



Green Pond Water, String Algae and Clarity

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POND WATER QUALITY

Green water is the most common complaint in pond keeping, and the honest answer is more interesting than "buy a UV." Clarity is a symptom. What actually reaches your koi is the daily swing in oxygen and pH that a heavy bloom drives, with the low point arriving at the hour nobody is standing at the pond.

In short

- Green "pea soup" water and string algae are two different organisms with two different fixes. A UV clarifier handles the first and does essentially nothing for the second.
- Blooms are fed by nutrients (nitrate and phosphate from feeding and waste), strong light, and a filter that is either immature or overloaded.
- Green water is usually not directly toxic. The danger is the swing: oxygen and pH climb through the day and fall through the night, bottoming out just before dawn.
- Clear a heavy bloom too suddenly and the decomposing algae can pull the oxygen down with it. Gradual is safer than dramatic.

Two different problems that get called the same thing

Almost every "my pond has algae" conversation is really two conversations. Single-celled suspended algae float freely in the water column and tint the whole pond green, from a faint haze to full pea soup. Filamentous algae, usually called string algae here and blanketweed in the UK, is attached. It grows on rocks, liner, waterfall faces and the inside of skimmer boxes as hair, mats or long ropes.

The distinction matters because it decides which tools can work at all. A UV clarifier only acts on organisms that pass through its chamber. Suspended algae does. String algae does not, and never will, because it is anchored to a surface. A pond can run a perfectly sized, perfectly functioning UV and still be carpeted in string algae, and nothing is broken.

QUESTION	GREEN WATER (SUSPENDED)	STRING ALGAE / BLANKETWEED (ATTACHED)
What you see	The whole pond is tinted; you lose sight of fish at depth	Water may be clear; hair, mats or ropes on rocks and falls
Where it lives	Free-floating in the water column	Anchored to hard surfaces and plant stems
Does a UV clarifier touch it	Yes, this is exactly what UV is for	No, essentially nothing

QUESTION	GREEN WATER (SUSPENDED)	STRING ALGAE / BLANKETWEED (ATTACHED)
What actually works	Nutrient control, shade, mature filtration, UV	Physical removal, nutrient control, competition from plants
Risk to fish	Indirect, through daily oxygen and pH swings	Mostly nuisance; heavy mats can trap debris and block flow

What actually feeds a bloom

Three ingredients, and algae only needs you to supply all three at once.

- **Nutrients.** Nitrate and phosphate, mostly from food going in and waste coming out. Heavy feeding, heavy stocking, uneaten pellets and accumulated muck at the bottom all count.
- **Light.** Long days and direct sun on an unshaded pond. South-facing, shallow and rock-free ponds bloom hardest.
- **A filter that cannot keep up.** Either immature, because it is new or was recently disturbed, or simply undersized for the fish load it now carries.

Two situations are so common they are almost predictable. A brand-new pond blooms because the biological filter has not colonized yet, which is also when ammonia and nitrite deserve close attention. And an established pond blooms in spring, when water is warming through the 50s and 60s Fahrenheit (roughly 10 to 20 Celsius) and the sun is already strong, but the marginal and submerged plants that would normally compete for nutrients are still dormant. The algae wakes up first. Both of these often fade on their own once the biology catches up.

The part that matters for your fish: the daily swing

This is the real point of the page, and it is the part that gets skipped. Green water is usually not directly toxic to koi. Fish live in green water in mud ponds all over the world, and breeders raise fry in it deliberately because it carries food. The problem with a heavy bloom is not the color. It is that a dense population of photosynthesizing organisms turns your pond into a chemistry experiment that runs on a 24-hour cycle.

Through the day, algae photosynthesizes. It consumes dissolved CO₂ and releases oxygen, so oxygen climbs and, because removing CO₂ removes carbonic acid, pH climbs with it. After dark, photosynthesis stops but respiration does not. The algae, the fish and the filter bacteria all keep consuming oxygen and releasing CO₂ all night. Oxygen falls, CO₂ accumulates, and pH falls with it. The minimum arrives shortly before sunrise, at the end of the longest stretch without light.

