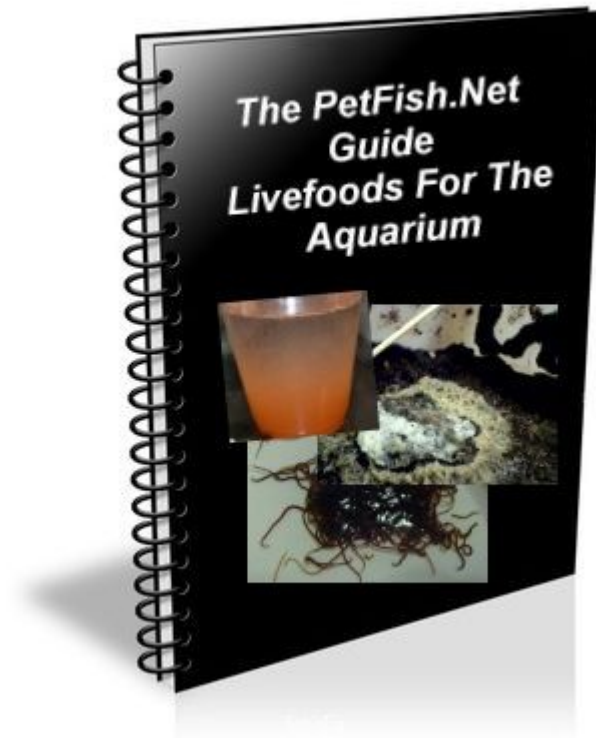


PetFish.Net Guide To Live Foods



White Worms

By Blessed Silence

White worms are one of the better live foods for conditioning fish for spawning or to get the picky eaters to eat. They are about 3/4" to 1" in length, when feeding to fish you need to be careful to offer a varied diet. White worms are high in fat content. They will also survive under water for several days, but if you have gravel in your tank they will wiggle themselves into the gravel away from your fishes hungry mouth.

While the discussion of how to keep the worms varies from person to person, I keep mine in coconut fiber rather than a peat/soil mixture. But they also do quite well in African Violet soil. I soak the medium until it cant hold anymore water then I squeeze it as much as I can, then it will be slightly damp. Put about 1" of the medium in the bottom of a plastic container. I like to use those plastic shoe boxes or sweater boxes, they are just right and the lid is loose enough to allow air in without having to make more holes to allow air in. After you have done this you can add your starter culture. Now the culture will like a lower temperature around 55 to 60 degrees. This can be done easily by getting an old cooler and storing your culture in that. Just get a two 2 liter soda bottles, and put water in them and freeze them. Then just alternate putting the frozen one in the cooler and the other in the freezer, I do this when its time to feed them. Now on feeding the worms, you can use old fish flake if you wish. I use baby cereal, oatmeal to be exact. I always use up all my flake for my fish and the cereal is not that expensive. Put just enough food in that the worms will eat it in one day, you don't want it to go moldy. You will also want to fluff up the culture once a week or so, that way the medium doesn't get too compact. You will want to add a little water once in awhile to keep the culture going, but don't do too much, if the worms start crawling up the sides you know that its too moist.

You will want to start a new culture when you notice your worm population diminishing or the medium looks darker, you will notice the difference. Then all you need to do is start new medium and add some of your existing culture to it, don't get rid of that one yet, wait till you know the new culture is taking off.

Now to harvest the worms can be a little tricky, I find that after feeding time they will all be clumped at the surface around the food, after all the food is gone I grab some of those worms and put them in water to rinse them off. I have heard of people putting a glass sheet and putting the food on top of that, I have not tried that because I have had good luck using my method.

Culturing Vinegar Eels

By Clint Norwood



A mature culture, ready for harvesting

Vinegar eels are an extremely tiny aquatic nematode (about the size of microworms or smaller), really a worm, not an eel. They are found naturally appearing in vats of vinegar. They make excellent food for fry of nearly all species of aquarium fish. Their advantages over microworms is that they are slightly smaller and they live longer in the aquarium. Their disadvantage is the somewhat more complicated harvesting methods that are required.

To start a culture of vinegar eels will require the following:

A quart or larger jar or bottle

Apple Cider Vinegar

A small piece of apple

A cloth cover for the jar, or a sponge type stopper for a bottle

A starter culture

To start a culture dilute your apple cider vinegar half and half with water, (1 part vinegar to 3 parts water will also work), add a small slice of fresh apple, add the starter culture and put all of this in a clean bottle or jar. Cover the jar with a cloth cover, a sponge stopper or even a paper towel. Don't use metal lids as it is reported to kill the culture.

Store this culture in a dark place and wait a couple of weeks. You should be able to hold a magnifying glass up to the culture jar and see millions of vinegar eels swimming around in the jar. That's it! All you need to do now is look at the culture from time to time to make sure it is still "cooking". If you notice a drop in production you can add a little vinegar, a small piece of apple or possibly even start a subculture.

