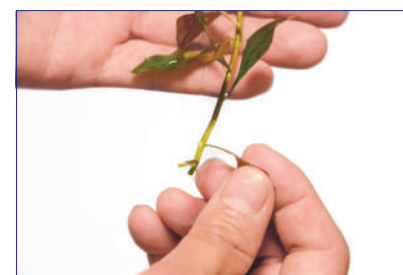
##### The Golden Ratio Supports the Balance of the Composition

The position of the focal point in the layout composition is very important. The balance of approximately 3:2 should basically be achieved in the layout as per the golden ratio of 1.618:1. In line with this thinking, the plants having larger leaves or stronger color should be planted on the focal point side.

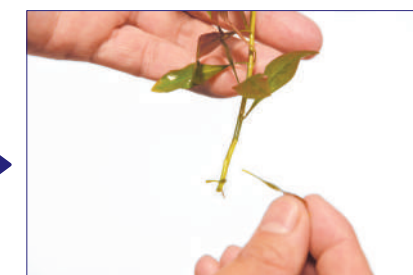


The basic plant arrangement is to locate high-impact plants, such as stem plants with large leaves or red plants, on the range of focal point in the layout (i.e., red shaded zone in the above illustration). When arranging red plants in one location, it is a cardinal rule to lap over the range of focal point.

##### "Preparation of stem plants with broad leaves"



For stem plants with broad leaves such as Ludwigia, remove the leaves on two lower nodes.



Since those lower leaves easily fall off and can cause rotten stem if left untreated, it is advisable to remove them before planting in order to make dense planting easier.

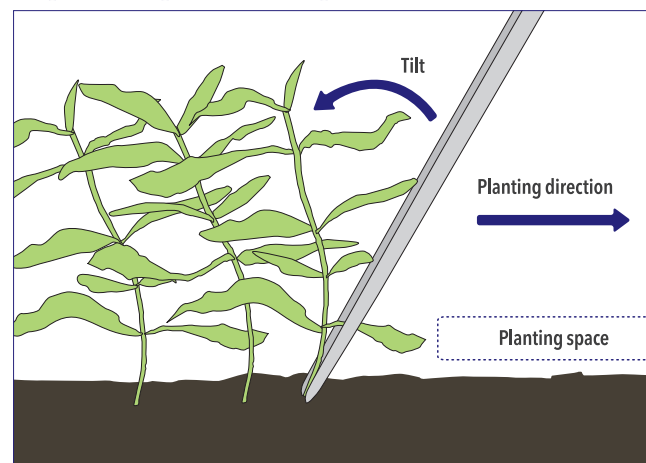


#### GUNSEI-BI

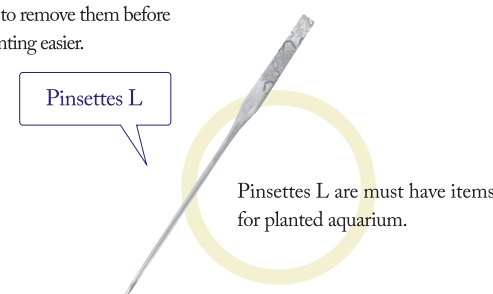
##### Planting Tips to Create a Beautiful Cluster

For stem plants which will develop large leaves, it is easier to achieve dense planting by removing their lower leaves in advance. It is also important to use specialized Pinsettes for aquatic plants and to work on planting as checking the planting space left.

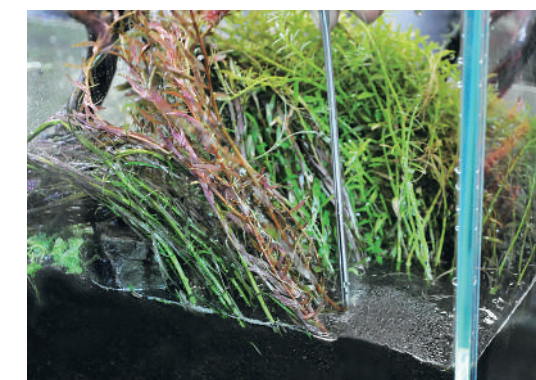
##### "Tips for dense planting of stem plants"



For neat and dense planting of stem plants, it is important to tilt the plants against the planting direction to secure planting space. Make sure of planting direction before starting the job.



