

API® Lesson 7 | Brine Shrimp

This lesson plan provides insight about live foods and instructions to learn the procedure to create and maintain brine shrimp hatchery for feeding fish. Live foods provide an activity for everyone to see the excitement when fish are presented with food that has movement.

For Instructor/Teacher/Parent

Make sure to read through the entire lesson plan before beginning this with students/family members as materials may need to be purchased and information prep will need to be done. Purchasing a brine shrimp hatcher is certainly an option. Many are very small and do not provide enough volume to grow enough brine shrimp to meet the average aquarium needs. Prior to beginning this exercise having a discussion on the benefit of offering a complete and balanced diets of commercially prepared foods is important. While brine shrimp are eagerly taken by fish, they do not provide the complete and balanced diet to maintain them.

Learning Objectives

After completing the activities outlined in this lesson plan, students should be able to:

- Build their own brine shrimp hatcher
- Understand the benefit and limitation of live Brine Shrimp
- How to separate live brine shrimp nauplii from unhatched eggs and shells
- How to feed fish with live brine shrimp

Length

This activity will take about 3 hours to build the brine shrimp hatcher and 48 to 72 hours for each batch of live brine shrimp.

Materials

- Brine shrimp eggs (Artemia Sp.)
- API AQUARIUM SALT
- API STRESS COAT™ water conditioner
- Tablespoon and teaspoon measure
- Container (e.g. a large beaker)
- Turkey baster or pipette
- Brine shrimp hatchery
- Three, clear 2-liter soda bottles
- Clear plastic tape
- Scissors
- Marker
- Flexible rubber airline tubing
- Rigid airline tubing
- Air pump

Key Terms

Review key terms (printable sheet included at the end of the lesson) with students/family members.

- 1) NAUPLII
- 2) NAUPLIUS
- 3) INSTAR

Before You Start

Many newly hatched fish are enticed to begin eating with live foods and then as they grow the fish can be switched over to a complete and balanced diet. When brine shrimp first hatch their first Instar stage provide a high protein nutritional value than every additional Instar stage the nutritional value drop unless the baby brine shrimp are enriched. Enrichment after the first Instar stage can be done by providing food in the forms of algae or an essential fatty acid supplement such as Selco during future Instar stage of growth. In the first Instar stage enrichment if desired would require allow the baby brine shrimp to swim in water with an essential fatty acid supplement. In the first Instar stage brine shrimp are not eating the fatty acid supplement, but it will stick to their body.

Feeding brine shrimp is fun and easy but we need to consider the size of the fish we are feeding. If we do not separate the newly hatched brine shrimp from the unhatched eggs or empty shells that have hatched, feeding them can be a concern. For larger fish this is often not a concern. Young fish, especially just born fish have very small intestinal tracts. Fish do not digest the shells and the if the shells or unhatched brine shrimp eggs are fed, they can become blocked in the intestine of fish. It is very important to sperate newly hatched brine shrimp from unhatched eggs or empty shells to protect the newly hatched fish or very small fish.

Fish as they grow need to have the correct balance of protein, fat, carbohydrate along with vitamins and minerals. While fish will aggressively eat brine shrimp when offered they seldom provide all the nutrients that fish need. One of the best ways to ensure your fish are getting a complete and balanced diet is to utilize aquarium foods that meet these needs such as API Flake Foods. API Flake Food is easy to grind between your fingers to the minute size of new fish. Feeding brine shrimp to entire newly hatched fish along with API Flake Food will ensure your fish are obtain the complete and balanced diet.

Proper preparation of the water we are using to hatch the brine shrimp is essential. If we are using tap water, we must be sure to use a water conditioner, like API® STRESS COAT™, to remove disinfectants such as chlorine and chloramines.

Once we produce/hatch a batch of brine shrimp it is important to clean our equipment before we start again. In all food preparation keeping things clean will help to eliminate concerns for our fish. The conditions that we incubate our brine shrimp are ideal conditions for a bacterial bloom and organic pollutants. All equipment that we use should be cleaned and disinfected between hatches.

The optimal time from adding the brine shrimp eggs to hatch is 24-hours. The time for hatching depends on the temperature and age and conditions of the eggs. The first Instar stage (Instar I) will be about 18 hours provided the brine shrimp hatcher is maintained at 78° to 80° F (26° to 27° C). Cooler temperatures require longer time for the eggs to hatch. If the brine shrimp hatchery is kept in the 73° to 76° F (23° to 25° C) the hatch will take longer, about 30 hours.



