

Koi News • April, 2003 • v. 9, #4

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Koi News

- Editor Phred Jackson
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<http://www.sfbakc.org>

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Virtual Membership ~ 43
Members w/ eMail ~ 82!

Phreditorial • Phred Jackson

Welcome. Another new format. My reasoning was that it would be easier this way, I could just run one article after another, appearance out the window, quick and dirty. Problem is I'm too anal, I've got to tweak and tweak. And I just don't have the time to do it anymore. It's been almost five years. So, here's what you have to ask yourselves, "Do I want to edit the newsletter or be President?"

What's involved? I'm glad you asked. Most of the info is supplied to you by the board and committee chairs; Minutes, Treasurer's Report, Calendar/directions, committee progress reports. All you have to do is dig up a couple of articles. I don't take them from *KoiUSA* since I believe everyone should have a subscription. It's not difficult; at UC, Professor Licht mentioned Chloramines will be added to the water in San Francisco for the first time this Fall. Bingo! It's time to start feeding your Koi again. Bingo!

As Chair of the Publishing Committee I'll be around for advice plus I will continue to print the color covers so the advertisers will get what they paid for.

☺ There are lots of pics to be

uploaded to the web site.

☺ I get the feeling a lot of Koi keepers don't pay a great deal of attention to water quality, food contents, health and disease prevention. Koi aren't difficult to raise under proper conditions but that requires a little help on your part, like knowing the nitrogen cycle and testing the water quality [pg 7], knowing about chloramine and how to deal with it [pg 4], how to recognize a good food without paying an arm and a leg [pg 8], what information to supply a Koi Health Advisor if there's a problem [My Koi's sick, fix it, key's under the mat, Ciao...]

We're planning some cool events for the near future; you'll want to contact the committee chairs to volunteer. I'll be a docent on the Pond Tour as well as helping where needed at other events. That's where the most fun is; volunteering. It's certainly not hard work and it gives you an opportunity to get to know abber with lots of people with like interests.

☺ Next meeting's in San Francisco, Ken Gray is the speaker and he's forgotten more than most of us know... We'll see you there...

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Rich Little
Bill Love
David Muth
Terri Noel

George Obujen
Tom Remigio
Lucia Rose
Linda Sorensen

board meeting

Saturday March 22, 10:50AM

Board members attending: Phred Jackson, Tom Remigio, Terri Noel and David Muth. Also attending was Lucia Rose and Elaine Jackson.

committee reports:

Koi Sale and Auction:

Committee Chair - Lucia Rose said that the committee has explored a number of sites and the one that looks the best is Champion Koi. The projected date for this event is either the 3rd or the 4th Saturday of September. More meetings are scheduled for this event.

Pond Tour Committee:

Committee Chair - David Muth said that the committee has contacted a number of people in the Contra Costa area about showing their ponds in the pond tour. Six people have said "yes" to participating in the tour to show their ponds. Saturday, March 29th, the committee is going to visit the six ponds.

Other business:

Phred has ordered sample pins and will have them for the next meeting.

Lucia went to the recent Gardena Koi Show with other Club members and noticed that the Gardena club offers club volunteers a monopoly type money for their efforts. That money can then be used to buy things that the club has to sell.

We need a new Editor for our Newsletter. Phred said that with the addition of being the President of the club, and the webmaster, the newsletter is too much work for one person. In addition he has been doing it for 5 years. The by-laws of the club state that the responsibility of the newsletter is supposed to fall in the hands of the Public Relations person.

San Mateo Garden Show
The Santa Clara club had a booth at the San Mateo Garden show and they were pleased with the results. They added a couple of new members. One of the things that the SC club does for new members is they give out a book on how to build a Koi pond. In addition, they give them a list of items in their library.

Inventory List

Tom talked about bringing the inventory list up to date. Tom is adding

the inventory items to the overall club inventory and adding an apparent value to each item. He also mentioned that the microscope needs to be adjusted by a professional, because it doesn't work very well.

Old Business

The club voted to have a bulletin board on the web site to post things there. Phred said that it is already on the web site Control Panel.

The board meeting ended at 12:00 PM

general meeting

March 22, 3:40 PM

Old Business

Lucia sent a letter to Larry Gill about the law suit and Phred read Larry's reply. Larry said that the whole process was unfortunate and this letter signals the end of the suit.

Your letter dated November 22, 2002 received on February 25, 2003 offering me lifetime honorary membership of the club and apologies for the pain caused in the long drawn lawsuit both membership and apology are both of which I gratefully accept. Hope we can all put that behind us and enjoy the Koi hobby. Thanks to all of you for your support.
•Larry Gill"

Committee Reports:

Koi Sale and Auction: See Board Note.

Pond Tour: See Board note. In addition, David mentioned that the committee had talked about a tour in two places, the 880 corridor and the 680/ HWY 4 corridor. The club discussed which area would be the best to

have the tour. Since the 680/Hwy 4 area has never had a pond tour and the club is interested in getting more members in the Contra Costa area, the club decided that it was a good idea to have the tour in the 680/ HWY 4 area.

Pet Expo

We have signed up to have a booth at the Pleasanton Pet Expo September 19, 2003. The cost for the booth is \$100.00. This show will be mostly from the educational side and will probably not involve Koi.

Phred wants to get \$500.00 back from that NCKC. The NCKC, according to Rich Little, is still in operation and believes that he can get the money back. The idea of having a Koi association of clubs is attractive, but not thru this committee.

