

RELATIONSHIP OF TEMPERATURE TO TOTAL ANNUAL GROWTH IN WHITE PERCH, *ROCCUS AMERICANUS*

A. N. SHERI* AND G. POWER**

A study of 868 scales indicates that no relationship exists in the air temperature and rate of growth of white perch.

INTRODUCTION

Many factors particularly density, temperature, quantity and quality of food, diseases, parasites, and pollution affect the growth of fish. Effect of density on the growth of white perch has been established (Sheri and Power 1972). Effect of temperature on the growth of white perch has been studied in the Bay of Quinte, area of Lake Ontario, as part of other investigations carried on this species (Sheri and Power 1968, 1969a, 1969b, 1969c, 1969d, and 1972).

MATERIALS AND METHODS

White perch used for the study were collected by the staff of Ontario Department of Lands and Forests, Fishery Station at Glenora. Air temperature in the area close to the Bay of Quinte were also made available through courtesy of Glenora Fishery Station. From 1957 to 1966 a total number of 41,862 fish were collected out of which 4162 fish were subsampled. Scales of only 868 fish were measured. Details of mean daily temperature, materials and methods have already been published (Sheri and Power 1969a, 1969b).

RESULTS

Besides the change in growth rate that accompanies change in the density of population, the most important factor that might affect growth is the average temperature during the growing season. There were no records of water temperature available upon which to base a comparison of annual deviation from normal temperature during the growing season and annual deviation from average growth in the white perch population of the Bay of Quinte. Annual percentage deviations from the average growth were compared with the annual deviations from the mean air temperature in the

*Department of Zoology, University of Agriculture Lyallpur, (Pakistan)

**Department of Biology, University of Waterloo, Waterloo, Ontario, Canada.

area. The deviations from the mean air temperature were calculated from May to September.

Figure 1 shows the annual percentage deviation from the mean for the growth rate, and the deviations from the mean for the growth rate, and the deviations from the mean temperature. Examination of this figure shows that there is no apparent relationship between air temperature and changes in the growth rate in the Bay of Quinte area of Lake Ontario. White perch showed the best growth during the period of active colonization in 1957 and 1958 when the mean air temperatures were below average. The years 1960 and 1961 had the same temperature conditions but the growth in 1960 was above average and in 1961 below average. In 1962 the temperature, although slightly above average, was less than in 1961 but the growth was better than in 1961. In 1963, 1964 and 1965 temperature was 7°, 1° and 7° below average

