FACTORS FOR CONVERSION OF FIN WEIGHT INTO ROUND WEIGHT FOR THE BLUE SHARK (*PRIONACE GLAUCA*)

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SUMMARY

In 2001 ICCAT recommended that the SCRS should conduct assessments for Atlantic shortfin mako and blue sharks in 2004, and hold an interim meeting, as SCRS considers necessary, to determine needed improvements in data collection. This includes update conversion factors used to estimate the round weight corresponding to the blue shark (Prionace glauca) products currently being exported (fins). This paper reports factors for the conversion of fins weight into round weight for the blue shark caught in the central-eastern Atlantic Ocean (Azores EEZ) by the Portuguese long-liners targeting swordfish.

RÉSUMÉ

En 2001, l'ICCAT a recommandé que le SCRS effectue en 2004 des évaluations du stock de requin taupe bleue et de requin peau bleue de l'Atlantique, et tienne une réunion intérimaire, s'il le jugeait nécessaire, pour déterminer la nécessité d'améliorer la collecte de données. Ceci prévoyait l'actualisation des coefficients de conversion utilisés pour estimer le poids vif correspondant aux produits de requin peau bleue (Prionace glauca) actuellement exportés (ailerons). Le présent document signale les coefficients de conversion du poids des ailerons en poids vif pour le requin peau bleue capturé dans l'océan Atlantique Centre-Ouest (ZEE des Açores) par les palangriers portugais ciblant l'espadon.

RESUMEN

En 2001, ICCAT recomendó que el SCRS realizase en 2004 evaluaciones para la tintorera y el marrajo dientuso del Atlántico, y que celebrase mientras tanto una reunión, ya que el SCRS considera que es preciso definir las mejoras necesarias para la recopilación de datos. Esto incluye la actualización de los factores de conversión utilizados para estimar el peso en vivo correspondiente a los productos de tintorera (Prionace glauca) exportados actualmente (aletas). Este documento presenta factores para la conversión del peso de las aletas a peso en vivo para la tintorera capturada en el océano Atlántico centro-oriental (ZEE de Azores) por los palangreros portugueses que dirigen su actividad al pez espada.

KEYWORDS

Blue-shark, Prionace glauca, Fish conversion factors, Fins weight vs round weight

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1. Introduction

During its November 2001 meeting, the International Commission for the Conservation of Atlantic Tunas (ICCAT) stated that "SCRS should conduct assessments for Atlantic shortfin mako and blue sharks in 2004, and hold an interim meeting in 2003, as SCRS considers necessary to determine improvements needed in data collection". During the SCRS meeting of 2003, it was decided that the Sub-Committee on By-Catches would conduct assessments of Atlantic blue shark (*Prionace glauca*) and shortfin mako shark (*Isurus oxyrinchus*) in 2004. Although this is the primary objective for the meeting, National scientists should make every effort to fill in the identified gaps. Among others, particular attention was recommended to be paid to reporting the conversion factors that are necessary for calculating round weight.

Off Portugal the blue shark is mainly caught by surface long-line. Although the fishing effort is primarily targeting swordfish, this is a multi-specific fishery, where the blue shark is the most important by-catch species. In the first years of the fishery blue shark was discarded at sea without being discriminated in the logbooks or in the catch statistics. The fins were collected to be exported to Asian markets, while the remain body parts were usually discarded back to the sea. However, during last decade the landings and the reports in the logbooks of pelagic sharks have increased, reflecting a change in marketing of these species and the increasing interest of the international markets by shark products.

The present study represents a further contribution to the knowledge of conversion factors from fins weight into round weight for the blue shark. To the authors' best knowledge, limited attention has been given to these species, by Portuguese researchers. The available studies concern short studies on the biology and aspects of the blue shark fishery in the Azores area (Silva & Pereira 1998; Simões 1998; Silva *et al.* 2000; Santos *et al.* 2001). Particular studies concerning conversion factors for sharks are also scarce (Boggs & Curran 1999; Mejuto and Garcia-Cortes 2003).