Harvesting

To harvest the eels I usually use a turkey baster to slurp a portion of the eel culture and squirt it into a coffee filter that is placed over a cup or small jar. Be sure to save the drainage to add back to the culture as it probably contains a lot of baby eels. Once the vinegar mixture drains I will rinse the filter once or twice with clean water to get rid of the vinegar residue, all you have to do is squirt

some water in the filter just like you did with the culture mixture. When it's done draining you can now invert the filter into a small container of water and swish it around good to loosen the eels. Now you can use a dropper or baster to dispenece the eels from the water into your fry tanks. Note: Small adult fish such as Guppies, Tetras and White Clouds love these tiny eels also.

A new harvesting method was recently posted on killietalk.

Pour a portion of your vinegar eel culture into a small "long neck" bottle. Fill up to the point where the neck starts. Place a plug of clean filter floss into the neck and then fill the rest of the way to the top with clean fresh water. A few hours later many eels will have migrated thru the floss into the freshwater and can be easily harvested. Seems the vinegar and water stay separated so you don't have to worry about getting vinegar into your fry tanks. When you are through return the culture mixture back to the main jar. Now that sounds a lot more simple.

Mosquito Larvae Free Live Food

By Clint Norwood

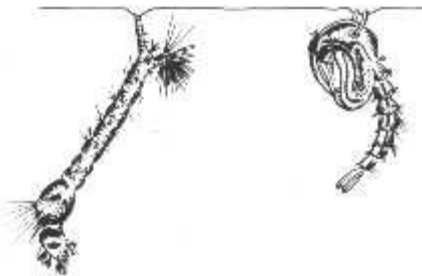
If you want to provide your aquarium fish with some of the most nutritious and natural food available, setup your own Mosquito Larvae culture.

Simple And Easy!



All you need is an old barrel, bucket, or any container that will hold water. Fill it with water and let it sit for a couple of days to dissipate the chlorine. Get a piece of old stockings or panty hose (this allows for easy removal later), stuff the stocking with a little lettuce, apple, or just about any fruits or vegetables (but nothing beats watermelon rind). Again let it sit for a while, this time for about a week. The container should be teeming with Mosquito Larvae. Now you can remove your stuffed stocking and strain the water through a net to collect all the "skeeters", feed the fish all they want and freeze the rest for later feedings.

Culturing Tips



Don't let the culture go too long without straining the "skeeters" out, else you'll become the live food; if you notice a lot of the Larvae look like they have "big heads", it's time to immediately strain the water and collect them before they mature into real live flying Mosquitos.

There's no need to refresh the stuffing, the stinkier and more putrid the better. As long as there's some left, keep using it.

If you want to check up on the progress of your culture look for tiny little "egg rafts", they look just like little pieces of bark floating in the water.

Fantastic Food

Live Mosquito Larvae are one of the best all around fish foods for the smaller types of Aquarium fish. Bettas, Guppies and Killifish absolutely love them. Try this easy to get live food and give your fish a special treat.

Micro-Worms

By Clint Norwood

Micro-worms are the easiest live food to culture for feeding small fish and/or raising fry.

What are Micro-Worms?

Imagine an tiny earthworm, so small you can barely see them, and then only if you strain your eyes. The perfect food for tiny fish.



An active microworm culture



The yeast I use



Worms crawling up the side for easy harvesting.

Culturing Micro-Worms

You will need the following:

A small plastic container such as a clean margarine container, with lid

A starter culture of micro-worms

Food - any of these - oatmeal, cornmeal, pablum, baby cereal or even a piece of bread

Yeast - baking yeast or brewers yeast

First punch a few holes in the lid of your culturing container. You can use a nail or a knife to do this, be careful! Then add your cereal or bread, add water to make it to about the consistency of breakfast oatmeal. Sprinkle a little pinch of the yeast on top, and add the starter culture worms. You're all set now.

Using Micro-Worms

Keep the worms at any reasonable room temperature. In about 3 or 4 days you'll see millions of these tiny worms crawling up the sides of your container. You can then harvest them. Use your finger to just wipe a few thousand off the side and then swish your finger around in the tank to be fed. If you're squimish you can use a knife or popsicle stick to scrape off the worms. You can harvest like this for days at a time.

If your culture seems to be slowing down, just sprinkle a little more yeast on top and/or add some more food and it should perk right up again. But sooner or later you'll need to start a new culture. To do this just scrape off as many worms as you can and use them as a starter culture, and repeat the steps above. It is considered good practice to keep a reserve culture going in case your main culture dies out unexpectedly. You'll need to look in on the worms every few days at least, because there is nothing in the world that stinks as bad as a ripe, dead micro-worm culture.

Tip:

If you need a lot of microworms in a very short time you can place the culture container on top of a heat source such as a fluorescent light. The heat will make the worms produce faster and climb up the walls of the container much more than normal. If you do this be sure to have a back-up culture going because it really makes them age fast.

Mini-Microworms

Mini-Microworms (also known as Walterworms) are a smaller version of regular Microworms. The only difference is the adult size of the worms. These are excellent for the super tiny fry like Gouramies, Bettas and Tetras.