Pinsettes L are must have items for planted aquarium.



Another tip for dense planting is to pour water just up to the substrate level.



# CREATE

Lighting and CO<sub>2</sub> Supply

## the Beauty of Plant Cluster

Rate of photosynthesis is determined mainly by “light intensity”, “CO<sub>2</sub>” and “temperature”. In the absence of any of these factors, it may become a limiting factor that lowers the rate of photosynthesis.



Solar I (Metal halide lamp)



Solar II (Fluorescent lamp)



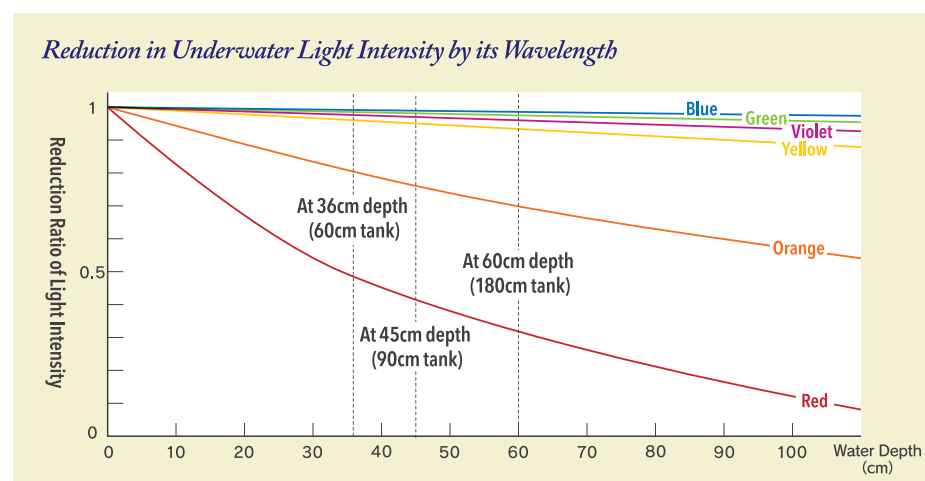
AQUASKY (LED)



GUNSEI-BI

### Light – The Most Important Factor for Plant Growth

The most important factor in growing aquatic plants is the light intensity. Therefore, it is necessary to choose a lighting system which can supply sufficient amount of light for your tank. There are various types of light sources available, including metal halide lamp, fluorescent lamp and LED. For a 90cm or larger tank, it has an advantage in using metal halide lamp which emits strong light.



The NA Lamp contains blue light which penetrates further in water, so that it is suitable for growing aquatic plants.

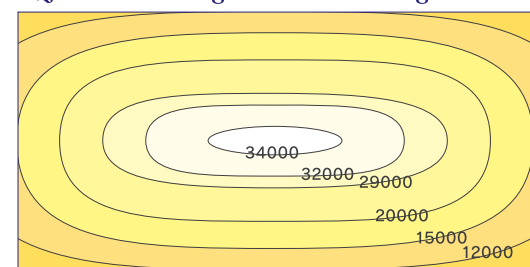


GUNSEI-BI

### Difference in Light Intensity between Center and Corners of Tank

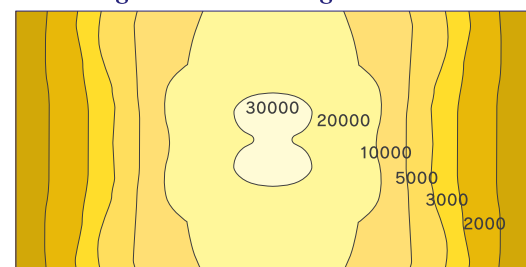
Although appropriate lighting system is installed for the tank size, the center part of the tank tends to be brighter than the corners of the tank where often result in darker. Since red aquatic plants prefer strong light, they should be planted around the center of the tank to help them grow beautifully. It is good to remember that plants may grow slower on the corners of a tank due to low light intensities.

