

Understanding the Koi Herpes Virus

The virus becomes most active at temperatures of 69 to 81 degrees. While the mortality rates in koi exposed to KHV were higher at these temperatures the effects of KHV were also seen in temperatures as low as 53 degrees. Heating/increasing the temperature to 88 degrees can make the virus dormant; However the length of dormancy is yet unknown, as is the conditions which will reactive the virus. We had read that this will eradicate the virus and it shouldn't return. We decided we had nothing to loose so we tested this theory. In our test the virus remained dormant for 1 ½ months before the mortalities reoccurred.

KHV is believed to remain in the infected fish for life, so whether the koi is exposed or in remission it should be considered a potential carrier of the virus. Studies have shown that some survivors were later found to be carriers, describing them as becoming "persistently infected with the Virus" They carry the potential to shed the virus, and infect other koi.

Exposure to infected koi: Once exposed incubation time is 7 to 14 days, after which symptoms may appear. Death usually occurs within 1-14 days after symptoms arise. Some would show external signs...like physical ailments (ulcers, fin and tail rot, irritation to the scales, deformed head, sunken eyes) while others showed no external problems. Our experience showed that not all koi shared the same symptoms.

The first indication of a problem was behavioral. Our Koi became solitaire and isolated themselves from the herd. Some would swim with their heads down. Their actions can be described as Lethargic; pectoral fins were sometimes were tucked in. They were usually seen sitting on the bottom of the tank motionless while yet others would tend to hang out in areas with more aeration. We noticed an increase in activity (swimming into the current) a day or two before death. Others swam lethargically or erratically near the surface as if trying to catch their bearings.

Here is a great example of a koi showing no immediate signs. We recently noticed our 12" Long fin Shusui isolating himself from the others. First glance he showed no physical ailments and appeared to be normal



The next day he was swimming erratically near the surface. Two days later it had died. A closer look showed deformities in his cerebral region. After we did an necropsy we discovered his gills had badly deteriorated



The Koi Herpes Virus is known to attack the epithelial cells, especially targeting the skin and gills. There are some instances where the virus was masked due to secondary bacterial and parasitic infections. In our situation all the scrapings came up negative...no parasitic activity was observed.

In an effort to show the effects KHV has on the unsuspecting koi I've assembled a series of events which occurred at our facility.

We will start with our Kohaku. The scales began to lift and it appeared as if they had been scalded or raised. They took on a white appearance and felt dry or rough to the touch. Slime coat appears to be missing.



Days Later scales are so sensitive they rub off or fall off easily



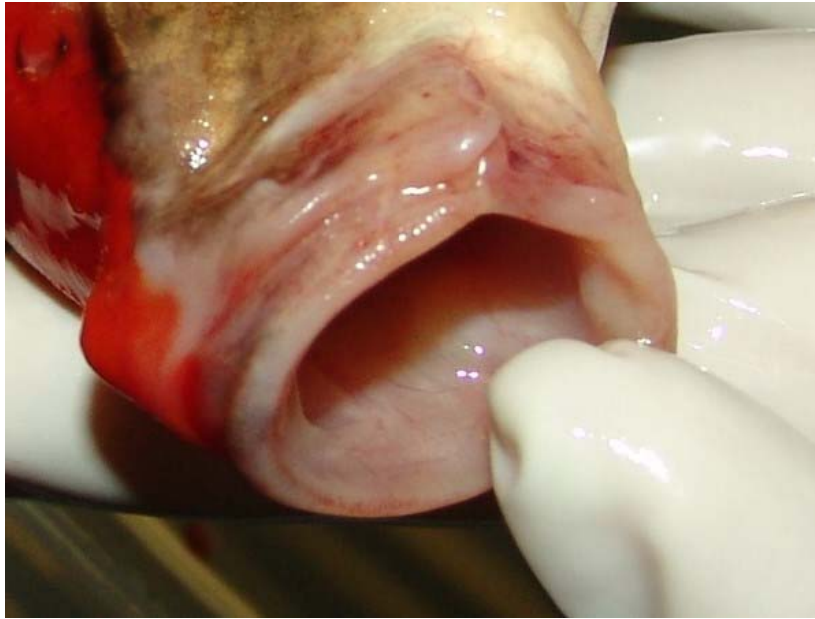
This next koi was placed in the infected tank, and within 1 week showed deterioration of scaled and fins. In 10 days the koi died. Keep in mind he looked fine before we subjected him to the KHV tank.



The fins and tail show redness and deterioration as seen on this Goshiki.
The koi dies within days.



On some, redness appears around the mouth.



