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15mm Grindal Worms (*Enchytraeus buchholzi*)



Grindal worms are a tiny relative of the common earthworm. They are much larger than microworms but only a fourth the size of the harder to keep white worm. Grindals are about half an inch long and as round as a piece of thread. 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.

Nutritional analysis

Anyone got any info? Please let me know by emailing tony@gelf.com.au.



Photo by the author

Suitable for:

They are probably one of the most important cultured live foods for both marine and freshwater fish. They make excellent live food for growing fry and conditioning breeder adults of smaller species such as Rainbows, Guppies, Tetras, Danios and Killifish. Even bigger fish greedily eat them.

Culture methods

Grindal worms are found in the wild consuming decomposing organic matter. Finding them is difficult, but they can be found if you are persistent.

Obtaining starter stock

Grindal worms are not commonly cultured in Australia.

The best way of starting a culture is to find someone who already has cultures. On rare occasions you may find them in your local fish shop.

Grindal worms can also be found in the wild, usually associated with decomposing kitchen scraps or compost piles, but they are very difficult to find and isolate.

Contained culturing

I have had success culturing Grindals using several different culture methods.

Culture containers:

Your selection of culture container will need to be plastic or glass with a wide area as grindals live on the surface of the culture. A tight fitting lid will be needed to prevent contamination by other bugs and to stop predators like cockroaches eating your worms.

Culture medium 1 (peat):

Mixing parts loam soil or good quality non-fertilised potting mix can produce a simple natural culture medium:

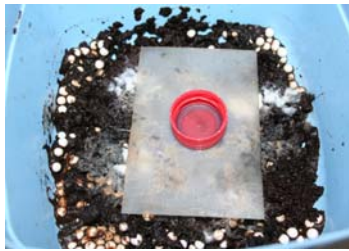


Photo by the author

<i>Parts</i>	<i>Substance</i>
5 parts	Garden loam or good quality unfertilised potting mix
5 parts	Peat or coco-peat
1 part	Dolomite (for pH balance)
1 part	Shell grit (for pH balance)
2 parts	Small styrofoam balls (optional)

Boil the lot for 5 minutes and allow to cool. Wash the mix under running water through several layers of muslin cloth, then squeeze dry by placing in an old stocking and squeezing until water no-longer runs free. The right moisture content is when the culture is wet/dry enough to stand in clumps on it's own without water settling out.

I then place the mix in sealable containers (old ice cream containers) and microwave on high (lid unsealed) until the contents are extremely hot. If you get a small scent of charred timber then the contents are hot enough. This process helps to ensure the medium has no potentially harmful bacteria or algae present. While hot, seal the lids for storage.

When preparing cultures for inoculation, add a layer about 2cm thick to the bottom of your selected culture container (do not compress). If the prepared medium has been stored for quite a while, I will re-microwave and allow to cool before adding the worms.

Once all is prepared add your worms and a little food.

Culture medium 2 (sponge culture):

Using an artificial culture medium, I have found a culture can be sustained indefinitely, though production is slightly lower than using natural culture mediums.

The culture medium is made by cutting a piece of open pore sponge to snugly fit into your selected culture container. The sponge will need to be about 5cm thick, or more.

Using a soldering iron, singe about 2mm into the foam on the top surface except for the edges and a few pylons for the harvesting tray to sit on.

Put about 2cm of water into the container, add your Grindal worms, and a little Grindal food. Ensure the food is sprayed with a little water when it is added, otherwise the worms will not eat it.

To maintain the culture requires fortnightly work.

Remove the sponge from your culture container and put aside, tip out all the water in the container (it will be stained and may smell), put the worm filled sponge back into you culture container and add fresh water to 2cm by pouring through the sponge (this will wash unwanted waste from the sponge while giving any washed out worms a chance to climb back into the sponge before drowning).



Culture medium 3 (Scotchbrite culture):

The use of Scotchbrite scouring pads or other open pore material as a culture medium is a common practise. I have conducted experiments with wadding (the material used for quilting) with good success. Although I found the production rate was less than using the natural culture medium, the harvest was clean of contaminants (medium), and there was less chance of the culture being infested with other bugs or fungus.