*AQUASKY 602: Light Distribution Diagram*



□ W60×D30cm  
Measured distance: 12cm  
(Estimated distance to the water surface)

*Solar I: Light Distribution Diagram*



□ W90×D45cm  
Measured distance: 30cm  
(Estimated distance to the water surface)

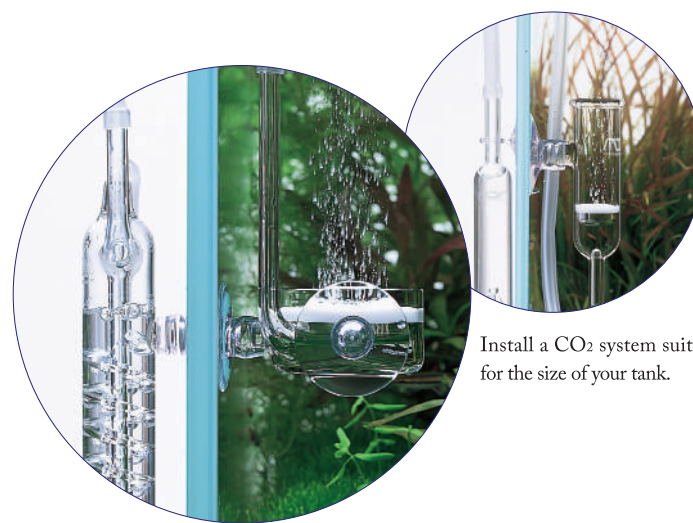
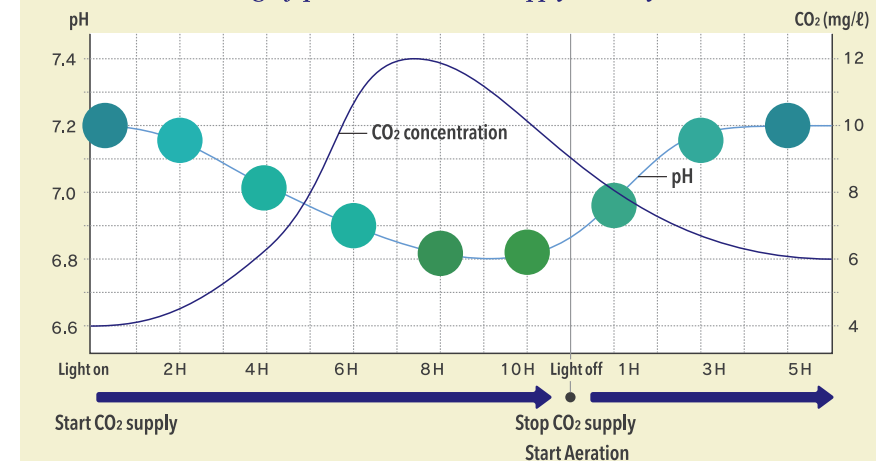


GUNSEI-BI

### Change in CO<sub>2</sub> Supply for Each Growth Stage

As stated already, the three factors that affect the rate of photosynthesis are “light intensity”, “CO<sub>2</sub>” and “temperature”. The most difficult factor to adjust is CO<sub>2</sub> concentration. It requires experience to determine the necessary amount of CO<sub>2</sub>. The good indicator is the data “3 bubbles per second” by using ADA CO<sub>2</sub> system, for instance.

*Time-Course Change of pH Level with CO<sub>2</sub> Supply in a Day*



Install a CO<sub>2</sub> system suitable for the size of your tank.

### “Check the Changes in CO<sub>2</sub> Level”

The diagram illustrates three CO<sub>2</sub> levels using a color-coded drop checker: Optimum CO<sub>2</sub> (Green), Insufficient CO<sub>2</sub> (Blue), and Excessive CO<sub>2</sub> (Yellow). A Drop Checker is shown with instructions: “Just install Drop Checker in the aquarium. You can check the CO<sub>2</sub> concentration simply by looking at the color of the reagent.”