Rich would like to have on the agenda at the next meeting to talk to the club about a new association of all the clubs in the area which would include SF, SCV, Sac, Redding [Shasta] and Fresno[Central]. [also Mendocino]

Janet Freer asked about the number of show tanks we have in inventory. Her concern is that if we don't have enough to do a show, that we buy some. Phred said we may need 2 or 3 more.

Rich said he would like to see the budget for the next meeting and to add to the agenda next meeting that we create a wish list. It was suggested that we make a wish list in the newsletter.

Meeting ended at 4:30

club tour of the amphibian lab

Tour Personal: Paul Licht, Dean of Science, Director of the UC Berkeley Botanical Garden; Stephen Fruet

The web site is berkeley.edu go to vertebrates go to frogs.


Paul talked for 30 minutes on the water quality at the lab which houses a lot of amphibians.

The schools labs and related departments use over 1,000,000 gallons of water per year and all of it has to have extensive filtering for the fish, frogs, toads, and turtles.

The reason is the chloramines in the water. We

were given a tour of the areas where a lot of the research amphibians live. It was quite an amazing tour. If you missed it, you missed something that is not open to the public. It was great.

David



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Darren Gutierrez
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San Francisco Bay Area Koi Club • Cash Flow Report • March, 2003

Beginning Balance as of 02/28/2003 **\$6,244.87**

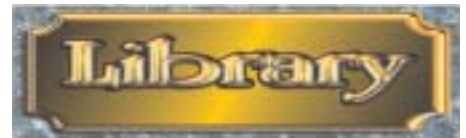
Cash In:

Membership Dues	110.00	
KoiUsa	20.00	
Water Garden	20.00	
Dealer's Ad	0.00	
Miscellaneous	2.25	152.25

Cash Out:

Shurgard Storage:	186.00	
KoiNews Postage	66.00	
Printing Supplies	0.00	
Website Charge: VeeWeb	25.00	
Kill-A-Watt Meter	39.95	
Darlene Henderson: Standby Pump	40.00	
Subscription Payments:		
KoiUsa	440.00	
U C Regents - parking fee	32.00	
PayPal Service Charge	2.25	
Bank Charges - service charge reversed	(35.00)	796.20


Ending Balance as of 03/31/2003 **\$5,600.92**



Kathleen Krudwig, Librarian, 510.351.3380

New! Seminar CDs

- Kokugyo by Mamoru Kodama
- Koi Kichi by Peter Waddington
- Still Waters by Nigel Craddock
- Biological Filtration by Dick Ashbaugh
- Pond Design and Filtration by Ben Plonski
- Water Synthetic Start-Up Procedure for New Ponds & Filters
by Norm Meck
- Design with Nature in Mind, Fabrication of Artificial Stone
by Ron Benville
- Defects Versus Deficiencies in Judging Koi
by Galen Hanson
- Koi Transportation by H. Gene Ewy, MD
- Israeli Koi Vs Japanese Koi
by Bill Ridgeway
- Koi For Profit, A Dealer's Perspective
by Andy Moo
- Koi Health: A fish Veterinarian Perspective
by Jill Spangenberg DMVM, Ph.D.
- Koi Health: A fish Veterinarian Perspective
by Myron J. Kebus MS, DVM
- Nishikigoi Ulcer Diseases: Cause and Prevention
by Laura E. Swaim
- Water Plants By Cathy Green
- Koi Pond Maintenance in Relation to Koi Health
by Ben Plonski
- Garden Ponds-Marvelous Models or Maintenance
Nightmares
by Gary G. Wittstock
- Koi Classification
AKCA with Bob Spindola
- Library Books:
- Koi Health & Disease
by Erik Johnson, DVM
- The Cult of the Koi by Michugo Tamadachi
- Living Jewels
by Ronnie Wat and Seraas de Kock
- Koi by Grant Fujita
- Practical Koi Keeping, Vol. I, II & III



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Chlorine & Our Koi Ponds

*British Koi Keep Society, Chiltern Section, no credit given
<http://www.chilternkoi.nildram.co.uk/>*

The conversion will affect 2.4 million retail and wholesale customers in San Francisco, and parts of Alameda, San Mateo and Santa Clara Counties.

Santa Clara water customers who fall in the impacted service area are located around Great America, Agnew Village, customers on both sides of Lafayette Street north of Montague Expressway, including residential customers at Estancia, The Carlyle, Citation homes, Bella Vista, Nantucket, Mansion Grove, Rivermark and Lake Santa Clara.

For more information on how to prepare for the chloramine conversion, please call our offices at (650) 591-8941 or visit <http://better.sfwater.org>

The experimental use of chlorine began in the 1890's to combat water-borne diseases such as cholera and typhoid. It quickly gained widespread acceptance because of its low cost and high efficiency in killing just about everything hazardous in water.

The problem with chlorine is that it is a known toxin and the implications of drinking this toxin over the long-term (i.e. your lifetime) is highly uncertain. Chlorine disinfection of water works by the formation of Hypochlorous and Hydrochloric acid. It is an extremely reactive substance and may also chemically bond with other substances in water, depending on the conditions to form further toxins. For example, it is known that chlorine reacts with naturally occurring phenols in water (which are naturally produced by plant life in water) to form Chlorophenols which are highly toxic to all aquatic life.

Chlorine also combines with other natural organic substances to form potent, cancer causing compounds known as Trihalomethanes (THMs). Trihalomethanes include such carcinogens as chloroform, bromoform, carbon tetrachloride, bischloroethane and others. The amount of THM's in our drinking water is theoretically regulated by the EPA. Although the maximum amount allowed by law is 100 ppb, (parts per billion) a recent study showed 31 of 112 municipal water systems exceeded this limit.