Unfortunately this Goshiki experienced excessive mucus shedding, dry/rough feeling skin and dead gill cells

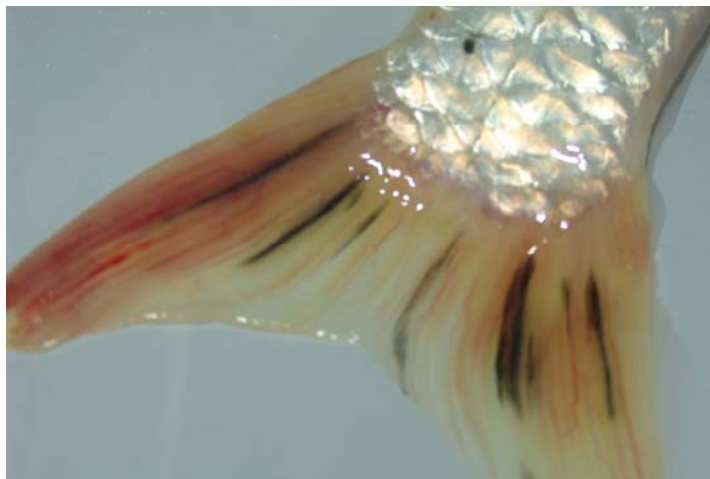


Around February 10th we had placed a koi with healed nose rot back into the general population in the domestic tank. This koi was in the medical tank with the Goshiki at one time. It had started Isolating itself from the herd so we placed it in the show tank with the other sick koi. At that time we had no idea the deaths that had occurred was due to KHV.

Seven days later we observed our 3 year old male Sanke isolating itself from the herd.



A few days later we noticed its tail turning red, and looked infected. Scrapings came up negative again.



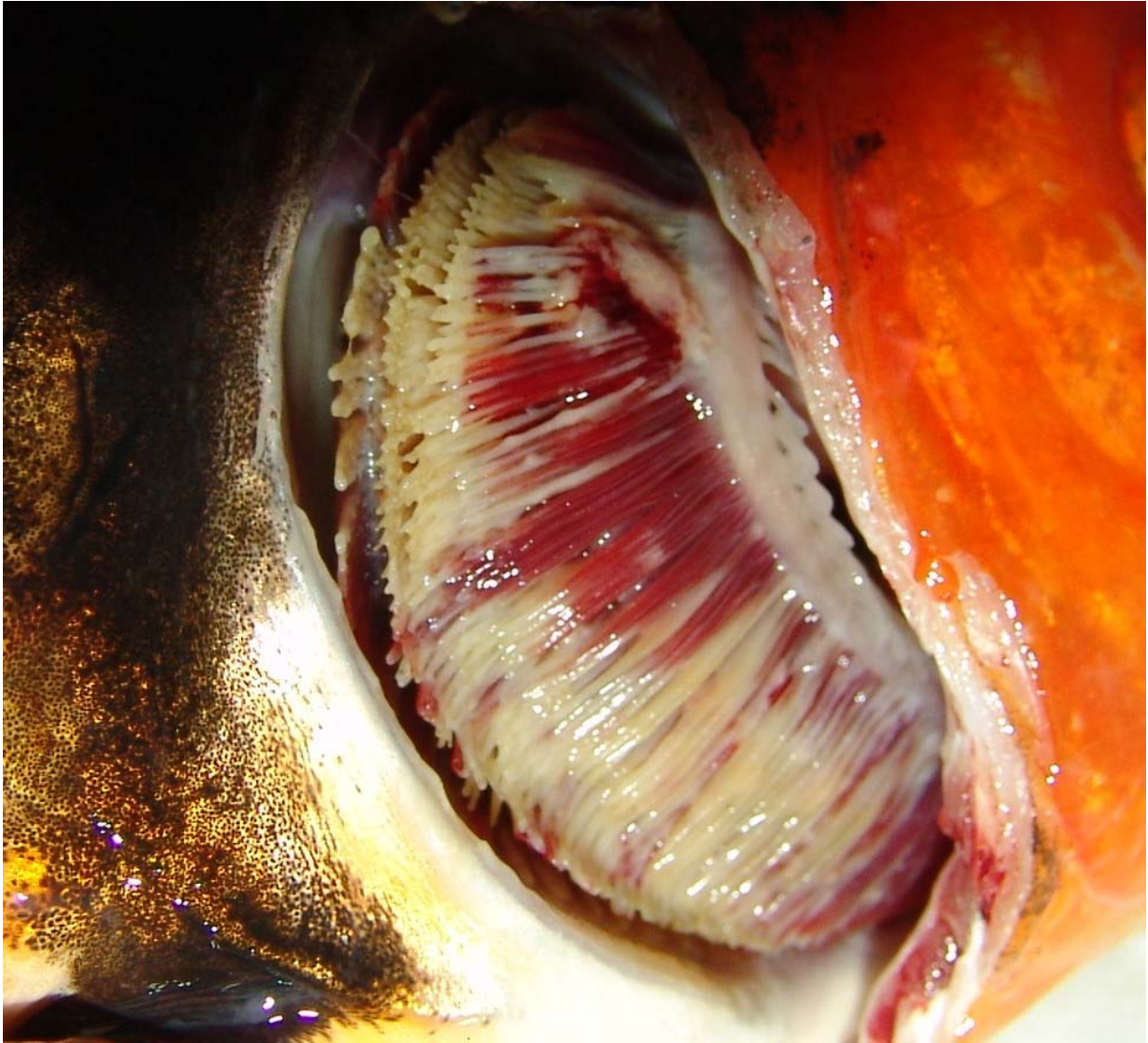
The Virus also attacked the skin of the fish. Notice the blood vessels emerging under the scales giving papa koi a reddish tint to his body. On the 10th day papa koi died. A closer look showed gill lesions.



