Tendipedidae were extremely abundant in the reservoir. The only significant food items recorded in other studies which also occurred in Beaver Reservoir bullheads were filamentous algae and organic detritus.

These data obviously indicate a substantial terrestrial fauna contribution to the bullhead forage base in Beaver Reservoir during the first three years of filling. The terrestrial food contribution is further emphasized by the large amounts of organic detritus (predominantly annual plants) ingested.

However, aquatic forage organisms available to the bullheads were also important. Intermediate size bullheads (4.5-6.5 inches) were inadequately sampled in electrofishing (Figure 1), suggesting they did not inhabit shockable inshore areas during this stage of growth. Virtually all the specimens taken in the July-August mid-water trawl samples were of this size. Their 98 percent *Chaoborus* diet probably reflects a spatial response to the abundance of this nocturnal migrating phantom midge, just as the winter-spring samples featuring terrestrial items represented a reaction to high food availability inshore. Mean townet numbers of *Chaoborus* per cubic meter in the reservoir during their planktonic stage in June, July, August, and September 1965 were 107, 216, 257, and 91, respectively, with the peak representing an estimated standing crop of 15 million per acre. Any such huge potential food source must be carefully considered in weighing the relative importance of the terrestrial versus aquatic contribution.

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PRELIMINARY OBSERVATIONS ON SUPPLEMENTARY FEEDING OF POND FISHES

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ABSTRACT

The food cycle of bluegill and redbreast sunfish was short circuited by direct feeding of dry pellets in an attempt to increase the produc-

tivity of small lakes. Automatic fish feeders were constructed and installed in an experimental lake and were programmed to feed specific amounts of Purina Trout Chow at regular intervals.

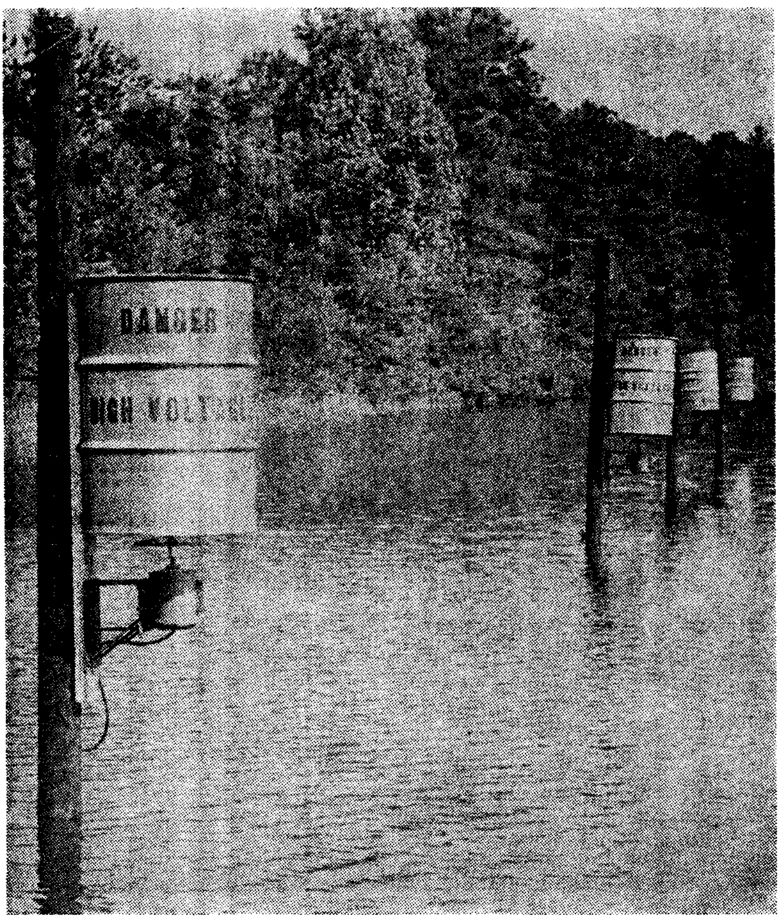
This paper deals with the construction of the automatic feeder and preliminary observations on the growth rate of bluegill and redbreast sunfish.

INTRODUCTION

In North Carolina sunfish are generally in their third or fourth year of life before they reach a size acceptable to most fishermen. In an attempt to rear acceptable sizes of sunfish in a shorter period of time, the food cycle of these fishes has been short-circuited by supplementary feeding of pelletized chow. Supplemental feeding of a sunfish population in a farm pond or small lake poses many problems, but the major task of getting the desired quantity of food to the fish on a regular schedule can be solved by utilizing automatic fish feeders. Automatic fish feeders to facilitate hatchery operations and for laboratory controlled experiments have been designed and reported by Waite and Buss (1963) and Joeris (1965).