Many believe that Disinfection By-Products (DBP's) are the single greatest threat in our water supplies, risking both human health and our aquatic environments. DBP's are contaminants, most of them cancer causing, that are left behind by the very chemical (chlorine) that is used to make water drinkable. Trihalomethanes are associated with an increased risk of bladder and rectal cancer, possibly accounting for 5,000 new cases of bladder cancer and 8,000 new cases of rectal cancer every year in the United States. Other disinfection by-products can cause adverse

effects on the liver, nervous and reproductive systems.

Over 2100 contaminants have been detected in U.S. drinking water since 1974 with 190 known or suspected to cause adverse human health effects. In total, 97 carcinogens and suspected carcinogens, 82 mutagens and suspected mutagens, 28 acute and chronic contaminants and 23 tumour promoters have been detected in U.S. drinking water. The remaining 90% of the organic matter present in drinking water has not been identified to date.

Approximately 230 million Americans (that's 90% of the population!) drink chlorinated water which also could contain hundreds of disinfection by-products. A new study on cancer risks in chlorinated water conducted by the Ontario Treatment and Research Foundation and the University of Toronto found:

Long-term consumption of chlorinated water increases the risk of bladder and colon cancer. Between 10% to 13% of all bladder and colon cancer in Ontario may be attributed to disinfection by-products in chlorinated water.

There is a 60% increase in the risk of bladder cancer for people exposed to high levels of disinfection by-products for more than 35 years as compared to people with little or no exposure.

Long-term drinking and bathing in chlorinated water likely causes a 34% increase in the incidence of bladder and colon cancer. The risk increases with the length of exposure and the concentration of disinfection by-products in the water.

THM's are a big pollutant because of the amount of chlorination used. They are a separate class of chemical from chlorine itself. Just because a drinking water system removes chlorine does not mean that it will remove THM's.

In the last 60 years more water authorities world wide have been combining Chlorine with Ammonia when treating water supplies which creates Chloramine. Chloramine, whilst less toxic than chlorine is a very stable substance and therefore provides long term disinfection properties whereas chlorine is quickly dispersed. Chloramine is more difficult to remove from your water supplies than chlorine and is still very damaging to aquatic life.

At low levels, chlorine and chloramine will stress your koi, burn fins and gill tissues and strip mucus. They will also cause irreparable internal organ damage.

Safe levels of chlorine and chlorine derivatives in water for fish life are less than 0.10mg/litre according to the EA in the United Kingdom.

so beware

The message is clear -

Ensure that when you top up your pond you do so via a purifier utilizing activated carbon

Always use a dechlorinator when adding water to your pond, even if you use a purifier.

Test your water for the presence of chloramines - especially during the summer when chlorination levels are increased.

Stop drinking water and drink more beer!



SFBAC Koi Show/Sale & Auction Committee

met Sunday, March 2 at 10 am for a pretty relaxed and efficient run through of the issues and possibilities regarding SFBAC putting on a Koi Show & Sale & Auction this year. Elaine Jackson, Sheila Jackson, Lee & Charmaine Nogue and myself attended this meeting. Janet Freer and Joan Hishida couldn't make it this time but are still on the committee for next time. This committee is aimed at discussing the feasibility of having a Koi Show/Sale & Auction, finding a site, developing some sort of preliminary budget and passing on all of this information to the Club. While I expect most of us want to work on the event(s), we will scout out a Show Chair, etc.

We reported on various efforts to find a site for a September event. While we have a yes and a no, plus one site that would cost the club about \$1500, there are still some suggestions to explore. We hope to bring to the March meeting a more final report. In addition to site scouting we have been discussing the feasibility of doing both events together. It would appear that the preference would be for the events to be separated because of the added stress and work factors. The site would, however, probably play a role as would budget factors. In the area of doing a Koi Show we have talked about approximately 15 tanks, getting AKCA judges, possible Show Chairs, water quality management, and banquet alternatives. Some of us worked hard at the first Cow Palace Flower & Garden Koi Show and this experience is going to be very useful. Plus, the Seminar experience has improved our team work. We will be looking for a Show Chair who has organizational skills rather than a lot of experience with Koi shows. The idea is to put on a small Koi show that will enable us to really learn about managing Koi shows and judging Koi. I spoke with Bob Finnegan in San Diego about our possible plans and he was very encouraging and promised to give us as much help as we might need. He really likes the idea of small club shows.

It is my hope that we will be able to put on a fully supported club Koi Show this year. By this I mean that everyone in the club will participate in some way, we will all learn a lot & have a really good time. I do not intend this to mean that the show would be limited to club members only. Thanks for all of your interest and support, here we go! Lucia

RAMBLIN' ROSE: A Travelogue...

I was very anxious to show folks how great an outdoor Koi Show can be, with those beautiful Koi colors shining and skin gleaming in crystal clear water against blue skies, so off we went to Gardena for the, now I am told, oldest and largest Koi show in the U. S. I love outdoor Koi shows. Janet & Ron Freer, Sheila Jackson, Tom Remigio, and Lee and Charmaine Nogue all signed on to do the trip. Lee & Charmaine decided to drive their own car, and turned back due to car trouble. Well, I gotta tell you we were so sad, but in the end Gardena is a very wonderful, well known Koi show which suffered the worst rains of its history this year. It was raining so hard the judges



List of Speakers & Topics

The more you know about Koi, the more there is to know. This series of seminars is being developed to introduce novices as well as advanced hobbyists to the intricacies of Koi keeping, pond building, and filtration concepts and methods. We're planning a varied series of speakers, panel discussions, demonstrations and workshops. Everything will be centrally located in the hotel conference center.

