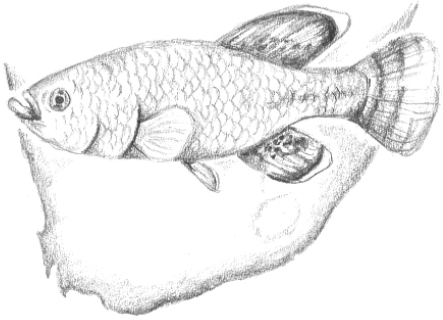
SOUTHERN AFRICAN KILLIFISH SOCIETY



Valued Killi Keepers

Firstly, I hope you like the new format. I understand that some of you may have problems with pdf format but it is more presentable and offers greater security to intellectual property (in the form of pictures and text) which I hope will encourage people to come forward with more articles. If anyone has serious problems with the format I will return to the Word document format used previously.

Secondly, I apologize for the delay in sending this issue out. I have been very busy with work at this time. I will try to have the next issue out on time but once again I fear it may come out only in February or March. It is also looking very empty at this time so come contributions would be very timely.

In this issue we have two articles. One taken from the August/September Journal of the American Killifish Society, and the other a local production by one of our members. I hope you enjoy both. The pictures in the first article may appear a bit fuzzy as they had to be scanned from a course paper.

Lastly, merry Christmas and a happy new year! And may your killies survive our hot summer.

Membership dues are slowly trickling in. We still have very few members though. I would like to encourage you to tell everyone you know who keeps killies about *SAKS*. Also, I would like all of you to try and distribute your spare fish so we can get more killi keepers in Southern Africa!

Once again, please submit articles! I know many of you out there have been in the hobby for many years and have amassed a large amount of invaluable knowledge. *Please share!*

News

A journal exchange has been started between *SAKS* and the *AKA*. Evidence of this is the article in this edition by Henri De Bruyn on filtration for small tanks.

Our Australian Friends have had some bad news, as stated in the following letter by *NAKA* member, Keith Hand:

`` *You might want to check out: http://www.infoscapeink.com/ ... click NAKA and go to the Links page and Adelaide Fish Central Forum. Lots more info there."*
``*At the ANGFA AGM tonight and over the convention weekend, a serious development in fishkeeping specifically and fauna and flora generally will be discussed. This has serious ramifications for all of us and could potentially put an end to the hobby as we know it. Without consultation, the federal parliament has passed a bill through both houses virtually outlawing the possession of most ornamental fish currently imported into Australia, including killifish. This will all take effect from 1 January 2002. Anyone convicted of such possession faces a gaol sentence of up to 5 years. So if you are caught keeping say A.gardneri or a particular Crypt. sp. you will be judged a criminal. Just as an illustration of how stupid the new laws are, one species of cichlid, Oscars, are not banned because someone in Qld with a commercial interest (as I understand it) threatened to release 1000's into local waterbodies if they were banned. Now that is democracy in action. More as information comes to me."*

Lets hope that this situation does not arise here! A good safe guard would be for us to organize ourselves better so as not only to police our own actions but also to stand up against such tyrannical law giving.

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Tel: 021-8553788

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Nothobranchius elongatus ``Dida KE 01-09"	R50/ws
Nothobranchius interruptus ``Kikambala KE 01-10"	R50/ws

SAKS Letters

Filtration for Small Tanks

by Henri de Bruyn
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All photos by the author.

During the many years I have been keeping and breeding killies, I began hating water changes because it is such a laborious and time consuming activity. I like to observe my fish, get them to breed, collect eggs, hatch the eggs, feed the fry and watch them grow. All (in my opinion) secondary tasks, like cleaning tanks, changing water and feeding the fish are just time consuming. So I was always looking for ways to reduce or even eliminate these activities. Another important factor is that worldwide freshwater is becoming scarce and expensive and wasting water should be avoided. In my native country, Belgium, we pay for water when we use it but we also have to pay additional taxes on the amount of water we are using to pay for the water treatment systems.

