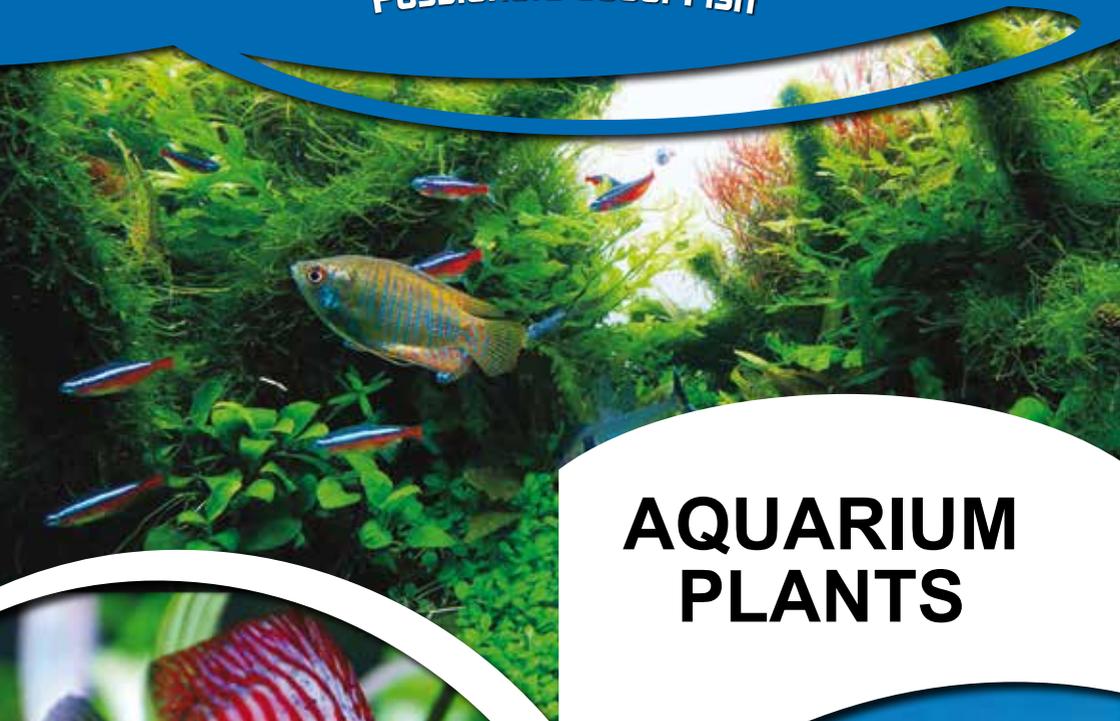




PRODAC[®]

MADE IN ITALY

Passionate about Fish



AQUARIUM PLANTS



www.prodac.it

AQUATIC PLANTS MAKE AQUARIUM BREATHE

Plants are very important for a well-working aquarium. They have vital functions and maintain the nitrogen cycle because they assimilate the various organic substances, such as fish excretions and leftover fish food, and metabolize them providing their own nutrition. The evaluation of the quantitative ratio between the number of plants and the number of fish living in aquarium is essential for obtaining the greatest efficiency from plants themselves.

The degradation of water quality is faster in a tank which contains plenty of fish and few plants. It is therefore necessary to maintain the right balance between the two groups before starting an aquarium, attention should be paid to ensuring a major amount of plants.

An 80 litres tank (= UK gal 17.60) – size cm 65 x 35 x 35 (= in 25.60x13.80x13.80) can keep about ten groups of plants, this situation is the closest to a self-sufficient system, provided that the number of fish is limited. Plants are called “primary producers” in aquatic ecosystems; they are able to transform inorganic substances into organic substances, with the help of an energy source such as light. Photosynthesis is a vital process that plants develop in aquarium, by which they transform carbon dioxide (inorganic substance) into carbohydrates (organic substance) with the help of light energy and by mediation of chlorophyll.

Plants are precious allies to maintain aquariums in the best conditions!



AQUATIC PLANTS INTRODUCTION

Times passing, plants have become the fundamental part in fish tank.

At present, in addition to being a decorative element, they are considered extremely important for providing a number of advantages.

