

A practical guide to Koi-keeping in South Africa



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INTRODUCTION

Our mission is to develop the Koi industry in South Africa and to assist by making koi-keeping in this country an enjoyable experience. Koi-keeping is not only a rich man's hobby, it will cost as much as you are able to spend. You can start off by buying small (at little as R 50.00 - but good quality Koi) and grow them. This way you can expand your collection in your own time and according to your budget.

There is not a right or a wrong way when it comes to Koi-keeping in South Africa. There are various differing points of view, many myths, and just as many Internet sites that guide you in a wrong direction (mostly only to sell their product).

The best is to investigate all the advantages and disadvantages and only then to make a decision.

The aim of this booklet is to provide you with some guidelines to assist you in making the right decision (based on your needs and requirements) when setting up a pond, maintaining your Koi, and to buy good quality Koi.

Koi is a great hobby, and is considered an excellent stress reliever. These living jewels are popular because of their beauty, and although for some it is a status symbol, others enjoy their Koi for the mere calmness and tranquillity these creatures bring into your garden.

INTERESTING FACTS

Koi are extremely intelligent and social fish. Koi will become very tame and can be taught to eat out of your hand.

Koi can hear quite well and will respond to voices especially the voices of their owners. It is said that most fish can hear up to about 1 000 hertz while Koi can hear three times higher -up till 3 000 hertz. Koi appreciate rapidly in value as they grow. They are measured and priced according to their size, colour, pattern and body shape.

HISTORY

Nishikigoi - the most popular freshwater ornamental pond fish - has become extremely popular worldwide. They are often referred to as living jewels because of their beauty, gracefulness and colour. Nishiki is Japanese for a very colorful piece of cloth. Goi (Koi) is Japanese for carp. Koi is a variety of the common carp (*Cyprinus carpio*) - 20 million year-old fossils have been unearthed in Southern China. As Koi-keeping became more popular around the world, people referred to them simply as Koi. However, Koi did not originate in Japan, but from parts of Eastern Asia (Persia) and China. It is still not sure what happened to koi between the 2nd and 17th centuries, but many suspect that koi was gradually spread around the Orient, and possibly to the middle east.

B265 - 316 AD: The first Chinese written record mentions these beautiful fish as Magoi (black koi). Hard to believe but they were known

to be an excellent source of nutrition and were kept in the rice paddies to provide food during the winter.

1800 - 1830: Colour variation begin to appear in the Niigata. The red fish were separated from the Magoi and through selective breeding created new and beautiful varieties. Red, white and yellow fish were selectively bred in the 1800s and in 1830 the selective crossings of red and white fish produced the first Kohaku. The popular and almost completely scaleless variety, Doitsu or Leather Carp, were introduced from Germany in the 1830s. (Doitsu means German.) These were followed by a cross between the Doitsu and the Asagi called the Shusui.

1914 - 1930s: Coloured carp were seen outside of Niigata when a batch were sent to the Great Tokyo Exhibition. Some were even presented as a gift to Emperor Taisho's son. It soon became a status symbol to have Koi. During the 1920s the Kohaku and Sanke were established, followed in the 1930s by the Shiro, Bekko, and Showa.

1970s: Koi were introduced to South Africa. Initial attempts - both formally and informally - to breed these beautiful creatures were rather mediocre due to lack of experience. This scenario has, however, changed and South Africa now stands in the same shoes of those of Japan, Korea and Malaysia, due to the dedication and perseverance of our own highly acclaimed Koi keepers and breeders.

VARIETIES

There are more than 80 varieties, but the following are the most common.

Kohaku	a White Koi with red markings and one of the most common quality Koi	
Sanke	a White Koi with red and black patterns	
Showa	a Black Koi with red and white patterns. The dominant colour is black and if there is any black on the head, it is a Showa as apposed to a Sanke	

Shiro Utsuri	a Black Koi with white patterns	
Ki Utsuri	a Black Koi with yellow patterns	
Hi Utsuri	a Black Koi with red patterns	
Bekko	Same as Utsuri but black on white	
Asagi	Characterized by scales which have a net-like appearance. An intense red normally covers the belly, the extended pectoral fins and the sides of the face. The back is normally blue.	
Shusui	This is a cross between an Asagi and a Doitsugoi(leather koi with now scales) The colouring is the same as an Asagi	
Ogon	One solid colour with a distinct metallic shine to their scales. The usual colours are yellow, gold, platinum or white.	
Goshiki	This means five colours and is composed of black, white, red, blue, and metallic gray.	

Kujaku	Kujaku" is the Japanese word for peacock. It has a shining luster to its skin, and a color pattern that appears as orange and white with matsuba scalation.	
Kawarimono	Collective name for non-metallic Koi, which do not fall into any of the specific varieties	
Hikarimoyo	all other metallic varieties of more than one colour.	

Knowledge of a bit of Japanese will help you to get along much better and herewith, a few basic words commonly used.

Ai - blue	Kin - gold
Aka - red	Mena - female koi
Bu - size classification	Midori - green
Budo - purple	Nezu - gray
Cha - brown	Orenji - orange
Doitsu - scaleless	Rin - scale
Gin - silver (pronounced like "give" and not "Gin & Tonic")	Shiro - white
Hi - red	Sumi - black
Kana - male koi	Tategoi - small koi with potential
Ki - yellow	

CHOOSING KOI

Good Koi are judged based on body shape, pattern, colour and elegance, the body shape being the most important. They should be symmetric in shape and clear of any deformities. Their pattern should have no blemishes and the edges must be crisp and sharp. If they have stains on their face, head or fins, they are less valuable. The colours must be deep and pure. If the Koi swims graceful and with elegance, it is more valuable.

On the other hand, most of us are not interested in show quality Koi. Beauty is in the eye of the beholder. Are you buying Koi for the Judges, or for yourself to admire. Why should I pay much more for a Kohaku with no red pattern of the eyes, if the one with a pattern over the eyes is more beautiful to me. I have got a few bad quality Koi, which I will never sell. I grew fond of them because of their personality, not because of

their looks.