GUNSEI-BI

### Observation of Photosynthesis and Environment



Under the environment with preconditions for photosynthesis, aquatic plants generate oxygen bubbles from their leaves to show us their fantastical beauty of cluster. Oxygen bubbles are not appeared when failing to fulfill the preconditions. It is important to observe the growing plants on a daily basis to provide the appropriate growing conditions for their growth.



## the Beauty of Plant Cluster

In addition to ensuring good water condition, providing appropriate water flow is also important to grow a beautiful cluster of stem plants. Optimized filter functions and water flow help create the beauty of plant cluster.

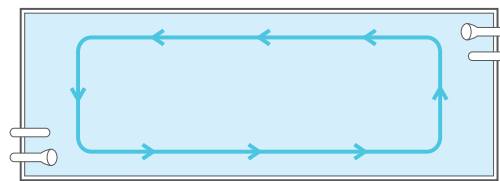


NATURE AQUARIUM GOODS  
SUPER JET FILTER

### Water flow equalizes CO<sub>2</sub> concentration

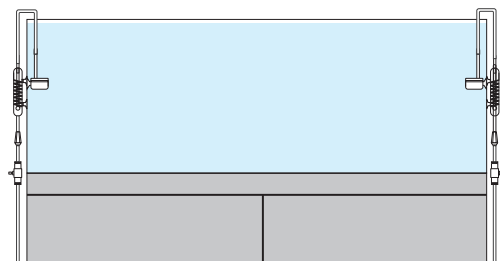
#### Install two outflow ports on both sides

Large aquariums often experience uneven CO<sub>2</sub> concentrations. A solution to this problem is to install two separate filter outflow ports on both sides of the tank to create water flow that circulates the entire tank. This will help equalize CO<sub>2</sub> concentration in the tank.

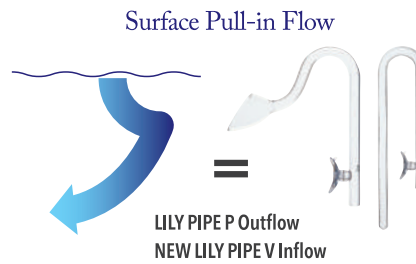


#### Divide CO<sub>2</sub> supply into two branches

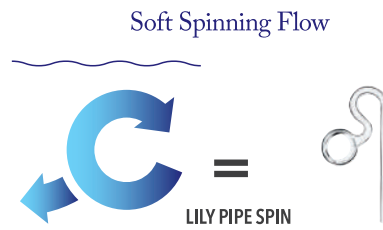
A higher efficiency in CO<sub>2</sub> supply is achieved by supplying CO<sub>2</sub> with two separate Pollen Glasses, rather than supplying a larger amount of CO<sub>2</sub> by using a single unit. In a large aquarium, it is advisable to branch off the CO<sub>2</sub> supply.



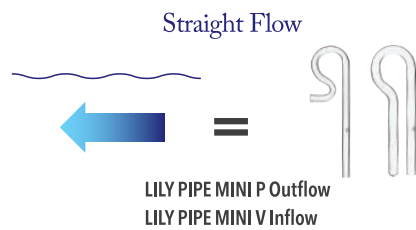
A filter system having adequate biological filtration functions is essential for growing a beautiful cluster of stem plants because it enhances clarity of the aquarium water and inhibits algae growth. As another benefit, the water circulation created by a filter delivers CO<sub>2</sub> and nutrients to stem plants and promotes their photosynthesis. However, excessively strong current can cause over-swaying or uprooting of plants, which hinders their healthy growth. For this reason, it is necessary to moderate the water flow in an aquarium. Optimizing filter capacity and water flow rate realizes stem plants to grow in a beautiful cluster.



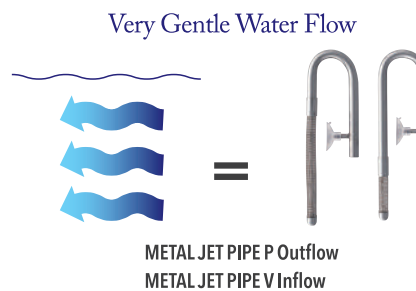
Lily Pipe, an accessory of Super Jet Filter, moderates the outflow of water and creates the ideal flow for the growth of stem plants.