Dr. Galen Hansen,
AKCA/ZNA Judge Certification
Committee, California:
Koi Judging from Slides

Galen will start off this year's seminar with a 2-hour block using slides to describe how Koi are judged.

AKCA Judging Committee:
Koi Judging Panel Discussion.

This 2-hour follow-up to the slide judging is a question-and-answer session with the AKCA Judging Committee Panel.

AKCA Judging Committee:
Live Koi Judging

View the live video and hear the judges' comments while judging approximately 20 Koi from Nishikigoi of Niigata as if it was an abbreviated Koi show.

Chris Neaves, South African Koi
Keepers Society:
Koi Keeping in South Africa.

As our Keynote Speaker Chris will begin by describing koi-keeping techniques in South Africa.

Chris Neaves, South African Koi
Keepers Society:
Stress in Koi.

Chris is a well-known expert when it comes to Koi health and will summarize the effects of stress on the health of Koi.

Burt Ballou
AKCA Judge, California:
*New Technology and Products for Koi
Keepers*

Burt's expertise in pond construction shines through as he discusses all the new things for the Koi hobbyist.

Bryan Bateman,
AKCA Candidate Judge:
Filtration.

Bryan has written several articles for Koi magazines such as Mid-Atlantic Koi and is considered an expert in filtration.

Maureen Behrens,
Pond Bloomers, Georgia:
Plants

Maureen is a long-time member supporting the Atlanta Koi Club is a well-known expert regarding water plants.

Bob Brudd
AKCA Candidate Judge, Illinois:
Koi Buying Trips to Japan.

Bob has put together an excellent presentation giving helpful advice to anyone planning a trip to Japan.

show-quality Koi.
Steve Childers
AKCA Judge, Texas:
Pond Design Dynamics
Steve will be joined by a panel of guests presenting some ideas on diffuser drains, TPR's, Skimmers, Midlevel drains, etc, and their placement for optimal effects.

Trevor Cole
Pond Wise, Alabama:
Filtration... The Old Fashioned Way.
Trevor Cole brings some traditional British views about filtration as with multi-chambered filter systems.

Spike Cover, AKCA, California:
Koi Health Advisor Program.
Spike will provide an status update on the AKCA KHA Program. Beginning in July, Georgia will be one of the states in this program.

Doug Dahl
AKCA/ZNA Judge, California:
Koi Classification & Judging Criteria
Doug has presented this briefing



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MEI LAN AQUARIUMS

*Billy Jue, Mgr.
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Oakland, Ca. 94605 Fax(510) 638-7284*

Joel Burkard
Pan Intercorp, Washington:
Tategoi.

Joel will give you some detailed tips on how to select a Koi with great potential.

Vicki Burnley, Univ. of Georgia:
Antibiotic Dip.

Vicki will tell you about a new antibiotic dip that treats and heals bacterial infections and ulcers without injections.

Richard Chesler, Florida:
How To Recognize Show Koi.

Richard will help the novice person interested in learning how to identify a

alongside the show tanks at many Koi shows throughout the states.

Doug Dahl
AKCA/ZNA Judge, California:
Beginning Koi Tutorial.

Doug will teach the basics of every aspect of Koi care, water, ponds, etc. in this new 4-hour presentation.

Peggy Ferguson, The Pond Doc's
Water Garden Center, Georgia:
Koi Research Using the Internet.

Peggy will show everyone how to find out just about anything and everything about Koi on the Internet.

Carl Forss
Koi by Keirin, Pennsylvania:
Pond Construction.

Carl will show you some tricks and procedures needed to install a good quality Koi pond.

Bonnie E. Hale
Sunburst Ponds, N. Carolina:
Plants

Bonnie has over 30 years of landscaping experience and is well known for her selection of pond plants and expertise in caring for Koi and their health.

Bob Heideman
Aquatic Eco Systems, Florida:
Aeration.

Bob is the founder of AES and an expert in the area of aeration. Learn how to determine how much air is needed and why.

Tom Holder
Koi Care Kennel, California:
Understanding Pathogenic Bacteria.
Tom developed Lymnozyme as well as other water treatments. Before you know what to use you need to understand the relationship of pathogens and Koi.

Dr. Erik Johnson, DVM, Georgia:
Quarantine

A good quarantine procedure is getting more and more necessary, and Erik will tell you make makes up a good quarantine system and protocol.

Ray Jordan, San Antonio, Texas:
Showing Koi at the All Japan Koi Show.
Ray will tell you about attending the All Japan Show and what's involved in showing Koi in this prestigious show.

Bill Mason
Georgia Ponds, Georgia:
Plumb It This Way for Pumps UV's and Skimmers
Bill will share quite a few plumbing tricks that he's learned through his years of experience fixing ponds.

Joe Pawlak
Blackwater Creek Fish Farm, FL
Brett Rowley
Brett's Fish Farm, TX
Fish Farming

Joe and Brett team up to present a very entertaining and informative view of fish farming.

Dr. Sandy Yosha, DVM
Univ. of Florida:
KHV, Viruses, Quarantine and Antibiotic Use in Koi.

Sandy is well known among all the KHA's and will share her knowledge focusing on Koi Herpes Virus and what can be done.