Part of the whole experience is to be able to choose a young Koi, and to see how it develops into a beautiful creature. Remember, the way you treat the Koi, will have a great effect on how it will turn out. It is an art to transform a Koi into a graceful living jewel, and it is not only depended on what you bought. Bloodline plays a major role, but nutrition and water quality have a great influence on the development of the Koi. Even luck plays a major role, as one can not always predict how a Koi is going to develop. The older the fish, the less it is going to change. Therefore, there is a huge difference in price between a six month old Koi as apposed to a twenty four month old Koi.

THE POND

Position:

- The fish needs some protection against constant direct sunlight;
- If the pond has no shading, the water will probably be too warm for the fish in typical South African conditions. Although it will grow fast, it will not reach it's full potential and will loose it's colours sooner.
- No shading causes excessive algae growth;
- If you are going to have water plants, remember that the plants require at least five hours of direct sunlight;
- If you do have water plants, the plants provide shade and no alternative shade is required.
- Nearby trees provide excellent protection, but can also cause too many leaves in the pond which, if not cleared on a regular basis, cause bad bacteria growth and ultimately bad water conditions;
- Care should be taken not to place a pond near any possible poisonous trees or scrubs. (Refer to the list of plants on next page)

Depth and size:

- The golden rule is, the bigger the better. It is easier to maintain good water conditions in a big pond. Temperature fluctuations are reduced and the fish will in general be healthier, happier and grow faster and bigger. You can not grow a Jumbo size Koi or even a 40 cm Koi in a small pond.
- The pond must be in proportion to your property;
- In respect of depth, the deeper the pond, the better the fish can escape from extreme weather conditions. If it is extremely cold or extremely warm, the fish will go to the deep end. a Point to remember is that the deeper the pond, the more difficult it is to catch the Koi.
- You can see the Koi so much better in shallow ponds and therefore you will pick up problems like Ulcers much earlier.

- The bigger the pond, the less expensive per litre to build.
- In my experience, a 7 x 3 metre pond with a deep end of at least 1 metre and a shallow end of at least 600 cm works well for a typical home pond with plants, however, the ideal depth for Koi is 1.5 metres.
- The pond should have shallow areas to place plants in.
- With a smaller, deeper pond, you limit evaporation of water because you limit high temperature and surface area.
- To calculate the water volume, you multiply the width, length and depth to get the total volume. A 4 m length x 2 m width x 1 m depth will contain 8000 litres if you fill it right to the top.
- A pond always appears to be at least 20% smaller when it is filled, therefore, always go 20% bigger than what you planned for.

Water plants - points to remember

- Water plants look lovely and create a tranquil environment and compliment your pond and property.
- They are expensive. The current price of a fairly small water Lilly is currently R 60.00.
- They preclude you from using too much salt in the water which might give parasites a gap to infest. With plants, you are limited to 0.1% (1,35 kg / 1000 l) salt concentration although the ideal concentration for Koi is 0.2% (2.7 kg / 1000 l) Some plants like the Lily's and Iris's are not affected very much and can handle a 0.2% salt concentration.
- Because you are limited with your salt concentration, you will have more algae growth.
- They preclude you from treating the pond properly with certain chemicals, for instance salt as mentioned above, unless you can easily take out the plants during medication.
- They give hiding space for the fish which gives them better protection against sunlight, birds and other elements;
- They provide shade and limit very high temperatures.
- The big Koi tends to eat the plants. It is therefore sometimes needed to protect the plants from access by the fish.
- Proper care has to be taken to ensure that the plant is not poisonous to the fish. (See list of plants in the next chapter)
- If there are too many plants, you might not see the fish.
- They can easily overgrow the pond and require constant attention if not controlled properly.
- They help to eliminate Ammonia, Nitrites and Nitrates.
- At night time they use oxygen and therefore compete with the fish if there is limited oxygen in the water. During power failures at night when you are unaware of the failure, you might find your fish suffocating.
- They compete with and therefore control excessive algae growth because they use the Nitrates and other nutrients in the water also required by algae.
- During day time they create oxygen which is beneficial to the

- fish.
- They can introduce fatal bacteria or parasites if proper treatment has not been taken. They should always be placed in quarantine before introduced to the pond.
- However, they might also provide breeding space for nasty bacteria like for instance Pseudomonas and sometimes create dead unaerated areas in the pond as it sometimes interfere with the water flow.
- They provide spawning material in the spawning season. After spawning, the plants can be removed easily and placed in a spawning tank, thereby preventing the fish from eating the eggs.
- They make it more difficult to catch fish in the pond. This is why dealers very seldom have plants in their ponds.
- They often prevent leaves and other debris from reaching the skimmer box, causing it to sink to the bottom and create unnecessary sludge which might introduce nasty bacteria.

A lot of Pro's and Con's, it is up to you. If you have very expensive show fish, why risk them by introducing plants. On the other hand, if you created a pond for the atmosphere and to enhance your property... a pond is not a pond without fish and plants.

Plants that might be poisonous to Koi

- | | |
|------------------------------|--------------------------------|
| Aloe - leaves | Colocasia - all parts |
| Allspice- leaves, seeds | Coral Plant - seeds |
| Amaryllis - bulbs | Cyprus - seeds |
| Anemone – all parts | Croton - seeds |
| Anthurium all parts | Daffodil - bulbs |
| Apricot - leaves | Datura - all parts |
| Azalea – all parts | Day lily |
| Baneberry - berries, roots | Delphinium – all parts |
| Bird of Paradise - seeds | Death Camas - all parts |
| Black Locust Bark - all | Dumbcane (dieffenbachia) – all |
| Black walnut - hulls | Digitalis – all parts |
| Boxwood - leaves, stems | Easter lily |
| Buttercup - sap, leaves | Elephant's - ear all parts |
| Cactus | Eggplant - all but fruit |
| Calla Lily - leaves | English Ivy – all parts |
| California tern roots seeds | Foxglove – all parts |
| Cardinal flower – all parts | Gloriosa lily – all parts |
| Carolina jasmine – all parts | Hemlock - all parts |
| Caladium – whole plant | Holly - berries |
| Cherry - all parts, | Honeysuckle - all parts |
| Chenille plant | Hyacinth - bulbs |
| Choke cherry – all parts | Jack-in-the-pulpit – all parts |