Plants are gradually gaining a growing importance in aquarium market, quickly achieving the position that belonged to fish. The result is a trend to prefer aquascaping where fish is a simple decoration as plants have been in the past.

Aquarium shops offer subtropical plants usually, not tropical plants, because subtropical plants are more resistant to high temperatures, above all during the hot summer period. Now, many aquarium plants are produced using the “tissue culture” or “in- vitro”, this technology offers highly long-lasting disease resistant plants, even if plants loose most of their original characteristics.

If the goal is to have a richly planted and long-lasting aquarium, the following water parameters must be maintained:

| | | | |
|--------------------------|--------------------|-----------|---|
| Maximum temperature | 24 - 26° C | Oxygen | 5 - 6 mg/l value measured in the morning |
| Conductivity | 300 - 350 mS/cm ca | | 8 - 10 mg/l value measured in the evening |
| Water total hardness | 8 - 10° dgH | Iron | 0,05 - 0,1 mg/l |
| Water carbonate hardness | 4 - 6° dkH | Nitrate | 5 mg/l max. |
| pH | 6.8 - 7.2 | Ammonium | 0,1 mg/l |
| CO ₂ | 10 - 20 mg/l | Phosphate | 0,1 mg/l max. |

All the above values can be easily kept by regularly water changes and by using PRODAC INTERNATIONAL products, regularly as well.



AQUARIUM LIGHTING

Light is essential for all living organisms because it stimulates protein synthesis that is vital for cell growth and metabolism.

No fish could grow without being exposed to some hours of light.

Light is pure energy to aquarium plants because it allows the photosynthesis process of converting carbon dioxide and water into carbohydrates which are indispensable to their life. Whether it is for aesthetics of fish tank or for plants growth, top quality and proper lightning is essential for any system that contains photosynthetic organisms.



Three different factors must be kept in duly consideration when choosing a lighting system: light intensity, colour temperature (measured in degrees Kelvin) and the amount of light required by aquarium.

- **Intensity:** not all plants need the same intensity of light. According to "classic rule", the right balance should be $\frac{1}{2}$ Watt - 1 Watt per litre of water (about 2-4 watts per gallon).
- **Colour temperature:** according to current criteria, it should be between 4800 K° and 10000 K° for freshwater and between 12000 K° and 18000 K° for saltwater.
- **Amount of light:** generally, the light period should be not less than 8 hours and no longer than 12 hours, depending on the number and types of plants in aquarium and on the intensity of the light available during the day. There are a wide variety of lighting options for aquarists. Traditional low-consumption fluorescent bulbs T-8 and T-5 PL are ideal for all types of fresh and saltwater aquariums.

As a relative "newcomer" to the world of aquarium lighting, LED light fixtures (light -emitted diodes) the advantage of low energy consumption which is very important at present, and long-lasting life. LED technology provides more penetrating energy and high light intensity with low power, if compared to traditional aquarium lighting fixtures. In the long term, the lighting efficiency of traditional fluorescent lighting systems loses its intensity and lamps must be replaced approximately every 2000 - 5000 hours (i.e. 8 months to 24 months), according to the amount of daylight hours. LED technology guarantees 10 years efficiency and that makes a difference!

AQUARIUM SUBSTRATES

Substrates for bottom layer are essential for quite all planted aquariums because they help to grow both flora and fauna.

Two types of materials must be used: a first layer of nutrient substrate which provides the quantity of nutrients required by plants to live and bloom, a second layer of sand or gravel to anchor plants and to help them to root.

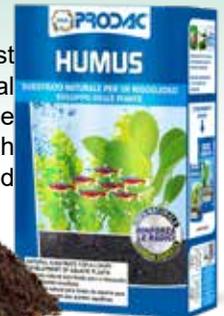


PRODAC INTERNATIONAL provides a wide range of nutrient substrates:

HUMUS

Bottom soil suitable for freshwater planted tank, with pH that must be kept low (6.0 - 6.5), consisting of several types of peat, special fertile soils and nutritional substances indispensable for promoting the growth of aquarium plants. Use: cover the bottom of the aquarium with a 1.5 cm (= in 0.59) deep layer of HUMUS, avoid packing it down and then cover with a 6-7 cm (= in 2.35 - 2.75) deep layer of gravel.