2. Materials and methods

The data reported in the present study was collected within the Portuguese observer program for the long-line mainland based fleet targeting swordfish, between October 2003 and May 2004. A total of 99 individuals were sampled. All these were caught in ICCAT fishing area 94B, in the Azores EEZ. Individual round weighting was determined with a top loading digital balance to an accuracy of 0.1 kg. All fins (1st and 2nd dorsal, pectorals, anal, pelvic and caudal) from each specimen were separately weighted (wet weight), by means of a digital balance to an accuracy of 0.001 kg. Their extraction was done with a knife, following fishermen current practice, near the base of each fin with a minimum muscle quantity (see **Figure 1**).

3. Results and discussion

The results obtained in the estimation of different round weight - fins weight relationships for the blue shark, along with several sample descriptive statistics, are given in **Table 1**. The obtained plots are shown in **Figures 2 to 7**. It is worthy of note that the results presented here might be used only on a preliminary basis, as they were obtained from a small sample corresponding mostly to relatively small fish (round weight < 30 kg). However, the determination coefficients are high for most cases, the exception being that for the pelvic fin ($r^2 < 0.75$).

In terms of the relative percentage of fin weight we found a mean value of 6.6% for the overall fins. This value is almost the same (6.5%) to that reported by Mejuto and Garcia-Cortes (2003) for the same species in Spanish fisheries. It is also similar (6%) to that found by Rose and McLoughlin (2001) in Australian fisheries. However, Anon (1973, *in* Rose and McLoughlin 2001) reported substantial different values, of 2.1% for the same body type of weight, and 3.7% for the carcass (dressed) weight. These inconsistencies may result from the fact that not all fleets remove all fins, or that the former authors used a different dressing criteria. Although, the later value corresponds approximately to the sum of the ratios for the dorsal and caudal fins (3.79%) obtained in the present study. However, this might be speculative and just a coincidence, as we do not have any evidence of such practice, being most common the removal of the larger fins (caudal, pectoral and dorsal).

The most widely referred ratio in fisheries literature and used as the basis for most shark finning regulations is 5% of wet fin weight to 95% dressed (gutted and beheaded) carcass weight, or 2% of wet fin weight to 98% whole shark (round or live) weight. However, some discrepancies in fin:body weight ratios were found arising from the differences in the ways in which fins are removed from the body (Rose & McLoughlin 2001).

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Table 1. Descriptive statistics and fin wet weight – round weight relationships parameters for blue shark. N - sample size; RWT – round weight (kg); min - minimum; max - maximum; SD - standard deviation; SE - standard error; Equation refer to the linear regression: R*WT* = *a* + *b* ?F, where *a* is the obtained constant, *b* is the slope, ?F is one of the following fins: FF – for overall fins; DF – for dorsal fins; PecF – for pectoral fins; PelF – for pelvic fins; AF – for anal fins; CF – for caudal fins. CI - confidence interval.

Relationship	*N*	*RWT mean ± SD (RWT min - L max)*	*?F mean ± SD (W min - W max)*	*Equation*	*Determination coefficient (r^2)*	*SE of b * (95% C.I. of b)*	*Mean % of fin weight (± SD)*
RWT – FF weight	99	20.3 ± 11.8 (3.8 – 98.0)	1.5 ± 0.8 (0.219 - 5.996)	RWT= - 0.315 + 14.09 FF	0.929 (*P*<0.0001)	0.0860 (2.6423 - 2.9856)	6.564 (0.747)
RWT – DF weight	66	20.7 ± 13.8 (3.8 – 98.0)	0.138 ± 0.083 (0.018 – 0.537)	RWT= 0.386 + 147.39 DF	0.870 (*P*<0.0001)	7.123 (133.16 - 161.62)	0.663 (0.141)
RWT – PecF weight	66	20.7 ± 13.8 (3.8 – 98.0)	0.484 ± 0.294 (0.061 – 2.020)	RWT= - 0.339 + 43.387 PecF	0.941 (P<0.0001)	1.360 (40.671 - 46.103)	2.319 (0.327)
RWT – PelF weight	66	20.7 ± 13.8 (3.8 – 98.0)	0.072 ± 0.041 (0.006 – 0.236)	RWT= 0.874 + 275.723 PelF	0.735 (P<0.0001)	20.713 (234.344 - 317.103)	0.354 (0.099)
RWT – AF weight	66	20.7 ± 13.8 (3.8 – 98.0)	0.021 ± 0.015 (0.003 – 0.097)	RWT= 3.742 + 790.176 AF	0.841 (P<0.0001)	42.952 (704.370 – 875.983)	0.104 (0.030)
RWT – CF weight	66	20.7 ± 13.8 (3.8 – 98.0)	0.634 ± 0.358 (0.113 – 2.569)	RWT= - 2.070 + 35.863 CF	0.953 (P<0.0001)	0.990 (33.884 - 37.841)	3.124 (0.345)

