A Feeding Tray For Use in Eel Farming

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Since 1975, the North Carolina State University Eel Culture Project has demonstrated techniques used in farming of the American eel, Anguilla rostrata at its facility near New Bern, North Carolina. A major portion of the labor and costs involved in this program, or any fish farming operation, is associated with ration preparation and feeding the fish. Fluctuations or alterations in either of these activities can strongly influence the economic feasibility of eel farming. In addition, any situation which results in loss of food before ingestion by the fish is creating a drain on the profits which may be realized.

The diet which is fed to our eels is composed of 75% menhaden fish meal, 25% alpha-corn starch and trace amounts of a vitamin pre-mix and an antibiotic. The food is blended as dry ingredients and stored until final preparation for feeding to the eels. This involves adding water and stirring until the mash reaches the consistency of dough. It is then placed in the feeding trays suspended just below the pond water surface.

During the process of pond grow-outs of the eels during 1975 and 1976, it became evident that considerable amounts of the daily ration were not being consumed. The mesh of the feeding tray permitted entry of the eels into the feeding area, but it also resulted in the loss of sizeable chunks of the ration which had been dislodged by the feeding action of the eels. After a few weeks of placing the feed in simple mesh feeding trays, sufficient uneaten food had accumulated beneath the feeding station to produce an area of decomposing fish meal which threatened good water quality in the pond and produced the obvious effects such food loss would have upon profits. Once food particles reached the bottom they remained uneaten because the American eel, despite common belief to the contrary, will not consume rotting organic matter.

As a result of the food losses, project personnel developed a baffled feeding tray which can be used for the mash feed mixture while preventing nearly all of the loss of food particles and resulting problems.

The design assets of the baffled feeders include the following:

1. the feeder permits the eels access to the food in a mesh tray;

2. baffles direct dislodged particles into a fine-meshed tray where they may then be eaten;

3. the fine-meshed tray is easily removed for cleaning of accumulated bone fragments or uneaten food.

FEEDING TRAY CONSTRUCTION

The materials and methods described below are suggested for the construction of a baffled feeding tray as shown in Figure (1).