Lily Pipe Spin creates a circling flow of water inside the loop section, and effectively reduces the strong flow. Particularly suitable for small aquariums.



Simple designed Lily Pipe Mini is suitable for combined use with an external filter with low flow rate designed for small aquariums.



Metal Jet Pipe for outflow slows down the water flow from the filter and creates very gentle current. Suitable for keeping fish that prefer gentle water flow such as Bettas.

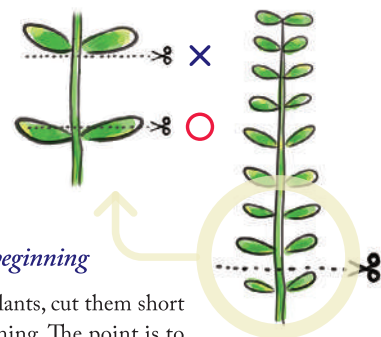


# 4 CREATE Trimming Techniques

## the Beauty of Plant Cluster

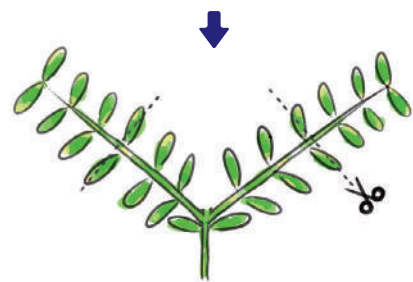
In Nature Aquarium, trimming is not merely a process to adjust the height of stem plants but it is a must-master technique in order to enhance the density of stems and leaves and to grow beautiful plant clusters.

### A GUNSEI-BI Basic Method for Trimming Stem Plants



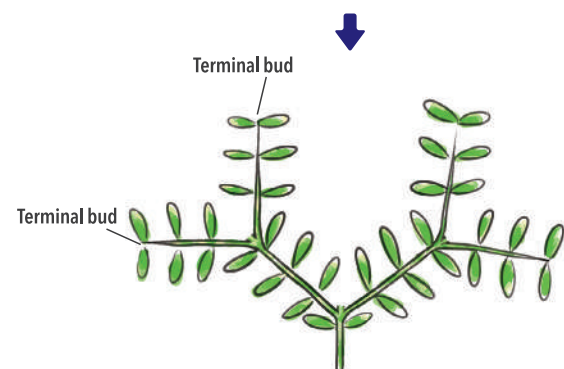
#### Cut short at the beginning

For grown stem plants, cut them short for the first trimming. The point is to cut immediately above a node.



#### Cutting position after second trimming

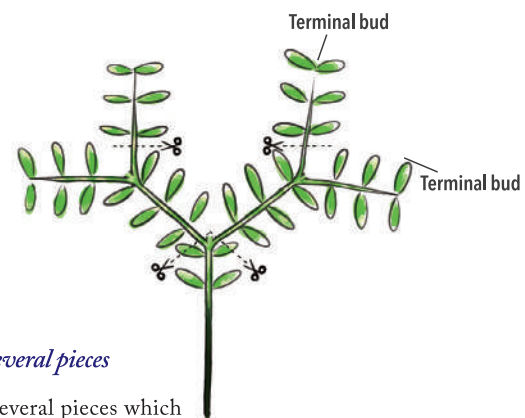
From the second trimming, cut the plant at a position higher than the previous trimmings. This will allow the stem to branch out.



#### Lateral bud grows and stem branches out

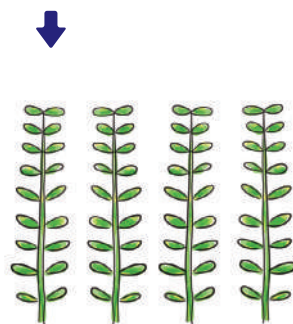
If a terminal bud is cut off, some lateral buds will grow and the stem will branch out. A stem will become like a broom by repeating this process.

