

# PRESIDENT CORNER

March! March? March, where did February go? Time sure has a way of flying by. The Valley of the Sun Show was excellent. Another success for our friends up north. Way to go Robbie and Brian, all your hard work paid off. Thanks for a wonderful time.

Tom Ayers & Bob Panter gave a presentation on Koi and Ponds at the monthly meeting of the Audubon Society. Thanks to Tom Moss the program director for inviting them. Tom is also a member of our club. Thanks again.

This month's meeting is at the house of Mr. & Mrs. Essex. We would like to thank them for having all of us to share in the joy of their pond and koi.

Water is getting warmer so check on your fish frequently. Be sure to test your water. This will help keep your fish healthy. You will also notice your koi like to eat more. So feed them. Surely you wouldn't like to go hungry!

Do not forget about the Home Show in April. SAKA will again have a few tanks set up. Please help if you can. Then in May is our pond Tour. What a wonderful time. Never a dull moment. Until next month.

For the love of Koi.

**Bob Panter**

Bob Panter, SAKA President

## ARE YOU GOING TO



### 22nd AKCA Seminar 2003

The Atlanta Koi Club is hosting the 22nd Annual Associated Koi Clubs of America (AKCA) Seminar. For over 20 years, AKCA has been sponsoring seminars in exotic locales to educate Koi keepers from around the world in beautiful settings like Atlanta, home of the 1996 Olympics.



### Hotel:

The Hilton Atlanta Airport & Towers will be our home for four days, June 26th-29th, 2003. The Hilton is a beautiful 4-diamond hotel conveniently located 1 mile from the Hartsfield Atlanta International Airport. We have negotiated a special room rate of only \$89 a night. Call for reservations at 1-800-Hiltons prior to June 1st.

### List of Speakers and 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

### 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.

### 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

### 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.

### 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

### 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

### 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

### 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.

### Carl Forss

#### Koi by Keirin, Pennsylvania:

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

### 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

### 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.

### Doug Dahl

#### AKCA/ZNA Judge, California:

Koi Classification & Judging Criteria. Doug has presented this briefing alongside the show tanks at many Koi shows throughout the states

### Dr. Erik Johnson,

#### DVM, Georgia:

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

### 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

**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

**Joe Pawlak**

**Blackwater Creek Fish Farm, FL**

**Brett Rowley**

**Brett's Fish Farm, Texas:**

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

**Joel Burkard**

**Pan Intercorp, Washington:**

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

**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

**Peggy Ferguson**

**The Pond Doc's Water Garden Center, GA:**

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

**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.

**Richard Chesler**

**Florida:**

How To Recognize Show Koi. Richard will help the novice person interested in learning how to identify a show-quality Koi.

**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

**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

**Tom Holder**

**Koi Care Kennel, California:**

Understanding Pathogenic Bacteria. Tom developed Lymnozime as well as other water treatments. Before you know what to use you need to understand the relationship of pathogens and Koi.

**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

**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

**Seminars:**

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**Vendor Faire:**

We have prepared a floor plan layout for 50 vendors 8'x10' spaces all conveniently co-located with the seminars, lunches and dinners in the hotel conference center. The Vendor Faire is free admission open to the Public

**Sightseeing Tour:**

**Carter Center Library and Museum:**

The Library consists of archives and a museum and is approximately 70,000 square feet in size. It is not a library in the usual sense but is a research facility and a museum. The archives is a repository of approximately 27 million pages of Jimmy Carter's White House material and papers of administration associates including documents, memoranda, correspondence, etc. There are also 1 million photographs and hundreds of hours each of audio and visual tape. A recent addition is President Carter's Nobel Peace Prize that will be on display.

