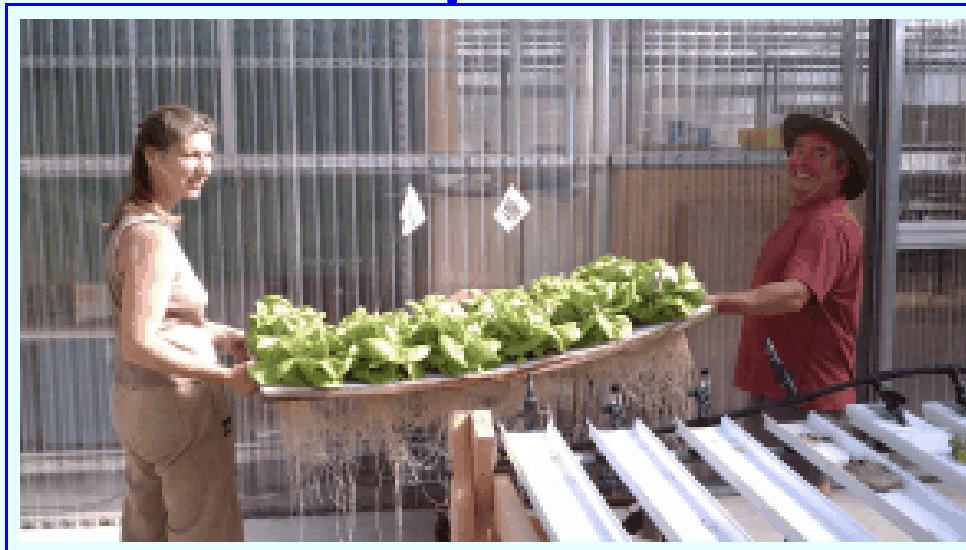




Splash

VOLUME 30, NUMBER 10 October, 2014

Koiponics



This month's speaker was Peter Shaw, Chairman of the Horticulture Program at Cabrillo College. Peter spoke on "Koi and Aquaponics". As most of you are probably aware aquaponics has become a "Big Thing" recently. As an example "Fancy Koi", now Dream-Pond, has evolved into a store that is now about 90% aquaponics.

As man continues to build cities on top of what was once prime farmland, think "The Valley of Heart's Delight", and there are more of us every year, aquaponics will be increasingly important for providing many kinds of food.

Combining fish farming with a thriving vegetable garden is the best sort of symbiosis. Allowing us to raise a large quantity of food, both meat and vegetables in small areas that most would not find suitable for farming.

Continued on Page 3

Visit our Web Site at: www.sckoi.com

Club Meetings:

The club meets on the third Tuesday of each month except July (Third Thursday) and December (No Meeting) in the Willow Glen Public Library, 1157 Minnesota Ave, San Jose, CA 95125. Check the web site Calendar for updates and a map. At our meetings we get acquainted with any guests, address any pond issues from guests or members. We generally follow this with a presentation which is usually related to pond or water gardening. Finally, we enjoy refreshments and open discussion.

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AKCA Representative	Don Chamberlain	(408) 594-4161	scvkwg@gmail.com

Membership

Club dues are \$30.00 per year. Our fiscal year starts July 1, so if you join before that date, your dues for the remainder of the current year will be prorated at the rate of \$2.50 per month.

To join, send your name, address, phone number and email address along with your check for dues to:

SCVKWG
PO Box 9006
San Jose, CA 95157

Treasurer's Report

Since the Splash is widely distributed and available online, the Treasurer's Report is no longer published.

The report is available from the club Treasurer.

September Steering Committee

The Steering Committee did not meet in September.

September Meeting

9/16/2014
Attendees

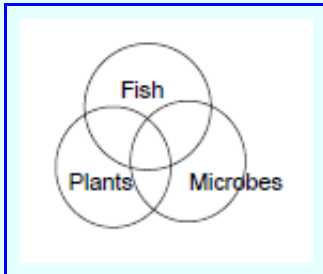
We had a very small turnout this month. Only 9 people turned up for Peter's interesting presentation. Unfortunately, I wasn't one of them as I was away on business.

Presentation - Koiponics

Peter provided a very detailed introduction to hydroponics and it was reported to me that a lively discussion ensued. Peter was kind enough to share his presentation with me so I can present a small part of the story for the rest of us, who like me did not make the meeting.

What is Aquaponics?

- The integration of aquaculture and hydroponics
- Serves as a model for sustainable food production system



It is a simple system depending on three factors:

- Feed the fish, they poop,
- Microbes "eat" the poop making nutrients available
- Plants "eat" the nutrients cleaning up the water for the fish



An Aquaponics Setup

From a Koi Growers Perspective

Ok, but how might this relate to a koi keeper?