Instructions for Learning Activity

1. Procedure: Making a hatcher.

1. Wash and dry the soda bottles and remove the labels.
2. Draw a circular line around the base circumference of one bottle. This is bottle 1.
3. Cut this material out and discard.
4. Tightly screw the cap onto bottle 1.
5. On the second bottle, measure about 4" (10 cm) from the top and draw a circular line around the circumference.
6. Cut along this line and discard the top part of the bottle.
7. Invert bottle 1 inside the second bottle bottom so that the cap is resting on the bottom.
8. Tape the seam with the clear plastic tape or use silicone sealant to make an airtight area between the two bottles.
9. On the third bottle, draw a line around the circumference of the bottom about 2 ½ inches (6 cm) up.
10. Cut along this line and discard the top portion.
11. Cut or drill three to four small ¼" (0.6 cm) holes in this cap.
12. Place the cap so that it fits over the inverted bottle.
13. Cut a piece of rigid airline tubing long enough to reach down the cap of the inverted bottle and out the top at least 2" (5 cm).
14. Pass this rigid tubing through one of the holes of the cap reaching to the bottom of the bottle below.
15. Cut the bottom end of the rigid tubing at a 45-degree angle.

2. Procedure: Hatching brine shrimp

1. Wash and dry the culture container.
2. Add about 1.5 liters of water (Tap water treated with API Stress Coat) to the culture container.
3. Add 2.5 tablespoons (54 grams) of API Aquarium Salt to the culture container. Target hatch water salinity 25 ppt (1.026 SG).
4. Add up to ½ a teaspoon (1 gram) of Brine Shrimp eggs to the hatchery (culture container)
5. Put the cover (cap) on and place the rigid tubing slanted end first through one of the holes.
6. Gently swirl the salt and eggs a bit to mix.
7. Attach flexible airline tubing to the rigid airline tube and an air source to get a gentle rolling of all the ingredients.
8. Aeration should be approximately one large bubble every 3 seconds. Note: fine air bubbles are not desirable as they can be trapped in the carapace of the newly hatched brine shrimp and forcing them to the surface.
9. Label and Date the culture container.
10. Keep the eggs in suspension. Do not bubble them out of the container.
11. Insert a submersible heater or adjust room temperature. Temperature is best set to 80 degrees Fahrenheit, the lower the temperature the slower they will hatch.
12. Eggs should hatch in 24 -36 hours.

3. Harvest and Maintenance:

1. At the end of hatch time remove the air source and the cover.
 2. Leave the rigid tubing.

3. Let the hatch container settle for five to ten minutes.
4. After eggshells have settled, place a light source (e.g. a fluorescent light or light from cell phone) next to the hatcher in the middle of the water column.
5. The brine shrimp will slowly swim toward the light source. It is best to reduce lighting in the room if possible.
6. Once enough brine shrimp have gathered near the light, use a pipette or turkey baster to collect the brine shrimp. At the bottom will be unhatched eggs, and shells will float to the surface. Be careful not to collect shells and only to collect the hatched nauplii.
7. Place the collected brine shrimp into a container filled with aquarium water or treated tap water. You can now feed the newly hatched brine shrimp (nauplii) to your aquarium.
8. Wash the brine shrimp hatcher (culture container), pipette or baster thoroughly with hot water after use.

SUPPLEMENTATION OF BRINE SHRIMP FOR FEEDING FISH

Use a turkey baster or pipette to feed the shrimp to the fish. Feed only enough shrimp that can be consumed by the fish, being careful not to overfeed. Uneaten brine shrimp will die and foul the water in small aquariums.

Discussion:

After students finish hatching and feeding brine shrimp to fish discussion suggestions for this exercise:

- Why do we not want to feed brine shrimp all the time as fish were so eager to eat them?
- What kinds of fish or age of fish are best suited for newly hatched brine shrimp (nauplii)?
- How does temperature affect hatch rate?
- How does light affect the newly hatched brine shrimp?
- Why do we separate the unhatched eggs or eggshells before feeding?

Quiz

- Once you've finished the discussion, pass out the Quiz worksheet (printable sheet included at the end of the lesson) to each student/family member.
 - Have them complete the quiz and then review the answers/have an open discussion about the answers with them. Answers are below.
1. Why do we not want to feed brine shrimp all the time as fish were so eager to eat them?
 - a. Providing fish with a complete and balanced diet is essential for the growth and health. Brine shrimp provides nutrition but is often lacking a balance of essential amino acids, vitamins, and minerals that fish need to thrive. Providing fish, a commercial prepared food that guarantee a complete and balanced diet is very important.
 2. What kinds of fish or age of fish are best suited for newly hatched brine shrimp (nauplii)?
 - a. Newly hatched fish with very small mouths or to entice them to begin eating
 - b. Smaller fish that need a bit of stimuli from a moving food.
 3. How does temperature affect hatch rate?
 - a. The lower the temperature the longer it will take for the brine shrimp to hatch. The ideal temperature is 80°F (27°C).
 4. How does light affect the newly hatched brine shrimp?
 - a. Brine shrimp are attracted to light. Providing a light on the side of the brine shrimp hatcher will attract the brine shrimp to congregate. Once they are congregated or assemble in mass, they can be removed with a turkey baster without concern for unhatched eggs or empty shells.
 5. Why do we separate the unhatched eggs or eggshells before feeding?
 - a. The unhatched eggs or eggshells can impact the intestine tract of small fish. Feeding the can cause a blockage in the fish resulting in their death.