Japanese laurel – all parts
 Indian Turnip - all parts
 Iris – leaves, roots, rhizomes
 Jasmine - berries
 Java Bean - uncooked bean
 Lantana – all parts
 Larkspur – all parts
 Laurel - all parts
 Lily of the valley- all parts
 Lobelia - leaves
 Locust - bark, leaves, seeds
 Locoweed - all parts
 Lupine – all parts
 Marijuana - all parts
 Mayapple - all parts
 Mimosa – all parts
 Mistletoe - berries
 Mock Orange - fruit
 Morning Glory - all parts
 Mustard – roots and seeds
 Narcissus – bulbs
 Nightshade
 Oak - acorns, foliage

Oleander – all parts
 Peach- leaves
 Philodendron – all parts
 Pine - sap
 Poinsettia - leaves, flowers
 Potato - eyes, new roots
 Privet - berries, leaves
 Prunus varieties - seeds, some
 Ranunculus - all parts
 Redwood - sap (from decks)
 Rhododendron – all parts
 Rhubarb - leaves
 Snapdragon - all parts
 Snowdrop - all parts
 Taro – all parts
 Tiger Lily - all parts
 Tomato - leaves
 Trumpet vine – all parts
 Tulip - bulbs

FILTRATION

Mechanical Filters

The typical way to filter your pond mechanically is to use a sand filter. Quite a lot of pond keepers will tell you that a sand filter is an absolute no no and should only be used in swimming pools combined with chemicals. We believe that this attitude derives from many web sites written by dealers who are trying to sell their high tech bio filters and therefore break down the use of sand filters.

Disadvantages:

- If filter sand is used, you will definitely have numerous problems with clogging of the filter. Use bigger gravel to solve the problem.
- If you bypass your filter for longer than a day (due to lack of oxygen) or do not backwash regularly, you might have problems with nasty bacteria. It is crucial to backwash your filter if it was not running for a few hours.
- There is a fairly big initial capital outlay because you need a

stronger pump (R 1100.00) (to backwash the filter effectively and push the water through the gravel bed) and your filter will cost you approximately R 1000.00 and your gravel will cost you approximately R 300.00 (R 100 per bag) A submersible pump will not work.

Advantages:

- It is an extremely convenient way to keep your pond crystal clear by a simple backwash once a week. You can do this even on your way to work with your suit on and takes only a few minutes. At the end of the day, you want to enjoy your pond and do not want to clean huge dirty filters by hand, which is sometimes a mission.
- The average sand filter provides approximately 150 square metres of surface area for bacterial growth which in itself is a form of a bio filter and is normally sufficient for a 10 000 l pond. Combined with a small bio filter filled with for example almagrog or lava rock, you will have sufficient mechanical filtration and enough bio filtration for even a 20 000 litre pond provided that your stock level is not too high.
- It can be combined with a settlement chamber where all the major dirt settles in the chamber to be flushed out from time to time, before it even reaches the sand filter, leaving maintenance to the sand filter to the minimum.
- Damage to the biomass(beneficial bacteria to be maintained) is minimal with backwash.
- It looks neat and can be buried or placed far away from the pond.
- Compared to the latest bio filters, the capital layout is not that big and it is very durable, lasting for many years.
- It is easy to bypass in case you have to medicate, using the simple valve. Before you resume, do a proper backwash to avoid problems with nasties.
- Although it clogs up from time to time, it can be opened easily to enable you to stir any crust developed at the surface before you backwash. For this purpose, the Koi filters have a lever to easily open and close it, as opposed to the swimming pool filters that have to be unscrewed.
- It comes with a valve to easily channel the waste to your drain by using the waste feature, especially if you attach a vacuum to the inlet.

Biological filters(Bio Filters)

The main function of a biological filter is to create bacteria which break

down the hazardous ammonia in the water deriving from fish faeces into Nitrites which in turn breaks down to Nitrates. The name is thus misleading because it does not really act as a filter, but traditionally the biological filter had a dual function as it also acted to filter debris. However, in our modern society, most people use mechanical filters like sand filters or settlement chambers combined with slow flowing chambers with media to clean the water from debris before it reach the bio filter. The more fish in the pond, the more ammonia is being created and the bigger the bio filter required.

The bio filter is the most important filter of all and is often neglected. If it does not work properly, there will be no bacteria to break down the ammonia, and the fish will die.

A bio filter is any system that creates the right type of bacterium (Nitrosomonas and Nitrobacter) required to break down ammonia and Nitrites. It normally contains a container with bio media inside, and the water flows over the media into the pond. Waterfalls also act as bio filters but are normally not sufficient.

Bio media is the media placed inside a bio filter to create an ideal environment for the bacteria to grow. The best on the market is Alfragrog which contains a lot of air pocket which is ideal for them to grow in, or lava rocks, which does the same. Plastic sponges or plastic bio balls or even plastic hair curlers are quite popular, but they need at least ten times more media than lava or Alfragrog.

The bacteria required needs a surface to cling on and with ammonia and oxygen they thrive. However, it takes at least one month for them to grow, and therefore, a biological filter is not effective within the first month (depending on circumstances), and it takes at least three months for it to function properly. Only after about 12 months, it is fully mature and runs at full strength. Therefore, it is always advisable to refrain from placing too many fish in a pond with an immature bio filter. Rather start off with a few fish and gradually add more fish in accordance with the growth of the bacteria and the maturity of your pond.

It is possible to boost the growth of bacteria by placing some mature bio media from a different pond into your new filter. This will stimulate growth and mature your filter in a much shorter period. There is also products for sale to "seed" your filter. Ask your local pet shop.

The bacteria also grows inside your mechanical filter like for instance a sand filter, against anything it can cling to in the pond, and even on the liner of the pond. However, this is normally not enough, except if you only have a few fish.

Because the bio filter gets dirty from time to time due to debris escaping your pre filter, it should be cleaned to prevent the growth of unwanted bacteria. This should be done by ONLY using pond water because any Chlorine in normal tap water will instantly kill the sought after bacteria, and rather stay away from Chemicals as far as possible. Cleaning should be done every three months depending on your system and the effectiveness of the pre filtering system of your pond.

Size: The larger, the less often you have to clean it, and remember, you can have it too small, but never too big, and leave room for extensions.