One of the most time and effort consuming activities was for me was the traditional water change. Some of my friends installed very elaborate automatic water change systems and I decided they were all too expensive or complicated and many things could still go wrong.

After observing killies in their natural environment during my different collecting trips, it is my opinion water changes are not natural at all. In nature water conditions are rather stable and sudden changes seldom occur. Water will change gradually from rainy season to dry season and the reverse. Water changes to replace water of inferior

quality in your tank with water of better quality is arguably a real need. Fish will like the new water but still will be stressed by the sudden change. In nature there is also a continuous biological cleaning by bacteria going on in all water systems. Rainwater modified by the substrate like sand, mud, rocks, roots and plants will pick up minerals and become alkaline or acidic and become harder or have higher conductivity. Bacteria will take care of biological waste.

Now something about the importance of water parameters. The pH, conductivity and hardness, salinity, temperature and oxygen content are the key parameters. I observed in nature that these parameters are often changing without bothering fish too much, except for one very important one... namely oxygen content. It is clear that the other parameters should not exceed limits that are safe to fish.

All factors and facts mentioned above motivated me to look into solutions to reduce- or even eliminate- water changes, reduce tank cleaning to a minimum and make fish feeding easier.

I started evaluating and comparing the different filtration systems.

Fully planted tank
In terms of water quality this is by far the best solution. The soil and plants effectively fulfil the biological water cleaning needs. Only overfeeding could ultimately ruin water quality. Put a pair of killies in a fully planted tank with lots of java moss or java fern and oxygen producing plants like hornwort or Elodea. Give this tank 12 hours of sufficient light a day and gradually you will see fry in different sizes in your tank. There are some negatives, like:

- The water may be too soft for your plant growth.
- Overfeeding will kill the biological balance
- Netting fish out of a fully planted tank is very difficult.
- Tank lighting is not easy to install if you are not using daylight (especially in a dark

Sponge and inside box filters
Both filters use air to operate and have sponge or foam material as filtering substrate. Dirt and biological waste will clog this material and gradually reduce the filtering capacity. In the filtering material there will hopefully be biological water "cleaning" due to bacteria. It takes some time to build up this action and if the filter media is cleaned you might destroy the bacteria culture or seriously reduce the bacterial action. Friends in the fish farming industry in Florida also confirmed what I suspected. "Bacteria doing their biological cleaning in a tank use more oxygen than the fish". You will never see an inside filter in the fish loaded tanks of fish farmers and wholesalers. They use big centralized filter systems continuously recycling the water.

Most of these inside filters take a lot of space in tanks and in some cases fish have been trapped between the filters and the tank bottom or sides. These filters do not eliminate or reduce water changes and the cleaning of the substrate is another time consuming effort.

Under gravel filters
These filters have the same problems as the box and sponge filters concerning oxygen consumed by bacteria. The filter material here is the soil and clogging here also decreases the filtering action. It is, however, much more difficult to clean the material to restore the adequate filtering without losing the bacterial action. Maintenance here is even more time and effort consuming.

Central filter system

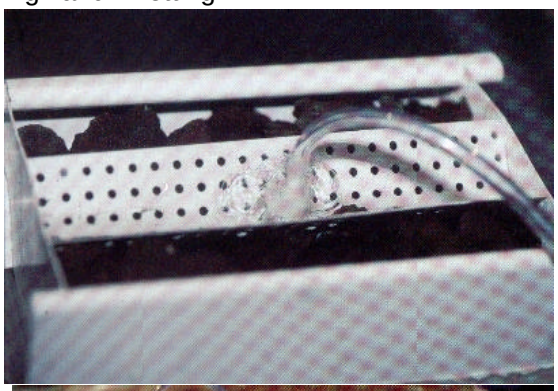
These systems are mainly used in wholesale operations and for fish farming. A central filter system provides clean healthy water in a continuous way to all tanks. Each tank has an overflow system to remove the dirty water from the bottom of the tanks to an evacuation system and eventually to the central filter. After passing through huge sand filters, a big biological filter and then through a disinfecting UV or ozone filters the water is reused. The continuous flow of water gives the water a high oxygen content so that many fish can be kept in the tanks without problems. I installed a system like that in my fish room on 25 tanks I used for growing up fry. Water quality was very good and indeed a lot of fish in each tank were growing rapidly and I was able to feed them intensively without problems. I regulated the inflow of each tank with a gauging tube to +/- 15 gallon an hour. I used a 50 gallon biological filter with two compartments. The main central one is filled with lava rock, leading to a second container where a garden pump sends the water up to the refill system. In the five years I have used this system and I never had a disease in any of the tanks and certainly not a spreading of diseases through the system.