Materials

a) 5½ inch wide aluminum garden edging

b) vinyl coated crab pot (chicken) wire

c) vinyl coated eel pot wire, 1" x ½" mesh

d) vinyl coated wire, ½" x½" mesh

e) aluminum window screening

f) crab pot rings

g) #19 gauge steel wire

h) link chain

Tools

1) wire cutters

2) needle nose pliers

3) crab pot ring pliers

4) tin snips

5) hammer

6) #6 nail

7) measuring rule

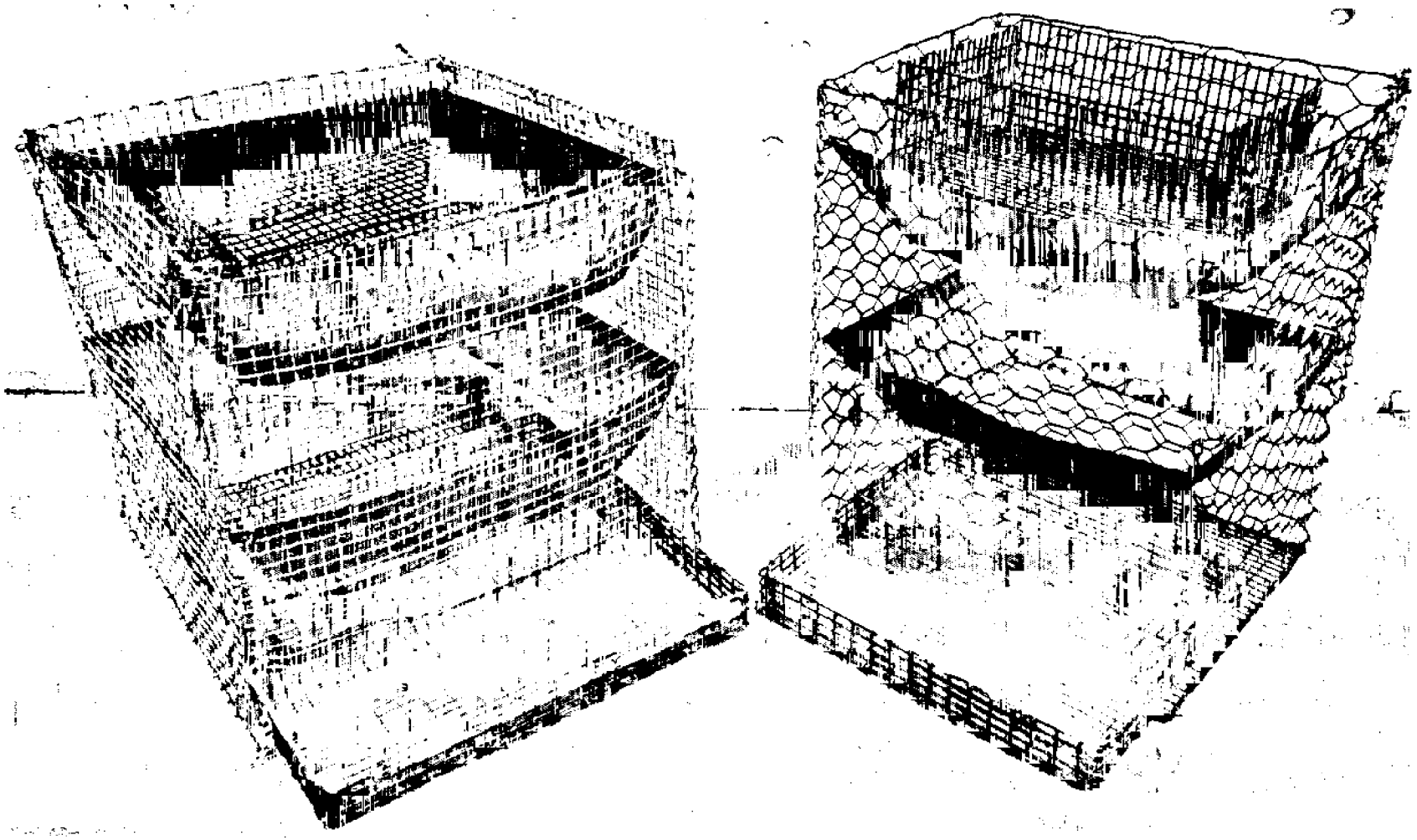

Figure 1. Two baffled feeding trays constructed of different sizes of mesh to ensure that eels of all sizes are able to obtain food.

1. Step One -- outer frame

The outer dimensions of the feeder are variable, they should be small enough that it can be easily raised and lowered through the allotted space in the feeding station without catching on the sides. Two inches of free space on each side works well.

Cut a length of the desired mesh wire (b, c, or d of the above materials) and make three, ninety-degree bends to give the feeder the desired outside dimensions (Figure 2). Use the crab pot rings to fasten the free edges to make the fourth corner.

