

CONVERSIONS BETWEEN TOTAL, FORK, AND STANDARD LENGTHS FOR LINGCOD, *OPHIODON ELONGATUS*

THOMAS E. LAIDIG, PETER B. ADAMS, KELLY R. SILBERBERG,
and HEIDI E. FISH

National Marine Fisheries Service
Southwest Fisheries Science Center
3150 Paradise Drive
Tiburon, California 94920

Although lingcod, *Ophiodon elongatus*, is an important commercial and recreational species (Silberberg and Adams 1993), there is a lack of consistency in the units used to record length. Total length, fork length, and standard length have all been used, but data were produced that are not easily comparable. Here, we present relationships between total length, fork length, and standard length for lingcod.

All measurements were from specimens collected off central California. Adult and subadult lingcod were collected from the recreational lingcod fishery from Pt. Año Nuevo to Pt. Reyes. Pelagic juveniles were collected from midwater trawls conducted from Pt. Sur to Pt. Reyes. Benthic juveniles were collected in San Francisco Bay using beach seines and bottom trawls. Total length was measured from the anterior tip of the lower jaw to the posterior tip of the longest rays of the caudal fin. Fork length was measured from the anterior tip of the lower jaw to the posterior end of the shortest caudal ray. Standard length was measured from the anterior tip of the lower jaw to the posterior end of the hypural bone.

Linear regressions of the form $y = \text{slope}(x) + (\text{y-intercept})$ were estimated using non-linear least squares (Systat 1996) for all combinations of measurements (Table 1, Fig. 1). All regressions were highly significant ($r^2 > 0.999$). We found no significant difference in the regression slopes between males and females (ANOVA for homogeneity of slopes). To use the data, place the corresponding variables into the above formula. For example, to determine the standard length of a 684-mm total length lingcod, use the following equation:

$$\text{Standard length} = 0.873(684 \text{ mm}) + 0.3 \text{ mm} = 597.4 \text{ mm.}$$

Table 1. Length parameters for linear regressions computed between total length, fork length, and standard length for lingcod.

	Slope	y-intercept (mm)	Sample size	Size range (mm)	MSE
Fork length from total length	0.981	-0.521	619	23-1046	8.029×10^7
Total length from fork length	1.019	0.562	619	23-1046	8.301×10^7
Standard length from total length	0.873	0.308	578	23-933	4.986×10^7
Total length from standard length	1.145	-0.286	578	23-933	6.532×10^7
Standard length from fork length	0.889	0.884	555	23-933	4.989×10^7
Fork length from standard length	1.124	-0.942	555	23-933	6.275×10^7

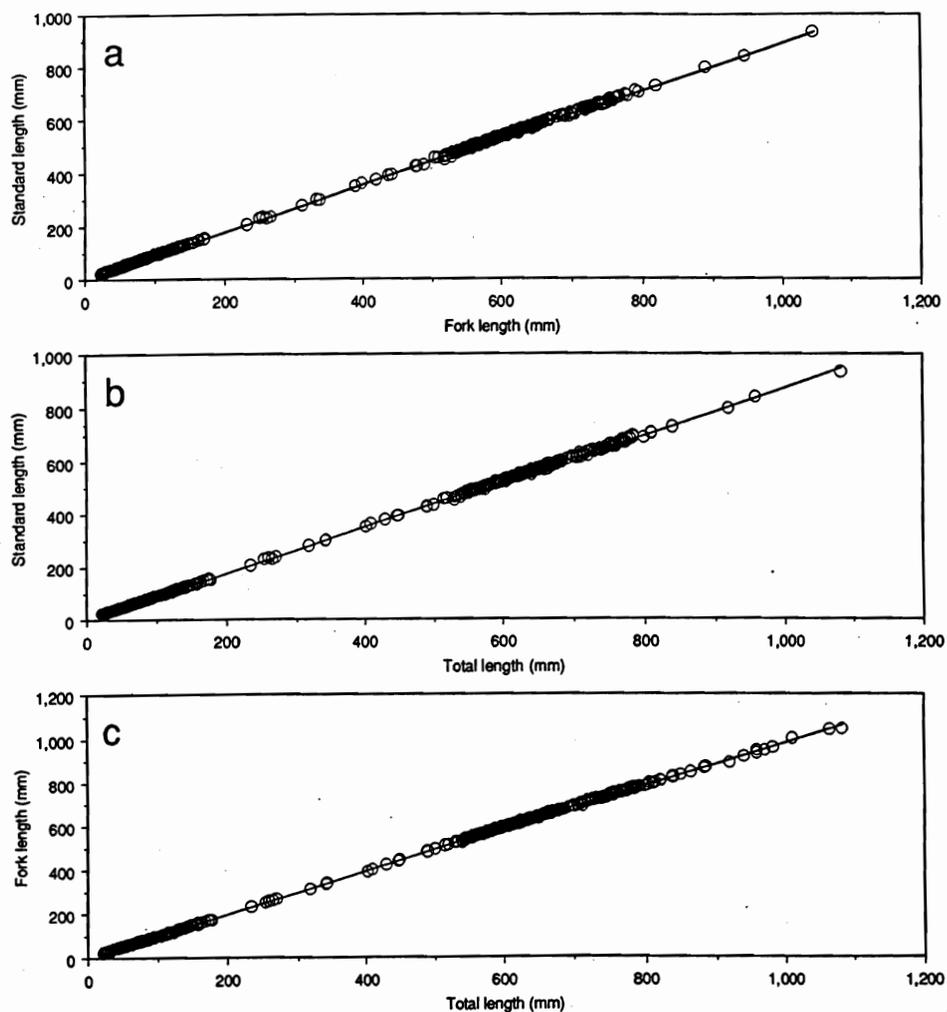


Figure 1. Plots of (a) standard length and fork length, (b) standard length and total length, (c) and fork length and total length for lingcod. Open circles represent measured values. Solid lines indicate predicted values from the two linear regressions created between the independent and dependent variables (from Table 1). The two lines are so similar that they appear as one.

LITERATURE CITED

- Silberberg, K.R. and P.B. Adams. 1993. A comparison of the recreational and commercial fisheries for lingcod (*Ophiodon elongatus*) off the Pacific Coast of the United States, and a description of the recreational lingcod fishery. United States Department of Commerce, National Oceanic and Atmospheric Administration, Technical Memorandum, NMFS, NOAA-TM-NMFS-SWFSC-193.
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Received: 27 March 1997

Accepted: 12 July 1997