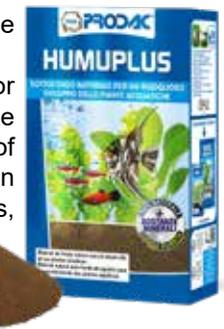
This product maintains its efficiency for a long period of time (approx. 2 years) and should be replaced at each new aquarium set up. By mixing HUMUS with HUMUPLUS you obtain a highly effective soil ideal for promoting the growth of all types of aquatic plants. Caution: before filling the tank with water, it is recommended to cover the gravel with a nylon sheet to avoid that the jets of water move the soil below. It is possible that the water initially will turn a pale amber colour, this is due to the humic acid content of the HUMUS peat.



HUMUPLUS

Bottom soil suitable for freshwater planted tank, with pH that must be kept low (6.0 - 6.5). This product should be mixed with other soils.

HUMUPLUS is a blend of several types of peat indispensable for promoting the growth of plants and more specifically for delicate and fragile ones. It is the perfect product in particular for all types of Cryptocoryne, Heteranthera Zosteraefolia (star grass), Aponogeton madagascariensis (Madagascar lace-leaf), Aponogeton ulvaceus, Echinodorus tenellus (Pygmy chain sword). HUMUPLUS helps to lower the pH value and Redox potential of the water allowing greater activity of the fertilizing properties



which are then easily assimilated by the plants. Use: cover the bottom of the aquarium with a 1.5 cm (= in 0.60) deep layer of Humu Plus, avoid packing it down and then cover with a 6-7 cm (= in 2.35 - 2.75) deep layer of gravel. This product maintains its efficiency for a long period of time (approximately 2 years) and should be replaced at each new aquarium set up. By mixing HUMUPLUS with HUMUS you obtain a highly effective blend of soils ideal for promoting the growth of all types of aquatic plants.

Caution: before filling the tank with water, it is recommended to cover the gravel with a nylon sheet to avoid that the jets of water move the soil below. It is possible that the water initially will turn a pale amber colour, this is due to the humic acid content of the HUMUPLUS peat.

FONDOVIVO

Is a natural bottom material for all aquariums. It is especially suitable for tanks containing cichlids because this species of fish digs paths through plants for its fry and stirs up substrates to uncover food.

FONDOVIVO is studied for promoting the luxury development and growth of aquatic plants. It is made of clay, trace elements and it is enriched with ferrous mineral under sulphate form. Its particular porous structure helps easy rooting of plants and the oxygenation of the ground. Use: open the packaging, do not wash the product to avoid eliminating the active substances, cover the bottom of the tank with a 2-3 cm (= in 0.80 - 1.18)

layer. A 1.5 kg (= 3.30 lb) bag is sufficient for a 60 x 30 cm (= in 23.62 x 11.80) aquarium. Note: in order to have the best and rich bottom material for the growth of your plants we recommend laying a mixture of: one pack FONDOVIVO, one pack HUMUS, one pack HUMU PLUS. The above indication is valid for a surface area of 60 x 30 cm (= in 23.62 x 11.80 in). Cover the mixture with a 5-7 cm (= in 1.97-2.95) layer of washed gravel, fill the tank with water paying attention to avoid the bottom material rising up to the surface. FONDOVIVO does not colour aquarium water.



FERTIL PLANT

Is a high quality substrate that is perfect for aquascaping and planted tank. It is a natural porous and gravel (2-6 mm = in 0.08 - 0.24) bottom soil consisting of clay, zeolite and soils rich in trace elements ideal for planted freshwater aquariums.

FERTIL PLANT is a natural and nutritional product absorbed through the plant roots ideal for promoting a lush and healthy growth. It also increases oxygenation at the bottom of the aquarium and does not cloud the water.

Use: do not wash the product to avoid eliminating the active substances.

Cover the bottom of the tank with a 1 cm (= in 0.39) layer and then cover with a 6-7 cm (= in 2.36 - 2.76) layer of gravel. Before filling the aquarium with water we recommend you cover the gravel with a nylon sheet to avoid moving the bottom soil when filling.



LIQUID FERTILLIZERS

After starting up a planted tank, aquatic plants need their vital feeding.

