

CHARACTERISTICS FOR DISTINGUISHING WHITE BASS, STRIPED BASS AND THEIR HYBRID (STRIPED BASS × WHITE BASS)¹

by

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ABSTRACT

Previously reported meristics, made from small specimens of these fishes, were found to be inadequate for positive identification; therefore, new methods and means of measurement were investigated. Measurements were taken from 214 white bass *Morone chrysops* (Rafinesque), 224 striped bass *Morone saxatilis* (Walbaum), and 204 hybrids (striped bass × white bass) from six upstate South Carolina reservoirs. The fish were from numerous year classes and both sexes. Specimens ranged in length from 127mm. to 889mm. and weighed from 23 grams to 8,172 grams. Fork length/body depth and body depth/head length ratios plus type of tooth patches on tongue indicate positive means of identification.

INTRODUCTION

In 1965-66, a new fish was created and later introduced into South Carolina waters. This new fish was not a product of natural occurrence. It was the result of a dream and of carefully laid plans for its creation.

This new fish, now commonly referred to as the "Hybrid," was the progeny of a white bass male and a striped bass female, and its introduction into the state's waters was enthusiastically greeted by South Carolina fishermen.

These introductions and the hybrids' rapid growth to trophy size soon indicated a pressing need for a positive means of distinguishing this fish from the white bass and the striped bass. As the first hybrids approached five pounds, both state and world fishing records for white bass were threatened, and after the weight of five pounds was surpassed, the conflict was with the striped bass.

Identification needs even more pressing arose from creel limit regulations and subsequent enforcement. Enforcement officers were unsure in identification, therefore cases of exceeding creel limits regarding these three fishes were (and are) disallowed in court. This results in great numbers of these introduced species being harvested as yearlings upon confusion with white bass.

Because of the large size the hybrid has attained (the state record is 14 pounds, 9 ounces) it might understandably be misidentified as a striped bass. This is especially true when the most often used field method of identification by the fisherman is the presence of broken lines. This could be termed the "broken line syndrome" in which any fish of this genus, if it has even the faintest hint of a broken line or chain-like effect, is automatically deemed a hybrid. Early in the development of the hybrid, this prominent feature was observed and rightly considered a possible identifying characteristic. Unfortunately, this was done before it was noted that on numerous occasions the striped bass, and the white bass also, exhibit this characteristic. Although most hybrids have the broken line pattern—some to a pronounced degree on one or both sides—even the faintest hint of misalignment on many striped bass and white bass has led to their being called hybrids.

At this time no white bass should be confused for a record size hybrid; however, there still exists the possibility that a small hybrid could be misidentified as a white bass, even a record white bass. Therefore, readily identifiable characteristics of the three fishes are considered imperative.

The white bass is the smallest of the three fishes with a relatively small head, well-arched back and flat body. Colors range from light green to gray with body stripes or lines indistinct.

The striped bass is the largest species in this genus with the South Carolina record being 55 pounds. Typically, this fish has a large head and mouth combined with a cylindrical, torpedo-shaped body. Colors range from dark gray to almost blue above the lateral line to silver below. Lines or stripes are distinct and occasionally broken and the back is not arched.

The hybrid has the deep, flat body; the small head and the distinct back-arch of the white bass. This is combined with the dark gray or blue and silver body coloration and distinct stripes (frequently broken) of the striped bass.

Thus there are obvious external differences between these three fishes when viewed together; however, these differences are, at best, subtle and not so obvious when the fish are viewed separately. Previously recorded meristic data and measurements for this hybrid, in South Carolina,

were taken from small specimens kept in hatchery facilities. Although these counts were used to distinguish small specimens (Bayless 1971), they do not continue to be adequate for distinction among larger fishes. No meristic data have been published previously for larger, reservoir-reared hybrids in South Carolina.

For the purpose of comparison similar meristic counts and measurements were made for the white bass and the striped bass. The envisioned result of the study was the discovery of readily identifiable characteristics for these fishes to be made available to fishermen, biologists and law enforcement officials.

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MATERIALS AND METHODS

Specimens of all three fishes were collected from six upstate South Carolina reservoirs in the course of various other studies. Data were taken from 214 white bass, 224 striped bass and 204 hybrids. All measurements of each fish were made to the nearest millimeter and weights were made to the nearest gram.