UV Light

Unless you are going to have only a few Koi and a lot of plants, a UV light is essential in South African conditions;

In very simple terms, a UV light is a waterproof Ultra Violet light, normally in the form of a fluorescent tube. The water from the pump flows over the tube towards the outlet of the pond and gradually kills most of the algae in the water.

A lot of Koi keepers believe that the UV light also kills bacteria. This is not true as the water flow is too fast to have any effect on bacteria flowing through the unit.

QUARANTINE

DO WE OR DON'T WE QUARANTINE....?

This has always been a controversial topic among Koi keepers as to how important quarantining is.

Here are some DO'S and DONT'S , you make up your own mind....!

- 1) Do have a quarantine facility ready for your new arrivals, the bigger the better.
- 2) Do regular water changes.
- 3) Do test for ammonia and nitrites regularly.
- 4) Do take scrapes if possible to ensure proper treatments for parasites and bacteria.
- 5) Do have appropriate aeration
- 6) Do monitor your new Koi's behaviour.
- 7) Don't use chemicals on new arrivals until they have settled in correctly.
- 8) Don't quarantine fish alone, they are social creatures and need company.
- 9) Don't subject your new Koi to fluctuating temperatures.

Koi is affected by stress, much like us human beings, which can result in all kinds of diseases and viruses. By netting, placing them into bags and transporting them are all stressful situations for them.

When we buy our new Koi from reputable Koi dealers, our Koi should be parasite free and healthy, but due to the stress, the fish are affected and so are their immune systems, making them susceptible to all kinds of "nasties".

Even if your new fish are bought parasite free and declared "clean" a week or so later, your fish could appear sick and full of parasites due to the stress or low immunity. Remember that basically all Koi will have parasites, but this is fine, as long as there is a balance. Koi can cope with a few parasites, the problem arise when they take over, and they most likely will, if the Koi is exposed to too much stress.

WHY DO SOME HOBBYISTS NOT QUARANTINE?

- 1) They loose fish during quarantine or;
- 2) They don't have a quarantine facility or otherwise don't have the space for one.

We believe in QUARANTINE all the way.

It is just not worth losing all your Koi that you have had for years, due to two new fish you have just added to your pond that is riddled with parasites. Especially in view of the KHV (herpes) virus which can kill all your fish overnight, you can not take chances. There were quite a few recent KHV outbreaks in South Africa and it is a reality also in our country, contrary to popular belief. There is no treatment available, and you can not diagnose KHV with a microscope as with parasites. It can only be diagnosed in Germany, although there is a facility in Durban who can test your fish and diagnose KHV with adequate certainty. It requires at least 18 degrees Celsius to show its colours, and therefore your quarantine facility must have at least a temperature of 19 degrees Celsius.

WHAT IS REQUIRED FROM A GOOD QUARANTINE FACILITY?

One must ensure that the environment for quarantining is good, to ensure that the fish is not exposed to more stress after the handling and transportation. The following are some guidelines:

- 1) have an adequate sized quarantine pond, which is covered with a net to prevent the fish from jumping out(they tend to jump out the first few days)
- 2) filtration, although some hobbyists feel that the turbulence of the water might stress them further;
- 3) a well-aerated pond;
- 4) correct temperature, a bit higher than your main pond to almost force possible outbreaks; (at least 19 degrees Celsius)

We feel that a kids size porta pool that hold approximately 1000 litres of water is sufficient.

Some hobbyists quarantine their new Koi for four weeks. However, you should look at various factors when deciding how long. Factors to be taken into account are the temperature, the season, whether you bought from a reputable dealer, do you have the peace of mind that the fish are parasite free, etc.

One must also always remember that during the quarantine period.....

Do not over medicate;

Always monitor the behaviour of your Koi carefully;

Check that your filtration system is working correctly;

Test your water regularly;

Do not unnecessarily handle or disturb your fish in quarantine, they are there to adjust, relax and recuperate;

It is advisable not to feed your fish for at least two days in quarantine, to allow them to settle in;

Watch for fish rubbing against the sides, this could be an indication of the fluke parasite, and also look out for any sores that appear or red markings. If so, add more salt.

If all goes well, you can safely move your Koi to the main pond within four weeks.

You should always have a quarantine pond available, not only for new fish, but also for existing fish. A quarantine pond is quite valuable for treating individual fish that have injured themselves or that have become ill. It is often better to remove these fish and treat them individually than to treat the whole pond.

We believe that it is a good idea to keep "feeder fish" or "tester fish" in a quarantine pond, as Koi does not like to be alone. This also serves to keep the new fish calm and secure in their new environment as well as keeping the biological filter active.

If you don't have a quarantine tank, it does not mean that you cannot buy Koi. It's just that the risk of infecting your other fish is greater, and really, can you take that chance?

A word of advice,,,,, try to invest in a microscope, whereby you can take a scraping should you suspect that your fish is carrying parasites.

HOW TO QUARANTINE A NEW FISH

1) Once the fish has arrived to its new home, float the bag in the quarantine pond for about 10 minutes to enable the fish to adjust to the new water temperature. Most people say 30 minutes, but we believe it is not advisable to put the fish through another 20 minutes of stress inside a bag full of Ammonia. After all, the fish must get used to various other water conditions for example Chlorine, PH, etc.

2) Open the bag and gently with your hands or a net release the fish into the water, do not allow the water from the bag to flow into the quarantine pond, as this may be infected and will contain ammonia.

3) Float something large on the pond or place a net over the top. This is to prevent the fish from jumping out. After a day or two it should be safe enough to take it off.

4) Try not to feed your fish for two days to allow them to adjust to their new surroundings and to give the bio filter time to kick in.

5) On the 2nd day you can treat the pond with salt (3 kg per 1000 litres)

and potassium permanganate.

- 6) Do a 10% water changes every two days (with water from the target pond) and add salt accordingly.
- 7) Test the water regularly for salt content, ammonia, nitrite and ph levels.
- 8) Make sure you have enough aeration. Adding an extra air stone would be a good idea.

QUARANTINING PLANTS

Not only can new fish carry bacteria and parasites on them, but so can new water plants you introduce to your pond. We therefore encourage you to always quarantine your new water plants. By using potassium permanganate you can ensure that most bacteria will be killed.

Dip your new plants into a bucket with Potassium and leave it for at least four hours. in the water before adding them to your pond.