However the system is not perfect for killie breeders since all tanks have the same type of water and a lot of killies like different water qualities such as temperature, pH and hardness (or even salinity) for breeding and raising them. My main problem with the system was that I started forgetting to do some basic maintenance since everything was running smoothly and nicely. Then sometimes an overflow gets clogged which results automatically in a flooding of the fish room. I didn't install a perfect overflow that never would clog. But maybe there is one. I have seen one working well in fish farm tanks, but it involves drilling a rather large hole in the bottom of all your tanks to install the vertical tubing regulating the water level. This job did not appeal to me-- especially the drilling of holes in hundreds of glass tank bottoms . On the other hand I learned through observing the influence of the system on the water quality (especially the oxygen content), fish health and growth rate that the external biological filtering and continuous water flow were both very important in a filtration system This is the point where I started thinking about how I could make a filter for an individual tank that met all my requirements. I also remembered the old days, in the 1950's as a kid helping my father in his fish room. He still had the metal frame tanks and all of them had open external filters hanging besides the tank where water is siphoned in the filter material compartment and air lifted the water from the second compartment back into the tank. These filters were doing a fine job. Finally, I came up with the idea to install the filter on top of the tank, pushing the water from the tank with air bubbles through a vertical tube from the bottom of the tank to the top of the filter, to let the water flow back through the filter material into the tank. So I obtained the continuous water flow over filter material exposed to the air where bacteria can transform all biological waste cleaning the water biologically using oxygen from the air rather than the tank water. On top of that, the water would be oxygenated while flowing over the filter material and dripping back in the tank. That is how my wet/dry filter idea started. I began building these filters for my breeding tanks and later on for all my tanks in different sizes. It is now more than six years since I started using them and more and more advantages show up.

The construction is not critical. The main part is a container for the filter material sitting on top of the tank and partly outside, partly inside the tank. I prefer to have 2/3 outside the tank so I can keep the water level high enough. I keep the water level 1/2 of an inch below the filter bottom to take the most advantage of the dripping water. The positioning will depend largely upon the space you have above your tanks and between the shelves. I use PVC gutter material I cut to size to fit between the tank sides. The gutter sides are cut so that lids are provided to hang on the tank sides. To finish the container I glue side panels in the gutter cut out from PVC sheets. In the bottom I drill one or two series of drip holes to let the water drip back into the tank. To prevent the filtering material from clogging the dripping holes I lay a piece of PVC profile, used in

Right margin, top to bottom: Figures 1 to 4. *Fig 1:* European version of the filter. *Fig 2:* Tank with European filter mounted on it. *Fig 3:* The USA type of the filter. *Fig 4:* Tank with the USA filter type mounted and in operation. All photo by the author.