Liquid fertilizers contain well balanced minerals and trace elements that are the supplements to make up for the nutrients deficiency caused by: daily nutrients consumption, water changes and by the progressive degradation of bottom layers.

NUTRONFERRO

An iron complex liquid fertilizer for aquatic plants which require specific care and treatment. Some plants particularly weak or fragile often have yellowing, fragile and transparent foliage even those planted in an well maintained aquarium.

The cause can be lack of iron, potassium and magnesium or the use of an unsuitable phosphate based fertilizer. To remedy this problem, regularly add NUTRONFERRO, a product specifically developed for treating weak and fragile aquatic plants which is rich in chelated iron obtained utilizing two different formulations and Vitamin C.

Above all NUTRONFERRO must be used to prevent plants from weakening caused by lack of nutrients. Use and dosage: shake the bottle before use, once a week pour 10 ml for every 40 litres (=UK gal 10.47) of water into the aquarium. Caution: this fertilizer may give the water an opaque appearance, this effect disappears after approximately 6-8 hours and the water becomes crystal clear. This does not in any way affect the biological balance in the aquarium.



To stimulate a luxuriant plant growth it is recommended to alternate NUTRONFERRO with NUTRONFLORA.

NUTRONFLORA

A trace element and mineral salt complex liquid fertilizer for aquarium maintenance ideal for stimulating a luxuriant growth of aquatic plants.

NUTRONFLORA is not only a supplement of vital elements for plants, but is a treatment for reinvigorating fragile plants preventing them from weakening.

Use and dosage: shake the bottle before use, once a week pour 10 ml for every 40 litres of water into the aquarium.



***** For greater growth development we recommend that you alternate this product with NUTRONFERRO or BIOTRIX: a supplement of minerals salts, humic acids and trace elements.

CARBON DIOXIDE or CO₂

Carbon Dioxide (CO₂) is an essential element for plants and in particular for their structure, therefore it is extremely important to maintain CO₂ level at optimum in planted tank and aquascaping. CO₂ alone is not enough to guarantee a luxuriant and healthy growth of plants. Plants need adequate lighting, good water and fertilizers to live.

Thanks to light intensity captured by chlorophyll, the more plants grow the more they take in CO₂ and the more oxygen they inject into the aquarium water. Plants compete directly with algae for light and nutrients, by consequence, the more plants in aquarium the less chance algae have of taking over.

In an aquarium environment CO₂ is in part produced by the fish, which however is an insufficient quantity for the plants, and more specifically for the foliage or when the "greenery" is a dominant feature of the scenery. The most commonly used carbon dioxide injection system consists of a cylinder of CO₂ under pressure with a regulator that allows the CO₂ to flow through a diffuser. PRODAC INTERNATIONAL EASY CO₂ SYSTEM is a disposable, user friendly, pressurized 500 gr (= lb 1.10) CO₂ bottle that guarantees regular flow and reliable functioning.



Another carbon dioxide "supplier" provided by PRODAC INTERNATIONAL is CO₂ PLANT, effervescent tablets that not only release carbon dioxide in the water, but other nutritional substances for stimulating a lush plant growth, an important advantage over the use of CO₂ bottles which only release carbon dioxide.

These CO₂ PLANT tablets are quick dissolving (approx. 10-15 sec.) and do not leave traces of excipients as the substances contained in the tablets act as the reaction medium and are absorbed rapidly by the plants.

Use and dosage: one tablet for every 50 lt (= UK gal 11) of water, once a week.



Simply drop the tablet in the middle of the aquarium. If more tablets are required, drop them in different points in the aquarium allowing a uniform release of carbon dioxide in the water. Up to a 40% over dosage is tolerated and does not harm the fish.



AQUARIUM DECORATIVE ELEMENTS

Plants should be one of the main decorative elements in the arrangement of the aquarium, it is however recommended to add other ornaments, such as wood, roots, stones, because they provide a natural refuge for fish. Particularly wood and roots will release the tannins and other substances that keep water parameters stable.

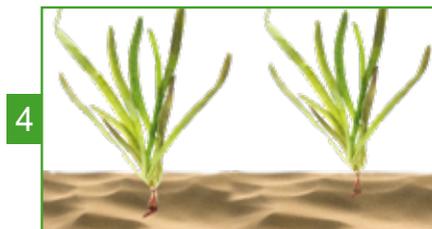
They slightly darken the water and re-creates the tropical environment where most tropical fish come from.



