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VARIABILITY IN SEINE HAUL SAMPLING OF SUNFISH IN A FARM POND

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INTRODUCTION

A large number of hauls were made with 50- and 15-foot seines in a recent study of a 26-acre farm pond at Auburn, Alama. Although this seine sampling method for determination of balance is used widely in the Southeast (Swingle, 1956), usually only a few seine hauls are made per pond. Variations involved in such seining are reported here.

DISTRIBUTION OF SEINE HAUL CATCHES

There is the problem of how to treat statistically the number of fish captured a particular method in all studies of fish populations. If fish were distributed randomly, the form of the distribution of numbers per seine haul would be Poisson. However, aquatic organisms generally are not distributed randomly. Where the form of their distributions has been studied, these forms generally have been contagious (Gulland, 1956, 1957; Kutkuhn, 1958; Lambou, 1960, 1961; Moyle and Lound, 1960; Scheftel, 1960; Strasburg, 1960; Taft, 1960; and Taylor, 1953). In order to transform contagious distributions where the variance is equal to the mean plus some constant times the mean to normal distributions the exact form of the distribution should be known. However, a transformation of the logarithm to the base 10 of N + 1, where N equals the number of items per observation, will approach a normal distribution and enable statistical techniques requiring the assumption of normality to be used (Gulland, 1956).

An attempt was made to determine if the transformation as described would be useful. A frequency distribution was constructed for 1- and 2-inch fish captured in 131 hauls taken with a 15-foot seine during the period August 13 to 19, 1960. These hauls were taken to determine what changes could be expected in seine hauls within a week. In this case only random fluctuations occurred. The plotted distribution for these values (Figure 1) was extremely skewed as revealed by a chi-square test that was significantly different from the normal distribution at the 0.005 level. Visual observation indicated that the square root transformation did not change the skewness; thus the distribution was not Poisson. The data transformed by the logarithm of N + 1 approached normality (Figure 1). The transformed distribution was not significantly different from a normal distribution at the 0.05 level.

EFFECTS OF ADJACENT SEINE HAULS ON VARIATION

The most important determination in sampling fish populations for balance by 50-foot seine hauls (Swingle, 1956), is the count of intermediate (3- through 5-inch groups) sunfish. It is important to know whether two seine hauls taken close together and consecutively will give samples of the fish population that will be useful in deciding the condition of balance in a pond. The following

results were obtained in this study: In 39 such paired hauls in 1960, 79 intermediate bluegill were captured in first hauls, whereas only 58 were taken in second hauls. In 51 paired hauls in 1961, there were 1,446 intermediate bluegill in the first hauls and only 767 in second hauls. The correlation coefficient between the first and second hauls with data transformed by the logarithm of N + 1 was calculated. This value (0.84) indicated that 70 percent of the variation in the second hauls was explained by the results of the first haul.

A paired *t*-test was run using transformed data of the results of the first and second seine hauls. A *t* value of 4.04 was obtained (89 d.f.) and had a probability of less than 0.001 of occurring by chance. This finding indicates that second hauls are likely to catch fewer fish than the first.

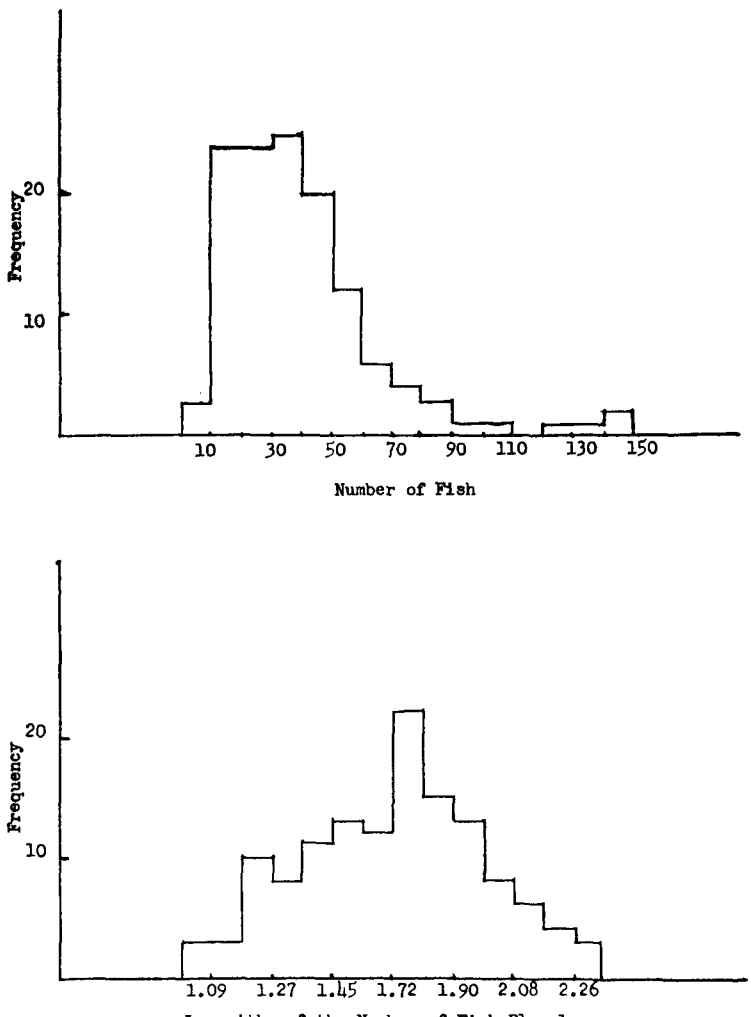

Figure 1. Distribution of Numbers of 1- and 2-inch Group Bluegills Taken in 15-foot Seine Hauls August 13-19, 1960. The upper graph represents the raw data. The lower graph represents the transformed data.

CONFIDENCE LIMITS ON SEINE HAUL MEANS

The means and variances of 50-foot seine haul catches transformed by the logarithm of N + 1 were calculated using only numbers of bluegill (*Lepomis macrochirus*) captured in the above seine hauls. Separate estimates were made on each day for the first hauls and the second hauls. The 95 percent confidence limits of the means were derived. Then the percent of the mean that one-half of the confidence interval represented was calculated. These values ranged from 32 to 300 percent for 46 four-haul sampling sets. The median of these values was 100.25.

CONCLUSION

It is concluded that in sampling ponds by seining to determine balance more than four 50-foot seine hauls need to be taken and that these hauls should be made in different sections of the ponds. The author realizes the impracticality of doing this in many of the ponds that have to be checked for balance. However, the limitations of the seining method should always be kept in mind.

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CATFISH BASKET COMPARISON STUDY *

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ABSTRACT

A study was conducted which tested the orientation of the slotted opening in welded wire catfish baskets. Comparisons were made as to the catfish and gamefish catches when the slotted openings were set horizontally, vertically, or at random.

Catch rates are presented in 48, 72, 96, and 120-hour set periods. Catfish (primarily white catfish) comprised 97.79 percent of the total weight, and

* This study was financed, in part, by North Carolina Federal Aid in Fish Restoration Project F-10-R.