TIME OF DAY	DISSOLVED OXYGEN	PH	WHAT IT MEANS
Mid-morning	Rising	Rising	Bloom is producing faster than everything consumes
Late afternoon	Highest of the day	Highest of the day	The reading most owners take, and the most flattering one
Late evening	Falling	Falling	Production has stopped; consumption has not

TIME OF DAY	DISSOLVED OXYGEN	PH	WHAT IT MEANS
Just before dawn	Lowest of the day	Lowest of the day	The reading that would have told you something, taken by nobody

A heavily blooming pond can move pH by a full point or more across a single day. The same pond reaches its oxygen minimum just before first light. Two owners with identical ponds can report completely different pH values and both be telling the truth, because one tested at 5 p.m. and the other at 7 a.m.

Why a bloom over thin alkalinity is the combination to watch

A daily pH swing is only as violent as the water lets it be. Carbonate buffering is what absorbs the CO2 shifts, and US test kits label it total alkalinity rather than KH. When that buffer is healthy, the bloom pushes pH around and the water pushes back. When the buffer has been eroded, by an established pond consuming it, by soft source water, or by nitrification, there is nothing to resist the nightly CO2 accumulation.

That is the classic overnight pH crash setup: a heavy bloom stacked on low carbonate hardness. As a working range, most koi keepers hold total alkalinity somewhere around 100 to 150 ppm as calcium carbonate and treat anything below roughly 80 ppm as thin. Ranges vary with source water and stocking, so measure your own pond rather than assuming.

If you have a heavy green bloom and low total alkalinity at the same time, treat it as urgent rather than cosmetic. Fix the buffer first. A pond in that state can hold a comfortable pH all afternoon and reach both its lowest pH and its lowest dissolved oxygen in the same hour before dawn, which is when losses actually happen.

Fixes, honestly ranked

Ordered by how much they change the underlying situation rather than how fast they change the color.

APPROACH	WHAT IT DOES	HONEST LIMITS
Reduce feeding and stocking pressure	Cuts nutrients at the source; the only permanent fix	Slow, unglamorous, and the one nobody wants to hear
Shade and competing plants	Removes light and takes nutrients away from algae	Takes a season to establish; koi eat many soft plants
Keep the filter healthy and mature	Processes waste before it becomes algae fuel	Over-cleaning media resets the biology and can trigger a bloom
<u>Water changes</u>	Dilutes nitrate and phosphate directly	Only holds if the input rate also comes down
UV clarifier	Effective and reliable against suspended algae	Does nothing for string algae; treats symptom, not cause
Mechanical removal	The realistic answer for string algae	Manual, repeated, and never finished

APPROACH	WHAT IT DOES	HONEST LIMITS
Barley straw	Traditional; may inhibit some algae as it decomposes	Weakly evidenced, mechanism unclear, field results inconsistent

On barley straw specifically: it is worth saying plainly that the evidence is thin. Some laboratory work shows inhibition of some algae species; field trials have repeatedly failed to reproduce it, some species grow better in its presence, and the mechanism is not established. It is cheap and low-risk, so try it if you like, but do not build a plan around it.

Where the fix is dilution, doing it continuously rather than in occasional large batches removes most of the swing that a manual change creates. H2Koi also builds bespoke automated water changes for exactly that reason. We have never found another system that does it, and neither have our clients.

Do not clear a heavy bloom suddenly. Every algae cell you kill becomes organic matter that bacteria then decompose, and that decomposition consumes oxygen from the same water your koi are breathing. An algaecide dosed into a dense bloom in warm weather, or a brand-new oversized UV switched on at full output, can take the pond from green to clear and from clear to a low-oxygen event in a day or two. Clear gradually, keep aeration running at full capacity throughout, and watch the pond through the following two nights.

Turbidity: clarity as a number instead of an impression

"It looks a bit greener than last week" is a hard thing to trust. Clarity changes slowly, you see the pond every day, and your eye adapts. Measured turbidity does not adapt. It gives you a trend line, so you can see a bloom building over a week before it looks obvious, and see whether what you did actually moved it.

Turbidity does not tell you what is causing the cloudiness. Suspended algae, stirred-up silt, clay from runoff and a bacterial haze after a filter clean all raise it. You still have to look at the pond and interpret. What the number does well is tell you that something changed, and when. The interesting reading is usually turbidity climbing alongside a widening daily oxygen and pH swing, because those three moving together is the signature of a bloom taking hold, not a bit of silt.