Harvest MILLIONS of Microworms

By Bill Wedekind

Dear fellow aquarium enthusiasts:

I only recently bumped into this site as a result of my search for a microworm culture. Only then did I learn of this valuable resource to share ideas and experiences. Well, I would like to share with all of you an incredible harvesting technique that I just discovered.

I used to grow microworms many years ago when I had over a dozen tanks in my parents home. I found them to be a very valuable live food for young fry. Now I am showing my children then joy of keeping an aquarium and breeding. I remember never being able to harvest enough worms for all my young. In an effort to increase my harvest, I would always have 6 -12 cultures going.

The time tested method of harvesting these worms is to scrape them off of the side of the container as they climb out of the medium. Indeed, this is what I did many years ago and it is also the instructions I received from Clint when I ordered my culture. However, if you have kept microworms before, you have observed the same thing as me - most of the worms are on the surface of the medium. Only a small fraction of them actually climb out to be harvested. Of course, if you try to harvest off the top of the culture, you will also get an unacceptable amount of the medium which you do not want to put in your tanks.

A little background: I used to grow the worms only in a corn meal culture. We put this in plastic shoe boxes which were great because they were large and clear with covers. Per the instructions that Clint provided, I saw that you could also use other material such as oatmeal. So, from the starter culture I bought, I started two cultures; one in oatmeal and one in corn meal. I wanted to see which would work better (provide the most worms). These were both put in large plastic shoe box size containers.

Both cultures grew well. However, even after 8 days of growth, there were not many worms climbing up the sides. Sure, there were millions of worms in each culture but they were mostly on top. I tried many things to harvest more worms but always got too much oatmeal or corn meal. So, after two days of experimenting, I tried something "revolutionary." In fact, it worked so well, I believe it could become the new standard for harvesting these worms. Would you believe that at each feeding, I actually harvested MORE worms than I could use. But now I just take less by choice. Here's the technique:

First, wait until your culture has reached maturity (has a gazillion worms crawling all over it). Then cut a piece of paper towel to fit over about half of the culture surface. You can decide later if you want to use more or less towel. The size of the towel will determine your harvest size. Now thoroughly wet the towel in fresh water and squeeze it so it is just damp. You are going to lay this towel over the top of the culture. We dampen the towel so as not to deplete the moisture in the culture. If you see your culture getting dry, just add water. Now, cover it and just wait a few hours. I let mine wait overnight the first time I tried it. In this time, worms will cover the surface of the towel. Now just remove the towel. It will be literally saturated with worms. The towel comes out virtually "clean." It comes out a bit cleaner from the oat meal culture but I believe the corn meal culture provides more worms. Rinse the towel in a cup or two of clean water. It usually takes me two cups of water just to rinse the towel to the point where it looks like it is free of worms. Then I finish rinsing the towel in one of my fry tanks. Even after taking the vast majority of worms off of the towel

and then dipping the "empty" towel in a tank, I am probably overfeeding this first tank (thousands of worms still on the towel). Next, I pour the cups containing the worms through a #2 cone coffee filter that I put in a second cup. I rinse this through 2-3 times. What is left is millions of worms in the coffee filter that you can use to feed more fry than most of us will ever have.

I took a photo of ONE of my worm harvests from one culture. It is an unbelievable sight. I weighed the harvest - it was OVER ½ ounce of worms without any debris. I had so much left over that I fed my adult tanks with it also.





Bill is still working on perfecting his new harvesting technique and has recently sent me this update:

Hey, I actually improved on the "millions of microworms" harvesting method described in the article you put on your web site for me. It totally eliminates the process of filtering the worms through a coffee filter. Although filtering works, I have found over time that sometimes the filter "clogs" and it takes a long time to get the worms "purified". Also, some of the worms go through the filter and are lost. Check this out - imagine being able to dip a teaspoon and get ONLY worms. No filtering, no trouble whatsoever.

Here's my final setup:

Get a worm culture going the normal way. Although my original article indicated that I thought the oatmeal was a better medium than cornmeal, I now prefer cornmeal (it stinks less, it seems to work better and it lasts longer).

So ...

- 1) Get a cornmeal worm culture started and wait until it is going strong.
- 2) Lay a paper towel over the well-populated culture (same as before). Sprinkle a few teaspoons of fresh water on top.
- 3) Wait until you see the worms in abundance on top of the towel (same as before).
- 4) Now, instead of removing the towel, leave it in place. Just use a spoon to gently scrape the worms right off of the towel. You get no cornmeal (or just a couple of specs). From my experience, you can leave the towel in place (as long as you don't tear it which if you do, just buy a stronger towel, not the cheap store brand) for the LIFE of the culture. This works better because it doesn't disturb the culture and the only worms disturbed are the ones you harvest. The culture continues without interruption - there is no "recovery" time (such as when you remove the towel). I have harvested 3-4 teaspoons of pure worms EACH DAY from each shoe box size culture. Each of my cultures goes about 3 weeks - some a little longer. When my kids say it stinks too much (I'm used

to it), I get some new ones going.

5) For each teaspoon of culture you remove, replace with an equal amount of pure water right on top of the towel.

