

KOINATIONS

NORTH ■ SOUTH ■ EAST ■ WEST

14 DAYS: *Koi in the Making*

OXYGEN
THINGS YOU DIDN'T KNOW

SEEING RED
THE QUALITY IS
IN THE BENI

SINK OR SWIM
SURGERY
SAVES KOI

KOINATIONS.COM



OCTOBER/NOVEMBER '09 \$6.95 US



plus { Omosako Empire
Born to Show
Show Reports
Trick or Treat?





DAY 1

Another World

From nothing to everything in one day... a Koi in the making

Photographs and Story by Joop van Tol

After taking a course on fish diseases, which I followed for our association, I became enthralled by the wonderful living world under the microscope. As a result of my position in the club as Koi pond health coordinator, I have seen some real “monster” parasites on Koi. Although one obviously hopes their own fish are not exposed to an attack, it is fascinating to see what is going on in a square millimeter under the microscope. You find yourself in a whole different world—a world that may look different, but to which the same law of “eat or be eaten” applies.

Not just for “monsters”

However, the microscope doesn't have to be used just to see the “baddies” of the pond. You can also watch as life unfolds before your eyes. I've captured it all. From the moment the Koi eggs settle on the pond's algae to the moment they turn 14 days old. It's a shame most people won't get to see this first hand. It takes your breath away to see a new beating heart, and to be able to monitor the blood flow in an egg.

What you see in the pictures accompanying this article is the result of

many hours of precision work, and a selection from hundreds of photos. I'm not saying you should have pity on me! I'm just letting you know what you're in for if you're thinking of doing this yourself. It was a very time-consuming job.

I estimate the size of an egg to be approximately one millimeter. As you can imagine, you have to have a steady hand to get one egg in one drop of water on a glass slide for the microscope. Then your work begins searching for the correct position of the egg—you do this by maneuvering it repeatedly until you have found the perfect position to take pictures or video. This is not easy as the egg has a tendency to rotate back to its original position.

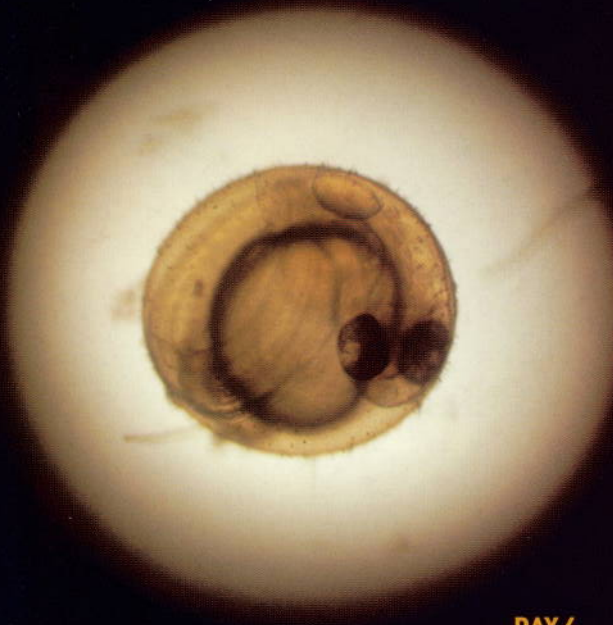
All this must also happen quickly; as the microscope lamp delivers so much heat it can kill the egg. And even for science you would not want to risk this. Although this work requires a great deal of patience it was all forgotten as soon as I got a sharp image in my microscope. Welcome to Mother Nature's wonderful world...



DAY 2



DAY 3



DAY 4



DAY 5

DAY 1: Easter eggs

This picture was taken just 10 hours after the eggs had been laid. The collection of eggs in the pond reminded me of an old-fashioned Easter egg hunt! I noticed the eggs were fairly strong. You can easily take them between your thumb and forefinger and pull them free from the algae, without doing any harm.

The big ball in the middle is not the fertilized egg, but egg yolk. This serves as food for the fry that develop over the following days. Koi eggs contain many nutrients and Koi in the pond behave like cannibals when there is a spawn. Letting the eggs remain in the pond, shrinks the eggs' chance of survival to almost nothing.

DAY 2: 24 hours of fame

The embryo grows, so to speak, around the yolk. In the bottom of the egg the fry's head is starting to develop. When you follow the clock around the yolk, you can see the tail at the bottom right.

This development has occurred in just one day which is incredibly quick. From nothing to everything in one day... a beautiful movie title.