- How to keep the water clean?
Many of us spend thousands of dollars on this problem.
- Filtration of solids
Every filtration system requires a mechanical section, and...
- Conversion of ammonium to nitrate (ASAP)
A bio-conversion section. Most bio-conversion systems convert ammonia to nitrite and then nitrite to nitrate, but do very little to eliminate nitrate.
- Getting rid of the nitrate
Since nitrate isn't especially lethal for koi, why is this important. The next time you have to deal with pea soup water or string algae, you'll begin to appreciate why this is important.
Also, many believe that high levels of nitrates lower your koi's immune system and reduce growth.

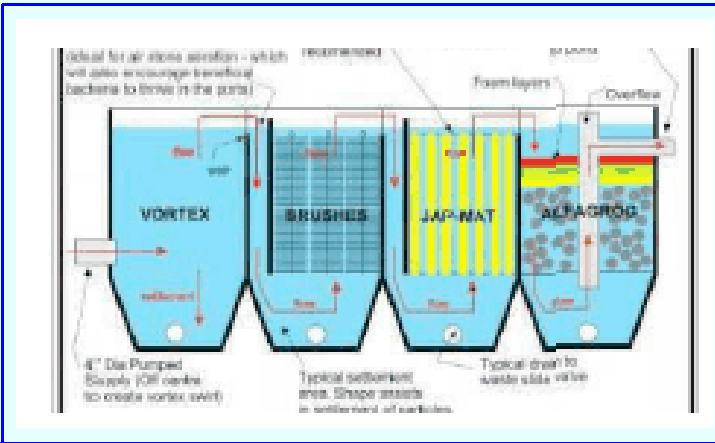
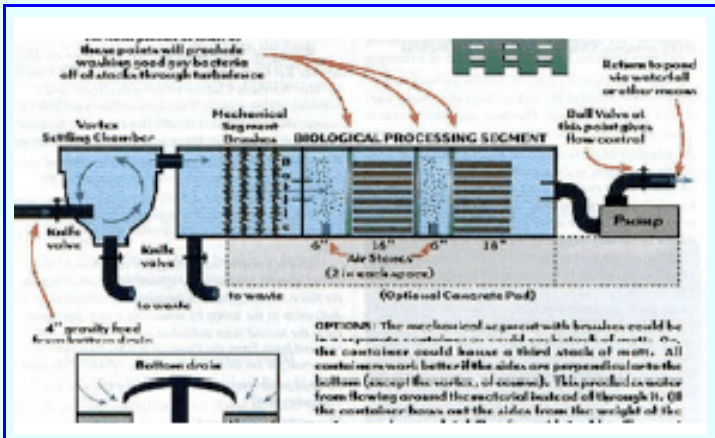
Solids Removal

- Removal of solids is key in both systems
Solids settle to gravel bed and areas go anaerobic
Solids attach to plant roots causing anaerobic conditions and root loss.
- Solid Removal Methods
Bottom drains

Swirl Filters

Mechanical Filtration

Mineralization filters



Diagrams of Typical Filter Systems



A High Density Solid Removal Unit

This appears to be a basic settlement tank, which is a common method of removing solids from the water.

You might add a Swirl Filter, more commonly called a vortex unit.



Vortex Filter



Solids Retaining Tank

This stuff looks and smells yucky, but your plants love it.

Mineralization

- 75% of the plant nutrients from the fish are soluble, being excreted via the gills
 - Only Ca, Fe, and K are found lacking when you remove the solids
- So, to feed plants I want that stuff, but its still in an organic form
- Must mineralize to make nutrients available

Low Density Aquaponics

- Fish grown for food or for poop
- Low fish load
20 – 4-8” koi in 275 gallon tank
About ½” fish per gallon, about 4.3 grams per gallon
- Small amounts of solids
- Small amounts of plants



Low Density Aquaponics

How Can This Work For Your Koi Pond

Peter is not sure exactly. He hasn't done one personally, but he can imagine several options:

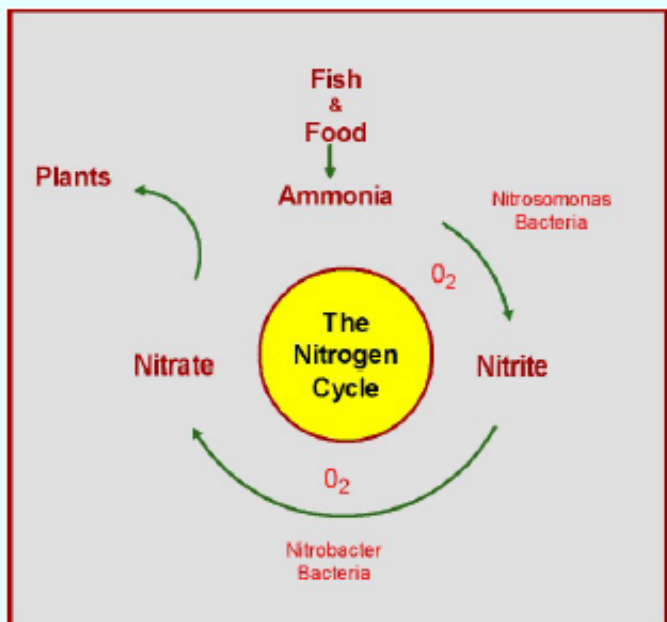
- Float Plants In Pond
Not very attractive and the koi will eat the roots.
- Replace the Mineralization Filter with a Media Bed to Grow Plants in

This what is known as an anoxic filter. Many koi keepers use this system to reduce nitrates. An excellent supplement to a koi pond filtration system.

You can find much more information on this here:

http://www.mankysanke.co.uk/html/anoxic_filtration.html

- Koi are a viable fish for small or large systems
- Koi are very valuable and breeding them can bring in more \$ than tilapia, catfish or others
- Tilapia sell for about \$2 a pound.



The Nitrogen Cycle

High Density Aquaponics

- Fish grown for food or for poop
- High fish load
75 – 6-8” koi in a 400 gallon tank
1.2-1.5” fish per gallon, about 18 grams per gallon
- Huge amounts of solids
- Large amounts of plants

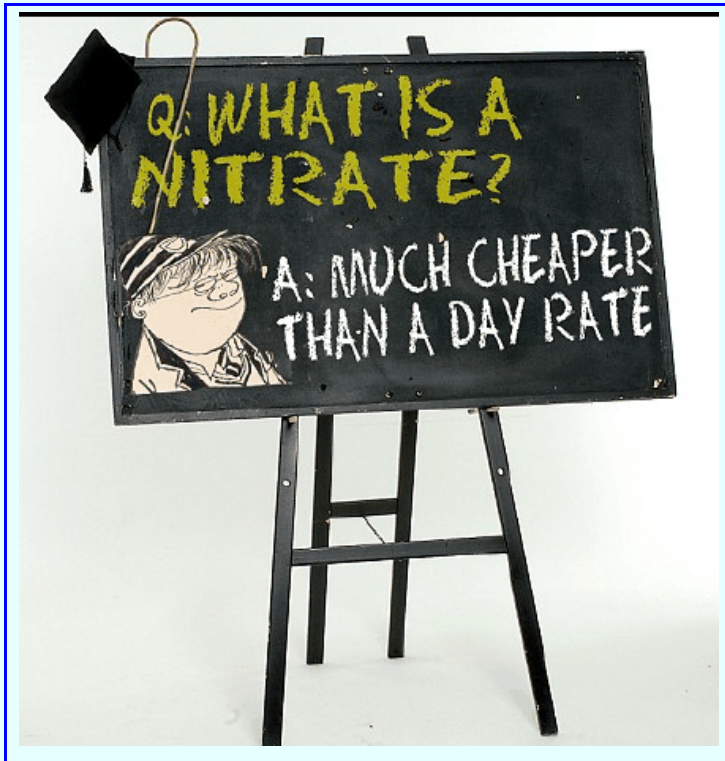


High Density Aquaponics

- Peter sold 18 koi (12-16" long and very plain Jane fish) for \$1000.

Before you go into business, you should be aware that breeding koi is a very labor intensive business and US breeders seldom make any real money.

- Other ornamental fish are valuable as well.



Horticulture Humor

Dessert

Alan reported that although the turn out was very low, the energetic discussion resulted in complete destruction of Alan and Linda's refreshments.

A Feeding Test

I ran across these test results somewhere on the net and found it very interesting. I should have taken note of the source for this, but didn't and can't seem to find it now.

I'm guessing this test was run by Jos Aben, a koi breeder from Poland, that is producing some very unusual and attractive koi.



A Jos Aben Koi

The Test Report

We needed to know what the evolution of our Koi would be on different size food. If there would be any difference and what that difference would be, If any at all.

We also needed to know because being a Koi farm we need to generate optimum results with our Koi. There is a very simple and honest reasoning behind this. As a farm we have to make the most profit on our product, our product is Koi and the better they develop the more profit we can make with lesser costs.