PLANTING AQUATIC PLANTS

Fundamental rules must be followed when introducing any type of vegetation in tank in order to make it root the better, the same rules are used for the terrestrial vegetation. Aquatic and terrestrial plants share many common grounds, for both types of plants the chosen place and the plantation are extremely important for their lush development (see scheme).

1. Rooted plants: if there is a lot of root growth, shorten them. Stem plants: trim stem ends slightly.
2. Dig a small hole in the substrate and place the roots or the stems firmly in it. Fill in the hole with the substrate to cover roots and stems.
3. Just make sure that the stems and roots are straight, that they do not bend and do not overcome the edge of the substrate.
4. Don't push the roots and the stems too deep and don't let them too uncovered, avoid to bury also the plant leaves.



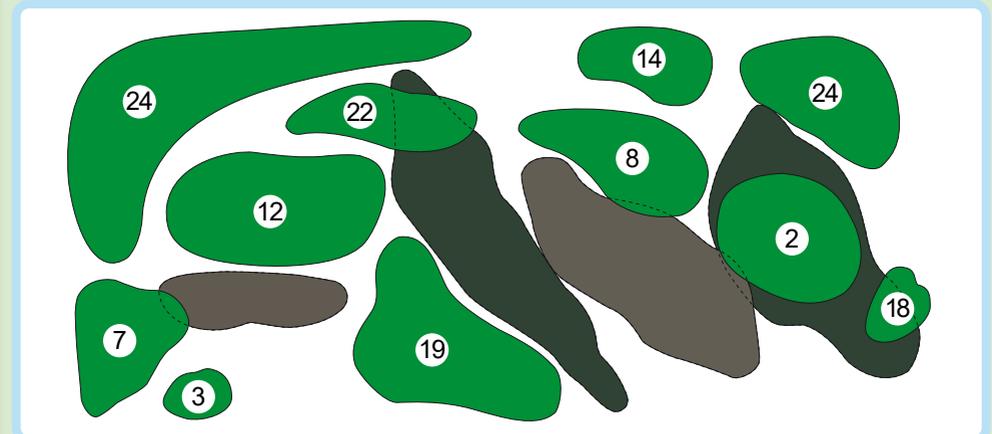
FISH TANK PLANT PLACEMENT

The type of plants, their size and a proper aquarium lighting are essential for choosing the right location for plants, do not put plants with different lighting needs next to each other. Do not place tall plants at the front of the tank because they will hide the view of the aquascaping when they grow up.

According to their size and the place they will occupy in the aquarium, plants can be divided in three categories:

- 1° Low- growing plants (decoration plants) listed as “foreground plants”.
- 2° Mid-growing plants listed as “middle ground plants”.
- 3° Fast-growing plants (taller) listed as “background plants”.

AN EXAMPLE OF A PLANTING PLAN FOR AN AQUARIUM



- 2 - Anubias barteri
- 3 - Anubias nanas
- 7 - Cryptocorine walqueri
- 8 - Echinodors sp. “Ozelot”

- 12 - Hygrophila diformis
- 14 - Limnophila acuática
- 18 - Microsorium pteropus
- 19 - Pogostemon helferi

- 22 - Rotala macrandra
- 24 - Vallisneria gigantea

AQUARIUM PLANT LIST

- Temperature measured in degrees Celsius °C.
- Maximum height (quoted in cm).
- Lighting: x = low, xx = medium, xxx = high
- Difficulty rating: 1 = easy, 2 = medium, 3 = hard.



1. *Alternanthera reineckii*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 50 | xxx | 1 |



2. *Anubias barteri*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 25 | xx | 1 |



3. *Anubias nanas*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 12 | xx | 1 |



4. *Bacopa monnieri*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 28°- 26° | 50 | xxx | 1 |



5. *Ceratopteris cornuta*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 25 | xxx | 2 |



6. *Cryptocorine nevillei*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 20°- 30° | 15 | xx | 1 |



7. *Cryptocorine walqueri*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 20°- 28° | 15 | xx | 1 |



8. *Echinodors* sp. "Ozelot"