KHA Lab, san jose

The KHA lab was a two day blast. The class was put on by three outstanding veterinarians Dr. Sandra Yosha, DVM, Dr. Tim Miller-Morgan, DVM and Dr. Rob Hildreth, DVM. We met some old friends and some new interesting ones. We got a chance to see still, moving and live parasites at the lab. It was a very interesting one on one Koi health class. One of the first things I learned was that you should be very careful with Supaverm. One of our class mates brought in a fish that was losing its slime coat after a Supaverm treatment. It cannot be said that Supaverm caused it but the lost of slime coat started after the treatment. Be careful. The second thing I learned was NEVER NEVER buy fish from ---mart. But then again we should give a big thanks to them, it was their fish that we found the Flukes, Costia and Trichodina. SFBACK's six KHA's are well on there way to completing the KHA course. It is very good to have contacts and advice from other class mates to share with your club members.

koi of the year

SFBACK have a lot of beautiful Koi within our membership that are calling for some club attention. That beautiful Koi would love to have its picture submitted for Koi of the Year at the AKCA Seminar and all you have to do is submit a picture and negative at our next meeting [no digital accepted-Ed.], and that could be your fish on the cover of KOIUSA.

koi person of the year

We will also be voting for Koi person of the year at our next meeting.

Ramblin' con't

couldnt really see the Koi in their tubs. We werenit able to see a single Koi until Sunday. I was watching Koi videos in the community center just too get a little fix. We gave up on the show & went to visit three g dealers down there which was a great thing to do, but it was really, really wet everywhere. Lee & Charmaine would not have been happy. Tom & I were wearing sandals & had to go to K Mart to buy some rubber shoes. He is still wearing his. Once again, due to wonderful dispositions & flexibility of our folks, because we had a great time

So then, two weeks later onto to San Jose to stay for the weekend for the Koi Health Advisory Program's lab session. This was fantastic and we met some great vets who I am hoping we can bring to speak to the club. I finally began to use a microscope. I am only 63, but have always used my poor eye sight to avoid biology labs. There was so much packed into those two days. Terri

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Noel, Sheila Jackson, Tom R., Rich Little & I were there from the SFBACK, there were old and new friends from the Santa Clara club, Sacramento, Shasta, Fresno and beyond. This may be AKCA's most innovative and rich program, and I feel very privileged to be participating. I think Spike Cover who originated and is running this program deserves a huge accolade from the Koi community.

Plans for the SFBACK Koi Show 2003 are moving forward. Janet Freer contacted Regan's Nursery in Fremont and they would be very happy to have us there, plus some of their staff has experience with Koi Shows at the old Western Nursery. Plus, Tom Lai of Champion Nishikigoi in San Jose is open to our having the show there. Time to choose. The really good news is that Tom Remigio has agreed to chair the Show, with the committee acting supportive with him. He is going to keep us organized and on track. Thank you Tom.

Be sure to come to hear Ken Grey speak at April's meeting. He is a very knowledgeable and respected member of the Koi community, and he is a really nice person. Pay attention to what he says. He really does know a lot. I will miss the meeting this month, and I hate missing Ken. Lucia

(Bio-Augmentation)

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Throughout the years that I have been involved in the aquaculture industry, one of the problems I have seen with the greatest impact on the health and well being of fish, whether koi, ornamentals or food fish, has been the problem of maintaining good water quality of the pond, tank or reservoir where the fish are kept. We know that there are three major components or contributors to good healthy koi: environment, feed and low exposure to infecting organisms that can produce disease. It is very important to maintain a balance of these three components if we want to enjoy our fish for a long time. When speaking about environment I refer to all the physical and chemical conditions of the pond. Feed is the specific nutritional requirements of fish and low exposure to disease is the prevention of foreign organisms that at one point can infect and damage or kill precious and expensive fish. If one is to maintain only two of these components in good operation but one is deficient, for example food quality and quantity is appropriate and the exposure to dangerous organisms is very low, the fish will possibly be stressed and barely surviving. In contrast, if we don't have control over two of these components we will experience heavy losses and difficulties. In this article I will deal with the problem of water quality and specifically with the use of bacterial products that can help us maintain better water quality in an inexpensive and almost effortless manner.

We all know that when we maintain fish in closed re-circulation systems, with very little water exchange, water deterioration will occur with time. This occurs more so with constant addition of nutrients through feed, run off, leaves and other materials that can fall in the pond. All these contribute to the decomposition of organic mater and as it dissolves in the

water or is consumed by the fish, it is subsequently metabolized. This process results in settleable and un-settleable solids, nitrogen compounds and phosphorous compounds that create an accumulation of organic material and toxic chemicals. In addition to the fish, algae, bacteria and other microorganisms begin to grow and multiply rapidly using this material as food. The organic material accumulates and the chemicals such as ammonia and nitrites soon surpass toxic levels, especially as the density increases due to growth or addition of more fish to the pond. High concentration of these nutrients will favor the development of massive blooms of algae that not only affect the transparency of the water in a negative way but also can reach such numbers that will contribute to massive "die-offs" depleting all the oxygen available and causing high mortalities. This high concentration of nutrients can also contribute to the development of filamentous algae that will soon cover rocks sidewalls and can even get into the pipes, pumps and filtering systems rendering them useless or less efficient.

The use of beneficial bacteria populations that can decompose organic sludge as well as bacteria that can convert ammonia and nitrites into nitrates, reduce BOD (biochemical oxygen demand), bind excess phosphates, prevents algal blooms and maintains a microbiological equilibrium in the pond. This process has been studied for many years in the water treatment industry and recently has been introduced in aquaculture with very encouraging results. For the koi enthusiast it is important to make sure that all of these functions are performed in the pond and unfortunately the commercial manufactures of these products have failed to make a complete source of all the bacteria needed for good water quality maintenance.

