

Patricia and David Carlson

8740 N Northern Ave

Meeting begins at 3:00, June 23, 2013

From Oracle, West on Hardy, South on Northern to Address.

Please let Brent know if you are interested in hosting a meeting.

SAKA, Inc Club Officers

President	Bob Panter sakabob@cox.net (520) 747-7278
Vice President	David Young koiman@mindspring.com (520) 403-2949
Secretary	Karen Johnson (520) 400-2073
Treasurer	Dan and Martha Cover mardan79@msn.com (520) 297-4071

Committees/Points of Contact

2013 Pond Tour	
33rd Koi Show Co-Chairperson(s)	Brent VanKoeving bvankoeving@longrealty.com (520) 780-3980
AKCA Representative	Debby Young debbyt@akca.org (520) 682-7697
Newsletter Editor	Brent VanKoeving bvankoeving@longrealty.com (520) 780-3980
Koi Health Advisor	Noel Shaw koifixer@yahoo.com (520) 400-0335
Membership Chairperson	Faye Hall (520) 297-1253
Education Committee	TBD

Editor's Note: Articles published herein are intended for the enjoyment of all and come from a variety of sources. The articles are not intended to replace veterinary advice. Pond owners, and not the club, are responsible for the health of their koi, water changes, what to do, and how to treat their pond. Reasonable effort is made to review these articles for accuracy before including them in the newsletter.

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Club Meetings

Hosting Meetings: For those wishing to host an upcoming business/education meeting, the club will reimburse the host up to \$50 (with receipts) toward food/beverage for the meeting. **We would like to see your pond!** Please contact Bob Panter or Brent VanKoeving if you are interested in hosting a meeting.

Club Announcements

Business Meeting Minutes

Minutes of May 26 2013

Meeting was called to order at 3:15 by President Bob Panter

Thank You Dan & Martha Cover for hosting this meeting

Welcome new attendee Jim Groeller

EDUCATION:

Steffan from Local Roots, gave a talk on Aquaponics. Dan & Martha showed off their new filtration system that included an aquaponic area.

COMMITTEE REPORTS:

Treasurer – checking \$13620.91 plus savings

AKCA – the slate of officers was elected

Koi Society – They lost our contact info; but we are on the list now. Over 20 clubs have joined.

Koi Show – Brent is working on getting the show site confirmed. We need volunteers to organize, food, advertising, raffles, trophies etc. contact Brent if interested

Membership – 30 families have renewed.

OLD BUSINESS:

All pamphlet displays were received well by the gardening centers and home improvement centers. Jim needs one more kit, Dan needs one more kit and Bob needs 25 more pamphlets. Thanks everyone for doing the leg work.

NEW BUSINESS:

Sherri Malorey 624-5656 has kimonos and obis for sale.

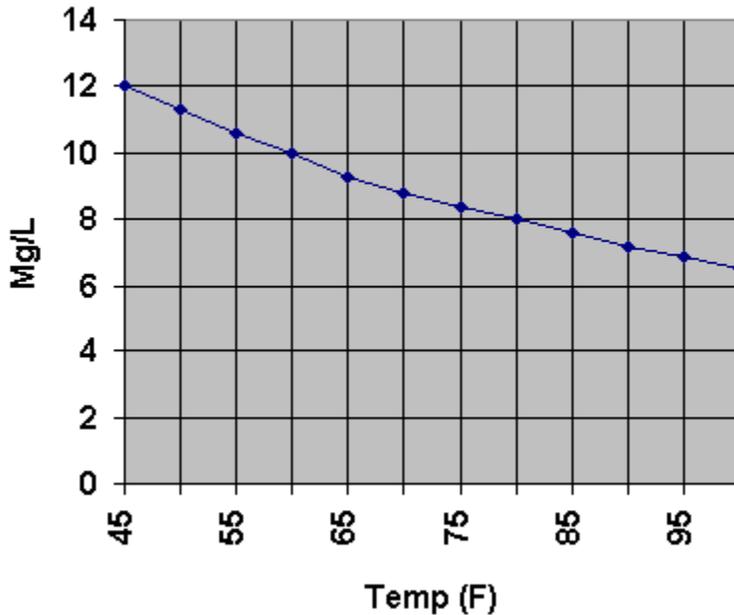
Motion to Adjourn 4:32

Featured Articles

DISSOLVED OXYGEN

A typical pond at a temperature of 70^o F. will have a concentration of about 9 mg/l oxygen. As oxygen in the air dissolves into the water, a point is reached where no more oxygen can be added. This point is called the saturation point. The saturation point is dependent upon several different factors but temperature is the most important. As the temperature increases to 80^o F, the water simply cannot hold as much oxygen as it can at 50^o F. Impurities added to the water or an increase in altitude further decreases the saturation level. The chart below shows the oxygen concentration (mg/l) versus water temperature.

Dissolved Oxygen Saturation



Koi are well adapted for consuming oxygen from low concentrations found in water. The rate of oxygen consumption by Koi is closely related to the water temperature. Koi are "cold blooded" in nature, and their body temperature is essentially that of their environment. Their metabolic activities are very temperature dependent, and increase with increased temperature. This increase in activity requires very high oxygen consumption. Unfortunately, the amount of oxygen available in the water also decreases with warmer temperature. Water with an oxygen concentration of less than 3 mg/l will generally not support fish. When concentrations fall to about 3-4 mg/L, fish start gasping for air at the surface. Larger fish will die before smaller ones since they require more oxygen. Aeration (adding oxygen to the water) gives koi added oxygen and should be considered during stressfully warm temperatures.