Do not quarantine the plants in water with a high salt content. (No more than 1% concentration/100g per 100 litres)

WHAT YOU WILL NEED FOR QUARANTINING

- 1) water from your pond.
- 2) small filter and pump.
- 3) small air stone.
- 4) net to cover the pond.
- 5) salt and Potassium Permanganate for your pond.
- 6) a test kit to test for salt content, ammonia, nitrate and ph.
- 7) most of all..... a pond of at least 1000 litres. (Kiddies pond or alike).

HOW MUCH SALT DO I ADD TO MY QUARANTINE TANK?

After about a day you can add salt. For about 1000 litres of water you should add 3kg of salt (non iodised). You can divide the total amount by three, meaning 1/3 the first day, 1/3 the second day and so on. This is to ensure that the fish adjust more gradually to the salt content.

PLEASE REMEMBER.....

When buying Koi, learn to know whom you are buying from. Do not be afraid to ask questions, are the fish clear of parasites and why do they say so? Were the fish in their possession for at least four weeks?, have they been tested?, were there any recent problems in their pond/s? Does the fish in their ponds look healthy, do their water smell, is their medication in their water and why? etc.

We hope that we have covered most of the information you require on

quarantining.

If you have more questions regarding this very important topic, feel free to E Mail us with your queries and we will gladly post it on our site for response by other Koi keepers including ourselves.

BREEDING

Love is in the air,,,,,, you smell the strange odour coming off your pond, the surface is covered in foam,,,,,, the fish are acting strangely, almost aggressively.....!

NO.... RELAX,,, DON'T PANIC.....They're in love and getting up to naughty things, YES,,, fish do those things too;

BUT WHAT DO YOU DO? They're bashing each other around, you want to interfere,,,,, STOPPPPPP!!!!!!!

OBSERVE....! This is very common and a natural occurrence,,, There is nothing wrong with your fish,,,,, Cupids arrow has been shot, Koi have 'active' sex lives.

The male chases the female quite aggressively, this is done to help the female release her eggs so he can fertilize them. This is normally quite stressful on the female and can cause injury to her, so much so that she may tend to jump right out of the pond.

You will find that this kind of behaviour normally occurs during the early summer when the temperature heats up, and it is normal for you to come across this in the morning around about 2am. If nothing happened, nothing will probably happen that day.

You may come across your pond filled with a white foam, this is only the by-product of what they have been up too.

YOUR FISH HAVE SPAWNED..... CONGRATULATIONS, you will shortly be the proud parents of you're very own Koi, provided you remove the eggs immediately from the pond, otherwise your fish will be treated to a great menu of caviar, they will eat the eggs and the fry,,, remove these if you want to have your very own fry 'babies'.

THIS IS HOW IT'S DONE:

KOI SEXING

1 It is not easy telling the sex of young koi, but as they grow older (two years) it becomes easier to see.

2 The females tend to have rounder bodies and rounder pectoral fins and their fins are a little smaller and more 'petite'

3 Males are more slender or 'sleeker', with larger fins and a more torpedo shape.

4 The easiest way to determine male from female, is to observe them during mating. The male is always more aggressive and he does the

chasing of the female,,,,, ' maybe we can equate that with us humans'.

Another way, one can check, is to gently rub along the lower abdomen wall with your thumb and forefinger. Males will secrete semen from the opening. Obviously, if you see that the Koi becomes bulky, it is a female full of eggs.

This procedure should be performed with the utmost care so as not to injure the fish.

I personally prefer to observe the fish, males will always do the chasing, while the females will secrete the eggs.

PAIRING

Should you wish to breed a certain type of fish eg: Kohaku, then I would suggest you use a Kohaku male and female.

Keep in mind that the male genes are always the more dominant and strongest.

Please make sure the fish you want to pair are both adults, to have a successful spawning.

SPAWNING:

Spontaneous spawning may occur and does occur, unobserved under normal pond conditions, which can result in the eggs been eaten by the other fish, especially if the pond is free of vegetation or spawning brushes.

When... however spawning is planned, the following should be taken into consideration:

AGE; As mentioned before, make sure that both male and female fish are adult, as young Koi may be fertile, but not produce a strong hatch.

RATIO; This depend on what breed you are trying to achieve, If this is not an important factor to you, make sure that you do not exceed the 2;1 ratio, as too many males can seriously harm the female.

SEASON; In South Africa, the best spawning takes place at the end of October until December when the water temperature is approximately 20 degrees. Although it is known to take place in January / February as well, depending again on the temperature and climate.

Interestingly, the Japanese believe the best spawning time is during the full moon phase.

SPAWNING MATERIAL

Koi will basically spawn on anything in the pond, but if you are planning the spawning, place spawning brushes or even shade cloth in your pond, do a good water change and increase the water temperature to try and force the spawning activity when you believe it is time.

Spawning brushes can be removed easily and without any damage to the eggs. A spawning brush is made up of synthetic brush like hair, similar to a baby's bottle brush and can be purchased at any Koi dealer. They are not that expensive and can also be used as bio media outside

the spawning season. Shade cloth also works well and normal rope is also quite popular.

PREPARATION; Normally the female Koi is bloated with eggs and visually she looks 'fat'. The female is heavy and bloated, almost giving the impression of being buoyed up by the water. At times like this she should not be taken out of the water and try to avoid any form of handling.

POND; At this time, both male and female should be housed in a separate pond, about the size of a porta pool taking 1000 litres of water, covered with a net to prevent the female from jumping out of the pond. This pond should be filled with water from the main pond.

Make sure there is enough aeration. An air stone is good enough and too much movement in the water is not good. Make sure that your water temperature is stable and not exceeding 24 degrees centigrade.

SPAWNING; Spawning usually occurs in the late evening or early morning. If nothing has happened by 9am, then usually nothing will happen that day.

When the female is ready, you will notice that she displays 'nesting movements' , although Koi doesn't normally make nests. You will notice that the male will follow her, forcing her against the sides of the wall, in a bumping fashion, or head butt with his nose, to expel the eggs. Should there be two males, they will tend to sandwich her, forcing her eggs out, while simultaneously fertilizing them.