So in order to find out we needed to test it on a large scale under a controlled environment. Also the test needed to be for a longer period of time to generate

valid and accurate results. So we decided to do a test for 6 months in different basins to give the best overview.

The tests were carried out in 4 basins with 25.000 litre of water. We then divided each basin again in two with a net in the middle. That way we had 8 separate systems but with 2 of each on the same water and filter system. So the pressure on the water quality was the same on each basin. We kept the temperature at 22-23 Celsius for four months.

The food was weighed each day to ensure the same amount of food was put in each basin. The pellets tested were 3, 4 and 6 mm. On one size of each basin we placed 10 Koi between 30/31 cm from the same parents.

On the other side we placed 6 big Koi of 68/70 cm (4 years old), also from the same parents. This we did in all four ponds. This way we had only Koi of about the same size and more important, each group was of the same year and day of birth. The reason for that was very simple, we wanted to know what the difference was after 4 and 6 month feeding with the pellet size.

For a good test we found it very important that the base for the test was as fair and equal as it could be. What I mean is that the outcomes can be very different if you were to mix Koi of different ages as we all know not every Koi will develop in the same way which would be a big problem for a serious test.

We even went to the extent of ensuring each fish in the test had very similar body and attributes. We used different varieties to ensure the results were reflected across different classes, one group was Showa, one Beni Kumonryu, four Chagoi, one Asagi and one Yamabuki. We measured all the Koi and started the test.

In basin 1 we tested 3 and 4 mm. 3 mm were given to the 30 cm Koi and the 4 mm to the 70 cm Koi.

In basin 2 we tested 3 and 6 mm. 3 mm were given to the 70 cm Koi and the 6 mm to the 30 cm Koi.

In basin 3 we tested 4 and 6 mm. 4 mm were given to the 70 cm Koi and the 6 mm to the 30 cm Koi.

In basin 4 we tested 6 and 4 mm. 4 mm were given to the 30 cm Koi and the 6 mm to the 70 cm Koi.

What we wanted to know two things

1.) How the development was of the Koi

2.) If there was a difference in development after this 4 to 6 month period.

We also tested how long it took for the pellets to get fully saturated. With the small 3 mm pellet it takes about 8 seconds shorter than the 4 mm pellet and about 15 seconds shorter than the 6 mm pellet.

All Koi got the same amount of food and they were fed by hand 8 times a day. The time the Koi needed to eat all the food was longest with the 3 mm pellet, then the 4 mm and fastest was the 6 mm.

So we already know that the time for the food to get soaked in water was optimum with the 3 mm pallet. This is important because the Koi were hungry and they directly start to eat when the food hits the water. So when the food hits the water the Koi were on top of it.

That means the small pellet had the advantage of being able to absorb the most water in volume in the shortest time. Would this have any effect on growth and development of the Koi? We had to wait and see.

Some Setbacks

In week 6 we had one Chagoi of 34 cm die in one of the basins. We then decided to take one Chagoi out of the other 2 ponds at the same size to keep the test updated and fair. In basin 3 we also had a slight issue with Costia.

We treated all the basins on the same day with Potassium, again so we could keep the test in the same conditions and to ensure nothing developed in the other basins.

Four Month Check

After 4 months we did the first check. We started at a average weight from the Koi:

30/31 cm at 526 gram.

68/70 cm at 5817 gram.

After 4 months the Koi from 30/31 cm were:

42/45 cm at average 1468 gram.

After 4 months the Koi from 68/70 cm were:

72/73.5 cm at average 6669 gram.

But this was average weight. The weight and length after 4 months in the separate basins was.

Basin 1 with the 30 cm Koi and 3 mm pellet were after 4 months average 43.5 cm and 1536 gram.

Basin 2 with the 30 cm Koi and 6 mm pellet were after 4 months average 42.5 cm and 1410 gram.

Basin 3 with the 30 cm Koi and 4 mm pellet were after 4 months average 43 cm and 1478 gram.

Basin 4 with the 30 cm Koi and 6 mm pellet were after 4 months average 42.5 cm and 1448 gram.

Basin 1 with the 70 cm Koi and 4 mm pellet were after 4 months average 72.5 cm and 6620 gram.

Basin 2 with the 70 cm Koi and 3 mm pellet were after 4 months average 72.5 cm and 6795 gram.

Basin 3 with the 70 cm Koi and 4 mm pellet were after 4 months average 72.5 cm and 6646 gram.

Basin 4 with the 70 cm Koi and 6 mm pellet were after 4 months average 72 cm and 6625 gram.

The Next Phase

After this 4 months we increased and kept the temperature at 24 Celsius. After 6 months we measured and weighed again.