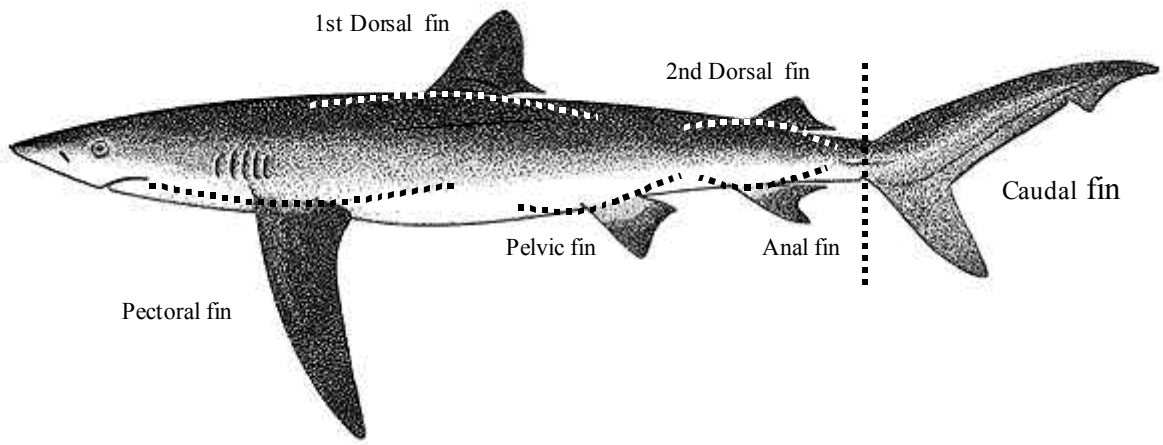

Figure 1. Blue shark finning (adapted from Compagno, 1984).

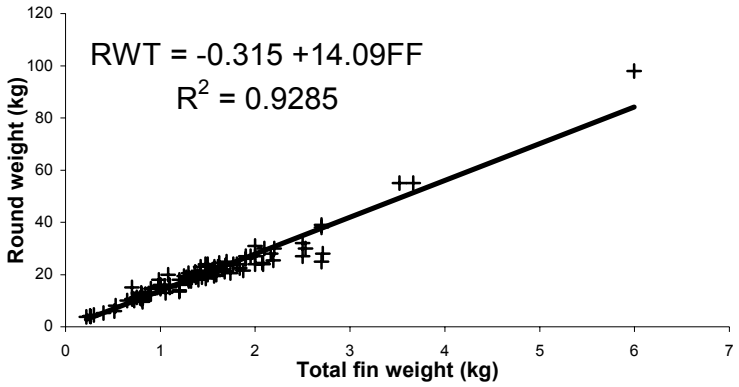

Figure 2. Plot of the round weight *vs.* total fin wet weight and adjusted curve obtained in the present study.

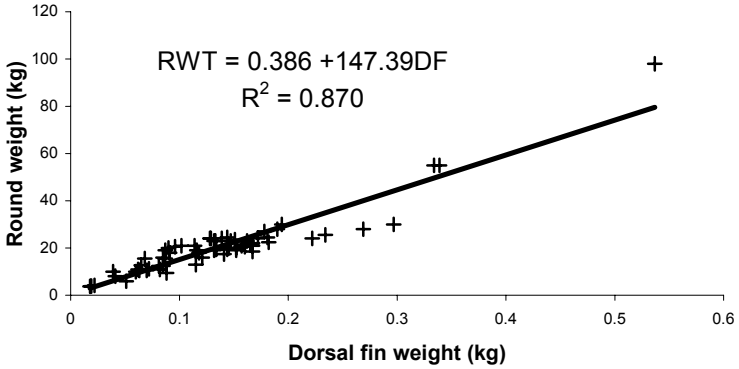

Figure 3. Plot of the round weight *vs.* dorsal fin wet weight and adjusted curve obtained in the present study.

