LENGTH AND WEIGHT CONVERSION EQUATIONS FOR BLUEFIN TUNA FROM THE EASTERN MEDITERRANEAN SEA

P. Peristeraki[1], G. Tserpes[1], C. Koutsikopoulos [2], G. Katselis[2] and A. Kallianiotis[3]

SUMMARY

This paper presents empirical estimators (equations) for conversion among different measures of size (length or weight) for bluefin tuna from the eastern Mediterranean Sea. These equations that allow conversions from upper jaw fork length to gilled-gutted weight and from pectoral fin-fork length to dressed weight, are based on data from the Greek fisheries exploiting the Ionian, Aegean and Levantine seas.

RÉSUMÉ

Le présent document fournit des estimateurs empiriques (équations) pour la conversion au sein de diverses mesures de taille (longueur ou poids) du thon rouge de l'est de la Méditerranée. Ces équations qui permettent des conversions de la longueur maxillaire supérieur-fourche en poids éviscéré et sans branchie et de la longueur nageoire pectorale-fourche en poids manipulé sont fondées sur les données des pêcheries grecques qui exploitent les mers ionienne, Egée et du Levant.

RESUMEN

Este documento presenta estimadores empíricos (ecuaciones) para las conversiones entre diferentes mediciones de talla (longitud y peso) para el atún rojo del Mediterráneo oriental. Estas ecuaciones que permiten realizar conversiones de longitud de mandíbula inferior a peso eviscerado y sin agallas y desde longitud de aleta pectoral a horquilla a pesco canal se basan en datos de las pesquerías griegas que explotan los mares de Levante, Egeo y Jónico.

KEY WORDS

Length-weight relationships, bluefin tuna

1. INTRODUCTION

Bluefin tuna (*Thunnus thynnus* L.) catches are landed in different condition (dressed, gilled–gutted e.t.c) in the various Mediterranean fisheries. As the necessary for fisheries monitoring size measurements (length, weight) are usually obtained from landed fish, there is a need for conversion equations among different measures that would allow size comparisons among areas, fisheries etc. Previously developed length-weight relationships allow conversions from fork length (FL) to round weight (RWT) and they are based on data from east Atlantic (Rey and Cort, unpublished; cited in ICCAT 1990) and Mediterranean landings (Arena, unpublished; cited in ICCAT 1990; Srour, 1993). The present work intends to present conversion factors for the Mediterranean bluefin tuna, based on data obtained from the Greek fisheries, which exploit the eastern Mediterranean Sea. Estimators were obtained for converting upper jaw-fork length (UJFL) to gilled-gutted weight (GWT) and pectoral fin-fork length (PFFL) to dressed weight (DWT).

[1] Institute of Marine Biology of Crete, Iraklion, Greece. e-mail:notap@imbc.gr.
[2] University of Patras, Dept. of Biology, Patras, Greece.
[3] Fisheries Research Institute of Kavala, Nea Peramos, Greece.

2. MATERIALS AND METHODS

A total of 226 UJFL (cm) – GWT (kg) and 341 PFFL (cm) – DWT (kg) measurements were obtained from the various Greek bluefin tuna fisheries operating in the Aegean, Ionian and Levantine Seas in 2000 and 2001. The term "dressed weight" refers to gilled and gutted animals without head. The commonly used, for describing length-weight relationships, exponential model ($W = a L^b$) was fitted to the observations and the model parameters were estimated by means of traditional least squares regression.

3. RESULTS AND DISCUSSION

Tables 1 and **2** present details and parameter estimates of the fitted models. Graphic presentations of the estimated length-weight relationships are given in **Figures 1** and **2**. A search in the relevant literature failed to detect any similar length-weight relationships for the east Atlantic- Mediterranean bluefin tuna stock as the existing equations refer only to the fork length-round weight relationship (Rey and Cort, unpublished; cited in ICCAT 1990; Arena, unpublished; cited in ICCAT 1990; Srour, 1993). ICCAT scientists suggest the use of specific month equations for the west-Atlantic stock (ICCAT, 1990) as the fish condition factor varies within the year due to various physiological and environmental reasons. It is normal to assume that the same would be valid for the east Atlantic-Mediterranean stock. Unfortunately, the available data set was rather short; thus did not allow comparisons among months and the development of month specific length-weight relationships. Until further data are obtained the present equations should be considered as preliminary and used in the absence of time specific models.

4. ACKNOWLEDGEMENTS

This study has been carried out with the financial assistance of the European Commission (DG FISH - Study Projects 98/045 and 00/044)

LITERATURE CITED

ICCAT, 1990. *Field Manual for Statistics and Sampling Atlantic Tunas and Tuna-like Fishes.* 3rd edition, Madrid, Spain.