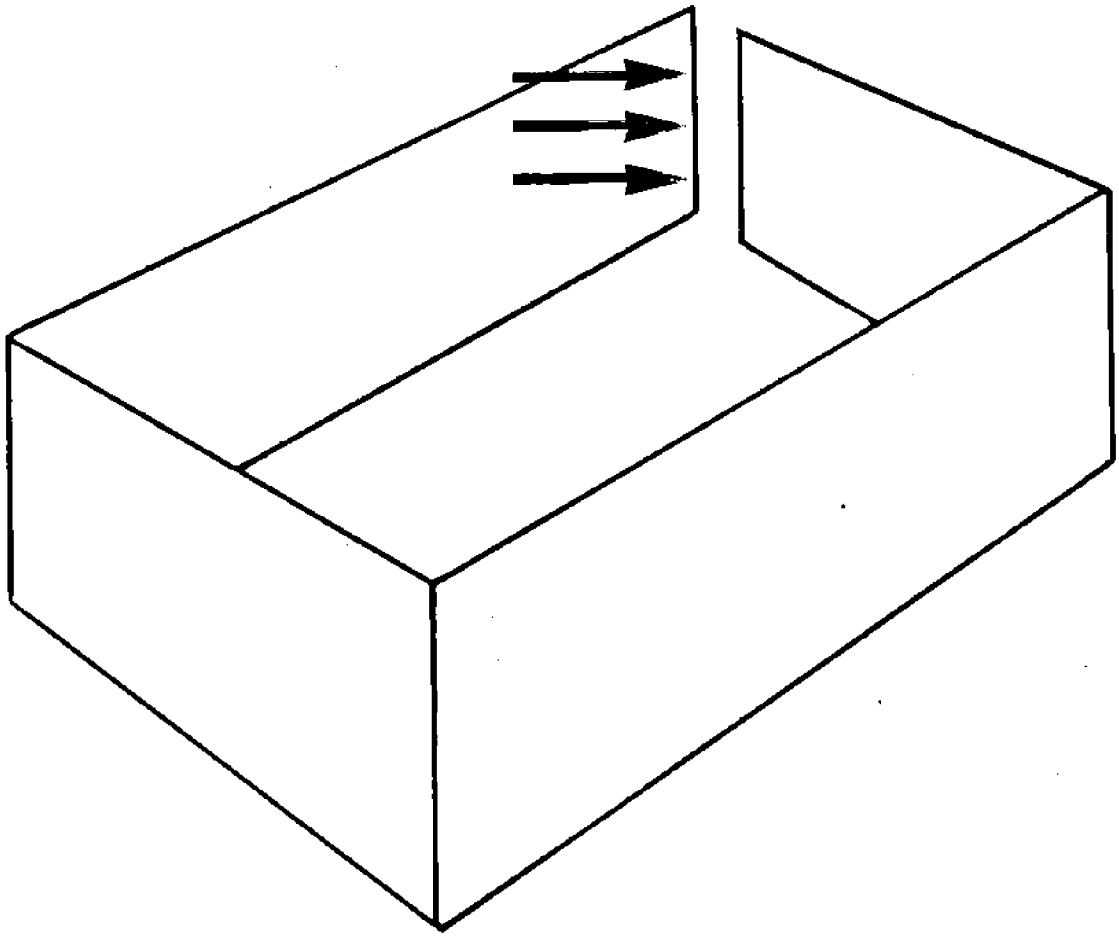

Figure 2. The outer frame with three ninety-degree bends. The free edges will be fastened together with the crab pot rings as indicated by the arrows.

2. Step Two -- feeder bottom

Cut a piece of the 1" x ½" mesh wire to fit the dimensions for the bottom. This heavier wire adds strength and rigidity to the feeder. Fasten the bottom to the feeder with the crab pot rings.

Cut out a 3" wide slot along the bottom of one long side. The fine-meshed retainer trays will slide into this slot (Figure 3).

