

## Lesson C3–5

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# Propagating and Selling Fish

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**Unit C.** Animal Wildlife Management

**Problem Area 3.** Fish Management

**Lesson 5.** Propagating and Selling Fish

### **New Mexico Content Standard:**

**Pathway Strand:** Natural Resources and Environmental Systems

**Standard: IV:** Employ knowledge of natural resource industries to describe production practices and processing procedures.

**Benchmark: IV-A:** Prepare presentations to describe how natural resource products are produced, harvested, processed and used.

**Performance Standard: 3.** Describe fish harvest techniques and procedures.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Identify propagation methods of fish
2. Describe how to care for fry
3. Identify strategies for marketing fish
4. Identify factors that affect selling fish

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Lee, J.S. & Newman, M.E. *Aquaculture—An Introduction* 2<sup>nd</sup> Edition. Danville, Illinois: Interstate Publishers, Inc., 1997. (Chapters 3 & 8)

**Other Resources.** The following resources will be useful to students and teachers:

Selness, D. *Exploration Activities in Aquaculture*. Danville, Illinois: Interstate Publishers, Inc., 1997.

Lee, Jasper S., et al. *Introduction to Livestock and Companion Animals*. 3<sup>rd</sup> Edition. Upper Saddle River, New Jersey: Prentice Hall Interstate, 2004. (Textbook, Chapter 13)

## List of Equipment, Tools, Supplies, and Facilities

Writing surface  
Overhead projector  
Transparencies from attached masters

**Terms.** The following terms are presented in this lesson (shown in bold italics):

Artificial spawning  
Broodfish  
Farm spawning  
Fingerlings  
Fry  
Live haulers  
Milt  
Mouthbrooders  
Natural spawning  
Photoperiod  
Propagation  
Spawning  
Spawning container  
Substrate spawning

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. What product does a cattle rancher sell?
2. What product does a hog farmer sell?
3. What product does a fish farmer sell?

*Allow this to lead into a discussion on all the products that a fish farmer can sell and how the products are produced. This will lead into a discussion of the content of this lesson.*

## Summary of Content and Teaching Strategies

**Objective 1:** Identify propagation methods of fish.

**Anticipated Problem:** How are fish propagated?

- I. **Propagation** is the process of man controlling fish reproduction. Fish reproduce by spawning. During **spawning**, the female lays her eggs and then the male deposits sperm over the eggs. The method used to propagate fish varies by species.
  - A. Catfish are often allowed to naturally spawn. **Natural spawning** occurs without the intervention of man. In doing so, the fish seek hollow logs or other structures to lay the eggs in. **Farm spawning** occurs when a male and female catfish are moved to a **spawning container** (an artificial nest). The fertilized eggs can be left in the pond or moved to a hatchery. Once fertilized, the eggs will hatch in 6 to 10 days.
  - B. Tilapia are usually spawned in ponds, tanks, or aquaria. The spawning of tilapia is controlled by the photoperiod. **Photoperiod** is the number of hours of sunlight during a day. Tilapia will spawn when the days reach 10 to 16 hours. This light can be controlled with the addition of artificial lights. An interesting fact about tilapia is that different species hatch their eggs in different manners. **Mouthbrooders** lay their eggs in a nest and allow them to be fertilized. Then, the female will incubate the eggs in her mouth until they hatch. In contrast, **substrate spawning** occurs when tilapia lay their eggs in nests on the bottom of the ponds and allow the eggs to hatch there.
  - C. Trout can spawn naturally like catfish or tilapia. The difference is that trout eggs take much longer to hatch, as much as 80 days. Trout are often propagated using artificial spawning. **Artificial spawning** occurs when the eggs are removed from the female and **milt** (sperm) is removed from the male. Humans control fertilization by mixing the two together. These fertilized eggs are placed in incubators where they are carefully monitored and controlled.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in identifying propagation methods of fish. Chapters 10 and 11 in *Aquaculture—An Introduction 2<sup>nd</sup> Edition* text are recommended. Use TM: C3–5A to aid in discussion on this topic.*

**Objective 2:** Describe how to care for fry.

**Anticipated Problem:** How should fry be cared for?

- II. Fry are immature fish. Special care must be taken to care for the fry to ensure they grow into adult fish. They must be protected from predators, which may include larger fish of the same species. Additionally, their dietary requirements are different than adult fish.
  - A. Catfish fry are born with an egg sac that gives nutrition to the new fry for a few days. After the egg sac is gone, the fry are fed a 49 percent protein feed that is finely ground. As the fry mature, the protein amount is reduced. Many producers keep catfish fry in troughs or other protected areas until almost a year, when the catfish, now called fingerlings, are stocked in ponds. **Fingerlings** are young fish slightly larger than human fingers, that are ready to be stocked in ponds.
  - B. Tilapia fry are cared for in a similar way to catfish. The exception is that they are started on a feed that is as high as 60 percent protein. The feed is usually ground into a fine meal, or pellets that disintegrate in the water.
  - C. Trout fry are cared for similar to catfish and tilapia. The biggest difference is that trout fry are very small. Once the eggs hatch in the incubators, they are usually moved to troughs where they are fed a nutritious feed. Once they have matured enough, they are continuously graded to keep fry of similar size together. This is done to prevent the larger fry from eating the smaller ones.