That's it! My cultures are working so well I could probably start feeding my adult population if these worms weren't so small. Thought you might want to share this with your readers as well. As good as the first method was, this is even better still. I don't plan any more improvements because I don't see any room. I'm harvesting worms as simply as taking frozen food out of a packet. It doesn't get any easier than this (unless you can get the worms to jump into the aquarium too :)))

Regards - Bill Wedekind

Article written by © [Bill Wedekind](#)

Infusoria

By Clint Norwood

Infusoria can be cultured and fed to the very tiniest of fry. Although I side with the group that tends to believe that most aquarist would be better served starting the fry off with Vinegar Eels, Microworms or baby Brine Shrimp, there are many other experienced fishkeepers who steadfastly believe in the use of Infusoria for their tiny fry. Examples of fish whose fry might need infusoria as a first food are Neon Tetras, Tiger Barbs and Dwarf Gouramis. All livebearer fry even as tiny as the 8th smallest fish in the world, Heterandia formosa, can handle larger foods, and all Cichlid fry are fully capable of starting off with larger foods.

A better fry food similar to infusoria, and probably even containing some Infusoria, is "Green Water", which in my opinion is not as "iffy", stinky or dangerous as a straight Infusoria culture.

Recipe For Green Water

Add old (unmedicated) aquarium water, along with any snail droppings, dead plant matter or detritus to a glass quart jar or similar container. Allow this container to sit in a windowsill for a few days catching some sunshine, or place it near another light source. In a few days it should be cloudy and/or green tinted. It is then ready to harvest and with very little smell. Although if you are curious enough to force the issue by sticking your nose where it really doesn't belong you will be duly rewarded.

You can either harvest an ounce or two from the top, with a turkey baster taking care to not get any of the mulm or solid material, and then squirt this directly into the fry tank - **or** - you can float a small wad of filter floss in the jar for a few hours and then swish it around in the fry tank.

This culture should easily last long enough for all fry to reach the next stage of fry food. Another alternative to is to just put some Java Moss in the fry tank and let them feast on the abundant microscopic organisms that live in it's fronds.

Growing Adult Brine Shrimp

By [William Berg](#)

General Info.

Brine shrimps, or artemia, are a zooplankton used mainly as fry food, but they can also be grown to about 20 mm (0.8 inch) in length and be a valuable food source for adult fishes as well. What makes brine shrimps such ideal fry food is their good nutritional value, their ability to live 5 hours in fresh water before dying, and the fact that the eggs can be stored for many years as long as they are kept away from water and oxygen. Once the dried eggs are returned into oxygenated saltwater they resume their development and hatch. This is an adaptation to living in desert lakes that dry up.

The time it takes them to hatch depends on the temperature. It takes 15 to 20 hours at 25°C (77°F). A higher temperature shortens hatching time. The optimal hatching temperature depends on the origin of the brine shrimps, however temperatures between 25-30°C (77-86°F) are recommended.

- Recommended salinity: 30-35 ppt (1.022-1.026 density)
- Recommended pH: 8.0 (pH 6.0-9.0 is acceptable)

Once they hatch they enter the umbrella stage, during which the larvae do not feed since they haven't yet developed a mouth or anus. They survive on their yolk sac during this time.

After 12 hours they enter the second stage of development and start feeding by filtering micro-algae from the water. The nauplii grow fast, and can reach adulthood in 8 days. Brine shrimp can live for up to 3 months.

Since this article is focusing on growing brine shrimp to adulthood, I shall not address the question of how to hatch brine shrimp.

Caring for your brine shrimp

There are several factors that contribute to the successful raising of brine shrimp to adult size. The two most important ones, besides giving the brine shrimp the above stated water parameters, are:

- Feeding: brine shrimp are not hard to feed. They accept most food they can filter out of the water as long as it's not too big and doesn't dissolve in water. There is brine shrimp food available in pet stores, containing micro-algae for the nauplii to eat. There are, however, quite a few cheaper alternatives that you can buy in your regular grocery store; for example yeast, wheat flour, soybean powder and egg yolk. It's hard to know how much to feed the nauplii, but the transparency of the water can be of help. During the first weeks you should be able to see about 15 cm into the water. When the nauplii grow, the food concentration should be kept a little lower, and a water transparency of 25 cm is recommended. Food levels should be kept constant, so frequent feedings are required.
- Aquarium maintenance: Brine shrimp are usually kept in small tanks, and therefore water quality may deteriorate quickly. Water changes are of utmost importance. I recommend changing at least 20% two times a week. This is to prevent low oxygen levels which will be a result of poor water quality. It's also important to clean the bottom of the tank since brine shrimp moult very often during

their way to adulthood, leaving a lot of remains on the bottom of the tank which may lower the water quality. Cleaning should be done at night using a flashlight to draw the brine shrimp to the surface. Brine shrimp are drawn to light, and the light from the flashlight will attract them to the light source, keeping them safe while you clean the bottom of the tank.