gutters to prevent them from clogging with leaves, over the dripping holes. In the center of the container I drill the hole for the vertical tube bringing up the water to the top of the filter. To spread the water over the filter material, I glue a PVC V profile between the sides and through a hole in this profile (in the center) the vertical tube brings the water up into this V shape channel. I am using predrilled PVC V shaped profiles as used for corner pieces in plaster walls. To bring up the water I glue an inner rigid air tube inside the outside vertical tube. The inner tube ends +/- of an inch from the bottom of the outer tube. The inner tube extends +/- inch outside the top of the external tube to be able to connect the airline to it. The sizes of the inner and outer tubes are critical to lift the water with the air bubbles using minimum air, lifting the maximum of water. After some experiments I obtained best results with an external tube of +/- inch and an inner tube of 1/8 inch. To glue parts together I use the PVC glue used in plumbing PVC pipes. The filter material I am using is lava rock which you can buy anywhere in garden centers. The size of the lava rocks is not important but it should not be too small. I prefer lava rock of 1/2 to 1 inch size. Over the air tube and inner tube I slide a perforated bottle cap as an umbrella to avoid air bubbles splattering and wetting everything around. At the bottom of the vertical tube (water inlet to the filter) I put a protective foam to prevent fish or fry from being sucked in. Since the filter covers part of the tank the remaining part can be covered hermetically with a lid to avoid losses to jumping fish. The filter being outside the tank takes less tank space than an inside box or sponge filter.



What does the filter do for us?

Bacterial and biological action

Bacteria will settle in the lava rock cavities and clean the water as it flows and runs back to the tank over these rocks. The bacteria culture will transform the biological waste into inoffensive mud. It will take some time to have a good and effective bacterial culture in your filter established. You can speed this up by a bacteria injection. You can squeeze a sponge filter with bacterial colonies in it

over the lava rock. Normally it will take several weeks to settle, but from that moment the filter does not need any cleaning or maintenance anymore. You will notice that the inoffensive mud resulting from the biological conversion of biological waste by bacteria will be found on your tank bottom which can be, but need not be, siphoned off.

Feeding fish

There are no more feeding limitations, since leftover food becomes biological waste it will not turn your water bad but will be lifted to the filter as food for the bacteria. You can feed your fish more and more often without danger. The amount of food will influence the growth of fish but also the reproductive capabilities of your fish. If they lay eggs and these eggs hatch in your breeding tank they generally will not eat their own fry, and if you provide hiding place for the fry, like java moss and peat fiber, you will be astonished how many juvenile fish will grow up with their parents in the breeding tank.

Introduction of new fish into the tanks

For many years I learned that new fish needed to be adapted gradually to their new water, preferably using a drop by drop method. Practically I had problems doing it, but I found my new filter system offered me a very neat solution. I simply put the new fish in a small plastic box and place it underneath the filter so that the filtered water drips into the plastic box until it's full and sinks... automatically releasing the fish after a drop by drop adaptation. Since I have used this method I have not lost any more fish to the stress of water adaptation.

Influence on temperature

Due to the important water circulation and inevitable flow there is increased evaporation. Due to that evaporation, the water temperature is kept lower than the ambient temperature. I measured on an ongoing basis a 5°F (2 to 3°centigrade) difference with the room temperature. This is very handy given the summer heat . Since there is also a lot of oxygen in the water, the fish do not suffer from high summer temperatures. In my fish room I found my fish still happy and healthy even at 85 to 90°F while others were loosing valuable fish to the heat waves.

Oxygen content

I was not able to do any measuring since I did not have the equipment and I only had the subjective finding that my water was healthy with no nitrite, no nitrate and no ammonia build up. My fish looked good and were acting healthy. They ate a lot and most importantly, they were laying eggs thus reproducing actively. In Florida, Charles Nunziata had the electronic measuring equipment and did comparative measures between two 10 gallon tanks (side by side), one with a sponge filter and the other with my wet/dry filter. His results indicated 11mg/l oxygen in the sponge filter tank and 14mg/l in the tank with the wet/dry filter- a 27% increase.

Cold water fish

Some of our killies known to come from higher elevations and colder water in the rainforest are known to stop reproducing when the temperature in the tank is too high. I have been breeding *Diapterons* in breeding tanks with wet/dry filters and to my astonishment they continued reproducing at temperatures of 70 to 75°F. This experience led me to the conclusion that it is not the higher temperature but the lower oxygen levels that are stopping their reproduction activities. Some of my European friend breeding these fish at lower temperatures had the problem of uneven sex ratio and I seem to have less problems breeding at higher temperatures. I do not have scientific proof of this but it might also be possible that temperatures and oxygen content both have an influence on sex ratios.