When looking for a product that can accomplish all of the above make sure it contains the following list of bacterial types:

• **Aerobacter aerogenes:**

Under aerobic conditions, these bacteria oxidize the carbohydrates and short organic acid chains to carbon dioxide and water. When oxygen is limited, *Aerobacter aerogenes* ferment the carbohydrates in order to produce short-chained organic compounds,

carbon dioxide and water. The short chained organic compounds serve as fountains of carbon and energy for other bacteria such as *Pseudomonas* sp.

• **Bacillus subtilis:**

These bacteria oxidize carbohydrates, organic acids and other compounds such as fats, oils, proteins and starches. *B. subtilis* is particularly active and beneficial in sediments because it can excrete enzymes into the sediment that function to degrade the organic fraction. They are active denitrifying bacteria, which means they take nitrate and convert it to nitrogen gas.

• **Cellulomonas biazotea:**

Convert cellulose to soluble carbohydrates, which serve for growth of *C. biazotea* and other bacteria.

• **Nitrosomonas:**

Oxidize the ammonium nitrogen to nitrite in the presence of dissolved oxygen and their activity is restricted by the presence of soluble organic compounds in quantities greater than 20 mg/l. These bacteria are very effective at binding orthophosphates and helping prevent excess algae blooms.

• **Nitrobacter:**

Oxidize nitrite to nitrate nitrogen. These also require aerobic conditions and their activity is inhibited by the presence of ammonium. They are very effectively binding orthophosphate and helping prevent excess algae blooms.

• **Pseudomonas denitrificans and Pseudomonas stutzeri:**

Reduce the levels of nitrate nitrogen under anaerobic conditions. Their principal function is to oxidize the soluble organic compounds.

• **Rhodospseudomonas palustris:**

Use the energy of light in order to oxidize organic compounds photobiochemically. Under anaerobic conditions, they perform denitrification.

Until now solutions to the problem of excess algae build up and water quality deterioration have been elusive and limited to expensive manual cleaning and dredging or use of dangerous or toxic chemicals. Finally an environmentally friendly solution is available. Live bacteria cultures of the right type can provide a convenient, cost effective treatment for even the toughest water restoration projects.



FoodGloriousFood

by Gerry Preston
www.koimag.com

Well, that's how the song goes, but is it all so glorious? Strange as it may seem, the reasons why Koi Keepers feed their fish in the first place varies greatly; what the fish might need or want usually being pretty low on the list of priorities. Much more likely, will a particular brand or ingredient make those 'lackluster reds' deep and shine like a newly painted pillar box; or will those 'sure fire' minuscule Tategoi become champion biggies in just a few short months? So why do we choose one particular brand over another? Believe it or not, advertising influences all of us. As such, advertising generally falls into two clear divisions - the informative and the persuasive. Fish food producers, particularly on the ornamental side, spend a great deal of money on fancy packaging and persuasive advertising. Highly paid copywriters are employed to dream up alluring blurb such as 'protein rich', 'highly nutritious', or 'easily digestible' and, in some cases, this may be so. However, first and foremost it is about enticing us to part with our money by telling us all the things we want to hear. Sadly, useful information is often lacking on the pretext that the buying public would not understand it even if given. My inclination is to interpret this as, were we more learned or given comprehensive information, we might not be enticed into buying something just for the picture on the packet! Just how useful, therefore, is the information given on a packet of fish food? Perhaps before we can attempt to answer that we also need to address the understanding issue. Leaving aside the often effusive content of the marketing ploy, what is on the packet is usually the best we can expect to see. Many have a closed formula, thus are very minimal in what they tell us. Others, perhaps in the hope that we will think more is better, claim the inclusion of almost every ingredient known in their food. Some will simply give percentages of all, or just a few, of the major nutrients and that is all we have to go on.

Price, not surprisingly, is the other major factor in the equation. Market research, itself very costly, largely determines the 'sell price' - this is the point just below which there might be product resistance. Conversely, make a food too cheap and everyone thinks it cannot be any good and, therefore, will resist buying it for that reason! For sure, no manufacturer is going to put in a more expensive ingredient than he has to, even though this is highly unlikely to take the price beyond the expected profit level. Of one thing we can be reasonably certain, the product price has little to do with ingredient price. Of course, some will argue that, quite rightly, Koi Keepers expect attractive packaging. Then there is production, handling and transport cost, particularly with goods of foreign origin. There is also an unknown, to us, number of middle merchants before the product finally ends up

with a very substantial mark-up in the retail outlet. In spite of all this, every year sees new contenders rushing to enter what, to most of us, already appears to be an over crowded market - each making new claims that their food alone contains the magic ingredients and additives that make it superior to all else, yet offering no independent proof of this whatsoever.

Thus returning to our labeling: as already stated, this is often limited to percentage of protein, oil, fiber, moisture and ash. There may also be some vitamin advice stated in weight or international units. The other major nutrient is carbohydrate. Since this is often the largest component in the formulation, I find its omission suspect. However, providing one is aware it will be present, we can usually deduce the percentage by subtraction. Although it is beyond the scope of this article to detail the biochemical make up of the numerous ingredients most likely used in fish feeds, perhaps a precis combined with defining the percentages will suffice. Those specified by the manufacturer will vary from brand to brand as will the number of individual percentages given, some being confined to just protein and oil. Since these all seem to be infinitely variable between brands, and often within the same brand, we already have a contradiction which begs the question which one is best?

protein

A major player and vitally important to the well being and growth of all living organisms. However, protein is just a collective word to describe the sum of its structural components, which are the amino acids. There are 10 essential amino acids needed and the same number that, when necessary, the fish can manufacture, and are thus termed nonessential. Of great importance is the amino acid profile, meaning the fish need the 10 essential amino acids in differing proportions. Just as important, the ratio required vary to a greater or lesser extent from fish to fish, or indeed from animal to animal. Thus the required amino acid profile of an outright fish eater such as pike would be quite different from a herbivorous fish such as roach. Carp are classed as 'omnivorous' suggesting they eat a wide range of food stuffs to include some of vegetable and some of animal origins.