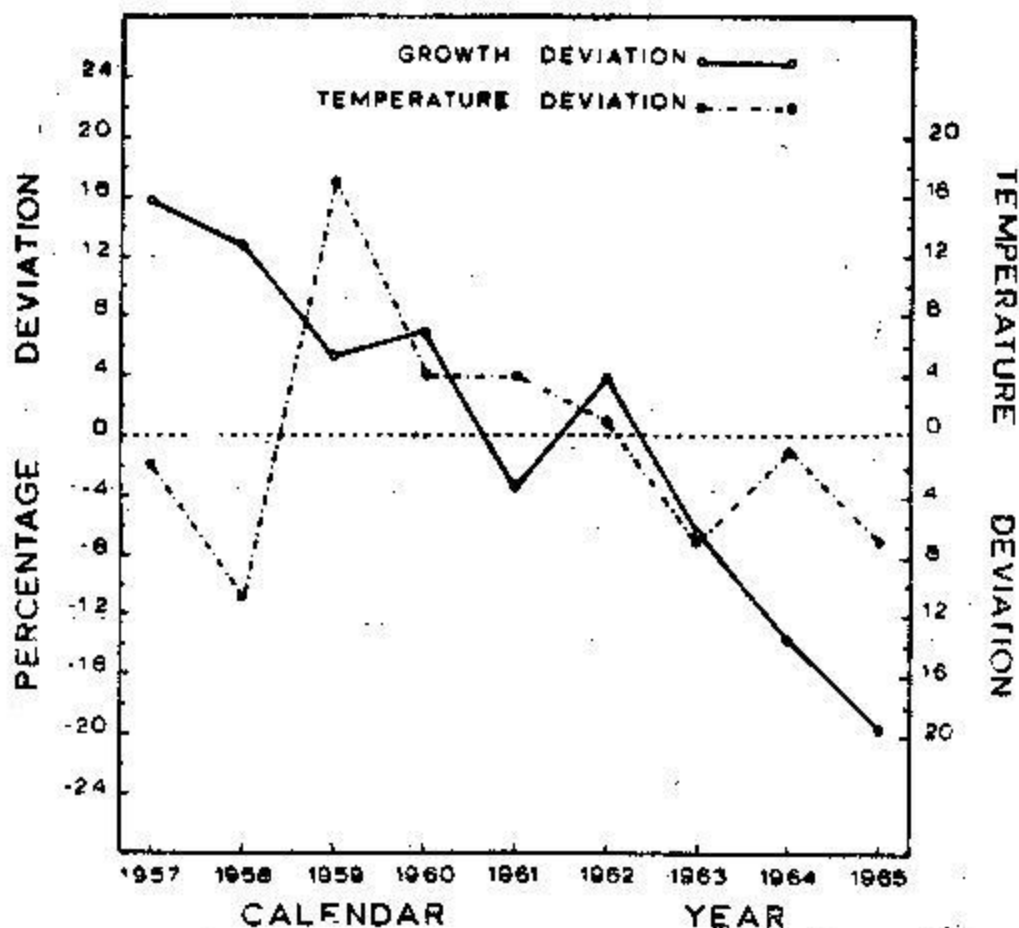


Fig. 1 Relationship between percentage deviation of growth of white perch, *Roccus americanus*, and air temperature deviation, in the Bay of Quinte, Lake Ontario.

but the growth rate consistently decreased from 1963-1965. Actually growth in 1958 was much better than 1965 although the temperature in 1958 was 11° below average while in 1965 it was 7° below average. So it is clear that the curves for the annual percentage deviation from the average growth for the white perch and the annual deviation from the average air temperature for May to September of each year showed a rather conspicuous lack of relationship.

DISCUSSION

The failure to find any relationship between temperature and growth rate does not mean that temperature has absolutely no effect on the growth of white perch. It must be realized that the fluctuations in the air temperature may not be a perfect index of fluctuations in water temperature. A better and more probable reason of lack of correlation between air temperature and growth can be that the annual differences in growth are closely dependent on some other factors and the effect of annual changes in temperature is overshadowed. The most important factor appears to be population density at least for the Bay of Quinte area during the period under consideration (Sheri and Power 1972).

LITERATURE CITED

- Sheri, A.N. and Power, G., 1968. Reproduction of white perch, *Roccus americanus*, in the Bay of Quinte, Lake Ontario. J. Fish. Resh. Bd. Can., 25: 2225-2231.
- Sheri, A.N. and Power, G., 1969a. Annulus formation on scales of the white perch, *Morone americanus* (Gmelin) in the Bay of Quinte, Lake Ontario, Trans. Am. Fish. Soc., 98:322-326.
- Sheri, A.N. and Power, G., 1969b. Validation of the scale method and back calculations for estimating age and growth of white perch, *Morone americanus*. Pakistan J. Zool., 1: 97-111.
- Sheri, A.N. and Power, G., 1969c. Fecundity of yellow perch, *Perca flavescens*, in the Bay of Quinte, Lake Ontario. Can. J. Zool., 47: 55-59.
- Sheri, A.N. and Power, G., 1969d. Vertical distribution of white perch, *Roccus americanus* modified by light. Can. Fid. Nat., 83: 160-161.
- Sheri, A.N. and Power, G. 1972. Effect of density on the growth of white perch; *Roccus americanus* (Gmelin), in the Bay of Quinte, Lake Ontario. Pak. J. Zool. 4(2): 109-132.