*There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in describing how to care for fry. Chapters 10 and 11 in Aquaculture—An Introduction 2<sup>nd</sup> Edition text are recommended. Use TM: C3–5B to aid in discussion on this topic.*

**Objective 3:** Identify strategies for marketing fish.

**Anticipated Problem:** What are some strategies for marketing fish?

- III. Marketing fish can be handled in many ways. Some methods or ways that fish are sold include:
  - A. Selling broodfish to fish hatcheries. **Broodfish** are fish used for breeding. Fish hatcheries produce eggs, fry, and/or fingerlings. These are sold to other fish producers.
  - B. Some producers obtain eggs or fry from hatcheries, then raise them to fingerling size and sell them to producers to stock ponds. These producers raise the fingerlings to harvest size and then sell the fish to processors, fee lake operators, or live haulers.
  - C. **Live haulers** buy fish from growers and then resell them to fish markets or fee lakes. Fee lake operators obtain fish from growers, stock their ponds, and then charge people to fish in their ponds. Many producers combine all or many of the above methods of marketing.

There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in identifying strategies for marketing fish. Chapters 9 and 10 in *Aquaculture—An Introduction 2<sup>nd</sup> Edition* text are recommended. Use TM: C3–5C to aid in discussion on this topic.

**Objective 4:** Identify factors that affect selling fish.

**Anticipated Problem:** What factors affect selling fish?

- IV. Marketing fish is affected by several factors. These include the size of the fish and grading the fish.
- A. Fish should be marketed at optimum size. The size of the fish varies with the species and at what stage they are marketed. The biggest factor is that when selling fish, they are in uniform lots. This involves separating the fish by size. Numerous mechanical devices can aid in separating fish.
  - B. Grading fish involves removing fish that are diseased or injured. Some species of fish are also graded on color. As with size, a uniform looking lot of fish is desirable when marketing fish.

There are many techniques that can be used to assist students in mastering this material. Students need text material to aid in identifying strategies for marketing fish. Chapter 9 in *Aquaculture—An Introduction 2<sup>nd</sup> Edition* text is recommended. Use TM: C3–5D to aid in discussion on this topic.

**Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at end of chapters in the textbook may also be used in the review/summary.

**Application.** Several opportunities for application are listed in the “Exploring” section at the end of Chapters 9, 10, and 11 in the *Aquaculture—An Introduction 2<sup>nd</sup> Edition* text. Laboratory Activities 3 and 5 in *Exploration Activities in Aquaculture 2<sup>nd</sup> Edition* are appropriate for this lesson.

**Evaluation.**

**Answers to Sample Test:**

**Part One: Matching**

1 = h, 2 = a, 3 = b, 4 = c, 5 = f, 6 = d, 7 = e, 8 = g

**Part Two: Completion**

1. natural
2. fee lake operators
3. hatcheries

4. injured
5. size

**Part Three: Short Answer**

1. Eggs are removed from the female, milt is removed from the male, and man mixes the two together.
2. To keep larger fish from eating the smaller ones.

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# Test

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## Lesson C3–5: Propagating and Selling Fish

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

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|----------------|------------------|
| a. Broodfish   | e. Mouthbrooders |
| b. Fingerlings | f. Photoperiod   |
| c. Fry         | g. Propagation   |
| d. Milt        | h. Spawning      |

- \_\_\_\_\_ 1. The female fish lays her eggs and then the male deposits sperm over the eggs.
- \_\_\_\_\_ 2. Fish used for breeding.
- \_\_\_\_\_ 3. Young fish slightly larger than human fingers, that are ready to be stocked in ponds.
- \_\_\_\_\_ 4. Immature fish.
- \_\_\_\_\_ 5. The number of hours of sunlight during a day.
- \_\_\_\_\_ 6. Fish sperm.
- \_\_\_\_\_ 7. Female fish that incubate the eggs in her mouth until they hatch.
- \_\_\_\_\_ 8. The process of man controlling fish reproduction.

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. \_\_\_\_\_ spawning occurs without the intervention of man.
2. \_\_\_\_\_ stock their ponds and charge people to fish in their ponds.
3. \_\_\_\_\_ produce eggs, fry, and/or fingerlings.
4. Grading fish involves removing fish that are diseased or \_\_\_\_\_.
5. Fish should be marketed in uniform lots of fish that are all the same \_\_\_\_\_.



# FISH PROPAGATION

- ◆ **Natural Spawning** – fish are allowed to naturally reproduce
- ◆ **Farm Spawning** – fish are placed in an artificial nest
- ◆ **Artificial Spawning** – eggs and sperm are removed from fish



**Eggs are being removed from a sacrificed female fish (top left), mixed with sperm expressed from a male (bottom left), and placed in a hatching jar for artificial hatching (right).**

## FRY

- ◆ **Immature Fish**
- ◆ **Usually kept in troughs**
- ◆ **Fed a high protein feed**
- ◆ **Grow into fingerlings**



**Thousands of tiny catfish fry are being removed from a hatching trough.**

## **MARKETING FISH**

- ◆ **Broodfish sold to hatcheries**
- ◆ **Hatcheries produce and sell eggs, fry, and fingerlings**
- ◆ **Fry are raised to fingerlings and then resold**
- ◆ **Fingerlings are stocked in ponds and raised to food size**
- ◆ **Live haulers buy food size fish and resell them**
- ◆ **Fee lake producers charge people to fish in their ponds**
- ◆ **Any of the above could be combined**

# FACTORS AFFECTING FISH MARKETING

## ◆ Size

- Fish should be uniform size
- Size varies by species and growth stage

## ◆ Grading

## ◆ Diseases

## ◆ Injuries

## ◆ Color