**CNN Center:** Tour the studios at The CNN center and see how CNN brings the world the news. To see an interactive view of the tour we will be taking, visit their web site at

<http://www.cnn.com/StudioTour>

**Atlanta Cyclorama and Civil War Museum:**

One of Atlanta's historic landmarks, the Cyclorama houses the world's largest painting "The Battle of Atlanta." The painting vividly depicts a charge led by General "Blackjack" Logan as well as other events occurring during that Civil War battle including the intense battle in the vicinity of the Troup-Hurt House. Although the painting accurately depicts the fighting, it definitely takes a Union perspective. General Sherman can be seen near the Augustus Hurt house while General Hood is not in the painting. For more information on the Cyclorama see: [Frommer's Atlanta: Cyclorama.](#)

**Wet Lab:**

The newest addition to the normal seminar events on Thursday will be a full wet lab conducted by Dr. Erik Johnson. Our plans are for every attendee to have a microscope and the University of Georgia will provide plenty of fish to use

**Cost: \$60.00**

**Package I: Includes Entry to All Seminars, Friday Lunch, Saturday Lunch, Saturday Banquet, and Sunday Pond Tour (Box Lunch)**

Single \$250.00

Couple \$375.00

**Package II: Entry to All Seminars only**

Single \$175.00

Couple \$255.00

**Money Saving Special**

Early Bird Registration (before April 1 2003)

Save \$30 for Single, or \$50 for couple First Time Special (never attended an AKCA Seminar)

Save \$50 for Single, or \$75 for couple

**Additional Activities:**

**Thursday, June 26:**

**Sightseeing Tour** \$60.00 per person

**Carter Center Library and Museum:**

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General Sherman can be seen near the Augustus Hurt house while General Hood is not in the painting. For more information on the Cyclorama see:

[Frommer's Atlanta: Cyclorama](#)

[Shopping Tour](#) \$10.00 per person

**Lenox Square Mall**

A bus will leave the hotel at 10 AM for an excursion to Lenox Square Mall. At Lenox Square are Macy's, Neiman Marcus, and Rich's as well as 230 specialty stores, kiosks, eateries and sit-down restaurants.

This center boasts the most unique specialty retailers in the area with BCBG, Bally of Switzerland, bebe, Bernini, Brooks Brothers, Cartier, Hermes, Nicole Miller, Max Mara, St. John's Knits and Versace Jeans Couture. Included in the mall complex are fine restaurants such as the new Clubhouse, Brassiere le Coze and Prime. A 6-screen movie theatre, luxury hotel and a high-rise office building round out the property

[Wet Lab](#) \$60.00 per person

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University of Georgia will provide plenty of fish to use

**Friday, June 27:**

Cocktail Party Free for Package I

Friday Lunch \$30.00 per person

**Saturday, June 28:**

Saturday Lunch \$30.00 per person

Saturday Banquet \$50.00 per person

**Sunday, June 29:**

Pond Tour & Box Lunch \$45.00 per

Person

**New Club  
Web site!!!**

Come visit it and make your comments. It is your site and I need your help. Go to

<http://www.SAKioA.org>

Have Fun Surfing it.

*The Following 2 articles are from the AKCA Web site, Koi Library.*

**Relevant Koi Diseases:**

Dr Eric Johnson DVM

reprinted from [1994 AKCA Seminar Binder](#)

**ICH: Ichthyophthirius multifiliis.**

Freshwater Ich causes small white spots all over the fishes body. In some cases, Ich spots may not be grossly visible, but you may see them under the scope. This has to do with a fishes' immune response or lack thereof. The disease is a ciliated

protozoon, and it kills smaller fish, while sparing the larger ones. Damage to the gills is the primary way it kills. Its life cycle is roughly 2-5 days, but can be longer (5+ weeks) if the water is cool, much shorter if the water is warmer. To treat, elevate water temps and add salt.

Using salt may harm plants, so if you are looking for an alternative, I would use Formalin 37% and Malachite Green, applying 1cc Formalin 37% per 10 gallons water every 3rd day after a 30% waterchange. The Malachite green is not that important in this, but would be used to give the Formalin an emerald color. Overdosing is unlikely with the Malachite fraction, used this way. Three or four treatments covering 10-14 days would be necessary. I always urge people to use salt first. Simply remove the plants and treat them outside the tank with Formalin 2cc per 10gal for 6 hrs before re-adding them to the system, to remove any latent Ich.