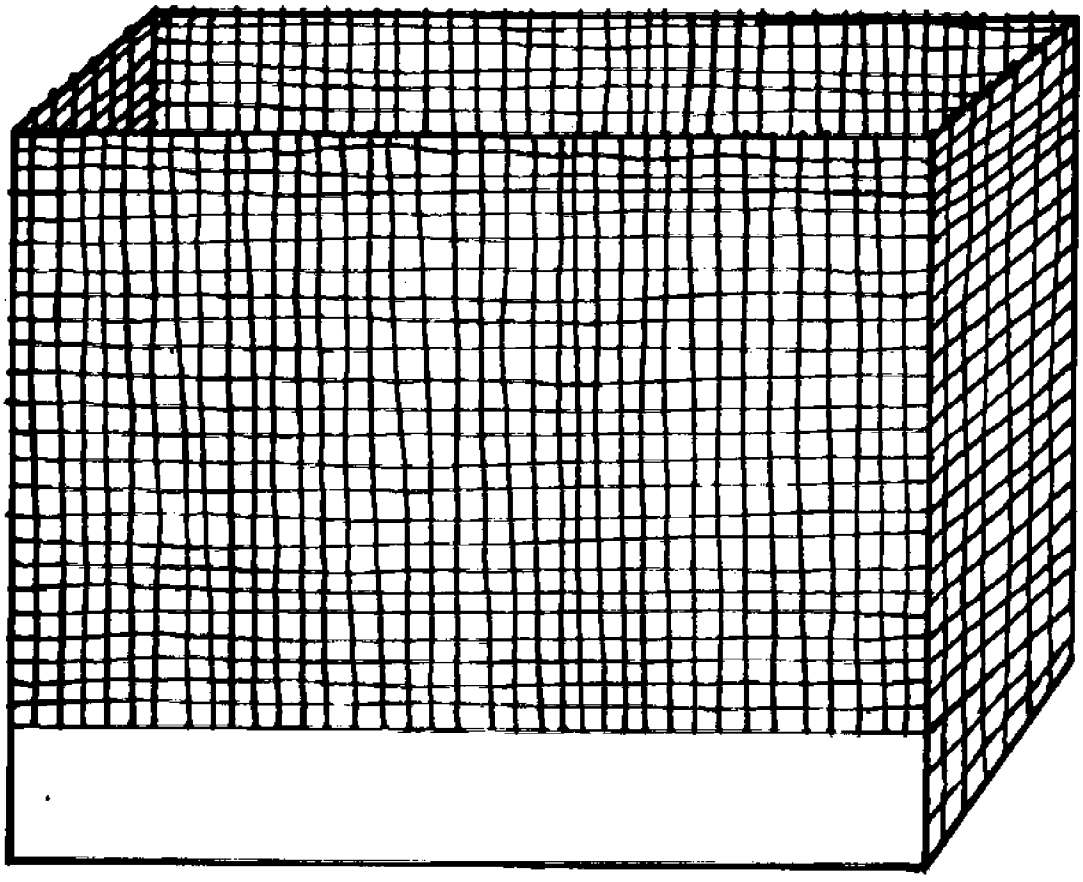

Figure 3. A front view of the outer frame with the retainer tray slot cut out.

3. Step Three -- retainer tray

The removable fine-meshed retainer tray catches the uneaten food. Its outside dimensions should be smaller than those of the feeder so that it can be easily inserted or removed from the feeder. The tray is composed of two layers of mesh. The outer layer is the 1" x ½" heavy mesh for strength. Cut a piece of the mesh similar to the piece for the bottom of the feeder but about one inch shorter on each side.

The sides of the retainer tray should be two inches high, and these are attached to the 1" x ½" mesh base of the tray with the crab pot rings.

The inner layer of the retainer tray is made from the fine mesh window screening. A rectangle of the screen cut five inches longer and wider than the 1" x ½" mesh tray and snipped about 2½ inches (Figure 4) from each corner will line the tray and overlap the tops of the sides for fastening with the crab pot rings.

