



Ozone and its uses in Koi keeping.

Ozone systems provide the ultimate weapon in the Koi keeper's armory in the constant fight against disease and the struggle to maintain superb water quality. We have seen much advancement in Koi system filtration in recent years – new filters, new media, new mechanical filter add-ons such as the Answer, and organic cure alls such as Genesyz and similar products all designed to improve water quality and filtration and thereby ultimately Koi health. None of these however comes close to delivering the benefits of Ozone systems, the advantages of which have long been recognised by the marine fraternity and like so many other great ideas, only now being introduced in to the Koi world.

Without dispute, Ozone is the most effective natural bactericide and viricide of all disinfecting agents available to the Koi keeper.

Ozone has the following properties in Water :

- Is highly effective in removing organics, ammonia and nitrites.
- Reverts back to oxygen quickly, leaving no detrimental residues when used correctly, and provides ultimate water clarity.
- Is economical and non-polluting when used correctly.
- Is used as a sterilizing agent to kill viruses, bacteria and other pathogens.
- Improves biological and mechanical filtration by burning off proteins, ammonia and nitrite straight to nitrates and by enriching our pond water with Oxygen.
- Lowers biological oxygen demand (BOD) and raises REDOX potential in the water (the ability of the water to oxidize pathogens).
- Can remove toxic pollutants, such as hydrocarbons and other toxic substances from our pond water, which cannot be achieved by any mechanical or biological filtration.

As well as disinfecting the water and killing bacteria, viruses and free swimming parasites, the Ozone also kills blanket weed and algal cells. This means that the UV is no longer required and is redundant. Also the water returned to the pond is saturated with oxygen so that the biological filter is able to work at its full potential. Ozone is so powerful that it is like having a permanent and very strong dose of Chloramine T or Potassium Permanganate in the pond, without any of the side effects. As the Ozone also burns off proteins and organics water clarity is improved enormously and the water sparkles to the point where the colour of the Koi is not impeded in any way by the depth of water, and Koi that have pure white skin at the surface also have pure white skin 6 feet down.

Whilst not a Utopia, since even with the use of Ozone Koi can still need individual medication and treatment if required, the other major advantage of Ozone in our pond systems is that it virtually eliminates the risk of cross infection between Koi. So even if a fish is introduced into the pond environment which itself is ill, e.g. carrying a bacterial disease, this is much less likely to be transmitted to other Koi. Further, any treatment employed to an infected Koi has a much improved chance of working effectively as the Koi are living in a much cleaner environment, biologically speaking – i.e. in an environment containing very few harmful pathogens.

This is especially noticeable when topically treating surface wounds, which once cleaned, heal much faster.

Similarly if parasites were present on certain Koi, the water would still need to be medicated to eradicate the parasites on the body of the Koi affected. Any medication used however, also works more effectively as the pond water is maintained at a much higher quality, with a higher Redox potential and with much less biological Oxygen demand (BOD).

Frequently Asked Questions.

What is Ozone?

Ozone occurs naturally in the atmosphere. When a molecule of Oxygen, O², is bound to a third oxygen atom, it becomes Ozone, or O³. Ozone is an unstable bluish water-soluble gas with a characteristic smell. At low levels it makes the air smell fresh and its colour makes the sky blue. Ozone is the 2nd strongest known oxidizer and the most powerful readily available water sanitizer. It kills bacteria and viruses over 3,000 times faster and is a 50% stronger oxidizer than chlorine. It is unsurpassed for control of many types of common bacteria such as E. Coli and faecal Coliforms as well as the de-activation of virus, fungus, mould, mildew and cysts, and is not carcinogenic.

How does it Work?

Ozone is nature's way of purifying the air we breathe. As ozone circulates and comes into contact with airborne pathogens, one of the three oxygen atoms detaches itself from the Ozone molecule, attaches itself to the pollutant and oxidizes it and turns it into a safer compound. Ozone is nature's way of cleaning our environment.

Ozone displays an all or nothing effect in terms of destroying bacteria. Ozone is such a strong germicide that only a few micrograms per litre are required to demonstrate germicidal action; it destroys all pathogenic and saprophytic microbes in water. Factors like humidity, temperature, pH, Ozone concentration levels, type of organism and time, determine the kill rate for pathogens. The action of Ozone gas in water is instantaneous. After oxidation, Ozone returns to its original form of oxygen, without leaving any toxic by-products or residues.

Ozone is a natural disinfectant and sterilizer and unlike chlorine, it does not produce trihalomethanes or chloroforms in water.

Without dispute, scientifically speaking, Ozone is the most effective natural bactericide and viricide of all the disinfecting agents.