**CHILODINELLA:**

Chilodinella is one of the hottest fish killers there is. Under the scope you may see a beanshaped organism, or a large round organism full of tiny bubbles. Alive, the Chilodinella resembles a heart shaped onion with a flizy end where you could imagine the onions roots would be. These are actually cilia. Dead, Chilodinella are motionless round balls full of tiny bubbles. They may resemble Ich but they do not have crescent nucleus nor do they move in their dead, rounded state. Chilodinella clears EASILY with salt. Leave the salt in for 14 days, and be sure to supplement aeration, as gill damage from Chilodinella may be severe in the survivors

Chilodinella should be suspected anytime large numbers of fish are dying on the surface or who roll over on their sides except when disturbed, the Koi dash madly.

**COSTIA/ICHTHYOBODO:**

Costia or Ichthyobodo necatrix, is a ciliated protozoon parasite of freshwater fish that also has the capability to kill fish in great numbers and in no short time-span. The only good fortune in this is that it perishes readily when salted. Costia may be attached, or freeswimming. Attached Costia look like little commas stuck into the skin (or gill) by the thin end.

Freeswimming Costia are graceless wobbly swimmers that look like commas or almost like half open Conch shells. Costia clears easily with salt, and this infection should be suspected when alot of fish are dying, fins may be reddened, and it appears that the fish cannot breathe very well. Spiderweb lesions in rapidly dying fish are also characteristic; as well as excess mucus on the skin.

**TRICHODINA:**

This saucer-shaped parasite is over-rated in its pathogenicity although, I have seen it cause spiderweb lesions in the skins of Koi. The most serious damage it may do is to the gills of smaller fishes. This is one of one of two or three parasites that causes scratching in Koi, with no serious side effects. The most important thing about Trichodina, is that when it is discovered, it belies a problem in the System Housekeeping department You can bet your license that there is some accumulation somewhere of mulm, and lots of it. TRICHODINA clears easily with SALT, and in very short order. You need only leave salt in for a few days to clear Tricho for good. Here again, if salt cannot or will not be used, Formalin is the next choice.

**OODINIUM:**

Oodinium is the causative agent in Velvet disease. This pearshaped sessile organism gives a velvety, gold dust look to affected Kol. It is reported that this may not clear with Salt, but I have yet to see this type of resistance. If it didn'tclear with Salt, I would use Formalin. I have only encountered Velvet/Oodinium very rarely in Koi. It would be more common in freshwater aquariums or on recently purchased Goldfish.

**EPISTYLIS:**

Epistylis is relatively uncommon, but, like Trichodina is more common under circumstances of poor water management, especially where water changes are not, or not frequently, done. Epistylis will live opportunistically in wounds and ulcers, and looks alot like Saprolegnia, (FUNGUS). It forms white tufts in smaller

wounds. Epistylis clears on its own when you begin good water quality practices, and can be helped out of the system with a good dose of what? You guessed it, SALT. Epistylis is obvious under the scope because it has a long, stick-like stalk.

#### **LERNEA:**

Lernea elegans, the most common type of Anchor worm affecting Koi, is a real threat. They attach ventrally, they hold on for about 14 days, and they reproduce copiously. The wounds they create almost always infect with Ulcer disease bacteria, Aeromonas, and then you have two problems. Treatment can be undertaken with Malathion, Fenthion, Trichlorfon, Dylox, Dimilin, and SALT. Salt works by killing the freeswimming reproductive forms. Malathion just kills the Lernea dead, but is dangerous to the fish. Fenthion is slow but safer Dimilin is great if you can get it EPA and FDA will trounce you for having and using it. I do recommend removing any adults you see attached and swabbing the wounds with Iodine or mercurchrome. I do recommend also feeding an antibiotic food when you see Lernea to head off problems.

#### **ARGULUS:**

Argulus lice are obvious when they hit. They are greenish, disc shaped parasites that 'suck' onto the fins and sides of the fish. They can cause damage great enough to permit Ulcer formation. They do NOT respond well to Formalin. They DO respond very well, and very quickly to Organophosphates like Fenthion and also Dimilin.