The device used for all measurements other than scale counts was a standard metric fish-measuring-board with a sliding brass arm. The board was altered to accept, at the head, a device to determine the angle of two body points and the center of the eye. Head length—including opercular membrane, total lengths and fork lengths were made in the usual manner (Fig. 1). Body depth was determined by placing the fish on its right side, head forward, with ventral surface against the head of the board. The fish was pushed into the board to a depth that allowed the point of the sliding brass arm to rest at the most anterior point of the base of the first dorsal spine. A perpendicular line from this point to the ventral surface gives a body depth measurement from a fixed and precise point (Fig. 2). This can be duplicated with each fish and is not dependent upon subjective judgement of greatest body depth. It appears that this measurement is influenced neither by seasonal or sexual disparity.

Angular measurements included angles formed by the center of the eye (E), and the anterior base of various fins of the body—first dorsal (D1), second dorsal (D2), pectoral (P1), anal (A), and pelvic (P2). Angles measured were: D1ED2, D2EP1, P1EA, AEP2 and D1EP2.

Differences in body conformation suggested possible skeletal disparity, and a comparison of one x-ray of each fish was made.

Since obvious differences exist between meristic counts for the small hatchery-reared fish and the larger reservoir specimens, all the usual measurements and counts were made according to guidelines established by Hubbs and Lagler (1970).

RESULTS AND DISCUSSION

Meristic data were taken from a total of 642 fish. Their size range—length and weight—is shown in Table 1. Results of the various methods and materials utilized for identification follow.

Upon examination of the few x-rays made no readily discernible differences were apparent, at least none that would facilitate external identification.

Meristics such as scale counts, ray counts, relative lengths of second anal spine and coloration did not offer valid or conclusive results.

The results obtained from the various angular measurements overlapped to the extent that this approach for positive identification was abandoned. Although only a measurement of a portion of the body depth at various points, these measurements might possibly be valid when restricted to similar size groups.

Characteristics that did offer means for distinguishing among the three fishes are shown in Table 2.

White bass are readily distinguished from striped bass (Table 2), and with the single patch of teeth on the tongue, plus general appearance, white bass should be separable from hybrids, even in the smaller fish. Findings reveal that white bass have a single patch of teeth, either rounded or heart

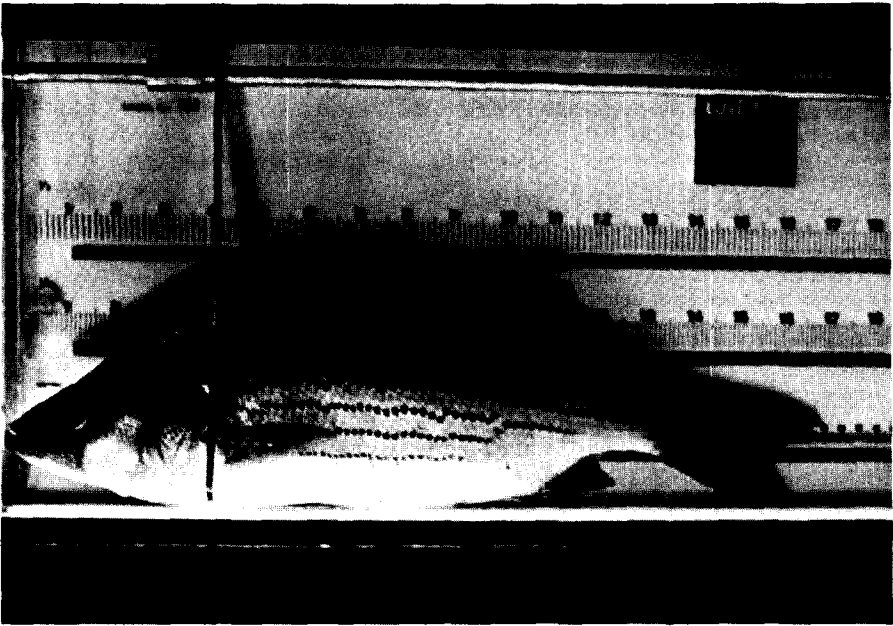


Figure 1. Head length measurement using standard fish measuring board with sliding arm.

