

4. At 70° F., all fry were alive at 76 hours following hatch whereas at 74° F., 75° F., and 80° F., all fry were dead within 70 hours following hatch (Table 2).
5. Increases in water temperature decreased the time of incubation (Table 3).

TABLE 3 — THE EFFECT OF INCREASED WATER TEMPERATURE UPON INCUBATION OF STRIPED BASS EGGS.

Temperature (°F.)	Incubation Time (Hours)
60	58
70	34
74	30
75	28
80	25

COMPARISON OF GROWTH AND SURVIVAL RATES OF STRIPED BASS AND STRIPED BASS X WHITE BASS HYBRIDS UNDER CONTROLLED ENVIRONMENTS

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ABSTRACT

During the spring of 1967, 240,000 striped bass and striped bass X white bass hybrid fry were stocked in four one-acre dirt ponds. Each pond received 30,000 striped bass and 30,000 hybrids.

At the end of a 71-day period, approximately 23,187 were harvested in three ponds, 12.88 percent of the original number. A total kill occurred in the fourth pond one week prior to harvest.

Results indicate the hybrid having faster growth and higher survival rates.

INTRODUCTION

Using eggs from the striped bass and sperm from the white bass, hybrids were first produced at the Moncks Corner Hatchery in the spring of 1965 and have also been produced each succeeding season.

Attempts were made in South Carolina during 1965 and 1966 to rear hybrids in dirt ponds. Efforts in 1965 were quite limited and were unsuccessful. Based on experience gained in 1965, hybrids were raised successfully in 1966. From observations it appeared the hybrids exhibited a faster growth rate; however, without exposing both species to identical environmental conditions, conclusions could not be made.

PROCEDURE

During the spring of 1967, four one-acre ponds at the Heath Springs Hatchery were selected for continuance of the study. This phase of the study was designed whereby the hybrids and striped bass would be stocked in the same pond thus exposing both to an identical environment.

On March 13 all ponds were treated with "Nox-Fish" (containing five percent rotenone) at the rate of 1 p.p.m. Each pond was treated for backswimmers on March 27 using five gallons of fuel oil per pond.

For successful survival past experiments with striped bass and hybrids have indicated that sufficient zooplankton must be available at the time mouth parts become functional; this is usually six to ten days following hatching.

Cottonseed meal was applied at the rate of 50 pounds per acre two weeks prior to stocking and again at one week prior to stocking. A plentiful supply of *Daphnia* was present at the time of stocking.

Both the striped bass and hybrid fry were of the same female striped bass parent. Fry were held for six days in separate aquaria at the Moncks Corner Hatchery. At the time of stocking the yolk sac had been absorbed and mouth parts were functional.

Using volumetric counts, 120,000 stripers and 120,000 hybrids were placed in plastic bags with oxygenated water (30,000 each per bag). At the time of stocking all bags were placed on the pond edge with a gradual mixing of pond water over a one-hour period. Temperature and pH data for each pond are indicated in Table I.

TABLE I—TEMPERATURE AND pH AT STOCKING.

	Temp. F°		pH	
	Bag	Pond	Bag	Pond
Pond 1	70	76	8	7.5
Pond 2	70	75	8	8.5
Pond 3	72	75	8	8.5
Pond 4	72	76	8	8.5

Note: Water temperature in bags on leaving hatchery was 66 F°

Even though usable size *Daphnia* were present, supplementary feeding was practiced. Ground herring fed at the rate of four and one-half pounds per day, per pond, was initiated the day following stocking and continued throughout the 71-day period. It is not known when the ground herring became the chief diet but this feeding program was initiated at this early stage in order that it would be available and to start, train or let the fish become accustomed to taking the feed.

This feeding program was not used in relation to body weight and it is believed that a portion of the feed was not utilized in the early days of growth. A larger portion would probably have been utilized in the latter weeks of the experiment had it been fed.

In Pond 4 a total kill occurred one week prior to harvest. The kill was complete in less than 24 hours. pH on the date of the kill was 10 plus.

Fish in Ponds 1, 2 and 3 were harvested in concrete catch basins and sorted in holding troughs as to size. Total numbers were determined by weight samples. Total survival is shown in Table II. All fish were pre-

TABLE II—TOTAL SURVIVAL OF STRIPED BASS AND HYBRIDS.