Maintenance
After more than five years observing the results and operation of these wet/dry filters I can tell you they are better than any other filter system, but they are not perfect. I never cleaned the filters. The filter itself is maintenance free. Dust in the air can block the airline or valve so no air comes through. This is true for all air driven filters. As long the filters are bubbling up water everything is OK. This is an easy visual check. The protection foam at the bottom of the vertical tube can become clogged and needs periodic cleaning. You can check for when this is required by checking the dripping water. If enough water drips back into your tank, everything is still okay. The inoffensive mud as a result of the biological filtering will cover the bottom of the tank. If you do not like this, it can be siphoned off, but this is not necessary. Your fish might like it since it gives a darker and more natural underground. Water evaporation will require some refilling, preferably with rainwater or Reverse Osmosis water.

Very Important!
The only parameter this filter is unable to remove is the urea acid of the fish. Using these filters will gradually make your water more acid, lowering the pH. There are two ways to overcome this. You can neutralize this acid by buffering with a sodium bicarbonate solution which will gradually increase your hardness, or you can do a water change. I prefer to buffer the acid and do only a water change maybe once a year when I do a general cleaning of the tanks. You have to check your pH regularly. I check the pH in my tanks every month and I buffer when needed with 1 or 2 ml of a saturated solution of sodium bicarbonate at that time.

I hope killie breeders will start experimenting with various kinds of filtration (including this one), because the experiences of many people can result in more discussion and subsequent improvement to the benefit of the killifish hobby. Hopefully this article and my ideas will provide you with a way to begin some experimentation of your own.

Biotope aquaria for *Nothobranchius*

by Jacques Gerber, M.Sc Botany
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The object of this exercise is not to produce an exact duplicate of a *Nothobranchius* habitat, as these differ depending on the species. What is desired is to produce an aquarium that resembles a flooded pan. Wild South African plant species tend to be tricky to keep alive in aquaria, and I'm going to specify plant species that resemble wild plants, but are easily available in the aquarium trade. You'll need to start setting up this tank at least three to four weeks before you plan to put killi's in it, as the water chemistry will vary wildly for the first two weeks or so, and certainly don't use it to house rare or very sensitive Nothos unless its been going for a few months. Naturally, if you decide to skip my substrate suggestions, then it becomes an ordinary aquarium with unusual decor, and it can be treated as such.

The Substrate
A number of decisions first have to be made. The first and most important involves the substrate. You can either go for a two layer substrate, which I recommend, or stick with the conventional single layer substrate. The two-layer substrate is divided into a lower soil substrate and an upper gravel or coarse sand substrate. If you decide to only use a single layer, then use three of fine gravel or coarse sand and skip past the lower substrate discussion to the upper substrate.

The Lower Substrate

To make this work, you really need to go a bit further than simple sand or gravel substrates though. You need a soil layer under the gravel. One to two centimetres will do. This is the first layer you'll put down. Note that this is totally incompatible with undergravel filters. A red clay soil is ideal, but garden soil will do. Best if it has not been fertilized or manured in a long time. This could cause substantial problems with algae. If in doubt, dissolve the soil in a bucket of water and let it stand for a week or so, throwing off any organic matter that floats to the surface. Change the water a few times too. The object of this is to remove as much of the artificial and/or excess nutrients as possible. Drain off the excess water, and add an equal volume of vermiculite, and mush it well with your fingers. Do this for about twenty minutes or so. Then add about 10% acidic peat by volume and mix it in well. You want the texture to be something like over-stiff oats porridge. Put this mix in the bottom of the aquarium in a smooth layer, between one and two cm thick. Then add our upper substrate.

