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Ichthyological Notes

SHRINKAGE OF TROUT AT DEATH AND ON PRESERVATION.—In studies on the growth of trout based on dead or preserved specimens, it is often desirable to know the length of the fish when it was alive. To compute this live length, a correction factor must be applied to the measurements taken from the dead or preserved material, to compensate for the shrinkage occurring during rigor mortis, or during preservation. To determine the value of the correction factors, some trout were measured alive, and again after rigor mortis had set in. Others were measured alive, again after they had been in approximately 10% formalin (4% formaldehyde solution) for varying periods of time, and once again after varying periods of preservation in approximately 70% alcohol. The procedure in preserving specimens was as follows: the specimens were killed and hardened in formalin solution, which was later poured off; they were then merely rinsed in water and kept in the alcohol solution without further changes until the third measurements were taken. This procedure is more or less similar to that customarily employed in preserving fish specimens.

SHRINKAGE DUE TO RIGOR MORTIS.—156 brook trout (*Salvelinus fontinalis*) varying in total length from 2.75 inches to 10.125 inches were seined on October 30, 1935, from the North branch of the Au Sable River, Crawford County, Michigan, measured alive, and allowed to die. After being kept three hours in a cardboard box in a room having a temperature of 66° F. they were measured again. The average total length of the live fish was 5.38 inches, and of the fish in rigor mortis, 5.24 inches. These figures indicate an average shrinkage of 0.14 inches in length, or 2.6%, and call for the use of a correction factor of 1.027 in order to compute the live length when the rigor-mortis length

alone is known. The considerable shrinkage of trout during rigor mortis has an obvious bearing on legislation and law enforcement.

SHRINKAGE FOLLOWING PRESERVATION.—84 brook trout (*Salvelinus fontinalis*) and 7 brown trout (*Salmo trutta*) were each measured 3 different times to determine the shrinkage caused by preservation. From these measurements the correction factors were computed. The results of these studies are shown below:

First and second experiments, using 38 brook trout and 7 brown trout taken June, 13, 1935:

Species	Brook Trout	Brown Trout
Average total length when alive, in inches	6.73″	6.59″
After 109 days in 10% formalin	6.37″	6.25″
Average shrinkage in formalin	0.36″	0.34″
Correction factor to determine live length from formalin specimens	1.057	1.054
After 117 additional days in 70% alcohol	6.38″	6.21″
Average shrinkage in alcohol	—0.01″	0.04″
Correction factor to determine length in formalin from length in alcohol	0.998	1.006
Total shrinkage after 226 days of preservation in formalin and alcohol	0.35″	0.38″
Correction factor to determine live length from alcohol specimens	1.055	1.061

Third experiment, using 46 brook trout taken November 9, 1935:

Average total length when alive, in inches	7.56″
After 22 days in 10% formalin	7.23″
Average shrinkage in formalin	0.33″
Correction factor to determine live length from formalin specimens	1.046
After 65 additional days in 70% alcohol	7.18″
Average shrinkage in alcohol	0.05″
Correction factor to determine length in formalin from length in alcohol	1.007
Total shrinkage after 77 days of preservation in formalin and alcohol	0.38″
Correction factor to determine live length from alcohol specimens	1.053
Correction factor to determine live length from alcohol specimens, as computed from all 3 experiments (weighted average)	1.054

The correction factor, 1.054, is greater than usually given by the few workers who have heretofore computed such a correction; for instance Van Oosten,[1] who found a correction factor of 1.016 to hold for the lake herring, *Leucichthys artedi* (Le Sueur). This circumstance is probably due to the fact Van Oosten and others determined the shrinkage of dead specimens on preservation, and thus did not consider the shrinkage due to rigor mortis.—DAVID S. SHETTER, *Institute for Fisheries Research, University of Michigan, Ann Arbor, Michigan.*

[1] Bull. U. S. Bur. Fish., 44, 1928 (1929): 273.

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Shrinkage Due To Rigor Mortis. -- 156 brook trout (Salvelinus fontinalis) varying in size from 2.75 inches to 10.125 inches total length were seined on October 30, 1935, from the North Branch of the Au Sable River, Crawford County, Michigan, measured alive, and allowed to die. After being kept three hours in a cardboard box in a room having a temperature of 66° F. they were measured again. The average total length of the live fish was 5.38 inches, and of the fish in rigor mortis, 5.24 inches. These figures indicate an average shrinkage of 0.14 inches in length,

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