After digestion by the fish, consumed protein is reduced once again to amino acids that can either be used to build muscle or, wastefully, further broken down for energy. It is only when the balance of amino acids in the diet is optimal that there is the necessary anabolism to produce efficient protein synthesis and, therefore, growth; yet even then there still 7- 10% indigestible protein. Fortunately, the amino acid requirement for carp is reasonably well defined, and has little tolerance outside that definition. In other words, if any one of the essential-amino acids is only available at under the proportional requirement to its neighbors, then use-f the others will be to that first limiting amino acid, and the excess discharged to waste. This unnecessary breakdown produces catabolism and possible fat deposition. Most of all it produces a high

ammonia load and is, inevitably, bad for water quality. It will also compromise growth-rate and, if continued long enough, could have a detrimental effect on health status. Methionine is usually the first limiting amino acid in many natural proteins and this plus cystine, which can reduce the methionine demand is often supplemented to a quality food. If the packet would generally boldly state this. We can now already see that a protein declaration is not telling us the entire story, and certainly gives no indication whatsoever of its suitability for our fish; neither is the protein percentage figure itself much help. The classification of proteins is largely of animal or vegetable origins. The amino acids contained in many fish meal proteins match well to the profile requirement of carp. As such their inclusion is generally a prerequisite to formulating a nutritious diet. The problem to the manufacturer is that they are expensive, particularly the very high quality white A meals derived from Alaskan Pollack or similar fish often used in Koi foods. The use of the much valued oily herring meal tends to be more in diets for Peruvian anchovy, is regarded as second best but a proportion can be included without too many problems. In the early days of fish farming it was common for the inclusion of bovine proteins in feeds. This practice reduced over the years and since the advent of B.S.E. is now very much frowned upon when included in rations for fish destined for human consumption!

Vegetable proteins are mostly poorly digested and many have a miss-match to amino acid requirements - a low chemical score when measured against the ideal. However, some do have an excellent biological value in their own right and mixing with fish meal proteins brings down the cost of the total protein expenditure. Soya bean is probably the most widely used for dilution but is lacking in several essential amino acids, thus its inclusion above a certain level, although attractive commercially, is undesirable. It also contains natural feeding deterrents. Heating largely overcomes this problem with the addition of chemo-palantants, thereby persuading the fish to eat what its instincts would, almost certainly, make it refuse. The addition of attractors to stimulate a fish's appetite is nothing new. Izzack Walton added honey to his baits to catch carp three hundred years ago. Carp have very well developed gustatory (taste) and olfactory (smell) senses. Present day carp anglers have a seemingly unlimited array of flavors, extracts and oils from which to choose. Many claim even the amino acids themselves to be attractors. Betaine HCl is probably the most used stimulator in baits and commercial feeds. However, should they do so, it is highly unlikely that many ornamental fish food producers would admit to using chemical palatability enhancers to make their product more acceptable.

With the ever shrinking bounty from the seas, seeking alternatives to fish proteins is essential, of that there is little doubt. The inclusion of dairy shows much promise. Perhaps the genus *Scenedesmus*, having a crude protein value of 55%, more than most and *Spirulina* could have considerably more value as a protein source than its over-

hyped powers of color improvement. However, trials tend to confirm a reduction in growth as the percentages of these alternatives increase with a corresponding decrease in the fishmeal. Increasing the percentages further leads to heavy losses. A notable exception, however, is krill, (*Euphausia superba*); these tiny shrimp like creatures abound in massive quantities in the Antarctic and are expected to make a considerable contribution to future livestock feed-stuffs. They have long been readily available to the aquarist. Coincidentally, of course, the much heralded inclusion of chitin in some Japanese Koi foods sits nicely with the Japanese peoples fondness for consuming enormous quantities of crustaceans and shell fish!

Wheat germ meal is another protein source well exploited by the ornamental fish food industry. Whether it is even remotely possible to justify all the hype, is impossible to say. Never have I seen independent, or otherwise, trial results published appertaining to growth, health or anything else. For years Koi scribes have played safe and just repeated everybody else - and eventually themselves - over and over again. throughout the summer and winter. Personally, if Koi cannot properly utilize food due to temperatures being too low I can see little point in feeding them at all. On the other hand, if you are going to feed, it makes much more sense to use a good quality high protein food all year round, but especially in the traditional slowing down and warming up period. At these lower temperatures Koi are going to eat greatly reduced quantities anyway. Therefore, even with a high percentage protein feed, their actual intake of protein is very modest.

One only has to examine briefly the sequential events in a natural body of water to realize the validity of this. In high summer there is a profusion of plant growth as well as a multitude of insects and organisms that we can loosely term animal. Nature thus satisfies herbivores, omnivores and even carnivores. Carp undoubtedly consume large quantities of easily available plant life at summer temperatures. Duck weed is a particular favorite and Koi will make short work of any efforts to try to establish water lilies etc, in an existing pond. Contrast this with the depths of winter when virtually all of the higher forms of animal life, so relished by carp in summer, are still available to them in winter should they wish to feed; yet all of the plant life has completely died away - hasn't it?