The Upper Substrate

The easiest option here is to use either fine aquarium gravel or swimming pool filter sand. Both of these are good options, but both tend to be a bit on the light side as far as colour goes. If you can find a fairly coarse dark sand (1 mm grains or so) or fine gravel (1-3 mm grains) then you are in luck. Umgeni river sand is quite nice. You do not want black though. It'll look wrong in this context. Don't worry about your fish diving into the sand to lay eggs. I'll deal with how to get around this later. The reason for this layer is partially to keep the soil mixture from entering the water column, but it also provides an aerobic layer above the anaerobic soil mixture. Lay down a layer of sand or gravel about an inch thick (2.5 cm). You can make it thicker towards the back if you choose.

Rocks and Breeding Killies

You'll need to put a couple of flat rocks in the aquarium. The best to use is a piece of slate, but a flat pebble the size of a stiffy disc is fine. How many depends on the size tank, but only use one in a small tank (ie 11 inches by 8 inches, or less). This is to support a glass (or whatever else you choose for that matter) bowl containing peat for egg-laying purposes. Nothos seem to use these in preference to trying to do it in the substrate. Its an unrealistic feature in the tank, but you can hide it behind some plants if you wish, or even come up with some way of embedding it in the substrate. I'll leave that up to you. A few rounded river pebbles can be added if you choose. Even craggy ones are fine, but don't use sandstone or limestone. Any stones, including the flat ones, should be well embedded in the upper substrate. Really big stones can rest on the lower substrate or even on the tank bottom. It all depends on how much you want to stick out. Use your own discretion.

Filling the Aquarium

Use tap water. I kid you not, tap water. It contains most of the micronutrients the plants you're going to be adding are going to need. Let it stand in buckets which have not been cleaned with soap for a day or two to let the Chlorine dissipate. How you set about filling the aquarium is your business, but if you're using a two-layer substrate, be careful about disturbing the lower layer. It makes a right mess if you do. Do not fill the tank to the brim. About two thirds will do. You don't want the water sloshing out when you plant the tank. You can fill it up once you have finished planting.

Planting the Biotope Aquarium

Plants commonly found in pans include *Potamogetons*, waterlilies, and sedges. For the first we'll use a substitute. The *Potamogetons* found in pans dies down when the pan dries up, but resprouts or grows from seed when the pan fills again. We'll be using a plant called *Liliopsis*. This is often sold in the trade as "Wheat plant". Its always in a pot, and resembles grass about 5-6 centimeters long. The pot is usually thoroughly overgrown. You'll need two pots per square foot of open substrate. Actually you can

use just one, but you'll have to wait for it to grow before the aquarium looks nice. The individual *Liliopsis* plants are connected by runners. Take the plants out of the pot, removing as much of the rock-wool as possible. Plant strands of about ten plants everywhere where you don't plan to put other plants. Simply push it into the upper-substrate. It'll eventually root itself into the lower substrate, but in the meanwhile avoid making a mess.

The waterlily in natural pans is probably *Nympheae nouchelii*, what used to be known as *Nympheae capensis*. For waterlilies, the best to use is the so-called "Pixie-lily", probably *Nympheae henkelii*. This has a dark-brown to black bulb with mottled mustard and maroon arrowhead shaped leaves. Usually the object is to prevent this plant from producing floating leaves, but in this case, this is exactly what we want. This plant can get pretty big, but its usually fine in the aquarium. Locate the eyes. They probably have leaves sprouting from them. They go to the top. Choose the spot where you want to plant this plant well if you're using a two-layer substrate. Its pretty difficult to move once it gets growing. A good spot is next to a flat stone, as it can use the soil below the stone. Push the bulb a little over half-way into the upper substrate. It may take several months for this plant to really get going.

By the way, if you find *Aponogeton crispus* for sale, you can plant it as you would a waterlily. This is found in the wild, especially in KwaZulu-Natal, Mpumalanga, and further north. There should still be waterlilies in the aquarium though, as it doesn't produce floating leaves.