#### **GYRODACTYLUS:**

Flukes, of the class Gyrodactylus and Dactylogyus, have long been separated into Skin Flukes, and Gill flukes. There is no need. Because while there are even subdivisions within Gyrodactylus and Dactylogyus, and they can be distinguished by their eyespots and Hooks, and embryos; they all die the same. Flukes cause flashing in Koi and other species of fish, more than any other parasite. Rarely fatal to any but the smallest fish, Flukes eat slime and create bleeding microscopic wounds on the gills and skin of fish. These wounds can, and often do become infected with Aeromonas bacteria, which is far worse than the original Fluke problem. Their lifespan is roughly 14 days, but they complete a reproductive-maturation cycle in 4 days, and they can be treated with Formalin 37%, Salt, Organophosphates, Droncit (Praziquantel) and Potassium recommend salt first, and if that has not cleared the problem, (as proven microscopically) then use Formalin as a clean up. Formalin as a clean up. Dactylogyus has eyespots, Gyro does not.

Gyro has an embryo inside, Dactylo does not.

#### **Dropsey/Bloater:**

Dropsy, also known as Bloater or Pinecone disease, is usually caused by bacterial invasion of the fishes' kidney. A herpes virus may also contribute. There is a sporozoan parasite that can damage the Kidney this way, called Mitraspora cyprini, but I have yet to see this on a necropsy. Dropsy is, for all intents and purposes, untreatable, based on 2 years experience, using the following drugs:

Azactam, Baytril, Chloramphenicol, Gentamicin, and Amikacin. I have tried a Sulfa drug, brand name Albon, and that did not resolve the problem either.

Bacterial dropsy is usually caused by Aeromonas or Pseudomonas bacteria. I have also seen cases infected with Mycobacteria. By the time and the scales protrude from the body, the damage to the kidney is so profound that recovery is impossible. If you must try to save the fish, isolate the specimen, elevate temps while elevating oxygenation, and begin injecting antibiotics intraperitoneally. You could also feed the antibiotics in a medicated feed.

#### **Saprolegnia:**

Fungal infections of Koi and other ornamental fish are usually caused by Saprolegnia, a common, if not ubiquitous fungus. Other types include Achlya, Dermatocystidium and Branchiomyces. None of the fungal infections I have EVER diagnosed from Koi in 2 years of clinical practice have been anything other than Saprolegnia, and NEVER has Saprolegnia struck where there was not SOME sort of stressor. Surviving 'jumpers', (fish that have cleared the pond and flopped around), are always affected. Healing ulcers often become infected with fungus. The disease looks like cotton-wool protruding from the lesion, and may become stained with algae. Diagnosis is by microscopy, and this is important, as very often, Flexibacter columnaris will look just like this, and it will not respond to anti fungal agents, because IT is a bacteria! Treatment of fungal infections is only possible where immaculate water quality and good diet prevails. Then, a variety of drugs are effective, to include my favorite, Methylene Blue. Formalin is effective but only worsens stress on the fish. Malachite green can be swabbed on fungal lesions if the specimen can easily be captured daily. Potassium permanganate effectively kills fungi, perhaps better than anything, but this is a VERY dangerous drug to use on fish, unless you have great experience and don't mind a risk.

#### **Scoliosis:**

Scoliosis is caused by a variety of

conditions, none of which is infectious.

The most common cause of scoliosis is Vitamin C deficiency. But there are 3 other causes. 2) Tryptophan deficiency: An amino acid protein building block that may be absent in foods due to improper formulation, hyper extended storage, excess heat in processing, or because no variation was permitted in the diet. To avoid this, always use two different high quality staple diets, and supplement periodically with earthworms or other bait worms. Mealworms and crickets may also be accepted, especially if partially crushed. 3) Trauma: The muscles of Koi and other teleost fish are assorted in bands called 'somites'. When a somite is damaged, by intra Muscular injection technique, for example, or a sharp blow, the somite may die, which then shrinks, and kinks the fish, especially when swimming. It may straighten at rest. 4) Organophosphates, like Fenthion, Trichlorfon, or Malathion to name but a few, can cause kinking of the body due to hyper contraction of the muscles. (A side effect of these drugs on the fish is to prevent relaxation of muscles) and this may kink, or break the fishes back.