Bio-converter bacteria in our filters and pond surface area, is aerobic and require a high level of oxygen in order to survive and thrive. At low levels of oxygen, bio-converter bacteria may start to die, dumping toxic material into the water and accelerating the lack of oxygen problem. The efficiency of the bio-converter bacteria is at maximum when water entering the bio-converter media is at the maximum oxygen saturation level. In order to have a healthy pond, koi keepers should strive to keep their pond water as close to oxygen saturation level as possible at all times. No water circulation due to pump failure can cause the bio-converter bacteria to die in a few hours. The bacteria in the bio-converter will start dying in about 4 hours without circulation.

When air is in contact with the water surface, oxygen is transferred from the air to the water until the water becomes saturated with oxygen. The saturation point differs with water temperature (see chart above). Saturation points can be reached in many different ways. Some of these ways are with use of waterfalls, water streams, air jets, and electric aerators through the use of air stones. Air stones are bubble forming devices driven by an air pump. A single air stone can supply sufficient air for up to a 1000 gallon pond. Heavily populated ponds may need supplemental air and ponds with a large amount of algae may need

supplemental air at night when the plants are not making oxygen but consuming it. It is recommended that a backup air pump with tubing and air stones be kept on hand in case of main water pump failure.

It should be pointed out that city tap water and well water, since they are not subjected to oxygen transfer from open air, generally do not contain any oxygen. When filling a pond with city or well water, it is best if the incoming water is sprayed with a fine mist into the pond surface. This action will cause the added water to absorb as much oxygen as possible during the water transfer.

Due to the reasons described above, in order to maintain a healthy pond, the pumps and filters in a pond should run 24 hours per day and be shut down only for brief maintenance. The importance of sufficient oxygen concentration in pond water cannot be overstated. The survival of koi and beneficial bacteria depend on an abundance of oxygen laden water. Check your system. Are you providing adequate aeration for very warm summertime water temperatures? Observe your koi on very hot days. Are they at the top of the water gasping for air? If so, you should consider adding an aeration source, such as an aeration device with air stones.

Another solution to low oxygen that can be used in emergency is to add 0.03% Hydrogen Peroxide to the pond water to supply oxygen. Apply 0.03% Hydrogen Peroxide at the rate of ONE QUART to FIVE THOUSAND GALLONS of pond water. Dilute this in a large container of pond water and spread along the edges of the pond. Agitate the water with a stick or paddle to spread the concentration of Hydrogen Peroxide as evenly as possible. An alternative is to pour some of the mixture in the water every few minutes rather than all at once. Keep it away from the fish as much as possible since this concentration when not mixed well with the water can be caustic to fish gills. This concentration should supply adequate oxygen for 3 or 4 hours. A quart of 0.03% Hydrogen Peroxide is readily available at most drug stores, and is handy to have on-hand just for this type of emergency.

Don Harrawood

Koi Health Advisor

Food Glorious Food

by Gerry Preston reprinted from [Nishikigoi International Magazine](#)

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 ratios 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 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: 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 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.

2012 SAKA Koi Show Vendors



Mountain View Koi Fish
3828 Keeling Rd
Hereford, AZ 85615
520-3678-1271

GoldFishNet.com



水晶宮

Tommy Hui
A's Aquarium



Desert Rainbow
Koi Farm

Laurel Nason

Kawarigoi Korner



SAKA has the Emergency Supply Stations - Praziquantel, Dimilin, Potassium Permanganate, Sodium Thiosulfate, ProForm C. Parasites begin to revive from the cold much sooner than the Koi. The Koi's immune system is at its weakest right now and until the water temperatures hit 60F. Watch your fish for signs of distress. Do not start feeding until the water is above 55F and will continue to increase in temperature, at this point feed a wheat germ feed or Cheerios.

[Click Here](#) to see new items for sale on the SAKA Website.

If you have suggestions for the newsletter or items to be included in Karawagoi Corner or the Calendar, Please contact Brent VanKoeving at 520.780.3980 or bvankoeving@longrealty.com.

Upcoming SAKA Education and Business Meetings

Date	Location
May 26	Dan and Martha Cover
June 23	
July 28	Curt and Lisa Ogren. Mountain View Koi
August 25	Michael and Carol Herndon
September 22	
October 27	
November	No Meeting. See you at the show
December	

Shows, Pond Tours and Seminars

Event	Dates/Location/Links
Tucson Japanese Garden Opens	http://tucsoncitizen.com/community/2013/01/14/lovely-new-japanese-garden-to-open-in-tucson-on-january-19/



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Today's Date: _____

of Koi _____

Years Keeping Koi: _____

Pond size: _____

Would you like to host a meeting?

Would you like to serve on a committee?

_____ If yes which one?

Make Checks payable to: SAKA, Inc.

Mail to: Martha and Dan Cover
 2841 W. Puccini Place
 Tucson, AZ 85741