The last type of plant to deal with here are the sedges. Only two in the trade are suitable. The first is sold as "hairgrass", species *Eleocharis aciculatis*. This is more suitable than the indigenous *Eleocharis* species. This is usually sold as thick tufts of very fine leaves, and may be sold in a pot. Get the worst of the rock-wool off and split the plant matter into a few clumps. These can be planted separately, or in a large clump with perhaps a centimetre or so between clumps to give the plant a chance to put out new roots. This plant may either die down to produce a low clump about three to four centimetres tall, or it may sprout and reach 15 centimetres or more. Both are fine and realistic.

The other sedge is an *Acorus* species. It looks like a coarse grass with sharp points, and is quite stiff, with straight leaves. Its usually a pale green, and is sometimes variegated. This can be used at the back and sides of the tank. Plant it in the upper substrate as with the rest of the plants. Another similar plant has narrow curled leaves which are dark green[1]. Don't use this plant. Firstly its nothing like any plant you'll encounter in a pan, and secondly all it'll do in an aquarium is die slowly as its a terrestrial plant.

Fertilization

Purchase some magnesium sulphate (epsom salts), potassium nitrate (saltpetre), and potassium sulphate (sulphate of potash). The first two are easy and cheap to buy at a pharmacy. For the last go to a university chemistry store, or get to know someone with access. Dissolve 20ml each of the first and last, and 5ml of the saltpetre in 200ml distilled water. Store in a clean glass bottle and keep it in the fridge if you can. Add 10ml of this per 20 liters of water in the aquarium, and 5ml per 20 liters every time you do a water change. This fertilization is essential for providing macronutrients for the plants. You can use half the dose or less if you choose, but don't skip it. Don't add too much, or you might run into algae problems.

[1] Ed's note: I believe this plant is what is called "Mondo grass" in nurseries. It is a fully terrestrial plant and is a good ground cover and border plant in gardens

By the way, if the water turns green while you're waiting to add the fish, throw in some Daphnia. They'll love the green water, and the fish will love them.

Lighting
This is probably the most contentious part of this set-up. You are going to need fairly strong lighting. The waterlilies will eventually cover most of the surface if you let them. Its best not to let them cover more than half, and preferably only a third. They'll provide areas of shade for the fish as will the *Acorus* plants. For Nothos I would use two separate light units. The first is on for 10-14 hours. Here you can use a colour enhancing light if you choose. The second is on for 4-5 hours during the middle of the photoperiod. This will provide the bright light the plants desperately need. If your aquarium is 60 centimetres or longer, or if you have a couple of biotope tanks next to each other, consider hunting down Osram Biolux tubes[2]. The TFC tubes are also excellent in regard to plant growth and colour.. These are cheaper than aquarium tubes from the petshop and are far better. Unfortunately these are only available in 60 centimetres and 120 centimetres lengths. Be warned these are daylight tubes which mimic the sun's spectrum. Their colour may look a little odd to you at first. If you're using small tanks, you'll either have to use available lights and double up on the lighting for 4-5 hours, or share lights between adjacent tanks.

Heating
How you heat the Biotope aquarium is up to you, but a temperature of at least 22°C will benefit the plants.

Filtration
Its best if you only use mechanical filtration. Activated carbon will strip the nutrients from the water, while biological filtration can adversely affect the nitrate balance in favour of algae. How you filter is up to you. I don't use filters in my tanks at all. Some water movement is beneficial however. An airstone or just an uplift from an undergravel filter will do if you decide to do without filtration. A 20% water change every two weeks is a good idea.

Good luck with your biotope aquarium if you go ahead and give it a try. Don't use a rare or unusually sensitive species initially. So long as you keep doing water changes, siphon off the mulm that collects on top of the upper substrate, remove dead plants, and not keep a lot of fish in the aquarium, it should last about 5 years before you'll have to strip it down.

[2] Ed's note: The Floutone tubes by Phillips are equivalent to the Biolux tubes and are available in 18, 30 and 36W from most hardware stores.

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