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Effects of Age-1 Bluegill on Large Zooplankton and Age-0 Bluegill Growth and Recruitment

Theodore R. Gray[1]* , James E. Breck[2,1], and Paul W. Webb[1]

[1] *The University of Michigan*
School of Natural Resources and Environment
Ann Arbor, Michigan 48109-1115

[2] *Michigan Department of Natural Resources*
Institute for Fisheries Research
212 Museums Annex Building
Ann Arbor, Michigan 48109-1084

Abstract.–We investigated whether age-1 (25-50 mm total length) bluegill *Lepomis macrochirus* reduced the abundance of large cladocerans (0.81 mm and larger) and thereby reduced growth of age-0 bluegill and their survival to the following spring. Adult bluegill successfully produced age-0 fish in six 0.25-ha ponds stocked with age-1 bluegill at 0 and 5.6 kg/ha, but not in three ponds stocked with age 1s at 16.8 or 23.5 kg/ha. For zooplankton sampled weekly from May to early June, before age 0s began exogenous feeding, mean density of medium (0.41 to 0.80 mm) zooplankton was lower in ponds with higher stocking densities of age-1 bluegills; this trend was not significant for large cladocerans. Most age-0 growth occurred from exogenous feeding in early June until early July. Even though the density of large zooplankton was depleted to an average of 6 L^{-1} by 18 June, fast growth of age-0 bluegill continued for an additional 11 to 21 d. Fast growth of age-0 bluegill ended when foraging reduced the densities of medium and small (0.40 mm or less) zooplankton to less than 50 L^{-1}. In ponds containing age-0 bluegill, the average density of large and medium zooplankton during the period of rapid age-0 growth was not significantly lower in ponds with age 1s than in ponds without age 1s. If age-0 bluegill were present in seine samples in early June, then they were found in seine samples throughout the summer, and substantial numbers (at least 140,000 ha^{-1}) were present at pond draining the following spring. The negative correlation found by Clark and Lockwood between the spring density of age-1 bluegill and the strength of the next year class could not be attributed to competition for food, including that for large zooplankton. Year-class failure in this experiment was only seen in ponds receiving the highest densities of age 1s (16.8 and 23.5 kg/ha), and was most likely due to predation by age 1s on eggs and larvae. Bluegill may be prone to stunting in part because age-0 fish can maintain fast growth even with total zooplankton densities as low as approximately 50 L^{-1}.

* *Ted Gray & Associates, 1024 Laurie Lane, Burr Ridge, IL 60521*