Using wadding or Scotchbrite pads, place 2 sheets cut to size in your chosen culture container. Put a small amount of water in the container, add the worms, and a little food.

To extend the life of the culture, occasionally pour out the dirty water and replace with clean aged water. When the top pad is too dirty, simply remove the bottom pad and place a new clean top. The old top pad becomes the new bottom pad. You will also need to do a water change at this time.

This method is good as moisture is easily controlled, there is no unwanted medium during harvesting, and the medium will not rot or mould. But I have found production rates are much reduced.

Food:

Grindals will need to be fed daily, after harvesting. Be careful when feeding your grindals, as more than what can be eaten in 24-48 hours will result in a fungal outbreak. Although this will not kill your culture, it will dramatically slow the production rate.

Grindals will eat a great variety of things. Simply using farax, rice flour, rolled oats, bread crumbs, or some other dried crushed grain product will have good results. I've also had good results using kitten food, soaked before feeding. Remember what you feed your worms will determine what goodness they pass onto your fish.

My recipe (only feed to established cultures):

3 cups	Ground oats	1 cup	Chick pea flour
20 cups	Farax	1 cup	Soy flour
1 cup	Ground fish food	5 cups	Rice flour
2 cups	Cornflake crumbs	1 cup	Spirulina
4 cups	Bread crumbs	1 capsule	Multi-vitamin tablet
2 cups	Cornmeal		

Grindals are also a great way to medicate your fish. You will use much less medication, and ensure all the meds get into your fish rather than affecting plants or biological filtration. In a culture established for the purpose of medicating fish, simply add the medication to the Grindal food, then once the food is consumed, feed the grindals to your sick fish (don't try this with worm medications as all they will do is kill your grindals).

Temperature and light:

Temperature – Best results are achieved at between 22-28°C. DO NOT place worms in the fridge.

Light – Worms will grow just as well in light or dark conditions. DO NOT place container in direct sun light.

Moisture – The culture must remain moist (not damp). If it begins to dry out, add a little moisture with a mist sprayer.

PH – Acidity is important, if the culture becomes too acid production will slow, and the worms may die.

Harvesting:

Once a culture has established, you can begin harvesting and treating your fish to this great live food.

1. There are several different variations on the same theme for effectively harvesting Grindal worms. Many texts and references talk about the use of a glass lid on the surface of your culture. I do not recommend this method as the glass compacts your culture and reduces the worm production rate. I have had excellent results by slicing the flat base out of a



Styrofoam meat tray and using a heat glue gun I stick a bottle lid on one side as a handle. I have also experimented with a mesh glued to the other side to increase harvest with good results.



Photos by the author

Another good alternative is to place the mesh directly on the culture surface.

You can wash the grindals directly into your tank, or into a container of water for feeding out to several tanks.

2. The mass harvesting method used for extracting white worms from culture also works for grindals. It is a simple matter of using a large enough colander or similarly meshed vessel with a fine enough mesh to hold back the culture medium but allow the Grindal worms through. Place the colander over a tray with water, a moist cloth or moist kitchen paper to collect the worms, and a desk light over the colander. Place your mature culture in the colander and switch on the light. The heat of the light and the drying of the culture will drive the grindals to the bottom and through the mesh to fall into your collector tray.

When all worms have left the culture, wash the culture to remove any fine waste, moisten to the appropriate level and re-inoculate with a new Grindal culture. When the culture is mature again, repeat the process.

Production:

Using standard harvesting methods, a single culture should be harvested and fed every day. It will produce enough worms to feed a 2' tank with a reasonable amount of fish in it.

Wild harvesting:

Wild harvesting is not a feasible option, as wild populations will always be low.

Storage of over-production:

Over production is only an issue if you're using harvesting method #2. Excess worms can simply be packaged and frozen in airtight containers for later use.

Warnings or cautions

Experience has shown crushed rye grain or rye bread crumbs will kill Grindal Worms. Do not use as worm food.

The worms are harmless to you and your fish, but be careful not to overfeed as you will end up with obese fish.

Your culture can smell. If culturing inside, always start new cultures as the odour becomes too offensive.

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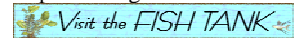
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Guppy from monsterfishkeepers.com

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