DAY 3: ET phone home

On the third day you can see the heart beat, and liquid flow between the yolk and fry. The embryo is growing rapidly and has started developing eyes. The eyes are large compared to the fry's head. And at this point the fry is known as an eyed egg. We will just assume that Mother

Nature knows what she's doing because at this stage it seems more like an alien than a fish.

DAY 4: Under attack

On the fourth day the first swim bladder becomes easily recognizable (the oval ball to the left of the centre). The swim bladder is obviously not filled with air yet. Under a microscope air in water will appear black in color. The eyes are more developed and the fry is growing well. The egg is attacked from outside by all sorts of organisms one of which is bacteria—they all want their share of an egg white meal. The egg's outer layer resembles a coral reef. Anemone-like animals, seaweed in the form of thread algae and mildew are surrounded by crayfish-like organisms.



DAY 6a



DAY 6b



DAY 6c



DAY 7a



DAY 7b



DAY 9

DAY 5: Alive and kicking

The fry become very restless, and often turn in the egg. They react visibly in the light of the microscope when I do something they don't like. It may be the light or heat, which provokes this activity, or even the possibility that the fry's eyes are already working. They have developed the red blood cells, which makes it even easier to follow the blood flow. This is why there is a red glow to the body.

DAY 6a: Let me out!

There is now far too little space in the egg and it must feel very uncomfortable. The fry is more than ready to go forth into the world. We can also see that the egg has been eaten from the outside by all the little creatures, and is far from the perfect round ball it was on day one.

DAY 6b: Outbreak

The egg has now broken at its weakest point. The tail is already out, and spine can be stretched. There is a bit of time now for a respite before the battle continues at full blast. For the fry that I have been watching hatch, the tail always comes

first. I do not know if it's coincidence or not.

When you feel the eggshell, it is incredibly hard. It could well be the explanation that some Koi are deformed (curved) because they could not leave their eggs on time.

DAY 6c: Free at last

With some sharp movements the fry has succeeded in breaking out of prison, as though it was Houdini himself. At this point the fry are known as yolk-sac fry. I got a cramp in my fingers from holding the camera perfectly still so as not to lose this important moment. While some fry swim around the tank they still have egg on their head as a sort of crash helmet. Completely unnecessary? I think not since these Kamikaze pilots have no coordination whatsoever!

DAY 7a: Little seahorses

With a large food reserves in the form of a plum bag this hatchling comes well prepared for the world. The first few days it need not worry about food, and can concentrate on swimming. In the picture, it is clear that the intestines are well

filled with waste materials, although the fry has not eaten a bite yet.

Some fry just hang at the bottom of the tank, while others—like seahorses—have attached themselves to algae.

DAY 7b: Almost human

When I look at a close-up picture of a fry's head, I almost think that there's something human about it, but I may have just been looking too long into the microscope. Because of the heavy burden of the yolk sack, swimming is almost impossible. One can hardly imagine that this fry may have the potential to grow and one day become a jumbo Koi.

DAY 9: Down the drain

Two to four days after hatching the yolk is completely used up. The fry has grown rapidly, and now is out to find food.

DAY 10: Colour my life

It begins to make itself some pigment cells. They are obviously extremely important, if the fry is



DAY 10

DAY 14

to grow up and become a champion. Pigment cells resemble ink droplets and can pull together in stressful situations.

DAY 14: Say cheese

The swim bladder is now filled with air, as shown by the black color. I wonder when the second swim bladder becomes visible. The fins have grown large. And, although some books

claim otherwise at this stage, I can only see three, of the four heart chambers. I can hardly imagine that the fourth ventricle is formed at a later date. On the other hand, the second swim bladder, I can not find at this time.

I hope in a few years to take these little ones to the Koi show in Arcen. And there I hope they will stay and pose once again to have their pictures taken. 🌸

 **Joop van Tol** lives with his girlfriend in Voorburg, a town near The Hague in the Netherlands. By day he is a professional economist at a large facility. He has been involved in all things Koi and is soon to be a new ZNA judge. Reach him at writers@koinations.com

SUBURBAN
Water Gardens, Inc.
Everything you need to build your Dream Pond

 **"The 1st American made bio-filter imported to Japan."**
ROTATIONALLY MOLDED VORTEX FILTERS WITH FACTORY WELDED FITTINGS, ELIMINATING MESSY DRILLING & EXPENSIVE BULKHEADS.
SIZES FROM 16" TO AS LARGE AS 48"

From Pond → Vortex Settling Debris → Mechanical/Bio Filtration (Baffle) → Mechanical/Bio Filtration → Pond Return / Waste

WWW.SUBURBANPONDS.COM • (631) 643-3500