Breeding brine shrimp

If well cared for and kept in a low salinity, your adult brine shrimp will (or might) spawn in your aquarium. Every adult female is capable of producing 75 nauplii a day, or 300 every 4 days. They will be able to spawn 10 times during a normal lifespan. However if well cared for they can, as I stated earlier, live for as long as 3 months and during that entire time spawn every 4 days.

About The Author

Article by William Berg writer for Aquatic Community with more then 20 years of aquarium experience. Find more of Williams articles about [Brine shrimp](#) or maybe something completely different like [Lungfish](#)

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Grindal Worms

By Clint Norwood

Grindal worms are a tiny relative of the common earthworm. Much larger than microworms but only a fourth the size of the harder to keep Whiteworms. Grindals are about half an inch long and as big around as a piece of thread.

They make excellent live food for growing fry and conditioning breeder adults of smaller species such as Guppies, Tetras, Danios and Killifish. They are also greedily eaten by even bigger fish. All fish benefit from some live food in their diet. Grindals live and reproduce well at normal household temperatures, take up very little space and are easy to culture.

How To Culture Grindal Worms



The worms surround a splotch of food
Toothpick for size comparison

Materials Needed

Culture Box - small plastic container with lid, such as a cleaned margarine tub.

Potting soil, enough to fill the container to a depth of about one inch.

Pablum or baby cereal - For worm food

Spray mister bottle - To keep the culture moist

A 2 inch square piece of plastic such as a piece of a fish bag - For harvesting the worms

A Grindal Worm Starter Culture

Starting A Culture

Put up to an inch of potting soil into your culture box, give it a good squirting with your mister, wet it to about the same moisture content as freshly turned dirt. Punch a few small holes in the lid for ventilation. Add your starter culture.

Feed the worms about a half teaspoon daily of the baby cereal, increase this amount as the culture grows, but try not to overfeed (leftover food will spoil and fungus) give it another squirt of water to

moisten the cereal. As you feed the worms, gradually spread the food out into a larger area of the culture as it grows.

When the culture is very heavily populated with worms you can start harvesting (usually after about 2 weeks). Harvest by wetting a small piece of plastic and sprinkling some of the worm food on it, the next day the plastic square should be covered with worms, you can then dip this into a cup of water, the worms will fall into the cup and can be fed to your fish. You can use a turkey baster or an eye dropper to dispense the worms.

Grindal worm cultures last for a long time and don't usually need to be re-cultured until the potting soil has soured or production has trailed off. When it's time to re-culture just harvest a few worm and repeat the above steps.



Grindal Culture, note the worms clinging to the grid.

Update

I'm now handling the grindal worm cultures in a new and much more productive way. First, no more potting soil or peat moss, now I'm using coconut fiber. The coconut fiber is less acidic and is much preferred by the worms. Also since the coconut fiber lasts longer without going bad I'm now feeding the worms fish flake food, specifically color food, instead of the less nutritional cereal based foods. This in turn gives the fish a more nutritious meal with the worms. Notice also in this picture the small piece of grid. That's cut from a large "needle point" mat that you can get at any Walmart or crafts store.

The harvesting method now is to dip the plastic grid into a cup of water, this makes the clinging worms fall off and wets the grid. Now I sprinkle the wet grid with the food and put it back on top of the fiber. No other water or food needs to be added. I can now go around to the fish tanks and dispense the worms to the fish.

Easier, faster and much more productive.

Fruit Fly Culture

By: "Blessed Silence"

There are several species of fruit flies, but it is easier to categorize them as wingless and flightless. Wingless don't have any wings or have small clumps of wing material, as where flightless have wings, there just not able to use them.

All species of Fruit Flies are raised the same way. There is commercial media available to raise them in, or you can make your own, both will need you to use active yeast. The benefit of the commercial media is that it already has a mold inhibitor mixed in it, no need to measure out the proper dosage. There are also a few homemade recipes one of which I will include at the end.

It is easiest to bottle raise these. For that you can get a small water bottle and place the media in the bottom, approximately 1/2" deep. Any more and it will be a waste. You will need something for them to climb up to get out of the media. I use those plastic canvas sheets that are used for needlepoint. You can also use excelsior (make sure it contains no dye). Both of these are readily available at a local craft store. You will also need to make a foam stopper for the top of the bottle. This will keep the fruit flies in, and unwanted critters out. I use soft foam cut small enough to fit in the neck of the bottle. You can also use a sponge just make sure it has not been treated with anything. After you have done this add a starter culture, usually 20-25 fruit flies. If you put them in the fridge for about 15-20 minutes it will slow them down enough to make it easier to add them to into your new culture bottle. In about 2-3 weeks you will notice little things crawling up the sides, they are the maggots that will eventually turn into the fruit flies. I find it best to keep the temperature between 65-72 degrees. For some reason if they are kept at higher temperatures they grow wings that they can use, and are able to fly. If this happens just open the bottle outside and let the ones that can fly out.

Harvesting these can be a little tricky. The best way I have found that works, is to sharply tap the bottle, which will knock a lot of them off of what they are perched on. I find if you use the plastic canvas it is easier to harvest and clean up for your next batch. Then just dump a few into your tank. Sooner or later you fish will learn to recognize the sound of you thumping the bottle, and come up begging to be fed.