### B GUNSEI-BI Method of Replanting a Branched Stem



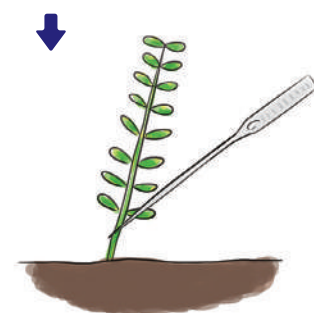
#### Cut a stem into several pieces

Cut a stem into several pieces which has a terminal bud. Throw the old and hard original stem away.



#### Align the stem length

In order to make the planting easier, gather the stems having similar lengths and trim them to the same length with scissors. Align the level of terminal bud and cut the bottom part of the stem.



#### Plant the stems with Pinsettes

For stem plants, hold the bottom part of the stem with Pinsettes to plant. If it has large leaves, remove them on the bottom part.



3 weeks after planting *Before trimming*



3 weeks after planting *After trimming*



©Takashi Amano

Subsequently, repeat the trimming of stem plants in the same way. The layout will perfectly look better with lush stems and leaves.

Tank size: W90×D45×H45(cm)

Main aquatic plants used: *Hemianthus micranthemoides* / *Micranthemum unbrosum* / *Rotala rotundifolia* (Green) / *Eleocharis vivipara*

### GUNSEI-BI Trimming of Stem Plants in an Actual Layout

Stem plants grow up to the water surface in 3-4 weeks after planting. This is the timing for the first trimming.



User-friendly Trimming Scissors

The point of the first trimming is to cut the plant as short as possible. Trimming Scissors are useful.

# CREATE Utilizing Liquid Fertilizers and Additives the Beauty of Plant Cluster

It is effective to use liquid fertilizers and additives to grow beautiful stem plants. Stem plants grow well with nutrients in the substrate and CO<sub>2</sub> supplied. In addition, stem plants need potassium and other trace elements.

## A GUNSEI-BI Examples of Use of Liquid Fertilizers and Additives

In a newly set up planted aquarium, aquatic plants do not grow much and water quality is unstable. One of the first things to do is to establish beneficial bacteria colony as biological filtration.



Green Bacter



First one week after setup

Once the aquatic plants start to grow, add potassium and trace elements to aquarium to promote the growth of healthy leaves. Apply an appropriate amount every morning.



Brightly K + Green Brightly STEP 1



One week to three months after setup

Right after trimming, the growth of aquatic plants are temporary suspended. Apply Green Gain which contains botanical hormone to promote the development of new buds.



Green Gain



After trimming

Aquatic plants grow densely in this period. Their colors will become vivid by supplementing more iron particularly with other trace elements.



Brightly K + Green Brightly STEP 2



3 months after planting

**First 3 months after initial setup** → **3 months to 1 year** → **After 1 year**

**Green Brightly STEP 1 + Brightly K**  
Contains well-balanced trace elements. Promotes development of new leaves.

**Green Brightly STEP 2 + Brightly K**  
Contains more iron required for growing plants. Maintains rich leaf colors.

**Green Brightly STEP 3 + Brightly K**  
Rich in trace elements with potassium. Promotes photosynthesis and root development.

## B GUNSEI-BI Application of Liquid Fertilizer According to the Plant Condition

Appropriate amount of trace elements and potassium differs depending on the condition of aquatic plants. For healthy growth of aquatic plants, trace elements should be given in a good balance when aquatic plants grow vigorously. When plants are thriving, more iron is required in addition to other trace elements. When the aquatic plants mature, supplementation of potassium is advantageous.

## C GUNSEI-BI Supplementation of Iron for Vivid Red Color

Nitrogen and iron especially affect the red color of aquatic plants. Unlike nitrogen which is always supplied from substrate and fish waste, iron is prone to be insufficient in planted aquarium. Adding iron-rich ECA helps plants to produce vivid red color.