During all this aggressive action the female (and male) might get injured and can sometimes cause split fin and tail. The male will continue battering her, at this time. They should be observed and when you feel that she has secreted all her eggs, which can take up to 4-6hrs, she should be removed to a more quieter environment preferably with younger Koi, where she can recuperate. At this time you can remove the males and place them back into the main pond, to prevent them from eating the eggs. Keep an eye on the female, she is still prone to jumping.

You will notice that the pond will take on a cloudy appearance and have a very distinct odour. When removing the eggs, please be careful not to allow the eggs to dry out or be out of the water for too long. Place the eggs in a separate holding tank with air stones. The water should be from the pond where the spawning took place. Filtration is at this stage not necessary. Treat the water with Malachite green. 0.2mg/liter(200 mg/1000 l)

DEVELOPMENT; It takes up to seven days for hatching to occur. By the 3rd day, the fertile eggs should be clear. Infertile eggs will change into a cloudy, opaque appearance with a hairiness. After the 3rd day you will notice two black dots, this is the eyes.

By the 5th day you will notice movement, which will tell you that the fry is alive. By the 6th and 7th day the eggs should hatch, depending on the water temperature.

At this stage, pay special attention as they are prey to insects, especially the dragon fly/larvae.

FEEDING; The 1st 24hrs, the egg sacs will supply the needed nutrition. Thereafter feeding of fry food will be necessary. Egg yolk is a good source of food for the first two days and special fry food is available at most dealers. Daphnia or similar live food is an excellent source of food at this stage, alternatively frozen Daphnia can be used.

REMEMBER The fact that you do not have filtration, a water change should be given regularly during the first two months.

Normally after 6 weeks one should start the culling process, getting rid of any fish with deformities, such as, no fins, two heads, deformed mouths, etc. At the end of the process, you should only have 10% of the initial hatch left.

If you cannot bring yourself to cull, you should not attempt to breed, as this is a must, the Japanese cull regularly to ensure good stock.

POINTS TO REMEMBER

- 1 Fries need ample supply of oxygen and natural food, if they are to grow fast;
- 2 No dry or artificial food should be given for at least 5 weeks
- 3 Do not overfeed. Nitrites will shoot up.
- 4 Check water quality regularly and do regular water changes.

GROWTH

The older Koi gets, the slower it will grow. Growth is extremely dependant on various aspects, mainly effected by: Nutrition, temperature, amount of oxygen, water quality, size of pond, amount of fish per litre, frequency of feeding and exposure to stress.

In ideal circumstances, you can expect the following growth in size and value(approximate size and price depending on quality and various other aspects)

Months	Size in cm	Value - Rand	Months	Size in cm	Value - Rand
1	0.7	.50	8	15	190.00
2	2.5	2.00	9	16.5	220.00
3	5.5	30.00	10	18	260.00
4	8	50.00	11	19	300.00

5	10	90.00	12	21	350.00
6	11.5	110.00	24	37	1000.00
7	13	140.00	36	48	2000.00

TRANSPORTATION

Catching and transporting a Koi is not difficult, it simply takes a little planning and practice. Even if you never plan to take your Koi anywhere you should be ready to do so. One of the most important pieces of equipment that you should have is a good quality big net.

Have a plan, the necessary equipment and practice catching and moving your Koi. The more you practice, the more experience you gain, and the less stressed you and the fish will get.

The ideal way is to guide the Koi into a tub and try not to lift the Koi out of the water. Another option is to catch the fish, and without lifting the net out of the water, scoop it with a plastic bag. A steel refuse bag works well. Turn the net sideways so it cuts through the water.

Try to keep the net in front of the fish's face. There are no scales on the head that can be damaged by a net. The fish might try to jump forwards out of the net. Be ready to lift the net slightly on the side where the head of the fish is. If it still jumps, be ready to move the net immediately catch it again before it hurts itself on the side of the pond or escapes.

Place the Koi in a plastic bag with just enough water to cover the fish, then fill the bag with oxygen. (just cover the dorsal fin.)

Add 5-10 times the amount of oxygen than water. It is a good idea to use the opportunity to treat the fish for possible parasites, especially because the fish is under stress and the parasites might just use the opportunity to take over. Therefore, add a drop of Methylene blue or Potassium to the bag, and three teaspoons of dissolved salt per litre is also a good idea. Put only one large fish per large bag.

Check your bags for leaks. It is not fun to get all ready to go and find water running out of a bag.

For safety, use double bags and put rubber bands on both.

The oxygen will keep the fish alive for at least ten hours depending on size of the fish and temperature.

Fish are remarkably well adapted to extract oxygen from very low concentrations dissolved in the water.

Water with an oxygen concentration of less than 3 mg/l will generally not support fish.

If oxygen is not available, use a bigger bag, and if possible, pump air into the bag with a normal air stone pump. This will be sufficient for at

least a 90 minute trip. Don't blow the bag up with your mouth as I have seen. If an air stone is not available, open the bag as big as possible, and with a swift movement, close the bag to trap as many surface air into the bag.

If a transport tank is being used for moving fish, an air stone or a tyre compressor can be used, connected to your car lighter power supply. Leave enough surface area in the bag to allow for gas air exchange.

Cover the bagged fish to eliminate light and keep bagged fish out of direct sunlight and as cool as possible. Transport the fish at night time or early in the morning if possible. Use an ice pack for longer trips and use the airconditioner of your vehicle if possible. The cooler the water, the longer the oxygen will stay in the water. Koi are cold blooded, in other words, their body temperature is essentially that of their environment.

The metabolism and activity increase with temperature which increases their oxygen demand.

It is important to remember that when fish respire they create carbonic acid. The alkalinity of the water will attempt to neutralize the acids produced by the faeces of the fish. As a result you will find that the pH drop. As a result, the ammonia the fish are producing will be converted to ammonium which is a far less toxic substance.

Place the head of a large fish directing towards the back of the vehicle. You do not want to convert the fish into a bull dog.

Before you release the fish in the water at your destination, never add water to the bag. The pH will shoot up and convert the ammonium to toxic ammonia.

When reaching the destination, release the fish as soon as possible but float it for at least 10 minutes to enable the water to adapt to the temperature. Why float the bag for another 30 minutes with low oxygen and high ammonia levels in the bag, unless there is a big difference in water temperature?