Vitamin C deficiencies may be avoided by feeding a varied diet to include the following greens: Spinach, Turnip greens, Broccoli heads, and Dark leaf lettuce. NOT PLAIN LETTUCE!!! Additionally, store no food longer than 90 days, and be sure the label has added ASCORBIC acid. Once scoliosis is noted, the fish is better removed to fresh water, and better attention to diet is advised. As a side note, the biggest, fastest growing fish are most likely to kink, as they need the most Vitamin C and calcium in their diet, to support their rapid growth.

#### **Ulcer Disease**

Ulcer Disease is almost always caused by Aeromonas bacteria or more rarely Pseudomonas bacteria clinically, I wouldn't know which because I rarely culture the pathogen. Why not? Because the results could take a week to return, and by that time, all the affected specimens would be dead. I have treated ulcer disease with the following drugs: Enrofloxacin, Chloramphenicol, Gentamicin, Amikacin, Tetracycline, and recently, Azactam. I inject these drugs. Suffice it to say, that to save these fish, my core recommendations would be to get the fish into a heated environment, provide impeccable water quality, swab the wounds with iodine or Mercurchrome, Feed Romet chow, Inject Enrofloxacin and or Chloramphenicol, and hope that the next spring that the fish does not bloat due to retention of latent bacteria in the kidney after clinical cure.

**LYMPHOCYSTIS**

Of all the viruses affecting Koi, perhaps the most common is LYMPHOCYSTIS. This is a viral pathogen that is poorly transmissible between your specimens. It strikes fish when some damage has occurred to mouth or fin, and sometimes on the body. The lesions are warty and rough. They may be singular or numerous. I see this viral infection in fish in immaculate waters, and so I cannot verify that this is a stress related disease I do know that it is merely disfiguring, not fatal. Lesions may be scraped off; but this could open the skin or fin to bacterial invasion. The only lesions that should be addressed surgically are mouth lesions that interfere with eating. Often, the lesions clear spontaneously, usually, but not always, the SECOND summer after infection, at the peak of the heat. There is a commercial remedy sold for this, but it does not work, and is being sold purely to flim-flam the trusting hobbyist. It is merely acriflavine which is a useless dye.

**CARP POX**

is another virus of a dermatological nature, that also has a low transmissibility from fish to fish, and is again, not fatal, merely disfiguring. The lesions are soft and waxy, not warty and rough. The lesions should not be scraped. They may be differentiated from Lymphocystis because they do NOT cause the cells to become huge (megaloblastic) in size. The way Lymph does. There is no treatment, and lesions do not resolve as well as Lymph lesions do. You should be aware that CARPPOX lesions are very, very rare in North America.

**RHABDOVIRUS CARPIO**

was reported to be a primary pathogen of cyprinid species, particularly KoI and Carp. The virus causes what the British try to call Spring Viremia of Carp, which is the grossest misnomer; that tries to bundle a multifactorial process involving cold water, depressed immunity, opportunistic pathogenic bacteria, and then, only possibly, a virus like Rhabdovirus carprio; into a simple viral disease. Rhabdovirus carprio has several other names, as several scientists have found the same particle and given it different names. We do know that it can cause swim bladder inflammation and a reddening disease of the skin called Carp Erythrodermatitis. You should know that Rhabdovirus carprio, and Spring viremia of Carp, have not been isolated from any fish on the North American continent, so before you cry VIRUS, read a little. Almost always, Aeromonas bacteria, (and a septicemia from same), are concurrent players with this virus, and it is hotly debated whether Rhabdovirus carprio can even act alone.

**Treating The Pond**

by Dr Eric Johnson

One word of caution on adding medications to your entire system. Most of them sterilize, or go a long way towards, sterilizing the filter bed of beneficial bacteria that live there. Most definitely, adding antibiotics will kill large numbers of the Nitrosomonas and Nitrobacter bacteria which will result in deteriorating water quality.