ECA



More intense and vivid red color with ECA

## D GUNSEI-BI Improvement of Plant Growth and Color by Supplementing Nitrogen



When aquatic plants thrive in an aquarium only with a small number of fish, the nitrogen in the aquarium becomes insufficient, which may affect the growth or colors of aquatic plants. Green Brightly Special containing nitrogen improves the plant growth and colors.



Green Brightly Special SHADE Green Brightly Special LIGHTS

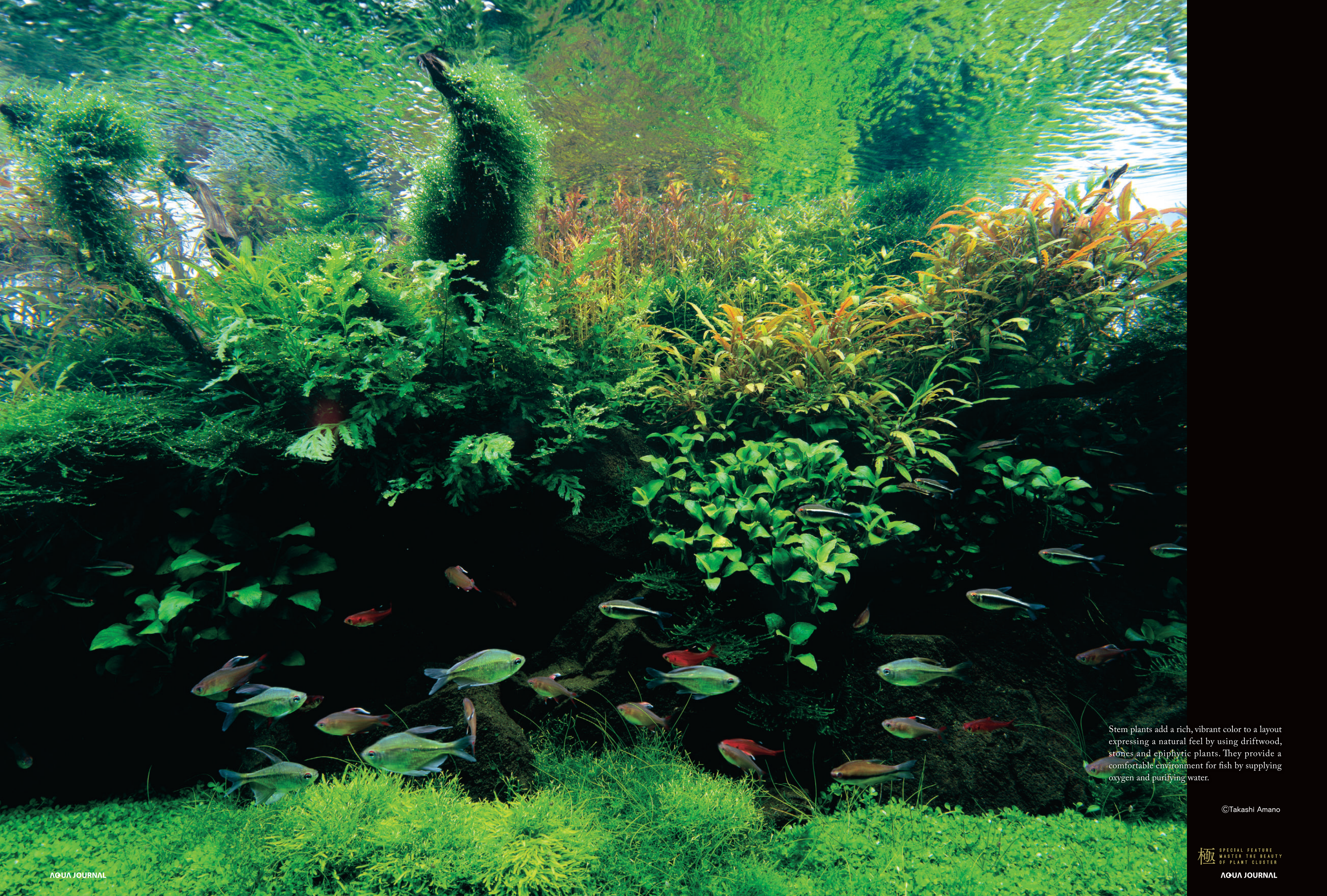


Beautiful clusters of stem plants add bright and colorful touches to the aquascape representing a natural feel.