Do not release the water in the bag into the pond. It might contain parasites and will contain ammonia.

Gently remove the fish from the bag while the bag is floating and place it in the pond/quarantine facility, either with your hand or with a soft net. Remember, new fish tend to jump the first two days, so, cover the pond with a net or even something that floats on the water surface if you do not have a net.

WATER CONDITIONS

Water conditions are the most important aspect of Koi keeping and should be mastered before introducing expensive Koi or too many Koi.

If your water conditions are not good, your Koi will not grow as fast, they

will get sick regularly or they will die. If the water looks clean to you, it might be dirty for the fish, as you can not see Ammonia and Nitrites in the water. Very often, dirty water is much better for the health of your fish than crystal clear water.

In short, the waste from the fish creates ammonia which is deadly to the fish. However, nature provided a nitrification cycle to solve this problem. Bacterium called Nitrosomonas grow and break down the ammonia into Nitrites. Nitrites are also deadly to fish, but Nitrites are being broken down by another bacterium called Nitrobacter into Nitrates which is beneficial to fish and plant life (but should also not exceed 50ppm).

Everything must be in balance like with everything else in life.

To little Nitrosomonas causes too much ammonia, too little Nitrobacter causes too much Nitrites. Therefore, the amount of fish, water volume and size of your bio filter must be in balance.

The biggest problem, a new pond and new bio filter need time to create these bacterium (at least two months). If you introduce to many fish before the pond and filter becomes mature, you will cause an imbalance.

Another problem, these two very important bacterium does not really grow in the winter. When the water temperature heats up in summer, the fish eat more, produce more ammonia, but the beneficial bacterium has not grown yet to convert the ammonia and nitrites. This explains that most major outbreak of infections and poisoning in ponds happens in spring.

Hobbyists also tend to clean their ponds less frequently during winter. Leaves, sludge and other debris builds up, creating "bad" bacteria. As soon as the temperature increases, outbreaks follow.

The chemical balance should be tested on a weekly basis, and every time any changes in the pond takes place.

At the beginning of summer, more regular testing should be done.

Therefore, a proper pond test kit is a must for any Koi keeper and is available at most Pet Shops.

Minimum allowed and what to test:

Ammonia - less than 0.1 ppm (depending on temperature)

Nitrites - less than 0.2 ppm

Nitrates - less than 50 ppm

PH - 6.7 - 8.5 (ideally above 8)

Alkalinity - 60 - 170 ppm

Hardness - 75 - 150 ppm

Chlorine - less than .04 ppm

Oxygen - more than 5 ppm

GREEN WATER

Green water is not bad for Koi, as a matter of fact, it is very good for them and breeders often prefer to keep their water green, because the fish thrive on algae. However, we want to see our fish. Isn't that what Koi keeping is all about??

Very often, the quality of green water is much better than crystal clear water.

The reason why the water turns green is because of the accumulation of nutrients in the water, especially those gathered during winter. The algae blossom on these nutrients, and one must get rid of the nutrients and the algae being the cause and the result.

The other reason for green water (which is linked to the above) is because of the absence of enough bacteria, especially directly after winter, because the bacteria takes a while to grow after the winter months, as it requires enough heat to grow. New ponds always go through a phase of green water, despite the presence of a UV light. This is nature's way of sorting out a balance. Don't interfere unnecessarily.

There are various options to solve the problem which can and should be used in conjunction with each other, depending on the severity of the problem.

Mechanical way

An effective UV light will clear most of the floating algae which makes your water green. However, it is not effective against blanket weed, the hardy type of algae on the sides and bottom, but these do not affect the colour of the water and can be removed manually if required. One has to remember that the tube is only really effective for a period of one year. So, if you have green water despite the presence of a UV light, a replacement of the tube or an additional light might be an option. It takes a few days to clear the water. When you buy a UV light, always buy a bit bigger than what you actually require. There is not a big difference in the price of a 15-watt and 30-watt UV light. The one is approximately R 550.00 and the other one is R 620.00. We install 30 watt UV lights in ponds of 12 000 litres, although the manufacturers indicate that they are good enough for 30 000 litres.

Chemical way

There are various chemicals available on the market, the most common one is "Pond Clear" which is available at most Koi outlets. It is fairly inexpensive at approximately R 75 a jar, which is good for a few treatments on an average pond. This will however cure the situation only temporarily, and it is extremely important to use the right dosages.

Potassium Permanganate can also be used, but it is not advisable for the novice. If you suspect the presence of parasites anyway, this is a good option. The Potassium will attack the algae which will make your

whole pond brown as it kills the algae within hours, and leave a clean pond a few days later after a water change. However, it also kills beneficial bacteria, unless you can successfully bypass your bio filter.

Plants

Another option is to introduce water plants or more plants that will use all the nutrients and compete with the algae, and the algae will gradually die off. Very often, Koi keepers introduce plants that were planted in nutrient rich soil. This will initially cause the opposite and make your problem worse because it normally causes an algae bloom. Water plants should be planted in normal garden soil with low nutrients mixed with gravel as opposed to compost or rich potting soil.

Bacteria

Most types of bacteria break down the nutrients. Introducing a bigger bio filter will cure the pond of algae, but it will take a few months. An option to get the water clear much faster, is to introduce a bale of straw into the water which will generate the right type of bacteria to limit the nutrients in the water. This is why a mature pond normally has crystal clear water, and it is difficult to maintain clear water in a newly built pond younger than 12 months.

Shade

To introduce more shade onto the pond, will also help to clear the green water and it will help to prevent it from happening again to some extent.

Salt

The increase of salt is also an option as it limits the growth of algae. However, it also limits the growth of bacteria and pond plants if the quantity is too much.

Replacement of water

Most people think that the quickest solution is to do more water changes or a total water change, thinking that the clear water added will solve the problem. The opposite happens. New water is rich in nutrients and the algae thrive again.

Patience

In a lot of circumstances, you only need some time. Any new pond will go through a green phase despite the presence of a UV light. Be patient. It will probably clear within a week. Let nature take its course. Nature is busy to create a balance. If not, assist nature by doing something about it.