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 28° | 25 | xxx | 1 |



9. *Echinodorus schlueteri*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 20 | xxx | 3 |



10. *Egeria (Elodea) densa*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 10°- 26° | 80 | xxx | 1 |



11. *Hydrocotyle leucocephala*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 15°- 28° | 20 | xxx | 1 |



12. *Hygrophila diformis*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 30° | 50 | xxx | 1 |



13. *Hygrophila diformis*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 30° | 40 | xxx | 1 |



14. *Limnophila acuatica*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 20°- 30° | 50 | xxx | 2 |



15. *Limnophila sessiflora*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 40 | xxx | 2 |



16. *Ludwigia palustris*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 26° | 50 | xxx | 2 |



17. *Lysimachia numularia*

| Temp. | Hgt.cm | Lighting | Difficulty |
|---------|--------|----------|------------|
| 8°- 26° | 40 | xxx | 2 |



18. *Microsorium pteropus*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 25 | xx | 1 |



19. *Pogostemon helferi*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 10 | xxx | 2 |



20. *Pogostemon* sp "Octopus"

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 28° | 60 | xxx | 1 |



21. *Proserpinaca palustris*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 40 | xxx | 2 |



22. *Rotala macrandra*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 22°- 28° | 50 | xxx | 3 |



23. *Rotala wallichii*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 28° | 30 | xxx | 2 |



24. *Vallisneria gigantea*

| Temp. | Hgt.cm | Lighting | Difficulty |
|----------|--------|----------|------------|
| 18°- 28° | 100 | xxx | 1 |

AQUARIUM MAINTENANCE TOOLS

The planted aquarium is a real garden the maintenance of which requires special attention, given the fact that hands should be kept out of the water!

Prodac International offers a wide range of tools for the care both of plants and of other elements in aquarium.

- Forceps, length cm 50-70.
- Scissors for pruning and trimming plants, length cm 50-70.



- Fish nets of different size and medium thickness mesh.



- Water vacuum cleaner for cleaning aquarium during water changes.

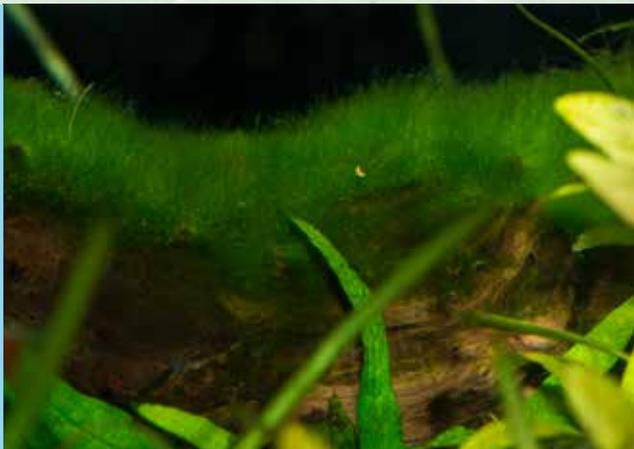


- Floating magnet glass cleaners.

ALGAE

Almost every aquarist will at some point face an algae outbreak in a tank.

Algae always compete with plants in the absorption of the light and other nutrients, their proliferation is directly related to some deficiencies in aquarium, poor water quality or improper lighting.



To prevent the growth of algae it is recommended to: make sure the aquarium is not in direct sunlight, control water acidity (pH), adjust lighting and use appropriate light bulbs for aquariums.

All abnormal growth of algae in a healthy tank is the sign that something is not right in the biological balance, mostly caused by an excess food. So do not overfeed the fish.



Algae belong to the plant kingdom, their spores are in almost every corner of the aquarium: in the decorations, in the water and in the plants themselves



ALGA CONTROL produced by PRODAC INTERNATIONAL is a water treatment for freshwater aquariums which controls, prevents and eliminates the growth of algae and infusoria that is harmful to fish, and above all to aquatic plants.

- Green algae, not only grows on the bottom of the aquarium and on the decorations, but it can also develop on the foliage of aquatic plants impeding their growth.

- The brown algae turn the aquarium water an opaque brown colour. Use and dosage: depending on the extent of opaqueness and colour of the water, once a week add 3-6 drops of ALGA CONTROL for every 10 litres of water (UK gal 2.20).



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