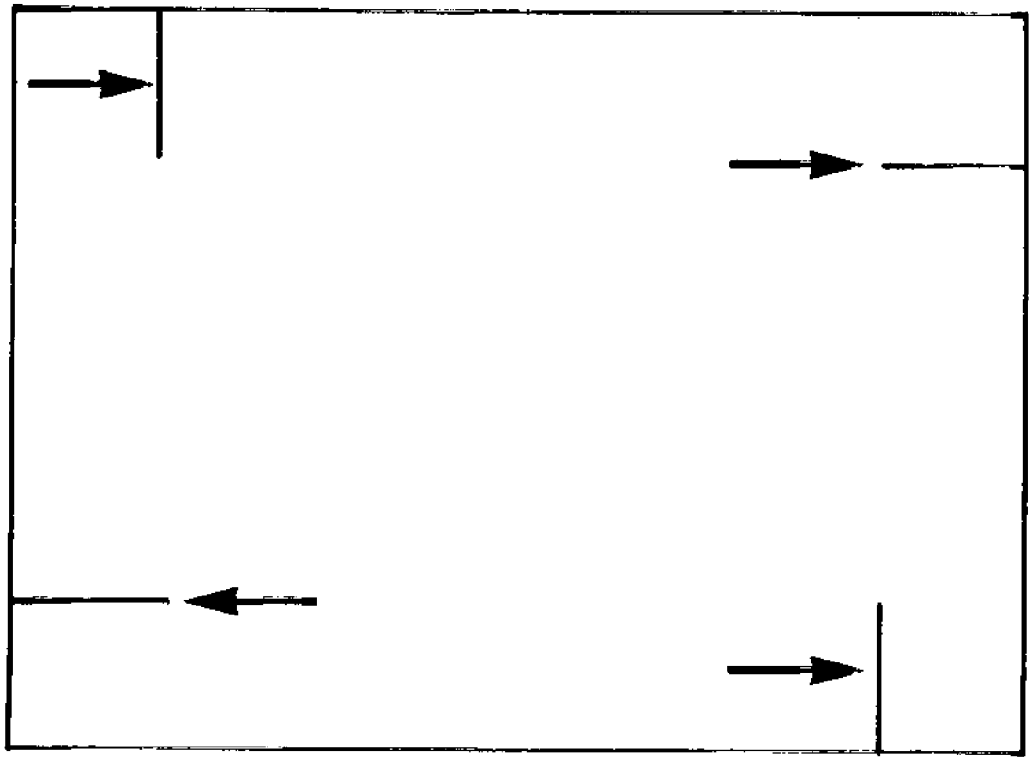

Figure 4. The pattern for making the fine-meshed retainer tray. The four cuts for folding are indicated by arrows.

4. Step Four -- Baffles

The baffles are made by cutting strips of the garden edging the same length as each of the sides. Snip a diagonal cut from the top corner of each strip to a point 3 inches in along the bottom. (Figure 5). Each feeder should have at least two baffles; three are preferred. Therefore, either eight or twelve strips of edging are cut. Punch three holes (using the nail) in the diagonal edge of each strip and two or three holes along the top of each strip. If the edges of the adjoining strips are overlapped slightly while the holes are being made, the holes will line up and fastening will be easier.

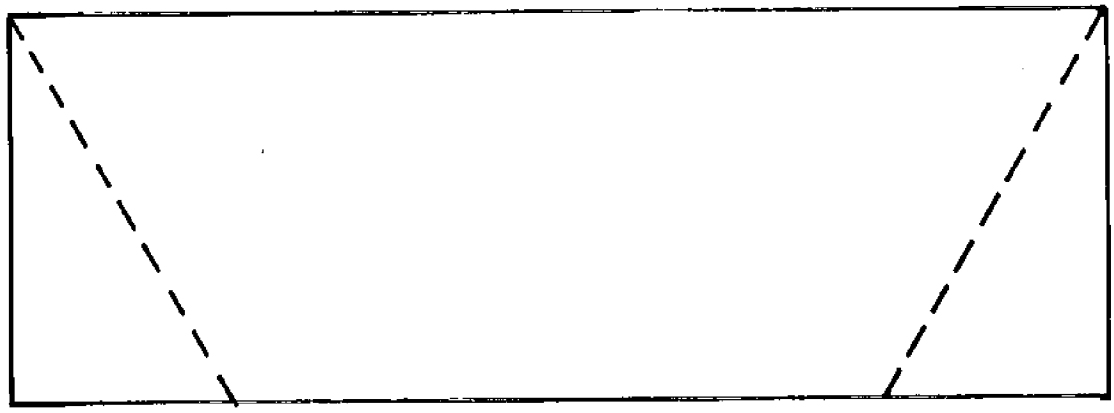

Figure 5. A piece of garden edging with the diagonal cuts indicated by dashed lines.

Fastening the edges of the baffles together with short lengths of the steel wire is done by inserting the wire through matching holes in adjoining edges of each strip and twisting with the pliers. The twisting should be just tight enough to avoid tearing the edging. This is done for each hole along the edge of each baffle (Figure 6).