Pond	Total Survival	Percent Survival
No. 1	5,326	8.87
No. 2	13,977	23.29
No. 3	3,884	6.47
No. 4	Estimated 4,000 died	..

served in 10 percent formaldehyde. Random samples were taken from each pond to compare survival and growth between the two species (See Tables III, IV, V, VI).

TABLE III—SURVIVAL PERCENTAGES AND GROWTH RATES
OF STRIPED BASS AND HYBRIDS.

POND 1

Total fish in pond	5,326
Total fish in sample	459
Percent sample is of total	8.62%
Number hybrids in sample	301
Number striped bass in sample	158
Percent hybrids in sample	65.58%
Percent striped bass in sample	34.42%
Probable error	1.48%
Number of hybrids in pond	3,493
Number of striped bass in pond	1,833
Survival rate of hybrids	11.64%
Survival rate of striped bass	6.11%
Mean length of hybrids	43.45 mm
Mean length of striped bass	34.48 mm
Difference	8.97 mm
Range in size	Hybrids. 30-85 mm
	Striped bass 27-48 mm

TABLE IV—SURVIVAL PERCENTAGES AND GROWTH RATES
OF STRIPED BASS AND HYBRIDS.

POND 2

Total fish in pond	13,977
Total fish in sample	704
Percent sample is of total	5.04%
Number of hybrids in sample	467
Number of striped bass in sample	237
Percent hybrids in sample	66.34%
Percent striped bass in sample	33.66%
Probable error	1.21%
Number of hybrids in pond	9,272
Number of striped bass in pond	4,705
Survival rate of hybrids	30.91%
Survival rate of striped bass	15.68%
Mean length of hybrids	45.77 mm
Mean length of striped bass	41.38 mm
Difference	4.39 mm
Range in size	Hybrids. 35-72 mm
	Striped Bass 36-50 mm

TABLE V—SURVIVAL PERCENTAGES AND GROWTH RATES
OF STRIPED BASS AND HYBRIDS.

POND 3

Total fish in pond	3,884
Total fish in sample	398
Percent sample is of total	10.25%
Number of hybrids in sample	336
Number of striped bass in sample	62
Percent hybrids in sample	84.42%
Percent striped bass in sample	15.58%
Probable error	1.21%
Number of hybrids in pond	3,279
Number of striped bass in pond	605
Survival rate of hybrids	10.93%
Survival rate of striped bass	2.02%
Mean length of hybrids	59.7 mm
Mean length of striped bass	49.6 mm
Difference	10.1 mm
Range in size	Hybrids. 42-87 mm
	Striped Bass 44-56 mm

TABLE VI—MEAN SURVIVAL PERCENTAGE AND MEAN GROWTH RATES OF STRIPED BASS AND HYBRIDS FOR THREE PONDS.

Total fish	23,187
Total sample	1,561
Number hybrids in sample	1,104
Number striped bass in sample	457
Percent hybrids in sample	70.72%
Percent striped bass in sample	29.28%
Probable error	0.78%
Number of hybrids in ponds (Total)	16,398
Number of striped bass in ponds (Total)	6,789
Survival rate of hybrids	18.22%
Survival rate of striped bass	7.54%
Mean length of hybrids	49.38 mm
Mean length of striped bass	40.11 mm
Difference	9.27 mm
Range in size	Hybrids..... 30-87 mm
	Striped bass 27-56 mm

To separate the specimens in each sample, each fish was examined under magnification.

CONCLUSION

The total number of striped bass and hybrid fry stocked was based on a volumetric count, therefore, a certain deviation of error is probable. However, with the survival of hybrids ranging from 10.9% to 30.9% as compared to 2.0% to 15.6% for striped bass this difference is significant enough to say the hybrids appear to have a higher survival rate under competitive conditions.

The mean length of hybrids ranged from 43.45 mm to 59.7 mm in the three ponds with the mean length of striped bass ranging from 34.48 mm to 49.6 mm which indicates the hybrid growth is faster under competitive conditions for the time period of this study.

Why the total survival ranged from 8.8% and 6.4% in two ponds and was 23.2% in another is unknown. It is interesting to note that in Pond 2 where the survival was 23.2%, the mean total lengths were higher than in Pond 1 where the survival was 8.8%.

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