MATERIALS AND METHODS

Supplemental feeding of sunfish can develop into a time consuming and exceedingly costly operation unless some type of automation is used. Automatic fish feeders can solve these problems if the design



incorporates the following three basic parts: (1) a large storage bid for the food; (2) means of distributing the food; and (3) a timer to regulate the time and amount of food distributed.

The automatic fish feeder described in this paper utilizes a 55-gallon barrel as a storage bin for the fish food with a food distribution plate driven by an electric motor with a Tork 8001-PC2-1005 timer to regulate frequency and duration of the feeding intervals (Figure 1).

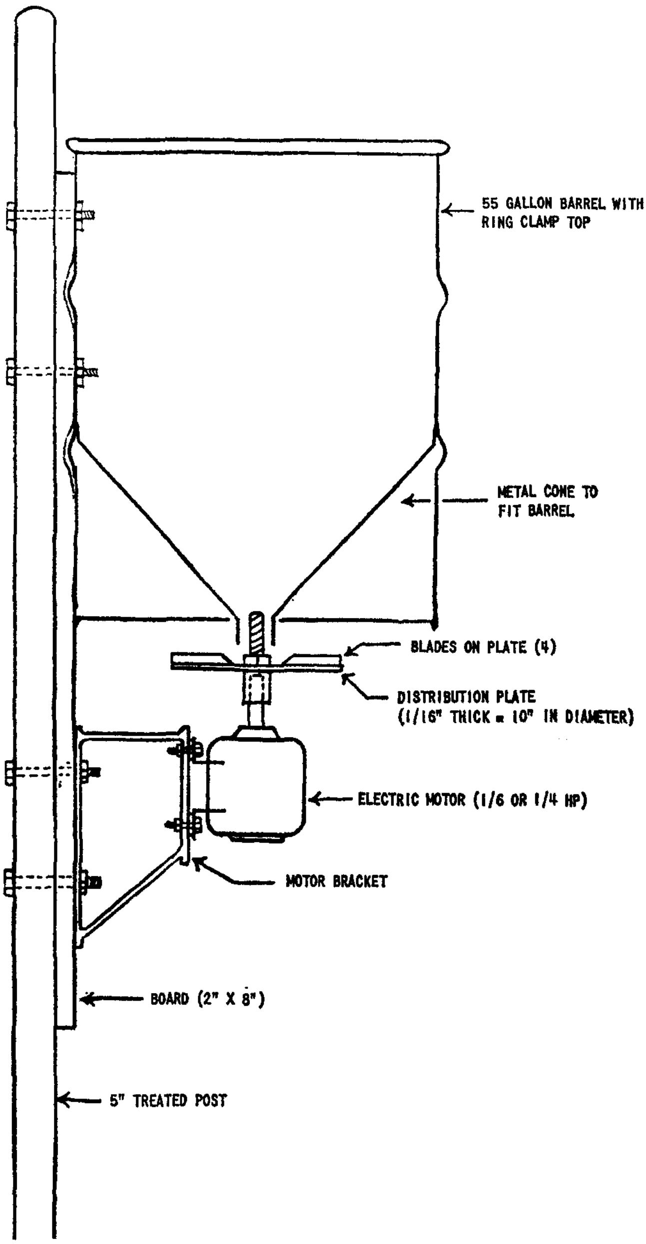


FIGURE 1. Diagrammatic sketch of automatic fish feeder.

A cone is installed in the lower one-third of the barrel and projects through the bottom. The size of the cone opening is one of three factors that determines the amount of food fed. In this particular feeder, the diameter of the opening is 2⅝ inches. By placing the cone inside the 55-gallon barrel, the distribution plate is located close to the bottom of the barrel which protects it from adverse weather. A 55-gallon barrel holds between 150 and 200 pounds of pelletized fish chow and the frequency of refilling the barrel with pellets depends upon the amount fed from the barrel each day. If a large amount of food is to be dispersed each day, it is advisable to install several feeders in the pond to share the apportionment of food and thereby reduce the task of refilling the storage barrels to once or twice a month.

The pelletized food is distributed from the storage barrel by means of a 10-inch metal distribution plate driven by an electric motor. The plate has four ½-inch blades attached to the top surface to aid in broadcasting the pellets. A work arbor is used to attach the plate to the motor shaft (Figure 2). The threaded end of the work arbor projects into the cone opening and acts as an agitator to eliminate any clogging of the pellets leaving the cone.