**Salt**

Use non iodized salt. It will eliminate 7 out of 9 parasites that are commonly found in a koi pond. It can be added at the rate of 2.5 pounds per 100 gallons ( yes, 25 lbs per 1,000 gallons). It should be added over a three day period in order not to "shock" the fish. Salt should remain in the system for at least 14 days. If it becomes necessary to do a water change, replace the amount of salt that would have been discarded with the water change. Overdose is just about impossible until you have tripled the given dose. Plants often do not relish this dose of salt and should be removed when ever possible.

**Formalin**

This is basically Formaldehyde in a water mixture. The most commonly available concentration is 37%. It is important to remember that the use of Formalin in freshwater binds free oxygen. For every 5mg/L of Formaldehyde, 1 ppm of Free Oxygen will be used. Formalin's primary use is in the treatment of fungus, odinium and gill flukes or if the use of salt will harm the plants. The dosage for continuous use is 1 cc per 10 gallons of water (25ppm). Be very careful with the use of Formalin, it is a carcinogen for humans.

**Tetracycline**

This anti bacterial can be used as a one hour bath at the rate of 500 mg per 2 gallons of water. Do this daily until the lesion begins to skin over.

**Potassium Permanganate**

Caution should be taken with the use of this drug. The correct amount to be used depends on the hardness of the water. A simple test should be performed to determine the dosage needed for your particular water. First dissolve 1.0 grams of potassium permanganate in 1 litre of distilled water. This is your stock solution. In 10 jars, add 1 litre of pond water to each jar. Number the jars 1 through 10. Now add 1ml (cc) of the stock solution to jar 1. Add 2 ml (cc) of the stock solution to jar two, continue to jar ten. (Note that jar one contains 1PPM and jar two contains 2PPM) Mix each jar well and after 15 minutes compare the colors. The jar having the faintest pink color represents

the proper demand. This dosage plus 2 PPM residual should be added to the pond.

**Organophosphates**

The Organophosphates are used for the treatment of Flukes, Anchorworm, and Lice. Most hobbyists are familiar with Masoten, Fenthion, Neguvon and Dylox. Malathion has the same spectrum as these other compounds. Care must be taken when using any of these drugs as toxicity and death is easily accomplished. To use Malathion, the dose is .25 ppm ( based on and active ingredient of 50%) in other words 2 cc of a 50% solution for 1,000 gallons. This should be used 3 times over a 14 day period. You do not need to make water changes between additions.

**Dimilin**

Can be used for the treatment of Anchorworm (Learnea) and Fish Lice (Argulus). There is no need for any water changes, and it is almost impossible to overdose your fish. Add 0.1 ppm to the pond water. The half life, although in dispute, is irrelevant considering toxicity starts somewhere around 100 ppm thus, addition of this drug monthly for three months is acceptable.

**Tincture of Iodine**

I recommend that you swab lesions with iodine, but Malachite, Mercurochrome and Panolog all work well. Do not allow these to run under the gill cover. Swab ulcers only once as medications like Iodine are caustic and may result in deep burns if over used.

**Glorious Food**

by Gerry Preston from the <http://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 'lack luster 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 of the others

will be to that first limiting amino acid, and the excessive 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-palantans, 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 HC1 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 property 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: Koi 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

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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 Chinironomidae (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 fish, 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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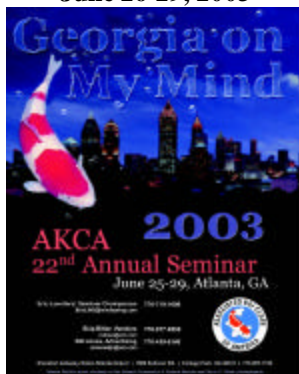
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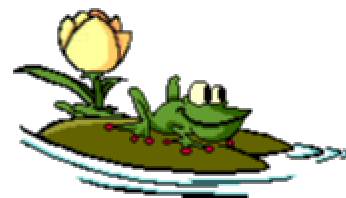
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