What H2Koi does and does not do here. The sonde measures turbidity directly, along with temperature, pH, dissolved oxygen in both mg/L and percent saturation, conductivity, ammonium (NH₄) and nitrate (NO₃). ORP is available as an option, as is a blue-green algae channel that reads phycocyanin fluorescence — the pigment specific to cyanobacteria — which is what lets it separate a blue-green bloom from stirred-up silt. That channel reports a trend, not a cell count, and it does not measure toxins. The sonde derives KH, NH₃, nitrite, salinity, TDS. General hardness (GH) is not reported at all. A self-cleaning wiper keeps the optical sensors clear, which matters in a blooming pond, because algae films on an optical window are exactly what makes turbidity and oxygen readings drift. For this topic the useful part is not the clarity number by itself. It is that the same instrument records the oxygen and pH swings the bloom produces, overnight and through dawn, so you can see the magnitude of the swing rather than infer it. What it does not do: turbidity alone cannot separate suspended algae from stirred-up silt, it cannot see string algae on your rocks at all, and it does not identify species. It is continuous early warning from industrial-grade sensors, and not a substitute for looking at your pond.

Why periodic spot-checking leaves a gap

Here is the structural problem with testing by hand during a bloom. Test kits get used when it is convenient, which is daylight, and usually late afternoon or early evening after work. That is the exact moment a blooming pond looks its best: oxygen at the day's peak, pH at the day's peak, everything comfortably in range.

The reading that would have warned you was at 5 a.m., and nobody takes it. So the swing itself, which is the entire mechanism of harm, is invisible to a routine of periodic testing. Two owners can both be diligent, both test weekly, and only one of them has a pond that is quietly hitting a low-oxygen minimum every night, and neither of them will know which.

A weekly test is one frame from a film. It is a real frame and it is worth having, but a bloom is a process with a period of exactly 24 hours, and you cannot characterize a 24-hour cycle by sampling it once every 168. Continuous measurement is not about precision beating a kit; a good kit in careful hands is fine. It is about being present at 5 a.m.

Common questions

Why is my pond water suddenly green?

Usually a nutrient and light surplus that the filter is not absorbing. The classic triggers are a new pond whose biological filter has not colonized yet, spring sun on a pond whose plants are still dormant, a recent heavy filter clean that reset the bacteria, or a step up in feeding as the water warms. In spring it very often clears on its own within a few weeks as the plants and the filter catch up.

Is green water bad for koi?

Not directly, in most cases. Koi are raised in green water in mud ponds on purpose. The risk is indirect: a heavy bloom drives oxygen and pH up all day and down all night, so the pond can swing pH by a full point or more daily and hit its oxygen minimum just before dawn. If carbonate buffering is also low, that is the setup for an overnight pH collapse. The bloom is the symptom; the swing is the danger.

Will a UV clarifier get rid of string algae?

No. A UV only acts on organisms that pass through the chamber, and string algae is attached to rocks, liner and waterfall faces, so it never goes through. UV is genuinely effective against the suspended single-celled algae that causes green water and essentially useless against blanketweed. For string algae the honest answers are physical removal, reducing nutrients, and giving plants a chance to compete.

How long does a UV clarifier take to clear green water?

A correctly sized unit on adequate flow typically shows visible improvement within several days and substantial clarity within a couple of weeks. If nothing has changed after two or three weeks, check the obvious things before buying a bigger one: lamp age, since output falls long before the lamp stops lighting, a fouled quartz sleeve, and flow rate through the chamber that is too fast for the contact time.

Does barley straw actually work for pond algae?

The evidence is weak and worth being upfront about. Some laboratory studies show inhibition of certain algae as the straw decomposes, but field trials have often found no significant difference from untreated ponds, some species grow better in its presence, and the mechanism is still not established. It is inexpensive and low-risk, so there is no harm in trying it, but treat it as a maybe rather than a plan.

Should I use an algaecide in a pond with koi in it?

Be careful, particularly in warm weather with a dense bloom. The chemical risk to the fish is one thing; the bigger practical risk is that killing a large volume of algae at once creates a large volume of decomposing organic matter, and that decomposition consumes oxygen. Ponds are lost this way more often than to the product itself. If you do treat, treat partially, run aeration at full capacity, and watch closely through the next two nights.

Why are my koi gasping at the surface early in the morning?

Gasping or hanging near the waterfall at first light, then behaving normally by mid-morning, is close to a signature of low dissolved oxygen at the end of the night, and a heavy algae bloom is one of the common causes. Increase aeration immediately and keep it running around the clock rather than only in the daytime. Then look at the underlying load: feeding, stocking, water temperature and the size of the bloom. Note that gasping has other causes too, including gill irritation and parasites, which water measurement cannot see and which need a physical examination of the fish.

