Is there a spatial separation in adult and sub-adult striped bass populations?

ABSTRACT

We tracked the movements of sub-adult striped bass, Morone saxatilis with those of adults in the Mullica River–Great Bay estuary in southern New Jersey. We used ultrasonic telemetry, both mobile and fixed listening stations to track fish tagged with acoustic transmitters. The movement of sub-adult bass was not similar to that of adults. Sub-adults occupied different areas of the Mullica River–Great Bay estuary from adults. Movement was sporadic but limited. Occupied areas were similar in both temperature and salinity, differing only in location, suggesting that segregation is based on factors not addressed in this study.

RESULTS

There was minimal movement of the tagged sub-adult striped bass. After release, sub-adults were most frequently detected in an upstream location of the estuary. Tagged adult striped bass also moved very little after release, residing primarily in an open water bay portion of the estuary. Figures 8 and 9 shows this age segregation of the adult and sub-adult populations. This spatial separation of the two populations shows no clear preference for either water temperature or salinity (Fig. 10). Water temperature data indicate no age related preference. Salinity data exhibit adult and sub-adult clusters, but with no discernible pattern.

The separation seemed to be no similarity in adult and sub-adults striped bass’s movements. The sub-adults were found farther up stream while the adults were more often found out in the bay (Fig. 11).

DISCUSSION

The spatial separation by age with this species seems unrelated to water temperature or salinity. Of examined environmental factors, geography (i.e., river vs. bay) appears to be the most important factor related to age segregation. This suggests a behavioral, rather than physiological explanation of the age separation, in which older, larger fish exclude, smaller, younger fish from prime feeding habitats. Such competitive exclusion based on dominance of prime territory by adults would effectively separate the species into two habitat utilization patterns based on age. Given that the diet of younger bass differs from that of adults and that only after two years are striped bass considered fully piscivorous, spatial separations could have diet related variable as well. Further investigation is warranted.

REFERENCES


Ng, C.L.H. “Habitat Utilization and Movement Patterns of Adult Striped Bass, Morone saxatilis, in a Southern New Jersey Estuary Using Acoustic Telemetry.” A Masters Thesis.


Fig. 1 Striped Bass (Morone saxatilis)

Fig. 2 Stationary and mobile hydrophones

Fig. 3 Acoustic transmitter, measuring 130x30mm

Fig. 4 Implanting a transmitter into an anesthetized fish. A) making a incision using a sterilized surgical scalpel. B) opening closed incision after implantation

Fig. 5 Release of acoustically tagged sub-adult striped bass.

Fig. 6 A portable hydrophone (A) coupled with an SRX-400 receiver/processor (B) was used from a boat to track the fine scale movements of sub-adult striped bass.

Fig. 7 Stationary telemetric infrastructure in the Mullica River–Great Bay estuary.

Fig. 8 Time vs. hydrophone graph showing which stationary hydrophone the fish were at over time

Fig. 9 Time vs. hydrophone graph showing which stationary hydrophone the fish were at over time

Fig. 10 Temperature vs. salinity graph, showing the environment in which the fish were found

Fig. 11 Locations where large fish (blue dots) and small fish (red dots) were detected by portable hydrophones. Locations of the points routinely checked by portable hydrophone (outset).