It is best to start a new culture regularly. This is so one doesn't foul and crash, usually once every week or two. I have 6 cultures going on at all times. This will ensure you have enough to feed your fish without depleting your cultures.

I regularly use commercially available culture media. It saves time and money in some cases. But I have also used a "home brew" which I found on the internet a while ago. I forgot where I found it, but it seems to work great. There are a lot of other recipes available. Try out a few and decide which works best for you.

Here is the recipe I use.

Home Made Culture Recipe:

1/2 Cup Instant Mashed Potato flakes.
4 tsp. Cornflower.
2 tsp. Active yeast.

½ tsp. Sugar.
Apple Cider Vinegar.

I mix all the dry in a larger portion and when needed add in the Apple Cider Vinegar before I use this. The Apple Cider Vinegar has 2 uses, first it is a good mold inhibitor, and second it helps bind the items together. When ready to mix the dry with the Vinegar you will want to mix it in a 1:1 ratio, it will be the consistency of a dry paste. You don't want it to be too wet, or it will foul your culture.

Daphnia As A Live Food For Aquarium Fish

By Clint Norwood

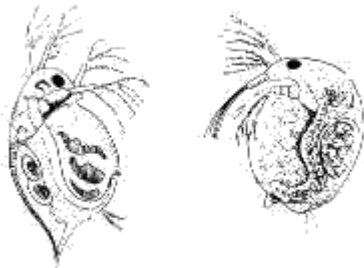
What are Daphnia:

Daphnia are a very small freshwater shrimp like creatures. They are found in small pools, ditches and ponds all over the world. They thrive best where there is an abundance of food for them. They are filter feeders, that is they swim around and filter the water for smaller organisms. They eat rotifers, algae and infusoria. Serious oldtimer Aquarist used to go on collecting trips for daphnia every weekend and they considered daphnia the best fish food available. I don't advise collecting wild daphnia because of the potential of possibly bringing home diseases, parasites or other undesirables along with the daphnia.

Getting Some Daphnia

Daphnia are hardly ever available in petshops, I have no idea why. But if you want to try them your best bet is to start a culture of your own. You can buy a starter culture from fellow aquarists or try a place like Aquabid.com which usually has some listed.

Culturing Daphnia



Looks like a scene from "Jar Wars", but it's really a drawing of daphnia many times larger than life.

What you need:

- 2 one gallon jars or something similar
- siphon hose (ie airline tubing)
- brineshrimp net or the toe part of a ladies pantyhose
- A source for algae or some bakers yeast
- a bubbling air line
- a brightly lit place to keep the culture jars

Culturing daphnia is not the easiest thing to do. Some people seem to have excellent luck with them while another doing exactly the same procedure fails altogether. I have an old unused swimming pool that I let turn green with algae and use the greenwater to feed the daphnia. I also sometimes use yeastwater, a mixture of a small pinch of bakers yeast and a little water "all shook

up" (ah huh huh). When using yeastwater add only a very tiny bit at a time, you want to just see a faint cloudiness, no more. Daphnia die more quickly from overfeeding than anything else.

Once you start a culture it's a constant job, not hard to do but requiring constant attention. they need water changes just like aquariums. I usually accomplish this while I'm harvesting the daphnia. I siphon out about a quart of the daphnia jar thru a brineshrimp net, or the toe portion of an old ladies panty-hose (I use my old lady's usually, just another way to get her involved in the hobby). This catches a good quantity of daphnia that I can now feed to the fish. I then add a quart of greenwater or a quart of clean water and feed some yeastwater back into the daphnia jar.

I advise setting up 2 or more one gallon cultures so if something goes wrong with one you'll have a backup. Of course a bigger container is better. The culture jars need to have an open airline running to them, doesn't need to be deep in the jar, just enough to keep the surface agitated and keep the water circulating around. This is very important because it keeps the daphnia food circulating around so they can eat. Don't use an airstone, they create too many fine bubbles that can stick to the daphnia, thus taking them out of circulation, and leaving em hopelessly floundering around the jar.



Close up of an adult daphnia moina
© Clint Norwood

Other items I've read about (but haven't tried) that are used to feed daphnia are graham bran, alfalfa powder (both from healthfood stores), blended spinach, liquid fry food, blood meal (yuk) and rabbit pellets. Another food I have just heard about is Gerber's Baby Food, Sweet Potatoes. It is said to be an excellent food for the daphnia with the added benefit of indirectly feeding the fish some high carotene food that will enhance their color. Other foods consisting of various manures have been suggested, but I really don't want to get into that crap.

One trick that I find especially pleasing is to put 10 to 20 or so adult daphnia in a fry tank. Though the daphnia are too big for the fry to eat, any baby daphnia they have will make good food, (they are smaller than baby brine shrimp) and the daphnia help keep the water clean. Of course you don't add any daphnia food to the fry tank.

There are several types of Daphnia commonly available. Daphnia Magna is about the biggest (about Brineshrimp size), followed by Daphnia Pulex a little smaller, and then Daphnia Moina, the smallest. I prefer the Moina because they are happy in water that is around room temperature, 70 to 85 F, (it's HOT in Alabama) while the other species require lower temperature, around 55 to 68F.