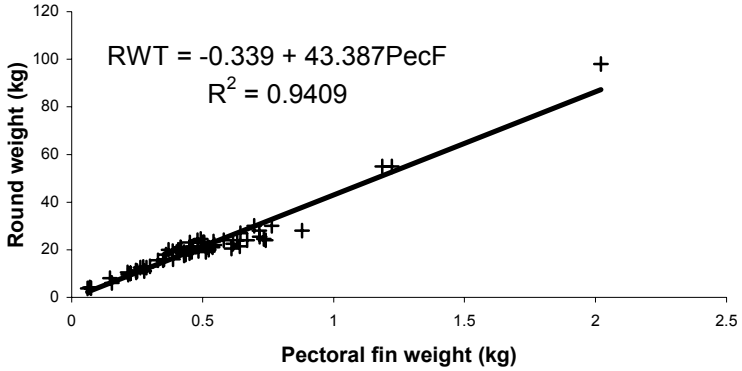

Figure 4. Plot of the round weight *vs.* pectoral fin wet weight and adjusted curve obtained in the present study.

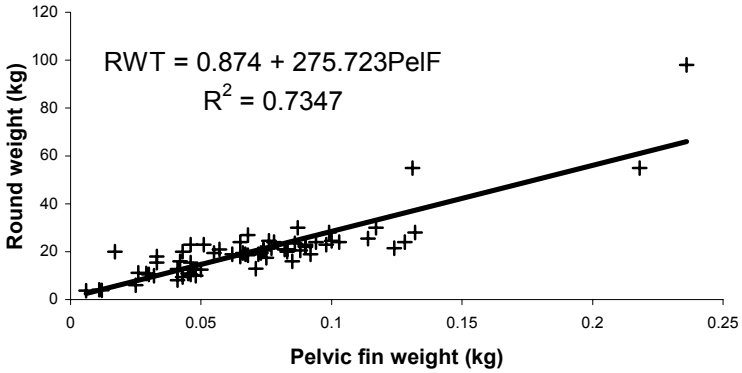

Figure 5. Plot of the round weight *vs.* pelvic fin wet weight and adjusted curve obtained in the present study.

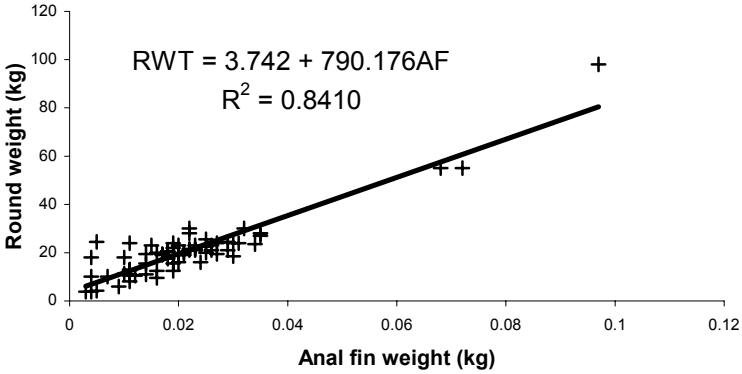

Figure 6. Plot of the round weight *vs.* anal fin wet weight and adjusted curve obtained in the present study.

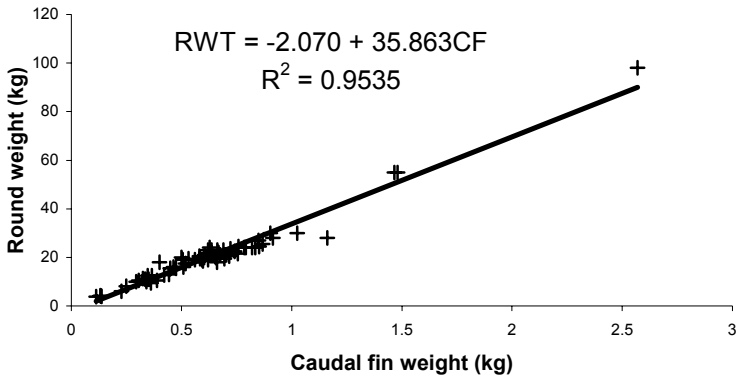

Figure 7. Plot of the round weight *vs.* caudal fin wet weight and adjusted curve obtained in the present study.