DISEASES

Koi are no different to humans, when it comes to illnesses and diseases, they are also susceptible to all the nasties out there, just like us. Koi are extremely tough and hardy creatures, but they too develop illnesses if the following criteria are not upheld:

AERATION; Fish breathe oxygen in the water through their gills. If the water does not have sufficient aeration the fish will suffocate. The more aeration there is, the healthier your fish will be. I have only learned this after many battles with health problems.

WATER CONDITION; Checking your ph, ammonia, nitrite levels, making sure that you have a good filtration system, and never allow the bio filter to backwash into the pond. This is one of the major causes for serious health problems.

WATER CHANGES; Do regular water changes on a weekly basis. Not too much but at least 10% per month.

CROWDING; Do not overcrowd your pond, as this places a great deal of stress on your fish as well as on your biological filter. Everything might be fine, until there is a power interruption or some other minor problem, or you lose the effectiveness of your bio filter.

FEEDING; Do not overfeed and make sure that your fish are getting the right nutrition.

INJURIES; This is quite common, treat it immediately if you notice external injuries. If you don't, you give the parasites an opportunity to abuse the vulnerability of the fish by expanding in numbers, entering the wound and exploit the immunity loss of the fish.

CIRCULATION; Make sure that there is good movement in the pond with no "dead" areas with low circulation. Stagnant water is not good as bad bacteria grows well in stagnant water with low oxygen.

It is advisable to follow the above guidelines to prevent future health problems. The good old saying "prevention is better than cure" applies here.

If you take the right approach in maintaining your pond, your fish should be fine - although minor ailments do pop up even under the best conditions.

REMEMBER..... As soon as you notice a problem, remove the fish immediately to a separate tank if possible and treat accordingly. You might save the other fish in the process.

Common diseases:

FIN ROT; This is a bacterial infection resulting in split or ragged fins, can be treated with antibiotics fin rot can be caused by stress, or that the fish can be carrying parasites, poor water conditions, or low oxygen levels.

FLASHING; If you notice your fish is scraping himself on the bottom or

sides of the pond, this could mean that it is carrying parasites. A good treatment of salt or potassium permanganate should solve the problem.

HEAD HANGING; Fluke is very often the culprit, which is a parasite which you can not eradicate with salt. Potassium is a good inexpensive treatment for Fluke.

MOUTH ROT; White growths around the mouth, often caused by a bacterial infection.

WHITE SPOT; The body and fins will be covered in small white spots.

SLIME; This is a greyish film on the body.

ULCERS; This comes across as open sores on the body.

GILL PARASITES; Mucus forms on the gills, and the gills become inflamed.

These are just a few of the common problems you may encounter during your years with your fish, but do not despair, with the treatments that are available, these problems can be rectified.

A very serious disease I would however like to warn you about, is KHV This means KOI HERPES VIRUS. This disease is at this point INCURABLE and can wipe out your entire pond in a matter of 2 weeks and affected a few ponds from breeders in the Western Cape recently.

This virus only attacks the common carp and koi.

WATCH for these symptoms and act immediately by removing the infected koi from your pond.

- GASPING FOR AIR,
- SUNKEN EYES - This is the most advanced stage of the disease.
- MUCUS - This is secreted by the skin, followed by dry patches.
- HEAD HANGING - Down for long periods of time.
- SEVERE GILL NECROSIS - that gill tissue breakdown.
- ULCERS - sores appearing on the body.
- HAEMORRHAGING
- DEATH - within 2 weeks.

PLEASE REMEMBER: Some of the symptoms can be related to parasitic/bacterial infections, caused by poor water conditions. Do not assume that your fish have the KHV virus, until you have an accurate diagnosis.

Up until now, no treatment has been found for KHV, but there are treatments available to prevent secondary bacterial infections.

PREVENTION

Only buy fish from reputable dealers, breeders and koi keepers who know about the existence of KHV. I cannot stress enough about

QUARANTINING, please quarantine all new arrivals that you have purchased.

Whenever you are not sure how to treat a fish, first treat with salt. Salt is the simplest, and one of the most cost effective cleaning treatments for koi, and kills 90% of parasites. It is only Fluke, Anchor Worm and a few other parasites that will not be killed by salt.

Here is a short summary of signs to identify possible diseases.

- fins closed - Ick/Costia
- breathing difficulties - Flukes
- Stress/off colour - Cloudy eye
- flashing - Flukes, anchor worm, ph
- gasping for air - not enough oxygen
- rapid gill movement - Ick/Costia
- "sitting" on the bottom - Flukes or swim bladder disease
- restlessness - Lice/Anchor worm
- wild swimming - check ammonia levels
- jumping - parasites in general

DOSAGES OF THE MOST COMMON MEDICATION:

Salt:

- 1.7 kg / 1000 litres (normal conditions) (6 cups)
- 1.3 kg / 1000 litres (if you have plants that might be affected by salt)
- 2.6 kg / 1000 litres (during minor health problems) (9 cups)
- 5 kg / 1000 litres (max during major health problems) (18 cups)
- 1.7 kg / 100 litres (dip for 10 minutes max - ulcers/parasites) - monitor carefully and if the fish flips over, stop treatment immediately.

Potassium Permanganate: (Aerate the water and much as possible)

2.65 g / 1000 litres (0.45 teaspoons) If the water turns brown within 30 minutes, you have a lot of organic material in the pond. Add one more treatment immediately at 0.3 teaspoons. Repeat treatment 2 days apart until the water stay pink for at least 6 hours and do a 20% water change after each treatment.

Malachite Green: (do not use with salt)

1 g / 10 000 litres

Methylene Blue:

1-2 g / 1000 litres

Please remember that late or incorrect diagnosis and or treatments are a common cause of death. Do not hesitate to get a professional opinion when you are in doubt. Very often, Koi keepers become desperate and jump from one form of medication to another. This is normally the biggest mistake, as different medication/chemicals often work against each other, alternatively the fish is unable to cope with all the different medications, causing more serious problems. Knowing your Koi's actions will assist you in diagnosing and recognising a problem early and you may actually save your koi's life if you react immediately and correctly. When in doubt and without help, start off with salt at 9 cups per 1000 litres. Get to know your local Koi societies, they are normally more than willing to help out with advice, or send us an E-mail: Koi@absamail.co.za

MAP TO KOI ONLINE (on appointment only)