All species will do great outdoors in the warmer months. I use a kids swimming pool. Just throw in a handful of plant food fertilizer to get the pool green with algae first and then add the daphnia a few days later.



One of my Daphnia Moina culture jars, right after feeding yeastwater. Note that you just want a slight haziness. Notice the airline tubing, and yes that is a snail, doesn't hurt a thing. Also adding a little marine type aquarium gravel or oyster shell will give the daphnia a buffer from a low pH and supply them with needed calcium.

I have read that it's not good to keep the lights on a daphnia culture all the time, but as a constant experimenter, I tried it anyway. The results were outstanding, the daphnia have doubled to tripled their production. I've been doing this for 2 months now, so there has to have been several generations raised in constant light.

So far there are no bad side effects, other than having to feed the daphnia everyday as opposed to once every 3 days before. I am currently using a 10 gallon tank with an old incandescent aquarium light fixture. I feed the daphnia about an 1/8 teaspoon of bakers yeast a day, and harvest about a 1/4 to 1/2 teaspoon of daphnia a day, everyday!

Also in the tank are 100's of snails and I throw them a small leaf of lettuce every few days. An added benefit to the constant light is that the fish now have a night light, and I put microworm cultures on top of the light, the heat makes the microworms multiply and grow much faster.

Visitor Comments:

Added By: Daphnia Freak

Comments: your info help my science fair project to win 1st place! thanks!

Added By: bulrush

Comments: I have several tanks of daphnia. I measured my ammonia one day in one tank at it was at 4ppm! The daphnia were doing fine though they were making ehippia. (Correction, a few were dying, probably due to ammonia.) I am guessing they started making ehippia when the ammonia was around 2ppm.

Ehippi are the "resting eggs" they make when their water gets bad or there's not enough food. Ehippia look like a packet of 2-3 eggs on their back. A blob starts out white, then grows black as the ehippia matures.

Ehippia can survive drying. So you can let your daphnia tank dry out, put the ehippia in the fridge for a week, then put them in a tank with water and they will hatch. Sometimes the ehippia will be shed when the daphnia sheds its exoskeleton.

Confused Flour Beetles

Trichogramma confusum

By Blessed Silence



Confused Flour Beetle © Blessed Silence

They have been so aptly named due to the fact they were confused with another beetle. They are a great food for herps, birds, frogs and some surface feeding fish. The hardest thing you have to do with this culture is not be impatient, it takes a little while for them to establish a good culture and once they have you don't want to over harvest them.

They are easy to keep, all you need is a container to hold them (I use those plastic shoe boxes) whole wheat flour and a start of beetles. I put enough flour to cover about ½ inch and pour in the start culture and put the lid on. A good colony will establish in about 4 to 6 weeks. You can check on it from time to time by looking for adult beetles and also the larvae. You can feed both adult beetles and larvae to your pets.

Harvesting is pretty easy; you just have to be careful not to let any crawl away. I use a small hand held flour sifter, not the large ones used for baking. I scoop up some of the media and sift it out, and then all you have left is beetles and larvae. This is the time to be careful; they can crawl out of the sifter so make sure you don't get distracted.

This may seem a little tedious to most, but if you are breeding a hard to keep fish, or have some picky frogs or newts it is well worth it, what other food can you grow this easy? Get multiple cultures going that way you can ensure a constant supply of food without having to worry about over harvesting.

Brine Shrimp As Fry Food

By Clint Norwood



Here is a typical 8 oz. cup of harvested baby brine shrimp that you should get from a ¼ teaspoon of eggs.

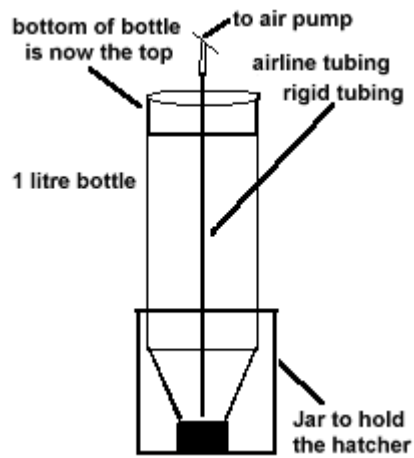
Brine shrimp, also known as artemia, are a boon to tropical fish keepers. They can be used as food for fish of all sizes. They can be fed live or frozen and even freeze-dried. Processed brine shrimp can usually be obtained from almost any pet shop. The live shrimp may be a little harder to find, but they are worth it.

Live baby brine shrimp are the best source of food for fry. The eggs are easily hatched in a solution of salt water, then strained through a fine net and fed to the fry.



An adult brine shrimp, about twice its natural size.
Ugly spud isn't it?

Making Your Own Brine Shrimp Hatchery



© Clint Norwood



The Hatchery In Action



Macro photo of baby brine shrimp © Clint Norwood

You will need an empty 1 litre soft drink bottle, a 12 inch length of rigid airline tubing and a large mouth jar of some sort so that the soft drink bottle will fit into when inverted.

