

Survival of Hybrid Striped Bass in Central Florida

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Abstract: Otolith aging was utilized to evaluate age structure and survival of hybrid striped bass stocked in 5 central Florida lakes. Age VI and age VII hybrids collected during the study represent the oldest yet collected in Florida. High survival rates of ages 0, I, and II were observed in all lakes. Lakes stocked for more than 4 years had low survival of hybrids older than age II. It is possible that adding hybrids in a lake on an annual basis may lead to overstocking. Alternative stocking practices are being investigated.

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The accuracy of aging fish with otoliths is well documented by Erickson (1983) and Beamish (1979). Orsi (1970) reported that aging California striped bass by otolith analysis was within 92% agreement to age determinations from scales. In Florida, determining age from scales is inaccurate because fairly constant growth rates do not allow distinct annuli to develop. Snyder et al. (1983), demonstrated the effectiveness of using otoliths to age Florida striped bass hybrids, (*Morone saxatilis* x *M. chrysops*) by comparing known age fish with results from otolith analysis.

The objective of this study is to analyze age structures of several hybrid striped bass populations to determine survival of the older year classes. During previous studies of Florida hybrids, analysis of length frequency histograms was used to determine age. Snyder et al. (1983), demonstrated that aging hybrids by length frequency was not reliable, because size ranges of many year classes overlapped. Past studies of survival gave inaccurate results since some age designations were incorrect. Otolith aging provides a more accurate representation of the age structure of a population, thereby allowing fishery managers to effectively assess their stocking practices.

Methods

Stocking histories of the 5 study lakes are summarized in Table 1. All lakes are located in Polk County in central Florida. Each lake is extremely

Table 1. Stocking history of study lakes, Reedy, Morton, Scott, May and Lulu.

Lake	Hectares	Years stocked : N/ha
Reedy	1,397	1980-1982 : 18 1983 : 10
Morton	17	1974-1975 : 124 1981-1982 : 25
Scott	121	1974-1975 : 62 1976-1978 : 25 1980 : 50
May ^a	16	1974-1983 : 25
Lulu ^a	123	1974-1983 : 25

^a Part of Winter Haven Chain of Lakes.

fertile with an abundance of threadfin and gizzard shad. Lake Reedy was stocked annually at a rate of 18 hybrid fingerlings/ha from 1980 through 1982. The 1983 stocking rate was reduced to 10 fish/ha. Lake Morton was stocked in 1974 and 1975 at 124 fish/ha and in 1981 and 1982 at 25 fish/ha. Lakes May and Lulu have been stocked annually at 25 fish/ha from 1974 through 1983. Scott Lake was stocked from 1974 through 1980 at rates varying from 25 to 62 fish/ha.

Lakes were sampled using 45.8 x 2.4 m gill nets, (3.8 through 15.2 cm stretch), set overnight. Lakes May and Lulu were sampled using a 900-m haul seine. Sampling dates are listed in Table 2. After length and weight data was obtained, the largest pair of otoliths (sagittae), were removed for age determination.

Results and Discussion

In all study lakes, high numbers of age 0, I, and II hybrids were collected (Table 2). Lakes that were stocked for 4 or more years (May, Lulu, Scott,

Table 2. Age structure of hybrid population samples in the 5 study lakes.

Lake	Sample period	N fish from each age group						
		0	I	II	III	IV	VI	VII
Lulu	Feb 1892	10	5	9	2	a	a	a
May	Feb 1982	24	9	5	1	a	a	a
Scott	Feb 1981	37	37	5	1	a	a	a
Reedy	Mar 1982	27	20	b	b	b	b	b
	Mar 1983	18	8	6	b	b	b	b
	Jan 1984	18	8	6	a	b	b	b
Morton	Dec 1981	190	b	b	b	b	8	4
	Jan 1984	b	82	67	b	b	b	b

^a Year class was not collected.

^b Year class was not stocked.

and Reedy), seemed to have low rates of survival of year classes past age II. Age III hybrids were low in abundance and age IV and older were not collected in any samples. Snyder et al. (1983) collected age IV hybrids in central Florida lakes successively stocked for 5 years; however, these specimens comprised an extremely small percentage of the total sample. Hybrid survival of nearly 8 years was documented with Lake Morton hybrids stocked in 1974 and 1975 (Table 2). Otolith aging confirmed that these fish were age VI+ and VII+. Lengths ranged from 480 to 520 mm and weights varied from 1,451 to 1,678 g. Extensive sampling from 1982 through 1984 did not produce any additional specimens from the 1974 or 1975 year class. Age V survival reported by Snyder et al. (1983) provides further documentation of the hybrids potential longevity. These fish were collected from a lake stocked only 1 time.

It was previously believed that high rates of mortality after age II was a result of the semi-tropical environment of Florida. Although limited, these findings suggest that high mortality may also be related to overstocking. Extended survival was observed only in Lake Morton where continuous stocking did occur. Survival of older age classes was low in lakes that were successively stocked. For example, Scott Lake sampling yielded high numbers of age 0 and I fish, however abundance of age II and older decreased dramatically. The annual addition of hybrids with their tremendous capacity for first year growth may be creating food supply limitations in these lakes.

Ware (1977) determined that stocking hybrids for 4 years in Scott Lake resulted in a significant decline of shad populations. Decreasing shad biomass resulting from continuous stocking possibly creates competition within the hybrid population. Krummrich et al. (1981) and Langford et al. (1982) determined successive stocking at high rates in other Florida lakes resulted in slowed growth and poor conditions of age 0 hybrids. Crandall (1978) noted slower growth in Texas hybrids stocked following an initial introduction. Yearly additions of hybrids may deplete the available forage, possibly attributing to the reduced survival rates of older fish.

Stocking practices such as alternating stocking years and reducing rates are being evaluated to determine if higher survival rates of the older age classes can be achieved. Higher abundance of the larger age III and IV hybrids would greatly enhance hybrid populations and increase angler appreciation.

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