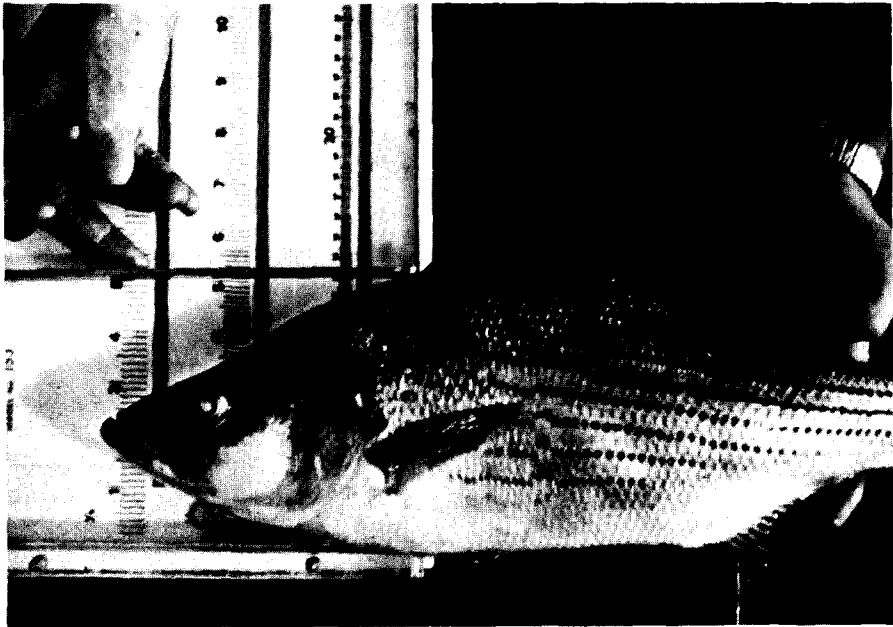


Figure 2. Body depth measurement from fixed points using fish measuring board with sliding arm.

Table 1. Number and size (length and weight) of fishes measured by species.

<i>Species</i>	<i>Number</i>	<i>Mean length (mm) and range</i>	<i>Mean weight (g) and range</i>
White bass	214	319 (127—447)	483 (23—1290)
Striped bass	224	462 (260—889)	1307 (208—8172)
Hybrid	204	450 (235—729)	1414 (176—6605)

Table 2. Characteristics of white bass, striped bass and their hybrid from six upstate South Carolina reservoirs.

<i>Species</i>	<i>Fork Length/ Body Depth Mean and Range</i>	<i>Body Depth/ Head Length Mean and Range</i>	<i>Teeth on Tongue</i>
White bass	3.477 (3.00—3.955)	1.198 (1.015—1.473)	One patch
Striped bass	4.440 (4.018—5.316)	0.893 (0.731—0.983)	Two patches
Hybrid	3.468 (3.082—3.987)	1.158 (1.048—1.323)	Two patches

shaped, which, (although it may have a line scribed through it) is not clearly separated as in the other two fishes. Striped bass and hybrids exhibit two separate, elongated patches of teeth in the middle of the tongue, which in larger individuals are usually divided by a space equal to or greater than the width of one patch of teeth. The two ratios in Table 2, fork length/body depth (Ratio 1) and body depth/head length (Ratio 2), indicate a positive means of identification for both striped bass and hybrids.

Ratio 1 describes the greater body depth of the hybrid in relation to the fork length than that of the striped bass. Conversely, Ratio 2 indicates the greater head length of the striped bass in relation to the body depth than that of the hybrid. Ratio 2, despite the near equivalence of mathematical expression, was for the striped bass always less than 1.000 and for the hybrid always greater than 1.000. With one exception all striped bass had for Ratio 1 values greater than 4.000 and were well within established parameters.

The exception is thought to be an error in either measurement or recording, therefore, using these ratios, precise measurements are essential. Otherwise, little confidence can be placed in the validity of these characteristics.

Although body shape, coloration and markings of all three fishes appear distinctly different when viewed together, definite and positive means of identification are essential when venturing into the realm of identifying fish for records or creel limits.

It is therefore felt, that by making precise measurements at constant points of reference, the characteristics depicted in Table 2 should, in most cases, prove a positive means of identification among these fishes.

Even so, such precise measurements will most likely have to be made by properly equipped biologists. Fishermen and law enforcement officers, in the field, will probably not be able to effectively determine the identifying ratios, at least to the satisfaction of the court. Therefore, introduction of hybrids into waters containing striped bass and/or white bass will likely continue to present identification problems regarding trophy fish and creel regulations.