Cut the bottom off of the soda bottle, leaving about an inch of the sides left on. Punch a hole the size of the airline tubing in the center of the bottom piece. Invert the large top part of the soda bottle and fit it into the wide mouthed jar.

Now turn the bottom piece over and fit it into the top of the inverted bottle, insert the tubing all the way to within about a 1/4 inch of the bottom of the hatchery. Add some regular airline tubing to hook it up to an air pump and your hatchery is complete.

Using the hatchery

Now all you need to do is add about 1/2 litre of tap water and a half teaspoon of aquarium salt. Hook up the air pump to mix the salt solution and add about a 1/4 teaspoon of brine shrimp eggs. In about 24 hours you should have hatched most of your eggs if they have been kept at 80 degrees F, it takes longer at cooler temperatures.

Unhook the air pump and wait about 5 minutes the baby brine shrimp will settle to the bottom neck part of the hatchery and then you can use the air line to siphon the shrimp into a fine meshed net.

I usually invert the net into a cup of fresh water and use a eye dropper or turkey baster to dole out the shrimp to all of my fry tanks. You can usually use the same hatching water twice before mixing up another batch although you do have to add more eggs each time.

You will find that baby brine shrimp are the perfect fry food, ensuring fast growth and healthy vigorous fry.

My Personal Tips For A Better Hatch

Getting the highest quality eggs with the highest hatch rate, 95%, is very much worth the price

difference.

I use less salt for hatching than most references state, the shrimp seem to hatch quicker and the water quality holds up longer. Salt is cheap, but in this instance less is better.

There's no need to dechlorinate hatch water, in fact the chlorine is beneficial to a better hatch rate.

If you are having consistently bad hatches, blame the eggs. Buy better quality eggs. Eggs that are stored in a petshop for a few months will get exposed to excess moisture and the hatch rate will really suffer.

Always keep stored eggs in a dry place, not close to the fish tanks. I use a sealed container for egg storage, and when possible I use 2 or more of those tiny "stay dry" silica pouches that come with some electronic and food items.

Blackworms

By Clint Norwood



Live Blackworms, about twice life-size. © Clint Norwood

Psst, want to get your fish in a spawning mood? Here's the trick, feed them some blackworms for about 3 or 4 days. Just about all aquarium fish love blackworms. They are a rich food but for conditioning or growth blackworms can't be beat.

Blackworms are a close relative of the more commonly known Tubifex worm. they are totally aquatic and usually live in nutrient rich bodies of water.

There are 2 camps when it comes to Blackworms. Some people blame the feeding of Blackworms for various fish ills that might pop up. But others including myself feel that clean live Blackworms are the perfect fish food. They're like fish manna, fish just love them. Some fish love them so much that they eat until they get sick, but a good Aquarist knows not to overfeed. Some fish are a little smarter than others, or maybe less gluttonous and can handle a few extra Blackworms in the aquarium, and then they can eat their fill over a few days. Blackworms will live fine in an aquarium, but they usually don't last long because the fish will constantly seek them out.

Of course nothing comes too easy and Blackworms do have their drawbacks. One, they have to be kept cold, that usually involves keeping them in your refrigerator until you're ready to feed them. And two, they are sometimes hard to find locally. I get mine over the internet from a California dealer. They are quite reasonably priced and shipped postpaid. Here's the link if you're interested <http://www.aquaticfoods.com/worms.html>, this is an unpaid endorsement. But if you are lucky you can find them at a local petshop.

The biggest problem I had was convincing the rest of the family that it is OK to keep them in "our" refrigerator.



Blackworms in the fridge, water for rinsing stored beside them.

© Clint Norwood

The reason for keeping them cold is to slow their metabolism down so they can be crowded into a manageable container, and it extends their useful life. Maintenance involves rinsing the worms daily, that means EVERY day, even if you're not feeding them to your fish today, you still have to rinse the worms.

I keep the worms in a small plastic container that you can find in nearly any grocery store. I fill this container to about a 1/2 inch (1 cm) depth with tap water that has been cooled. Upon receiving the worms just rinse them once and place them in the container. I add several old brown oak leaves, an old fishkeepers trick, which greatly helps to keep the worms in good condition.



Yummy! Black Worms for Dinner

Heres my "perfected" daily procedure:

Take the worms out of the fridge, set up close to the sink.

I use a tooth pick to scoop out the amount of worms I'll be feeding to my fish today. I put them into a small cup of room temperature water, then use a eye dropper or a baby medicine dropper to dispense them to the tanks.

Fill the worm "keeper" with ALL the water in the bottle, try to cause as much turbulence as possible, without splashing.

While I'm waiting for the worms to stop floating around I refill the water bottle.

Pour all the excess water out of the worm keeper until you have the depth at about 1/2 inch

Return the worms and the water bottle to the fridge.

Elapsed time 1 minute, or less if you're quick. Now just take a leisurely stroll around to all the aquariums, feed the fish some tasty Blackworms and watch your fish become a pig.

THE END

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