Koi literature is constantly stating the value of wheat germ revolves around being easily digestible and is, therefore, the ideal low temperature food. Even assuming that is true, the actual percentage of wheat germ in the food is very small indeed. Thus begs the question, how digestible is the rest of the food? Not very much is the easy answer, and probably a good job too since the major proportion will be carbohydrates. The universal use of carbohydrate is as a binder, to bulk out a feed, and as a cheap energy source. As carp's energy requirements in cold water are very minimal, if these feeds really were highly digestible, much of it would be retained as saturated (solid) fats within the body cavities and internal organs of

the fish. In practice most of it simply passes through with little absorption into the blood stream. It probably does no more harm than it does any good! What it does do is to keep the cash registers ringing and the hobbyist content in the belief that they are providing quality food.

quality and quantity

Thus returning to the protein in dry diets, it becomes clear that separating quantity and quality is not so easy. A particular pellet having a high claimed protein percentage may well have a large amount of plant proteins in its inclusion. We have no control over this and little hope of identifying the good from the not so good, even when given a long list of ingredients. However, quantity is something tangible and it is very noticeable within the same brand that the higher the protein percentage the higher the cost. So is it okay, or more economical, to feed the cheaper lower protein food? Think of it like this: Kol have a daily quantity protein requirement governed largely by temperature and their size. Should that requirement not be met they certainly will not grow and could have trouble repairing damaged tissue, laying down eggs, etc. In fact most of the functions needed to maintain a fish in good health. Now to keep the maths simple, supposing two Koi Keepers were to each feed 100gm of pellets a day, but M10% protein and the other very with a 30% protein. We can see instantly that the former gives as a daily protein intake of 40gm and the latter only 30gm of the same. Also, supposing the 40gm was the correct daily intake, then in order for the lower protein pellets to meet that requirement, the actual quantity of pellets would have to increase from 100gm to nearly 135gm. Although this is probably better than not meeting the 40gm protein requirement, it could well make the cost of feeding a cheaper food more expensive. Also satiation may be exceeded long before consumption of the required protein quantity. In addition there is the possibility that the resulting excess of other nutrients could have a detrimental effect on the health of the fish. For certain it will have a detrimental effect on water quality, particularly with increased suspended solids. Unfortunately, many Koi Keepers feed a quantity of food totally unrelated to protein content! This is exacerbated by feeding Koi with bread, barley, corn, etc., in the belief, quite reasonably, that the fish enjoy a change. Such foods, although well accepted, are very low in proteins and being of vegetable origin have a poor biological value. Therefore, it is only if t Hess supplements are used as well as a high quality protein pellet food, is there a wide enough margin to compensate and maintain adequate daily protein levels. Although the overall cost of a high percentage protein food Will increase, it should not do so proportionally as the percentage of other ingredients, obviously, would have reduced. However, it is certainly gratifying to me after campaigning for so long that Koi foods are generally too low in protein, that many producers now offer a range of foods with increased protein content - usually described as high growth food.

growth

I suspect that the long held view that carp do not need high protein arose from carp farming traditionally being extensive - the fish getting most their nutrition from natural food in the pond. Daphnia (water fleas) have a protein content of between 48% to 50%, Gammarus (shrimp) 45% to 52% and Chinronomidae (bloodworms) as high as 55%. Thus it was perfectly reasonable to supplement with bulky low cost food-stuffs, causing only modest dilution of the readily available protein rich feeding. A bio-filtered Koi pond has very little in common with these conditions and is indeed, in every sense, very intensive. Consequently, with natural feeding being virtually non-existent Koi, ideally, need foods of an exceptionally high biological value.

Additionally, I am afraid we cannot separate growth from temperature. As my own trials have shown (NI Winter 96/97), it is possible to achieve phenomenal growth using very high protein foods combined with consistently high water temperatures. Unheated Koi ponds are very different. Unless the water is sufficiently warm the fish simply cannot consume enough food to grow at their full potential. All the more reason to feed to a maximum during the normal growing season providing, of course, the filter is able to cope with this, and to feed what makes them grow, protein. There have been many studies to find optimum nutrient levels, but with most arrived at by considering the economics. If an additional 5% protein costs, say, 10% more for only a 2% increase in growth-rate, some might not consider that economical. Koi Keepers rarely worry about such restraints and most will happily pay more for only a modest return. However, many authorities seem to concur with around 38% protein as a minimum. I would add, especially if also regularly giving any legume or pulse feeds, 40% plus would be even better and just hope you have bought good quality protein in your chosen brand of food. Certainly if growing on small fish separately, then nearer to 50% protein would show a marked benefit in size and shape of the fish. Last but by no means least, it is quite feasible to reduce the feeding quantity by giving a high protein diet. The benefits, are soon obvious. It encourages fish to clear-up everything on offer but f, u still meeting their essential needs. Also realize that most recalculating systems are far better able to cope with increasing ammonia loads than they are of solids, which tend to inhibit nitrification. Thus by simply upping protein levels makes for a cleaner pond and healthier fish.

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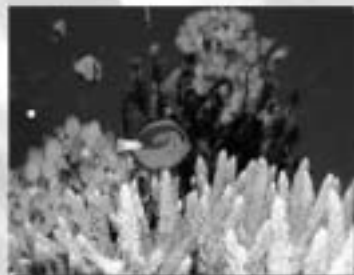
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