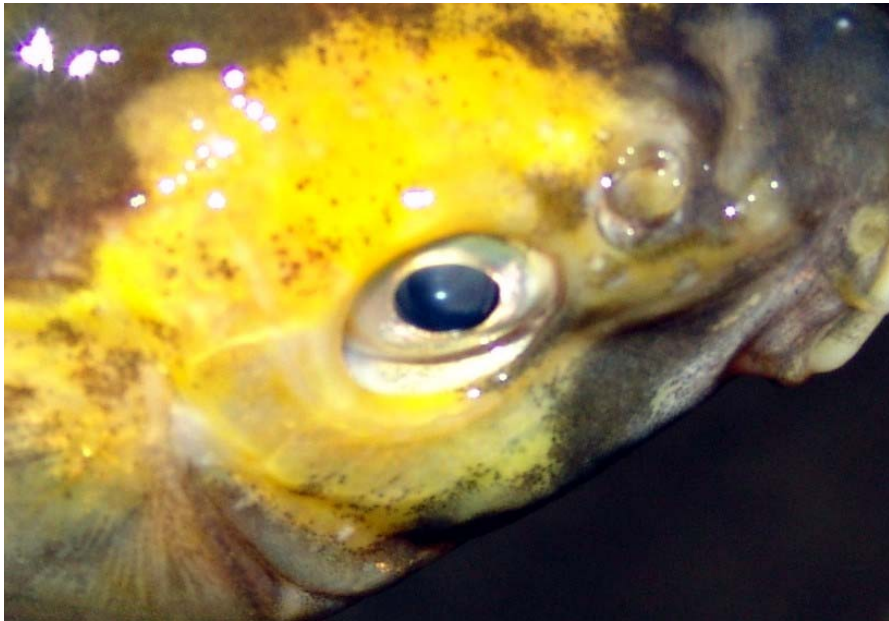
On Scale less Koi ulcers may appear as seen on this Sushi. On other scale less koi the skin appeared as raised veins. These ulcers appeared 4 days after being exposed to the infected koi



After the koi died we examined the gill region. On every case there was damage to varying degrees which would account for the actions exhibited by the koi before it died. Hanging around the aerator or trying to remain in the current from the pumps. Notice the mucus and the deadened areas?



At the time of death not all koi displayed the same external signs. We noticed the eyes on some were sunken in.



Others; the head appeared deformed between mouth and forehead.



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Within 1 week we lost 16 out of 21 koi.

The 5 remaining survivors were placed in a separate holding tank. Dr. Helen Roberts provided outstanding assistance while we went through this process. She took samples from the dead koi with suspected KHV infection. Gills, kidney, and spleen were removed and sent to the University of Georgia. There they would conduct a PCR test to determine if the koi had died from KHV.



One ironic thing to note: there were no signs of parasites. Scrapings on the 3 koi had been conducted and water samples tested all showed negative.

Our thanks go to Dr Helen Roberts for having the knowledge to direct us and guide us through this process.

To date there is no known cure for KHV, nor is there an immunization to prevent it from occurring.

If you're buying koi from multiple suppliers, then you should have separate quarantine systems set up.

If your koi contract KHV you really only have 2 options....

1: Depopulate. Euthanize all remaining koi. Sterilize everything, pond filters, pumps, nets, and buckets with bleach. Repeat the process.....

2: create a KHV pond and wait

This whole adventure has been a burden on Lin and I. We've endured more than I would wish on anyone. For those who think we were fools for keeping the infected koi so long....well we did it for you. Not many know about the virus, and even more have never seen its damaging effects.

Although it's true there is no cure, you can be sure one will emerge. Until then take every precaution with your precious koi and they will bring you years of delight and pleasure.

We have now sterilized our 2 main holding tanks as well as our nets, buckets, pumps filters and floor. Bleach kills the virus.

As near as we can tell our 2 remaining tanks are safe from this deadly virus; however if the test come up positive then the remaining koi will be tested to assure that the tanks are in deed disease free.

Friday February 18, 2006

Helen Roberts took the time while participating in a seminar called to inform me that the Koi came up KHV positive. She instructed me to make a list of questions and would in turn ask Dr. Richie, one of the leaders in KHV research.

Upon hearing the results we examined the last 5 remaining koi. Two of them had lesions on the gills and were euthanized.

February 19, 2006

We noticed papa koi isolating him self from the others in our domestic tank. February 20, his son a 10" Bekko started doing the same. Both started to take on a reddish appearance as their scales were reddening. Tuesday the Bekko died, followed by papa koi on Wednesday the 22nd.

Our hopes of the domestic tanks with all our original koi along with some of our newly purchased imports were going to make it thru became shattered.

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