SROUR, A., 1993. Relation taille-poids et composition en tailles des captures du thon rouge *(Thunnus thynnus)* de la Mediterranee Marocaine. ICCAT, Coll. Vol. Sci. Pap. XL(1): 155-156.

Table 1. Coefficients of the equation $GWT=aUJFL,^b$, used for predicting bluefin tuna GWT (kg) from UJFL (cm) for the eastern Mediterranean Sea.

Sample size	*Length range (cm)*	R^2	*a*	*b*
226	73-282	0.91	0.0001	2.5984

Table 2. Coefficients of the equation $DWT=aPFFL,^b$, used for predicting bluefin tuna DWT (kg) from PFFL (cm) for the eastern Mediterranean Sea.

Sample size	*Length range (cm)*	R^2	*a*	*b*
341	71-175	0.92	0.0003	2.5322

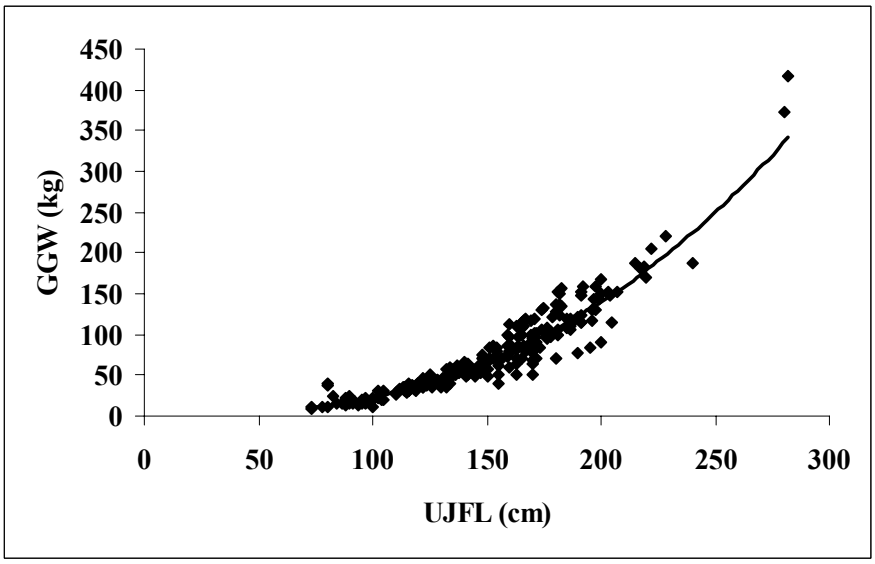

Figure 1. UJFL-GWT relationship for bluefin tuna from the Eastern Mediterranean Sea.

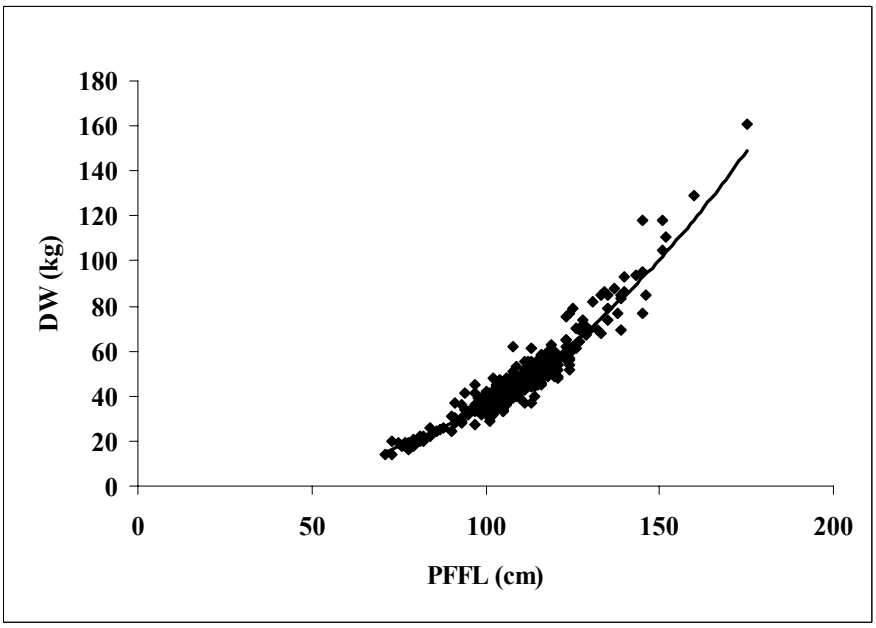

Figure 2. PFFL-DWT relationship for bluefin tuna from the Eastern Mediterranean Sea.