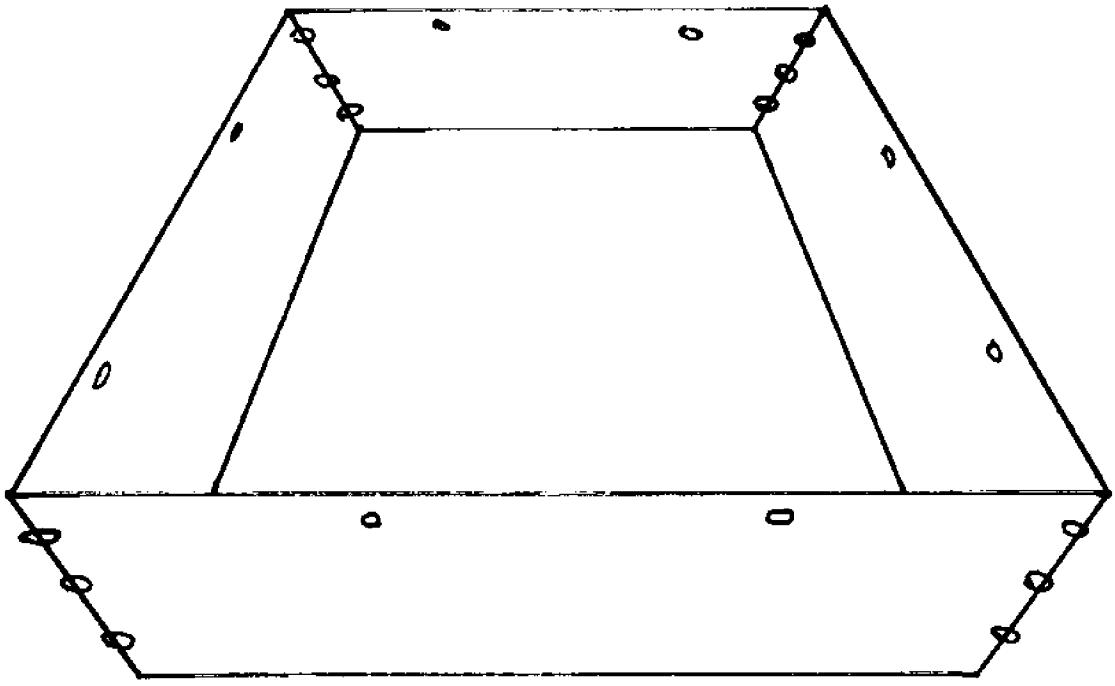

Figure 6. A completed baffle with holes along the upper edge for fastening to the outer frame.

5. Step Five -- Attaching the baffles.

Use short lengths of the steel wire to attach the baffles to the inside of the feeder. Place one baffle about one inch from the top, one about six inches from the bottom, and another in the middle. If only two baffles are used, attach the bottom baffle closer to the middle of the feeder. Be sure to attach the bottom baffle first and work upwards for easier access.

6. Step Six -- Feeding Basket

The actual feeding basket in which the ration is placed should have the finest mesh possible and still allow the eels easy access to the food. A finer mesh will hold the food better and allow less to fall through. The largest mesh necessary for a feeding basket will be the 1" x ½" wire. As the eels become too large for one mesh, simply replace the basket with one with a larger mesh.

The feeding basket should have a flat base about four inches shorter on each side than the outside dimensions of the feeder. The sides of the basket should be three inches high, and fastenings on the basket are made with crab pot rings (similar to Figure 2). The basket should be suspended in the middle of the feeder using steel wire connected to each top corner of the feeder and near the middle of each side, if necessary, for stability. The bottom of the feeding basket should be roughly level with the middle of the top baffle.

7. Step Seven -- Chain

The feeder is now ready to be placed in the feeding station. Cut the chain into lengths for attaching to each corner of the feeder. The chains should be long enough to permit adjusting the heights of the feeder if the pond level changes so that the bottom of the feeding basket is at the water surface and the top baffle is partly above the water.

Discussion

A baffled feeder such as that described has helped to solve several problems encountered during the pond grow-out of eels. With the eels feeding against the ball of food in a simple mesh basket, the surrounding water actually became clouded due to the many small particles of food being dislodged. Also, small chunks of food would fall through the mesh and accumulate on the pond bottom as described earlier. The oxygen demand of such uneaten food threatens the water quality of the pond and is a drain on the potential profits of the farming operation. Finally, the use of a simple mesh tray and its accompanying loss of food prevented the calculation of meaningful food conversion figures which are essential to evaluating any fish culture endeavor.

By varying the mesh size of the wire used to construct a feeder, the sizes of eels entering the feeder can be controlled. This is important in grow-out situations in which continuous size grading of the eels cannot be conducted because of limited pond facilities. A small-mesh feeder allows smaller eels to obtain adequate food without having to compete with the larger eels. Using more than one feeder with different mesh sizes per pond ensures that all of the eels have access to the food and assists in producing a more uniform grow-out time. Feeders made of different mesh sizes are shown in Figure 1.

While this baffled feeder is relatively time consuming to build, it will last several years and save considerable money in feed costs.