One of the good things about stem plants is their wide variety, so that we can choose the species having the same type of leaves in different colors. Taking advantage of this feature, this layout has a color gradient made by a combination of different species of stem plants. You can have a wider latitude of expression by using stem plants like paints.

Tank size: W180×D60×H60(cm)

©Takashi Amano



Stem plants add a rich, vibrant color to a layout expressing a natural feel by using driftwood, stones and epiphytic plants. They provide a comfortable environment for fish by supplying oxygen and purifying water.

©Takashi Amano

# Composition Framework Accentuating Clusters of Stem Plants by Using Sansui Stone and Driftwood

This layout is created based on a convex composition having clusters of stem plants in the center. Firstly, many Sansui stones are placed in an upright position near the center of the tank to make an enclosure. Then, a large amount of Aqua Soil-Amazonia is poured inside the enclosure to make a planting space for stem plants above the level of the rest. The driftwood, with the effect of *Hygrophila pinnatifida* attached, perfectly blends with the bush of stem plants.

Sansui stones are skillfully arranged to make a solid enclosure, so that poured Aqua Soil-Amazonia would not flow out.



Stone Arrangement



Composition

Since the substrate for stem plants is raised high, the bushes of stem plants stand out without being hidden behind the driftwood or epiphytic plants.



A



*Glossostigma* is planted around the Sansui stones as the main plant. Some Wabi-kusa *Utricularia graminifolia* is also placed to add a different touch to the carpet plants.



B

The area below the driftwood creates a shade to the aquascape. The texture of Sansui stones and epiphytic *Anubias* are producing a natural feel.



C

*Utricularia graminifolia* creates subtle unevenness in the foreground while some patches of *Riccia* and *Eleocharis acicularis* add a natural feel.



Complete

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## DATA

Shot on	February 10, 2014
Tank	Cube Garden W180×D60×H60 (cm)
Lighting system	Grand Solar I (NAG-150W-Green, NA Lamp Twin 36W x 2) × 3units; lighting 10 hours/day
Filter system	Super Jet Filter ES-2400 (Bio Rio L and NA Carbon)
Substrate	Aqua Soil-Amazonia, Power Sand Special L, Bacter 100, Clear Super, PENAC W, PENAC P, Tourmaline BC
CO <sub>2</sub>	Pollen Glass Beetle 500, 6 bubbles/sec with CO <sub>2</sub> Beetle Counter (CO <sub>2</sub> Tower used)
AIR	Night aeration with lights off by using Lily Pipe P-6 for 14 hours
Additives	Brightly K & Green Brightly STEP2
Water change	1/3 water change 1 time/week
Water quality	Water temperature: 25°C pH: 6.8 TH: 20mg/l

<b>Aquatic Plants</b>	<i>Rotala</i> sp. (Ceylon) <i>Rotala rotundifolia</i> <i>Micanthemum</i> sp. <i>Hygrophila pinnatifida</i> <i>Bolbitis heudelotii</i> <i>Microsorium</i> sp. (Trident) <i>Anubias barteri</i> var. <i>nana</i> "Yellow Heart" <i>Anubias barteri</i> var. <i>nana</i> "Petite" <i>Fontinalis antipyretica</i> <i>Glossostigma elatinooides</i> <i>Riccia fluitans</i> <i>Utricularia graminifolia</i> <i>Eleocharis acicularis</i>
<b>Fish Species</b>	<i>Hyphessobrycon rosaceus</i> var. <i>Hyphessobrycon haraldschulzi</i> <i>Moenkhausia pittieri</i> <i>Hyphessobrycon herbertaxelrodi</i> <i>Nematobrycon lacortei</i> <i>Crossocheilus siamensis</i> <i>Otocinclus</i> sp. <i>Caridina japonica</i>



You can find the video of this aquascape on ADA view: <http://www.adana.co.jp/jp/catalog2014/>