If Ozone kills bacteria, what about my Bio-Filter - won't that be affected?

Yes - but only beneficially! Pathogens are killed instantly as they pass through the Ozone stream in the Ozone reactor or protein skimmer, but obviously your nitrosomonas and nitrobacter do not, as they live on your filter media. True, they are free swimming as well, and any that pass through the Ozone system will be zapped. However, it is a recognised fact that the beneficial filter bacteria have relatively short lives but regenerate very quickly. Further it has been scientifically shown that nitrification bacteria will die faster without the presence of Ozone than with Ozone. This is almost certainly because the entire pond environment is cleaner and considerably more aerobic (oxygen rich) in an Ozone treated pond, and it is a well known fact that nitrifying bacteria reproduce and perform much better in oxygen rich systems. The majority of pathogens, on the other hand are anaerobic (live in a zero or reduced oxygen environment) and in a pond treated with Ozone there will be virtually no chance of anaerobic conditions existing. So the high Redox levels of the pond water is of considerable benefit to our friendly bacteria, but is definitely the enemy of pathogens.

If the Ozone kills only on direct contact in the Ozone reactor - what kills blanket weed and Algae?

Ozone raises the Redox potential of the water substantially. This renders bacteria, algal spores and other organics much more susceptible to oxidation - to having their cells destroyed or disrupted, even though they are not necessarily in direct contact with Ozone. Put another way, chemically the pond water is far more reactive as it is saturated with Oxygen, and single cell organisms or organisms with a simple cellular structure are easily oxidised and therefore tend to have a shorter life span. Direct contact with Ozone in the Ozone reactor means instant death, the higher Redox of the pond water means cells are easily oxidised (killed) and cannot reproduce effectively so their population decreases.

I've been told that Ozone makes the water sterile and can mean that the koi's immune system deteriorates as it doesn't have to work so hard any more?

Not true! In a sterile pond environment, the Redox level is around 700mv - at this level life would cease to exist in the pond. Koi ponds usually run at a Redox level of around 350 - 400mv. At this level between 90 and 98% of pathogens are destroyed but your koi will be very happy and healthy.

Can I use an Ozone system in place of a conventional filter?

No, you should consider an Ozone system to be a part of your overall filtration strategy, as it will not replace either the mechanical or biological elements of your conventional filter, but it will enhance the performance of your existing system thus rendering it far more efficient.

Can I still treat my pond with chemicals? and what happens when I do?

Yes of course, from time to time you may need to use a pond medication for parasites etc. When you do, simply switch off your Ozone generator. Ozone would destroy chemicals in the pond very quickly and would render your treatment useless. When your treatment is complete, switch on again and the Ozone will clear the chemical residue very quickly.

Can I still use salt in my pond?

Yes, absolutely. The Ozone won't affect the salt and you will find your protein skimmer produces a lot more foam with salt in the water, so it actually works even more efficiently.

All sounds very complex - do I really need an Ozone system?

No, we can't claim an Ozone system is an essential part of a koi pond system, but that's what was said about bottom drains and vortexes a few years ago. Now very few 'proper' koi ponds are built without these essential items. For the serious koi keeper we would recommend an Ozone system be included as part of the overall filtration strategy. We believe that in the near future, Ozone systems will become just as much of a necessity as a bottom drain.

Koi are beautiful but expensive creatures and each year thousands of koi die needlessly from all kinds of illnesses most of which are simply caused by poor water quality - nothing more. In any koi pond one of the eternal and recurring problems that we have to overcome is bacterial disease and in a well stocked and mature koi pond the bacterial load on the system can become very high - especially in the summer months. Without doubt the single biggest benefit of installing an Ozone system is that the bacterial load on your system (and therefore on your koi) will be drastically reduced. Ergo much less disease - more healthy koi. Unquestionably water quality will also be transformed using Ozone. Ask yourself why have marine/tropical aquarists been using Ozone to help manage water quality for the last 15 years or so? Why is the koi fraternity always the last to catch on?

The saying that we are not koi keepers - we are water keepers is absolutely true. If your pond water quality is superb, your koi are more likely to be healthy and live longer - it's as simple as that.

At the smaller end of the scale, the Ozone reactors and skimmers tend to be very efficient, and this therefore means that the amount of Ozone we need can be reduced because the reactors are very good at mixing water/Ozone for optimum performance. Efficiency can be increased further by the addition of an air dryer.

At the other end of the scale, we need to produce more Ozone than we strictly need as the Ozone reactors are not as efficient when scaled up, and more Ozone gases to waste.