APPENDIX

See items below to be passed out to family members or students for the lesson.

KEY TERMS

NAUPLII

Refers to multiple individuals (plural for nauplius)

NAUPLIUS

Refers to an individual animal (single brine shrimp)

INSTAR

growth stage of molts. As brine shrimp grow, they shed their outer shell and grow larger. Each stage of growth is called an Instar I, Instar II, Instar III, etc.

BRINE SHRIMP LIFE CYCLE

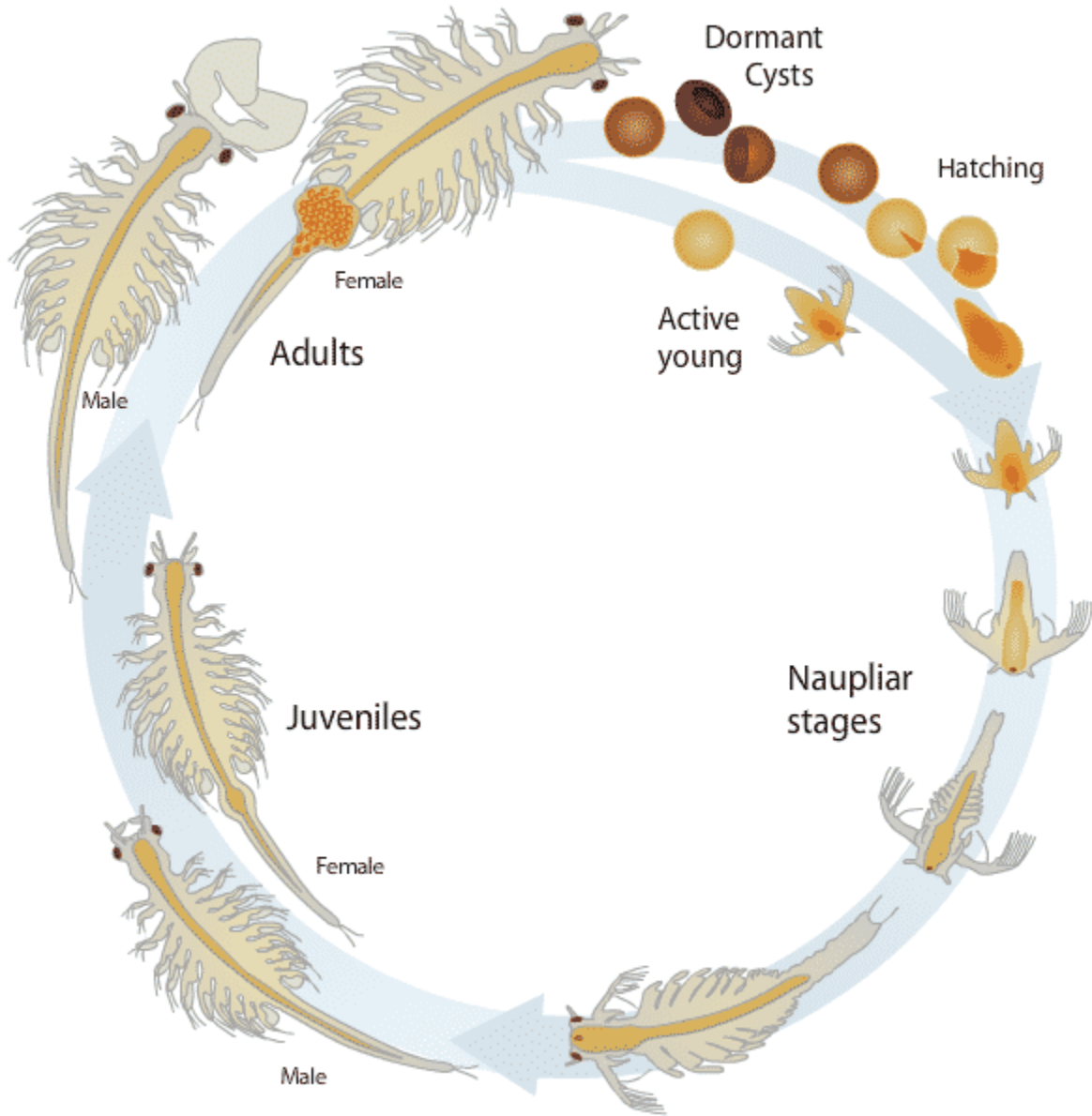


Image Source: fishkeepingadvice.com

QUIZ

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CONTACT US & ADDITIONAL RESOURCES

For more information regarding this lesson plan, API® brand, or any general fishkeeping questions and/or comments, feel free to contact us below.

- Website: www.apifishcare.com
- Telephone Number: 1-800-847-0659