Six Month Check

Basin 1 with the 30 cm Koi and 3 mm pellet were after 6 months average 46.5 cm and 1942 gram.

Basin 2 with the 30 cm Koi and 6 mm pellet were after 6 months average 44.5 cm and 1635 gram.

Basin 3 with the 30 cm Koi and 4 mm pellet were after 6 months average 45.5 cm and 1798 gram.

Basin 4 with the 30 cm Koi and 6 mm pellet were after 6 months average 45 cm and 1732 gram.

Basin 1 with the 70 cm Koi and 4 mm pellet were after 6 months average 73 cm and 6920 gram.

Basin 2 with the 70 cm Koi and 3 mm pellet were after 6 months average 73.5 cm and 7095 gram.

Basin 3 with the 70 cm Koi and 4 mm pellet were after 6 months average 73 cm and 6846 gram.

Basin 4 with the 70 cm Koi and 6 mm pellet were after 6 months average 72.5 cm and 6785 gram.

The Conclusion

After 6 months of testing we clearly concluded that the 3 mm has the better results over the 4 and 6 mm pellet both in length and body mass. Over a year the difference can be up to 3-5cm but over 4 years it could be up to 10-15cm difference and this is huge!

This is why we believe pellet size is so important and why Yoshikigoi food is only produced in 3mm, to get the most out of your Koi. This simple change of pellet size now ensures we can optimize the growth of our Koi and realize their true potential.

So although the weight of food was the same just the pellet size alone generated pretty vast differences in growth and volume.

Jos and I have discussed in some detail as to why the smaller pellet generated so much more weight to the fish and the volume of the fish were far larger. Of course there will undoubtedly be the odd fish that has speedier/slower conversion of the food but on average the results were clear.

We believe that the increase in weight and length can be attributed to a quicker conversion of food to muscle, cartilage and other soft tissue from a smaller pellet. The larger pellets clearly use more energy to break down, this loss of energy is energy that could otherwise be used to grow and develop this fish.

So a very simple test but quite conclusive and something that the farm and any keen hobbyist must look at in order to optimize the size of their fish each season. I hope this has been of some help and I hope it gives a little more detail about this unique diet.

What Turns You On

Let us know what you'd like to hear about at our meetings or in the Splash. Just drop a line to scvkwg@gmail.com with your ideas.

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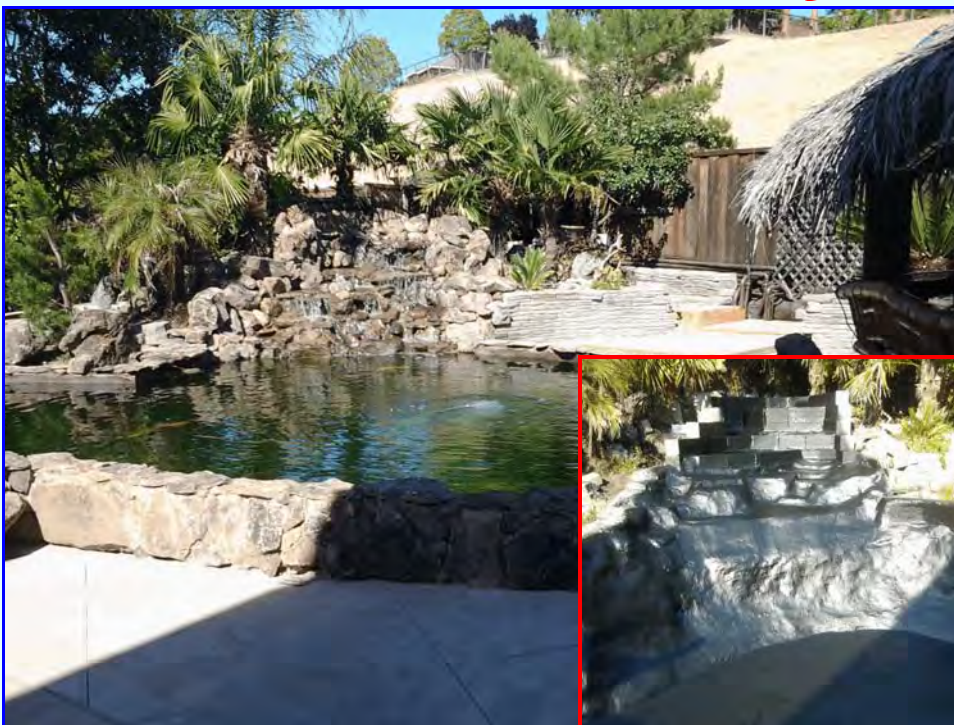
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