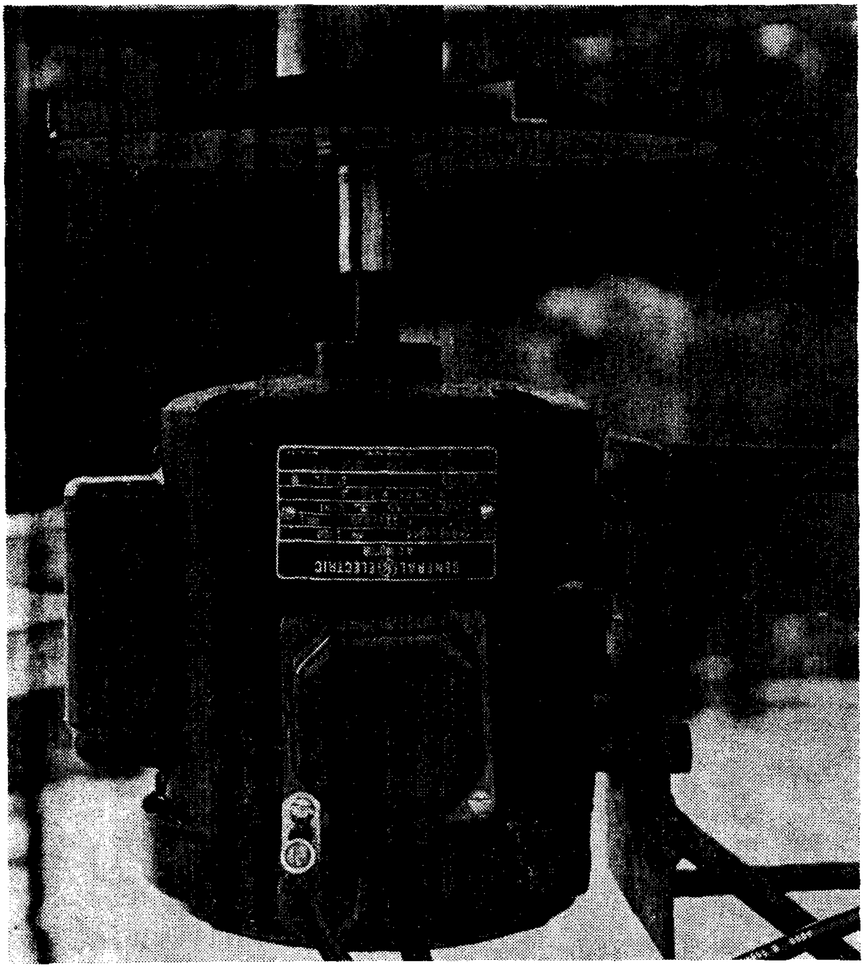


Figure 2. Motor and distribution plate assembly.

Since there is a very small load for the electric motor to pull, a 1/6-horsepower motor is adequate. The mounting bracket for the motor should have vertical slots through which anchor bolts of the electric motor can be attached. These slots allow up and down movement of the motor thereby giving greater control over the quantity of pellets fed by varying the distance between the distribution plate and the cone opening. Finer adjustments of this distance can be made by moving the work arbor on the motor shaft. The slots in the mounting bracket can also be used for leveling the distribution plate to prevent spillage of food when the plate is inactive.

The electric timer is the third and major factor controlling the amount of food fed. It is the heart of the apparatus in that it controls the operation and makes automatic feeding possible. The timer presently being used for these feeders is a Tork 8001-PC2-100S.

PRELIMINARY OBSERVATIONS ON SUNFISH GROWTH

Three distinct size classes of redbreast sunfish were stocked in an experimental 35-acre lake. One group averaged 1.5 inches in total length (1,250 fish per pound); the second group averaged 3.0 inches (600 fish per pound); and the third consisted of six-inch or larger adults that were salvaged from the lake when it was drained prior to the experiment.

Seine samples of the fish population four months after initial stockings still showed the three distinct size classes. The adults were captured only on their spawning beds approximately 1,200 feet from the feeders. The smaller size classes captured in the vicinity of the feeders had grown to averages of 3.5 and 4.3 inches in total length and 12 and 30 grams in weight, respectively, by August 31.

Originally the automatic feeders were programmed to feed twice a day a diet of sizes 5105 and 5106 Purina Trout Chow representing 14 percent total bodyweight of the sunfish. After a week, it was obvious the fish were not utilizing this amount of food and the feeders were programmed to feed once a day. This schedule was followed until the middle of August when it was decided to feed twice a day but the total amount of food per day was not increased.

Since the feeding program started in May 1966, many advantages and disadvantages of automatic feeding have become much clearer.

The advantages of automatic fish feeding are evident in the cost and man-hours saved over that required to continuously feed fish. Also, the rate of growth of sunfish can be increased by short-circuiting the food cycle, thereby producing harvestable size sunfish in a shorter period of time than would occur under natural conditions.

The disadvantages which have become apparent since the beginning of this program are first of all, the feeders should contain their own power supply so they can be placed at any location in the lake. In this study, all the feeders were grouped in one location where electrical power was available. Secondly, some form of shelter for the fish should be available near the feeder. This cover would tend to hold them near the feeder where they could immediately utilize the food thereby cutting food loss to a minimum. If floating pellets are used, some consideration should be given to the direction of prevailing winds to prevent food loss on the shore.

Observations from this study indicate that it is better to feed a small amount of food on numerous occasions rather than feeding the fish their daily ration in a lump sum.

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